ATTACHMENTS

ORDINARY COUNCIL

Wednesday 20 February 2019

PORT MACQUARIE HASTINGS COUNCIL

Ordinary Council Meeting
Wednesday, 20 February 2019

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1 Leadership and Governance

20/02/2019

What we are trying to achieve

A community that works together in decision making that is defined as ethically, socially and environmentally responsible.

What the result will be

We will have:

- A community that has the opportunity to be involved in decision making
- Open, easy, meaningful, regular and diverse communication between the community and decision makers
- Partnerships and collaborative projects, that meet the community's expectations, needs and challenges
- Knowledgeable, skilled and connected community leaders
- Strong corporate management that is transparent

How we will get there

1.1 Inform and engage with the community about what Council does using varied communication channels
1.2 Maintain strong partnerships between all stakeholders - local, state and federal — so that they are affective advocates for the community
1.3 Demonstrate leadership
1.4 Use innovative, efficient and sustainable practices
1.5 Ensure strong corporate and financial management that is transparent and accountable

PORT MACQUARIE-HASTINGS COUNCIL

Governance

Action Created
Meeting Date: **19/04/2004 - Council Meeting**

Item 19
Subject MAYOR - DELEGATED AUTHORITIES
Director BJS/LK

To consider the authorities to be delegated to the Mayor.

RECOMMENDATION
That the authorities listed in the report be delegated to Councillor Rob Drew as Mayor.

Discussion

Section 226 of the Local Government Act, 1993, specifies that the role of the Mayor is to:

- exercise, in the cases of necessity, the policy-making functions of the governing body of the Council between meetings of the Council
- to exercise such other functions of the Council as the Council determines
- to preside at meetings of the Council
- to carry out the civic and ceremonial functions of the Mayoral office.

At present, the Mayor has the following delegated authorities:

"1. Exercise general oversight of the performance of the General Manager.

2. In conjunction with the General Manager, to authorise the issuing of Media Releases.

3. Authorise any work which, in his opinion, is urgent, at a cost not exceeding $10,000 and ensure that the account for such work is submitted for payment by Council in the same way as other accounts for goods and services against the Council.

4. At any meeting of the Council, remove or cause the removal of any member of the Council, who after warning, is guilty of disorder, and at the same or any subsequent meeting, exclude or remove such member unless he/she apologises without reservation.

5. To limit the number of persons within the Council Chambers in order to prevent any obvious overcrowding.

6. Offer rewards up to $5,000 for information leading to the conviction of any person causing wilful damage to public property.

7. Authorise the introduction of water restrictions.

8. Offer rewards in cases of lighting fires.

9. To allocate funds from the "Mayoral Sporting Fund" following consultation with the

Mayoral Sporting Fund Allocation Working Party".

COUNCIL RESOLUTION:
Resolved: (Intemann/Mayne)

That the authorities listed in the report be delegated to Councillor Rob Drew as Mayor.

Local Government Act 1993
Current version for 8 January 2019 to date (accessed 22 January 2019 at 07:36)
Chapter 12 Part 3 Section 377

377 General power of the council to delegate

(1) A council may, by resolution, delegate to the general manager or any other person or body (not including another employee of the council) any of the functions of the council under this or any other Act, other than the following:
(a) the appointment of a general manager,
(b) the making of a rate,
(c) a determination under section 549 as to the levying of a rate,
(d) the making of a charge,
(e) the fixing of a fee,
(f) the borrowing of money,
(g) the voting of money for expenditure on its works, services or operations,
(h) the compulsory acquisition, purchase, sale, exchange or surrender of any land or other property (but not including the sale of items of plant or equipment),
(i) the acceptance of tenders to provide services currently provided by members of staff of the council,
(j) the adoption of an operational plan under section 405,
(k) the adoption of a financial statement included in an annual financial report,
(l) a decision to classify or reclassify public land under Division 1 of Part 2 of Chapter 6,
(m) the fixing of an amount or rate for the carrying out by the council of work on private land,
(n) the decision to carry out work on private land for an amount that is less than the amount or rate fixed by the council for the carrying out of any such work,
(o) the review of a determination made by the council, and not by a delegate of the council, of an application for approval or an application that may be reviewed under section 82A of the *Environmental Planning and Assessment Act 1979*,
(p) the power of the council to authorise the use of reasonable force for the purpose of gaining entry to premises under section 194,
(q) a decision under section 356 to contribute money or otherwise grant financial assistance to persons,
(r) a decision under section 234 to grant leave of absence to the holder of a civic office,
(s) the making of an application, or the giving of a notice, to the Governor or Minister,
(t) this power of delegation,
(u) any function under this or any other Act that is expressly required to be exercised by resolution of the council.

(1A) Despite subsection (1), a council may delegate its functions relating to the granting of financial assistance if:
(a) the financial assistance is part of a specified program, and
(b) the program is included in the council's draft operational plan for the year in which the financial assistance is proposed to be given, and
(c) the program's proposed budget for that year does not exceed 5 per cent of the council's proposed income from the ordinary rates levied for that year, and
(d) the program applies uniformly to all persons within the council's area or to a significant proportion of all the persons within the council's area.

(2) A council may, by resolution, sub-delegate to the general manager or any other person or body (not including another employee of the council) any function delegated to the council by the Departmental Chief Executive except as provided by the instrument of delegation to the council.

(3) A council may delegate functions to a joint organisation only with the approval, by resolution, of the board of the joint organisation.

ATTACHMENT A

**JOINT ORGANISATIONS & NSW GOVERNMENT
COLLABORATION FUNDING PROPOSAL**

Proposal

1. **That the NSW Government provide ongoing funding of $300K per annum for each Joint Organisation commencing in 2019/2020, indexed with the rate peg or CPI.**

2. **That a 4-year funding agreement be developed with agreed performance measures between the NSW Government and each Joint Organisation.**

1. Background

In November 2017 the NSW Government passed legislation to establish Joint Organisation's (JOs) of Councils in NSW and JOs were proclaimed throughout 2018. Eighty-five Councils have resolved to become members of a JO with membership numbering three councils up to ten. The NSW Government provided Establishment Funding of $300,000 to each of the 13 JOs at the commencement of 2018-19. Recognising their unique challenges, additional funding packages have been provided to the Far North West and Far South West JOs.

At this stage, beyond the establishment funding there has been no commitment by the NSW Government towards ongoing operational funding. JOs have maintained that there are significant ongoing operational costs to meet the basic level of service required by a JO; including delivery of the three prescribed *core functions*:

- To establish strategic regional priorities
- To provide regional leadership
- To undertake intergovernmental collaboration

In addition to the above, there are significant governance, administration and statutory reporting requirements associated with the operation of an entity under the Local Government Act.

It is now recognised through the network of JOs that there is a growing concern in relation to the ongoing financial viability of JOs and the level of financial commitment required from member Councils. NSW Legislation and policy maintains that membership of a Joint Organisation is voluntary. The capacity of a JO to attract new members is limited under the Legislation by regional planning boundaries and the voluntary nature of the Legislation.

Joint Organisations seek advice from the NSW Government by mid-February 2019 in respect of the operational funding to allow for timely budget planning and each Board to make it decision regarding resourcing for 2019/20.

Development of this proposal has involved consultation with Executive Officers and Chairs of the JOs. It has been identified, except for one, all other Joint Organisations are strongly in support of the NSW Government providing operational funding.

2. Joint Organisations – Example Operating Budget

Joint Organisations will vary in size and nature and the cost of their structure will depend on what activities the JO chooses to undertake. However, there is a basic level of resources required to deliver the benefits of the *core functions* to its member Councils and the NSW Government.

Example budgets for JOs with different staffing levels and expenses to operate as a fully independent entity has been costed between $410,000 - 690,000 per annum as detailed in the **Appendix.**

This does not include the funding of strategic projects which would need to be separately funded. Different funding options will be assessed against the average figure of $550K.

3. Funding Options for an average JO Operational Budget

a. **Fully Council funded**
- 10 Councils - Cost $55K per Council
- 3 Councils - Cost $183K per Council

Neither of these contributions are sustainable. The acceptable level of contribution will vary between Councils however experience indicates that contributions that exceed $25K per annum per council will be difficult for endorsement by the member councils.

b. **NSW Government funded**
The full funding of the operational budget by the NSW Government will provide financial sustainability and will provide the opportunity for Councils to direct their resources towards strategic projects.

c. **Shared Funding Arrangement Council-NSW Government**
50/50 shared funding - Joint Organisation $275K
- 10 Councils - Cost $27.5K per Council
- 3 Councils – Cost $92K per Council

With a 50/50 shared arrangement of funding operational costs the ongoing financial viability of JOs remains problematic. To be financially viable JOs would need to reduce operational costs or find additional income.

d. **Collaboration Funding Provision of $300K by NSW Government**
Provision of annual ongoing funding of $300K will provide base funding for the JOs to determine how they will set up to be financially sustainable in the long term. This is considered a minimum amount in order to be sustainable. The annual cost to the NSW Government, based on $300,000 for each of the thirteen JOs, would be $3.9 million in the first year and then indexed annually by either CPI or rate peg.

4. Funding Agreement

a. **Timeframe**
An operational funding agreement needs to operate for several years to give surety to all parties in regard to planning projects and resources. It is suggested that any funding agreement be developed for a 4-year term to coincide with the NSW government election cycle.

b. Performance Measurement

To demonstrate that the NSW Government is receiving *value for money* in relation to operational funding then there needs to be appropriate *performance measures* developed. This will enable each JO to report back to its member Councils as well as the NSW Government. It would be expected that these *performance measures* would be created around the core functions of the JO. The actual performance measure would vary between each JO as the goals and objectives are likely to vary considerably. It is therefore considered important the *performance measures* be negotiated with each JO.

5. Benefits of Operational Funding from NSW Government

- Will demonstrate support from the NSW Government.
- Will allow the employment of enough resources and a skilled and experienced Executive Officer to make JOs functional and develop a sustainable business model.
- Will create an environment of certainty in relation to staff tenure.
- Undue financial contribution pressure on member Councils may lead both the councils and the community to question the value proposition of the JO.
- Will alleviate immediate pressure from some JOs which are now currently questioning the ability to suitably resource the JO due to the small membership.
- There is a reduced risk of JO failure due to inadequate performance if it is adequately resourced.
- Adequate resourcing will increase the probability of establishing effective partnerships with the NSW Government and other stakeholders to deliver inter-governmental collaboration and initiatives.
- Adequate resourcing will increase the chance that JOs will be a successful vehicle to implement change.
- Will encourage continued enthusiasm for success of the JO by member councils.
- Will alleviate the view amongst some local government representatives that the creation of JOs is another cost shifting exercise by the NSW Government.

6. Conclusion

Although the Establishment Funding provided by the NSW Government of $300,000 was welcomed and is acknowledged, this funding will not sustain the basic level of resources required to deliver the core functions of a Joint Organisation beyond the first year.

Sustained investment in Joint Organisations by the NSW Government will allow the continued development of the strong relationships required to build sustainability in the JO Network to deliver outcomes for regional and rural NSW.

The NSW Government should provide annual operational funding to each joint organisation with:

- minimum of $300K per annum, indexed annually
- funding provided for 4 years, considering the election cycle
- performance measures be developed with each Joint Organisation
- provision of annual funding be subject to meeting agreed performance measures.

Twelve out of the 13 Joint Organisations have indicated a need for the provision of ongoing operational funding for Joint Organisations.

APPENDIX

Example Joint Organisation Annual Operating Budget

As each Joint Organisation operates in a different context as such there is a range of operating budgets required to accommodate delivery of the prescribed core functions of a JO. As such, two budget examples are provided to demonstrate these differences with an average of $550K p.a. used in the funding options assessment.

Expenses Budget	Org. A ($)	Org. B ($)
Executive Officer	185,000	200,000
Government Relations Officer	-	150,000
Admin Officer	55,000	70,000
Employee Oncost	50,000	85,000
Vehicle	15,000	30,000
Accounting Services	10,000	20,000
Telephone / Internet / Website	7,000	7,000
Travelling	3,000	3,000
Office Rental	25,000	25,000
Advertising	1,500	10,000
Legal Costs / Audit fee	20,000	20,000
Printing / Stationery / Postage	9,000	9,000
Utilities / Office consumables	20,000	20,000
Conferences / Meetings	5,100	15,000
Accommodation	1,000	6,000
Technical Support (HIR/IT/GOV)	2,400	10,000
Accommodation (regional Board meetings)	1,000	10,000
Total Administration Expenses	**$410,000**	**$690,000**

Midnorth Coast Joint Organisation of Councils FY 20

Financial Statement

17-Jan-19

Income Statement	Reporting Period: 28 Nov 18 to 31 Dec 18	YTD
Income		
Office of Local Government	-	($300,000.00)
Bank interest	($120.72)	($178.69)
Total Income	($120.72)	($300,178.69)
Expenses		
Meeting Costs	-	$1,071.66
Executive Officer Support	-	$23,610.00
Developing Strategy	$8,134.28	$8,134.28
Total Expenses	$8,134.28	$32,815.94
Net Profit/Loss	($8,013.56)	$267,362.75

Bank Statement Reconciliation	Reporting Period: 28 Nov 18 to 31 Dec 18	YTD
Opening Balance at Bank:	$275,376.31	$0.00
Income Banked	$120.72	$300,178.69
Expenses paid from account	($8,134.28)	($32,815.94)
Closing Balance at Bank:	$267,362.75	$267,362.75
Less commitments not yet paid		
UTS - Research Services:- why local Govt matters	($75,400.00)	($75,400.00)
Net Cash available as at 31-Dec-2018	$191,962.75	$191,962.75

Strengthening local government

Office of Local Government

Circular to Councils

Circular Details	19-02 / 8 February 2019 / A635365
Previous Circular	*18-43 Council decisions on the administration of the September 2020 elections*
Who should read this	Councillors / General Managers / Council Governance Staff
Contact	Council Governance Team / 02 4428 4100 / olg@olg.nsw.gov.au
Action required	Information

IPART review of the costs of conducting local government elections and extension of the deadline for councils to make a decision on the administration of their elections

What's new or changing?

- The Government has approved a review by the Independent Pricing and Regulatory Tribunal (IPART) of the costs of conducting local government elections in NSW. The matters for consideration under the review's terms of reference are provided in the attachment to this circular.
- The purpose of IPART's review is to ensure a robust methodology for determining costs is applied, in order to minimise the financial burden on councils and ratepayers and to ensure local government elections are conducted efficiently and cost effectively.
- IPART has been requested to report to the Minister for Local Government recommending a costing methodology to be applied in determining the amount the NSW Electoral Commissioner (NSWEC) charges councils to administer their ordinary elections.
- In undertaking its review, IPART is expected to consult with relevant stakeholders including councils.
- IPART is to report to the Minister for Local Government by **30 August 2019**.
- As the outcomes of the IPART review may impact on the administration of the September 2020 council elections, it is proposed to introduce legislation in the first parliamentary sitting period of 2019 following the NSW State Election to amend the *Local Government Act 1993* (the LGA) to extend the deadline for councils to make a decision on the administration of their elections under sections 296AA and 296. This deadline will be extended to **1 January 2020**.

What this will mean for your council

- Under the proposed amendments, councils will have until **1 January 2020** to resolve to make a decision on the administration of their elections and enter into any arrangements with the NSWEC.

Key points

- Under section 296AA of the LGA, councils must, at least 18 months before each ordinary council election, resolve to either enter into an election arrangement with the NSWEC to administer its elections or that elections are to be administered by the council's general manager.

- Under section 296(3)(b), where a council enters into an election arrangement with the NSWEC, the arrangement must be entered into no later than 15 months before the ordinary council elections.
- Under section 296(5), councils can enter into an election arrangement for the NSWEC to administer an ordinary council election less than 15 months before the election if the council has resolved to enter into the election arrangement and the NSWEC is satisfied that there are exceptional circumstances that make it necessary or desirable for the election to be administered by the NSWEC.

Where to go for further information

- Contact OLG's Council Governance Team by telephone on 02 4428 4100 or by email at olg@olg.nsw.gov.au
- Contact the NSW Electoral Commission by telephone on 02 9290 5999.

Tim Hurst
Chief Executive

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Attachment

Matters for consideration under IPART's terms of reference

Matters for consideration
IPART is requested to provide a report to the Minister for Local Government recommending a costing methodology to be applied in determining the amount the NSWEC charges councils which use the NSWEC to administer their ordinary elections.

The purpose of the IPART's review is to ensure a robust methodology for determining costs is applied, in order to minimise the financial burden on councils and ratepayers and ensure local government elections are conducted efficiently and cost effectively.

In undertaking the review, IPART is to:

- review the NSWEC's existing methodology for determining the amount to be charged to councils which use the NSWEC to conduct their elections
- consider whether it is appropriate for the amount charged to be limited to the direct and unavoidable costs of conducting the council's election
- have regard to the market for electoral services in which the NSWEC operates
- have regard to any differences in the costs involved in conducting elections in metropolitan and regional areas
- have regard to any other matters it considers relevant.

Consultation
IPART should consult with relevant stakeholders and NSW Government agencies as part of its review. It may also hold public hearings and publicly release a draft report.

Reporting
IPART is to submit its final report to the Minister for Local Government by Friday 30 August 2019.

PORT MACQUARIE
HASTINGS

Risk Management Framework

May 2007

Version 4.0

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1 Introduction

This document sets out a risk management framework for the Port Macquarie-Hastings Council. It clearly details the aims, objectives and actions required to deliver a best practice approach to integrating risk management into the leadership, business planning, staff culture and operational delivery of all our programs and services, and then to sustain this delivery in an environment of continuous improvement.

The Risk Management Framework should be read in conjunction with Councils Risk Management Policy. The Risk Management Policy defines the responsibilities of all staff in respect to risk management.

1.1 Risk Management – What is it?

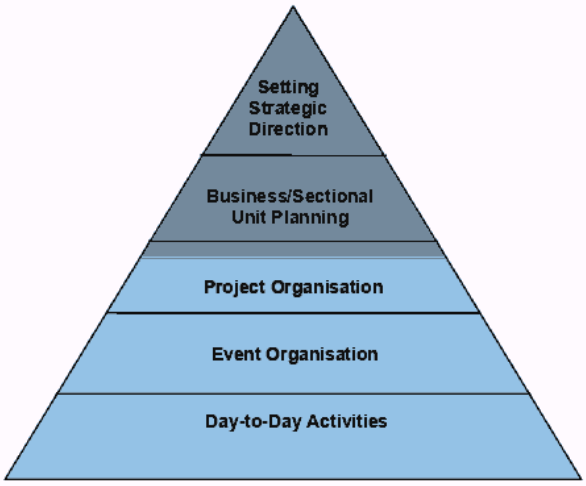
A risk is defined as:

- Any threat that can potentially prevent Council from meeting its objectives; or
- Any opportunity that is not being maximised by the Council to meet its objectives.

Risk is inherent in all our activities and we need to be continuously managing risks using a formal systematic process of identifying, evaluating, treating, monitoring and communicating risks associated with any activity, function or process.

Managing risk is an integral part of good business practice. Effectively managing risk enables managers to improve outcomes by identifying and analysing a wide range of issues and by providing a systematic way to make informed business decisions. A structured risk management approach also enhances and encourages the identification of greater opportunities for continuous improvement through innovation. The objective is not to eliminate all risk but to ensure that risk is managed at an acceptable level in a cost effective manner.

It should be recognised that risk management may be applied at all levels of Council activities as indicated below:



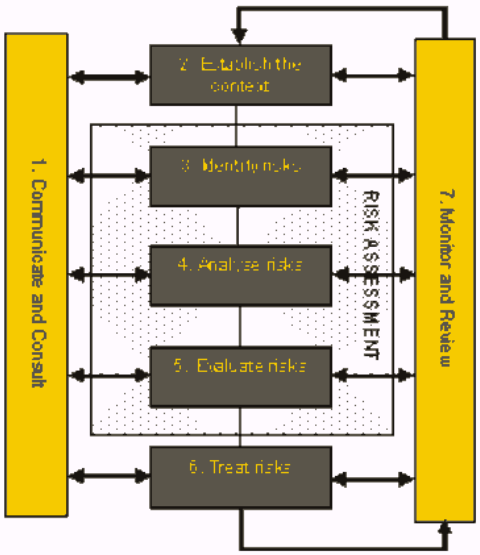
1.2 Aim

The aim of the **Risk Management Framework** is to:

- Provide staff and management with a systematic and formalised process for identifying and managing risk;
- Ensure a consistent approach to risk management is adopted across Council;
- Ensure risks are identified and effectively managed using appropriate internal controls;
- Allow resource allocation towards risk mitigation controls to be considered during strategic planning and business plan development;
- Provide appropriate documentation standards, resources, tools and reporting systems;
- Develop an organisational ethos and operating culture, which achieves the integration of the risk management process into all staff and management activities.

2 Risk Management Process

The process for managing Council's risks is consistent with the Australian Risk Management Standards AS/NZS 4360:2004. It involves seven key steps and some additional steps to ensure feedback through a monitoring and review process and appropriate communication and consultation.



(AS/NZS 4360:2004)

A 'Risk Management Reference Sheet' that summarises the following risk management process can be found in Appendix A.

2.1 Step 1: Communicate & Consult

Communication and consultation are important elements in each step of the risk management process. Effective communication is essential to ensure that those responsible for implementing risk management, and those with a vested interest, understand the basis on which risk management decisions are made and why particular actions are required.

It is important that the communication approach recognises the need to promote risk management concepts across all management and staff.

2.2 Step 2: Establish the Context

Establishing the context defines the basic parameters within which risks must be managed and sets the scope for the rest of the risk management process. The context includes the Council's external and internal environment.

External Context

Establishing the External Context is not only about considering the external environment, but also includes the relationship or interface between the Council and its external environment. This may include:

- Business, social, regulatory, cultural, competitive, financial and political environment;
- Industry trends and practices;
- Council's strengths, weaknesses, opportunities and threats; and
- External stakeholders.

Establishing the external context is important to ensure that stakeholders and their objectives are considered when developing risk management criteria and that externally generated threats and opportunities are properly taken into account.

Internal Context

An understanding of Council is important prior to undertaking the risk management process, regardless of the level. Areas to consider include:

- Culture;
- Strategic Drivers;
- Internal stakeholders;
- Structure;
- Capabilities in terms of resources such as people, systems,
- Processes, capital; and
- Goals and objectives and the strategies that are in place to achieve them.

Risk Management Context

The level of detail that will be entered into during the risk management process must be considered prior to commencement. The extent and scope of the risk management process will depend on the goals and objectives of the Council activity that is being addressed, as well as the budget that has been allocated to that activity.

In each instance, consideration must also be given to the roles and responsibilities for driving and undertaking the risk management process.

Documentation

For a large project, Step 1 (refer to Page 3) should be documented to demonstrate that all factors have been considered. Documentation may include:

- Scope and intended outcomes of the risk management process;
- Success measures;
- Important elements of the internal and external environment; and
- Relevant Stakeholders.

2.3 Step 3: Identify Risks

The next step in the risk management process is to identify the risks to be managed. Comprehensive identification using a well-structured systematic process is critical, because a risk not identified at this stage may be excluded from further analysis. Identification should include risks whether or not they are under the control of the Council.

A number of questions should be asked when attempting to identify risks. These include:

- What can happen?
- Where could it happen?
- When could it happen?
- Why would it happen?
- How can it happen?

Answering these questions will assist in the generation of a list of risks and events that may have impact on achieving set objectives.

Risk Identification Methods

There are a number of different methods to identify risks, some of which may include:

- Brainstorming sessions with all stakeholders;
- Checklists developed for similar events/projects/activities; and
- An examination of previous events/projects/activities of this type.

Changes in the external and internal environments of local governments may present risks. Monitoring of such changes can facilitate the early identification of unforeseen risks.

Documentation

Where there are a number of risks identified within an activity, all identified risks should be documented in the 'Risk Description' column of the 'Risk Assessment Template', which can be found in Appendix B.

2.4 Step 4: Analyse Risks

Once all risks have been identified, the next step of the risk management process is to analyse the risks. This step involves considering the controls or mitigating activities already in place that reduce the level of risk. These controls or mitigating activities should be identified and documented in 'Existing Controls in place' column of the 'Risk Assessment Template' in Appendix B. Controls may include inspection regimes, Safe Work Method Statements, other documentation of work practices, defining responsibilities and accountabilities, and monitoring and reviewing processes.

This step also involves analysing the positive and negative **consequences** of the risk (i.e. its impact or magnitude of effect), and the **likelihood** that those consequences may occur (i.e. its frequency or probability). The consequence and likelihood are rated against established criteria (refer to Appendix A).

Consequence

When scoring the consequence associated with a risk, consideration needs to be given to its impact in terms of:

- Socio-political & Community Issues;
- Business Impact (including Legal);
- Public Safety; and
- Environment.

The impact scale is rated from "insignificant" to "catastrophic" as indicated in the Consequence Table in the 'Risk Management Reference Sheet' in Appendix A. In determining the overall consequence score, the highest individual score should be applied. The Consequence Table provides specific examples on the types of incidents and their associated impact scale, to assist staff in determining the Consequence rating that applies to the identified risk.

Likelihood

For Port Macquarie-Hastings Council, **likelihood** is rated from "rare" to "almost certain" as indicated in the table below.

Likelihood Rating	Description
E. Almost Certain	Is expected to occur in most circumstances
D. Likely	Will probably occur in most circumstances
C. Possible	Might occur at some time
B. Unlikely	Could occur at some time
A. Rare	May occur only in exceptional circumstances

Documentation

All controls identified should be documented in the 'Controls in place' column of the 'Risk Assessment Template', which can be found in Appendix B.

All risk ratings should be documented in the 'Consequence' and 'Likelihood' columns of the 'Risk Assessment Template', which can be found in Appendix B.

2.5 Step 5: Evaluate risks

The next step in the risk management process is the evaluation of risks. The purpose of this step is to establish an initial risk rating based on the consequence and likelihood levels identified in *Step 4: Analyse risks.*

Risk Impact Matrix

The initial risk rating for each risk is calculated by plotting the likelihood and consequence response scores on the Risk Impact Matrix (refer below) to give a risk rating of Extreme, High, Moderate or Low. This rating provides a measure of the level of risk and will identify the risks that require further treatment in *Step 6: Treat risks.*

Consequence / *Likelihood*		Insignificant	Minor	Moderate	Major	Catastrophic
		1	2	3	4	5
Almost Certain	**E**	Moderate	High	High	Extreme	Extreme
Likely	**D**	Low	Moderate	High	Extreme	Extreme
Possible	**C**	Low	Low	Moderate	High	Extreme
Unlikely	**B**	Low	Low	Low	High	Extreme
Rare	**A**	Low	Low	Low	Moderate	High

All risks with an initial rating of "Extreme" or "High" will require additional controls. Moderate and Low risks may be excluded from the implementation of additional controls at managements discretion. However, the rationale for not implementing additional controls for these risks should be documented to demonstrate the completeness of evaluation undertaken. This should be documented in the 'Additional Controls to be put in place' column of the 'Risk Assessment Template' (Appendix B).

Documentation

The risk rating should be documented in the 'Rating' column of the 'Risk Assessment Template'.

2.6 Step 6: Treat Risks

The next step of the risk management process involves identifying a range of options for treating risks, evaluating the options and developing additional controls for implementation.

Selecting the most appropriate option involves balancing the costs of implementing each option against the benefits derived from it. It is important to consider all direct and indirect costs and benefits whether tangible or intangible. Specific issues that may be considered in making decisions about options are listed below:

Decision Making Issues relating to Treatment of risks

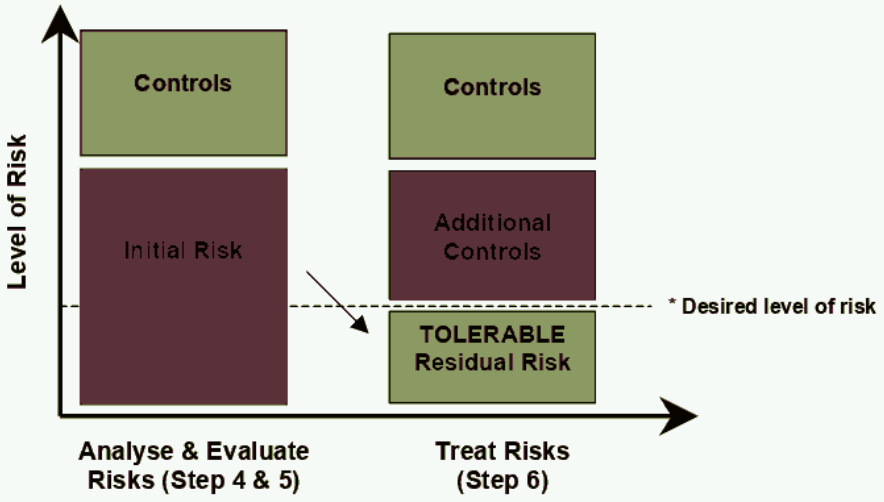
Acceptability	Is the option likely to be accepted by relevant stakeholders?
Administrative efficiency	Is this option easy to implement or will it be neglected because of difficulty of administration or lack of expertise?
Compatibility	How compatible is the treatment with others that may be adopted?
Continuity of effects	Will the effects be continuous or only short term? Will the effects of this option be sustainable? At what cost?
Cost effectiveness	Is it cost effective, could the same results be achieved at a lower cost by other means?
Economic and social effects	What will be the economic and social impacts of this option?
Effects on the environment	What will be the environmental impacts of this option?
Equity	Are risks and benefits distributed fairly e.g. do those responsible for creating the risk pay for its reduction?
Individual freedom	Does the option deny any basic rights?
Jurisdictional authority	Does this level of government have the authority to apply this option? If not, can higher levels be encouraged to do so?
Leverage	Will the treatment options lead to additional benefits in other areas?
Objectives	Are Council's objectives advanced by this option?
Regulatory	Does the treatment (or lack of treatment) breach any regulatory requirements?
Political acceptability	Is it likely to be endorsed by the relevant government authority? Will it be acceptable to communities?
Risk creation	Will this treatment introduce new risks?
Timing	Will the beneficial effects be realised quickly?

The objective is not to eliminate all risk but rather to ensure that the risk is maintained at a tolerable level in a cost effective manner.

It should also be recognised that the risk treatment itself may introduce new risks that need to be identified, assessed, treated and monitored.

Residual Risk

Based on the additional controls put in place, *Step 4: Analyse risks* should be conducted again, to establish a revised/residual risk rating. The extent to which additional controls are required is determined by level of tolerable ***residual*** risk with which Council is comfortable. This is demonstrated by the following:



***Acceptable level of risk, or at a level which cannot be removed / cost effectively controlled.**

Documentation

Additional controls should be documented in the 'Additional Controls to be put in place' column of the 'Risk Assessment Template' in Appendix B. Steps 4 and 5 should then be repeated to evaluated the revised tolerable risk rating which can also be documented in the 'Risk Assessment Template'.

Based on the revised risk rating, each additional control to be implemented should then be prioritized. This number can be recorded in the 'Priority' column of the 'Risk Assessment Template'.

The following two columns of 'Responsibility' and 'Timeframe' should then be completed to indicate the staff member responsible for ensuring the additional controls are implemented in the specified timeframes. In this case, the timeframe should be documented as an end date (e.g. 1 July 2007) rather than a timeframe (e.g. 2 weeks).

2.7 Step 7: Monitor and Review

It is important to understand that the risk management process is a continual one. It is essential to incorporate ongoing monitoring and review procedures into all Council activities in order to capture any new risks arising from changing business circumstances and to review implementation of current risk mitigation strategies. Any risks rated 'Extreme' or 'High' should be monitored on a regular basis to ensure that the rating assigned, controls identified, and treatment plans established remain valid.

3 Risk Management Tools

3.1 General Risk Management

All standard risk assessments conducted on everyday activities, functions or events of Council can be documented in the tools described in Section 2: Risk Management Process. The tools highlighted in the explanation of this process are as follows:

- Appendix A – Risk Management Reference Sheet
- Appendix B – Risk Assessment Template
- Appendix C – Event Risk Assessment

3.2 Risk Management System

Council is still investigating which risk management system will be used internally across the organisation. This decision will be based around ease-of-use and ease-of-accessibility.

3.3 Strategic Risk Review

A process will be developed whereby sectional risks are incorporated into each Council sections annual business plan. These risks will then be collated and reviewed by the Risk Management Committee in an effort to identify the key risks facing Council at a corporate level. Through this process, all of the risks identified as being of strategic or corporate significance will be considered during the establishment of the following years Internal Audit Plan *(*refer to *Section 4.1: Internal Audit).*

3.4 Project / Event Risk Management

Whenever a new program or activity is established within Council, the 'Project / Event Risk Management Plan' (refer to Appendix C) can be used in order to conduct a risk assessment. This tool is similar to that used for the standard risk assessment however it also provides assistance in identification of risks, and highlights a number of common risk management areas that need to be addressed when establishing a new program/project or coordinating an event.

4 Risk Management Elements

Risk management is not just about the risk assessment process. There are many other areas that also incorporate risk management principles. These areas include, amongst others, Internal Audit, Insurance, Emergency Management, Business Continuity Planning, Disaster Recovery Planning and Occupational Health & Safety.

4.1 Internal Audit

The Internal Audit Committees role in risk management is to provide assurance that management has identified key risks and is managing them appropriately. As referred to in *Section 3*.3 above, all of the risks identified as being of strategic or corporate significance will be considered during the establishment of the following years Internal Audit Plan. Changes in Council's risk profile will need to be reflected in the Internal Audit Plan.

4.2 Insurance

Insurance is a means of arranging funding for particular types of losses in return for paying a premium. This is just one way Council addresses the risk of possible lack of financial resources to pay for damage to property and other consequential costs.

Areas covered by insurance include public liability, professional indemnity, personal accident (to employees and volunteers), income protection, hirer's liability, workers compensation, motor vehicles, and assets and buildings.

4.3 Emergency Management

Community Emergency Response Plan

TBA

Disaster Recovery Plans

Council has acknowledged the requirement to develop and implement Disaster Recovery Plans for Councils major infrastructure. These plans are in place to minimise the impact of a major disruption and are developed to enable a rapid resumption of critical business functions and support operations within Council. These plans also ensure that Council can continue to deliver critical business services to the community during the period of an emergency / crisis situation.

4.4 Occupational Health and Safety

Occupational Health and Safety (OH&S) is an element of risk management in that it addresses risks facing employees conducting their everyday activities. OH&S is the responsibility of all staff but is managed by the Human Resources section of Council and is not an area that is explained in detail for the purposes of the Risk Management Framework. For further information on OH&S practices within the Port Macquarie-Hastings Council, please contact the Safety Officer.

5 Appendix A – Risk Management Reference Sheet

PORT MACQUARIE
HASTINGS

Risk Management Reference Sheet

Risk Management Defined
Risk Management is defined as the systematic application of management policies, practices, and procedures to the task of identifying, analysing, assessing, treating and monitoring risk. Essentially it involves anticipating what can go wrong, why and what can be done.

Risk Management does not mean that risks can be prevented or avoided completely. Rather it enables us as an organisation to reduce the impact of risk to an acceptable level; be informed with our decision-making, and to make contingency arrangements. For further information, please refer to the Risk Management Framework.

So what is a risk?
Anything that can prevent the Council from achieving its objectives or an opportunity that is not being maximised by Council to meet its objectives.

The level of risk relates to the likelihood of something happening (i.e. its frequency or probability) and the potential consequences i.e. its impact or magnitude of effect. The level of risk is influenced by any controls, or measures, currently in place to minimise the likelihood of the occurrence or its consequences.

Risk Impact Matrix
Risk is measured in terms of consequence and likelihood.

Consequence / *Likelihood*		Insignificant	Minor	Moderate	Major	Catastrophic
		1	2	3	4	5
Almost Certain	**E**	Moderate	High	High	Extreme	Extreme
Likely	**D**	Low	Moderate	High	Extreme	Extreme
Possible	**C**	Low	Low	Moderate	High	Extreme
Unlikely	**B**	Low	Low	Low	High	Extreme
Rare	**A**	Low	Low	Low	Moderate	High

Likelihood
The level of possibility that the Council could be exposed to risk.

Likelihood Rating	Description
E. Almost Certain	Is expected to occur in most circumstances
D. Likely	Will probably occur in most circumstances
C. Possible	Might occur at some time
B. Unlikely	Could occur at some time
A. Rare	May occur only in exceptional circumstances

6 Appendix B – Risk Assessment Template

PORT MACQUARIE
HASTINGS

Risk Assessment

[Function / Activity]

Created By:
Date Created:

Please refer to the Risk Management Reference Sheet (Appendix A) for further information in relation to Risk Ratings

Ref	Risk Description	Existing Controls in place	Consequence	Likelihood	Rating	Additional Controls to be put in place	Consequence	Likelihood	Revised Rating	Priority	Responsibility	Timeframe

7 Appendix C – Project/Event Risk Management Plan

PORT MACQUARIE
HASTINGS

Project / Event Risk Management Plan

Please direct any queries regarding this form to Jennifer Johansson x8682 or Ruth King x8602.

Please use this form in conjunction with the Risk Management Reference Sheet (Appendix A of the Risk Management Framework)

Title:

Date (if applicable):

Organiser:

Location:

Number of Attendees / Participants:

Responsible Manager:

Description of Project / Event:

Has Insurance cover been requested through the Insurance & Risk Section? Yes ☐ No ☐
If No, enquire with Insurance & Risk staff to determine if Insurance cover is required)

Risk Checklist

Question		If YES:
Will there be children present?	Yes ☐ No ☐	▪ Ensure children are supervised ▪ Ensure person facilitating has senior first aid ▪ Ensure person has mandate notification
Will there be alcohol involved?	Yes ☐ No ☐	▪ Ensure liquor license is obtained ▪ Ensure activity does not conflict with any By-Laws (eg. Dry zones) ▪ Ensure Council has approval for event / project ▪ If a large event / project, ensure community consultation has been conducted (eg. Local residents / restaurants)
Are external parties involved?	Yes ☐ No ☐	▪ Ensure proof of public liability insurance is obtained ▪ Ensure there is an agreement of services provided ▪ Ensure third party is appropriately qualified / accredited if applicable ▪ Ensure all amusement rides are registered and check serial numbers
Does the number of people attending exceed 50?	Yes ☐ No ☐	▪ Ensure venue appropriately caters for number of attendees (eg. Toilets, parking, building capacity etc) ▪ Ensure crowd control / security has been organised ▪ If 50 or above, ensure skilled first aid attendants are present ▪ If under 50, ensure First Aid Kit is supplied ▪ Ensure appropriate emergency services are notified of event and preliminary arrangement made if attendance is required (e.g. St Johns, etc)
Will electrical or sporting equipment be present?	Yes ☐ No ☐	▪ Ensure safety aspects of the activity/equipment have been considered ▪ If electrical equipment, ensure safety testing has been conducted on equipment ▪ If external parties equipment, ensure a certificate or proof of testing has been supplied and equipment is tagged
Is the activity to occur on Council owned property?	Yes ☐ No ☐	▪ Ensure adequate maintenance has occurred ▪ If indoors, check with Building Services that venue complies with safety standards

Question		If YES:
		▪ If outdoors, check with Parks & Recreation that reserve has been inspected for safety and that reticulation marking has been undertaken ▪ Ensure all relevant permits have been applied for ▪ Ensure layout / set up of equipment (stage, table, chairs etc) has been provided to ensure adequate space
Are other activities occurring in the vicinity on the same day?	Yes ☐ No ☐	▪ Ensure liaison with other organizers of activity if applicable ▪ Ensure no double booking of property has occurred
Will food or beverages be provided / served?	Yes ☐ No ☐	▪ Ensure Environmental Health Officers been made aware of activity ▪ Ensure that food handlers are aware of food handling and service regulations ▪ Ensure food handling training has been provided to people serving food ▪ Ensure appropriate safety aspects of serving food and beverages have been considered
Will attendees be participating in organised activities?	Yes ☐ No ☐	▪ Ensure safety aspects of the activity/equipment have been considered
TOTAL NO CHECKED 'YES'		**If 'Yes' has been answered for more than 3 questions, a Risk Assessment is required**

Project / Event Risk Management Plan

Risk Assessment

Once the above Event Risk Checklist is complete, please refer to APPENDIX B – Risk Assessment for formal completion.

8 Appendix D – Consequence Table

Impact Scale	Socio-political & Community issues	Business Impact	Public Safety	Environment
1. Insignificant	▪ No adverse effect on public image ▪ Insignificant level of community concern ▪ Negligible adverse impact upon social health and well being of the community which has little or no impact upon established community relationships and links	▪ Low financial loss – impact of less than $5k ▪ Small delays in undertaking routine needs or tasks for ½ day.	▪ No injuries or no significant injuries ▪ Negligible loss or damage to property / infrastructure	▪ Contamination – on-site release immediately contained ▪ Slight, quickly reversible damage to few species.
2. Minor	▪ Minor adverse effect on public image ▪ Minor level of community concern ▪ Minor adverse impact upon social health & well-being of the community that may have a minor impact upon established community relationships & links.	▪ Medium financial loss – impact of between $5k and $20k ▪ Minor impact in undertaking routine needs or tasks for 1 day	▪ First aid treatment required ▪ Minor loss or infrastructure damage	▪ Some minor adverse effects to few species/ ecosystem parts that are short term and immediately reversible
3. Moderate	▪ Moderate adverse effect on public image ▪ Moderate level of community concern ▪ Social health and well being of the community affected by moderately reduced opportunities for participation in community life and/or decision making, moderate incidences of increased isolation etc.	▪ High financial loss – impact of between $20k and $50k ▪ Capability / production impaired, moderate impact on stakeholders & routine needs or tasks for 1 – 3 days. ▪ Minor legal issues, non compliances and breaches of regulation	▪ Medical treatment required ▪ Moderate loss/or infrastructure damage	▪ Contamination – on-site release contained with outside assistance ▪ Temporary, reversible damage, loss of habitat and migration of animal population, plants unable to survive, pollution requires physical removal, land contamination localised and can be quickly remedied
4. Major	▪ Major adverse effect on public image ▪ Significant level of community concern ▪ Social health and well being of the community seriously affected by major community unrest and/or significant breakdown of established community relationships and links.	▪ Major financial loss - impact of between $50k and $100k ▪ Loss of capability, disruption to production, major impact on stakeholders & routine needs or tasks for 3 – 5 days. ▪ Serious breach of regulation with investigation or report to authority with prosecution and/or moderate fine possible	▪ Serious & extensive injuries ▪ Serious structural damage to infrastructure or serious loss of assets	▪ Contamination – off-site release with no detrimental effects ▪ Death of individual animals, large scale injury, loss of keystone species and widespread habitat destruction
5. Catastrophic	▪ Huge effect on public image ▪ Community outrage ▪ Social health & well being of the community hugely affected by major community unrest and/or significant breakdown of established community relationships & links.	▪ Huge financial loss/exposure – impact greater than $100k ▪ Loss of production/capability, failure to meet stakeholders needs for more than 5 days ▪ Projects & programs failure, inability to meet minimum acceptable standards, most objectives not met ▪ Major breaches of regulation, major litigation	▪ Fatalities ▪ Critical loss, irreversible damage property / infrastructure	▪ Toxic release off-site with detrimental effect ▪ Death of animals in large numbers, destruction of flora species, air quality requires evacuation, permanent and wide spread land contamination, irreversible soil erosion or severe compaction, widespread introduction of weeds

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RISK MANAGEMENT POLICY

1. INTRODUCTION

The Port Macquarie- Hastings Council Risk Management Policy describes our commitment to and objectives around managing risks. It explains how responsibility for managing risks is distributed between officers of the organisation.

The policy is enacted through the Risk Management Framework; this includes the Risk Management Risk Management Procedure and various management system processes and procedures.

2. POLICY STATEMENT AND SCOPE

Council is committed to using formal risk management practices as part of effectively undertaking its normal operations. This will be consistent with the risk management principles identified in the current risk management standard AS/NZS ISO 31000.

Council will accept risk in order to achieve or exceed our objectives, provided that we first understand the risks and have managed the risks as necessary.

Council's procedure for managing risks is set out in the Risk Management Procedure. Council will use the Risk Management Procedure across all of its operations. The Risk Management Procedure will include guidance in relation to how risks will be reported and to what organisationally levels.

In accordance with the current AS/NZS ISO 31000 standard all staff will observe the Risk Management Procedure when carrying out their duties.

3. RESPONSIBILITIES AND AUTHORITIES

Elected Council (Mayor and Councillors) are responsible and accountable for:

- the approval of the Risk Management Policy; and
- ensuring the effective implementation of the Risk Management Policy (assisted by its Audit, Risk and Improvement Committee).

The Audit, Risk and Improvement Committee is responsible and accountable to[1]:

- Review whether management has in place a current and comprehensive risk management framework, and associated procedures for effective identification and management of business and financial risks;
- Review whether a sound and effective approach has been followed in developing strategic risk management plans for major projects or undertakings;
- Review the impact of the risk management framework on its control environment and insurance arrangements; and
- Review whether a sound and effective approach has been followed in establishing business continuity planning arrangements, including whether plans have been tested periodically.

The General Manager is responsible and accountable for:

- approving Council's Risk Management Procedure;
- ensuring the Risk Management Policy and Procedure are applied in a consistent manner across the Council and to all forms of planning and decision making;
- endorsing, supporting and promoting the Risk Management Policy and Procedure and lead in the development of a positive risk management culture, making it an integral part of normal business practice and decision making.

[1] Source: Council's Audit, Risk and Improvement Committee Charter

Directors are responsible and accountable for supporting and promoting the Risk Management Policy and Procedure and leading in the development of a positive risk management culture and making it an integral part of normal business practice and decision making.

The Group Manager Governance and Procurement is accountable and responsible for:

- developing and maintaining the Risk Management Procedure;
- providing technical risk management support and associated tools and practices.
- reviewing the Risk Management Policy within 12 months after any scheduled Ordinary Local Government Election.

The Risk Management Working Group is responsible for the development of risk management practices and promoting a proactive risk culture across Council, including the review and implementation of the risk management framework and monitoring the performance of the framework across Council.

Group Managers, Managers and Supervisors are responsible for applying our standards to assessing and treating risks in their business areas, and monitoring the correct functioning and ongoing applicability of controls.

All Council officers shall fulfil their specific risk management functions.

4. REFERENCES

Making Council Policy
Risk Management Procedure
Local Government Act 1993
AS/NZS ISO 31000 Risk Management – Principles and Guidelines.

5. DEFINITIONS

Council officer	A member of Council staff.
Councillor	An elected member of Council.
Director	2nd tier management position and titled as such.
General Manager	1st tier management position and titled as such.
Group Manager	3rd tier management position and titled as such.
Manager/ Supervisor	A person responsible for controlling or administering staff.
Risk	The effect of uncertainty on objectives. Note: An 'effect' is a deviation from the expected - positive and/or negative.
Risk Management:	Coordinated activities to direct and control Council with regard to risk.
Risk Management Framework	The set of foundation documents and organisational arrangements for designing, implementing, monitoring, reviewing and continually improving risk management throughout the company.
Uncertainty	The state, even partial, of deficiency of information related to a future event, consequence or likelihood.

6. PROCESS OWNER

Group Manager Governance and Procurement

7. AMENDMENTS

Amendments to align to *AS/NZS ISO 31000*.

LOCAL GOVERNMENT NSW

LGNSW SURVEY REPORT

IMPACT OF COST SHIFTING ON LOCAL GOVERNMENT IN NSW: A SURVEY OF COUNCILS

OCTOBER 2018

LOCAL GOVERNMENT NSW

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ABOUT LGNSW

Local Government NSW (LGNSW) is the peak industry association that represents the interests of all general purpose councils and related entities in NSW.

LGNSW aims to help strengthen and protect an effective, democratic system of local government across NSW. We do this by supporting and advocating on behalf of members and delivering a range of quality services.

This cost shifting survey is undertaken every two years by LGNSW as part of our advocacy work.

LOCAL GOVERNMENT NSW

KEY FINDINGS

Cost shifting by the NSW Government and the Australian Government on to local government in NSW in the financial year 2015/16 is estimated to amount to $820 million - 7.5% of local government's total income before capital amounts and about $150 million higher than the result for 2013/14 of $670 million.

Cost shifting is estimated to have increased significantly, from $380 million in 2005/06 to $820 million in 2015/16.

The cost shifting ratio has also increased significantly, from 7% of total council income before capital amounts for 2013/14 to 7.5% for 2015/16.

The trend increase is mainly driven by the NSW waste levy. On a state-wide basis (i.e. all 152 general purpose councils existing at the start of the financial year 2015/16), cost shifting associated with the waste levy increased from $212.5 million in 2013/14 to $305.1 million in 2015/16. This is an increase of 43.6%.

The NSW Government is responsible for the vast majority of all cost shifting, with just 2 per cent attributed to the Australian Government.

The accumulated total cost shifting burden since the survey began in 2005/06 is an estimated $6.2 billion.

INTRODUCTION

The Local Government NSW survey is based on the work of the *Independent Inquiry into the Financial Sustainability of NSW Local Government*, which found more "hard data" about cost shifting was required and recommended that LGNSW undertake an annual survey of all councils to measure and monitor cost shifting.

LGNSW's survey is a continuation of the cost shifting survey for the financial year 2004/05, undertaken by the Inquiry in 2006.[1]

LGNSW conducted surveys for the subsequent financial years 2005/06, 2006/07, 2007/08, 2008/09, 2009/10, 2010/11, 2011/12 and 2013/14.[2] Since the survey for 2011/12, LGNSW has conducted the survey on a biennial basis to measure and monitor the extent of cost shifting onto NSW local government by the Australian and NSW Governments.

The survey:

- Measures the amount of cost shifting and calculates a cost shifting ratio for each respondent council included in the final survey sample and for the whole sample; and
- Extrapolates, from the sample ratio, an estimate of the amount of cost shifting on to the whole of NSW local government.

This report provides the findings of LGNSW's cost shifting survey for the financial year 2015/16. All NSW councils were invited to participate in the survey, which was conducted during May to November 2017. LGNSW would like to thank all councils and the staff involved for their participation.

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[1] Independent Inquiry into the Financial Sustainability of NSW Local Government, *Final Report: Findings and Recommendations*, (2006), page 66-72.
[2] See for survey reports the LGNSW website at www.lgnsw.org.au/policy/finance/cost-shifting-survey.

LOCAL GOVERNMENT NSW

Amalgamations and boundary changes in 2015/16

On 12 May 2016, the NSW Government announced council amalgamations and boundary changes, effective 13 May 2016. For this survey and report, councils were taken as they existed at the beginning of the financial year 2015/16. All amalgamated councils provided separate cost estimates for one or more pre-amalgamation councils. Councils were asked to provide cost estimates covering the financial year and, if necessary, make their own pro-rata adjustments.

WHAT IS COST SHIFTING?

Cost shifting describes a situation where the responsibility for, or the cost of, providing a certain service, concession, asset, or regulatory function is "shifted" from one sphere of government to another sphere of government, without the provision of corresponding funding or the conferral of corresponding and adequate revenue raising capacity.[3]

- The Independent Inquiry into the Financial Sustainability of NSW Local Government in 2006[4] defined cost shifting as including: the imposition of responsibility for providing a certain service, asset or regulatory functions upon local government by the Federal or State Government without the provision of corresponding funding or compensation or the conferral of corresponding and adequate revenue raising capacity;

- the transfer of responsibility to local government for funding certain services or functions (including concessions and rebates) where responsibility for the funding of which lies with other spheres of government;[5]

- the situation where local government agrees to provide a service/function on behalf of another sphere of government but funding is subsequently reduced or stopped, and local government is unable to withdraw because of community demand;

- when another sphere of government ceases or provides insufficient levels of a service/function it is responsible for and local government steps in because of community of demand.

PARTICIPATION

The online survey for 2015/16 was accessible to all general-purpose councils in NSW during a period of about ten weeks during May, June and July 2015. 73 councils completed the survey. From August to November 2015, returned surveys were assessed and issues clarified with councils. Seven returned surveys were rejected from the sample. Rejection took place if:

- Returned surveys were incomplete;
- Doubtful data could not be satisfactorily clarified with council; or
- Cost estimates could not be provided in more than 25 per cent of the 26 functional areas.

Of the 66 councils included in the final sample, 21 are classified metropolitan; 27 urban regional and 18 rural.[6]

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[3] This description does not necessarily address the question of which sphere of government should be assigned a particular expenditure function.
[4] Independent Inquiry, op cit, pages 67-70; Moege S, *The Impact of Cost Shifting on Local Government in NSW - A Survey of Councils*, (2006).
[5] Mere price increases (as long as they are appropriate and apply to all service recipients equally) are not considered cost shifting. In the context of payments to state government agencies, cost shifting can only occur where cost related to a service/function are transferred onto local government even though responsibility for funding lies with other spheres of government (e.g. pensioner rate rebates). This is not the case where local government pays for a service like all other recipients.
[6] The classification is based on the Australian Classification of Local Government. Metropolitan councils include the sub-classifications "capital city" (UCC), "metropolitan developed" (UD…), and "fringe" (UF…) if within the Sydney metropolitan area; urban regional councils

LOCAL GOVERNMENT NSW

METHODOLOGY

The survey establishes the following figures:

Cost shifting amount for each participating council

The survey establishes the total amount of cost shifting based on the council estimates of the net ongoing cost (excluding capital expenditure) in each of the 26 functional areas identified by the survey. Councils were invited to add further financially significant examples of cost shifting. These additional examples were accepted where they were considered consistent with the survey's approach towards cost shifting. A list of the 26 functional areas can be found as appendix A to this report.

Two additional cost shifting examples have been continued since the survey for 2009/10:

- *Question/example 24 - Revenue limitations on crown reserve land under council management*

  Cost in $ associated with limitations imposed by the NSW Government on revenue raising ability on council managed crown reserve land or requirements to transfer revenue from council managed crown reserve land to the NSW Government.

- *Question/example 25 - Processing of development applications*

  Cost in $ of processing development applications under the *Environmental Planning and Assessment Act (NSW) 1979* and associated regulations less any revenue related to this function (e.g. development application fees, state government payments/subsidies).

Net ongoing costs generally refer to the total annual cost of providing the service or function (operational and administrative, excluding capital expenditure) less any annual revenue related to the provision of the service or function, (e.g. grants or subsidies from the NSW or Australian Government, fees or contributions collected by councils).

For consistency purposes, councils were asked to exclude corporate overheads and base their estimate of the direct net ongoing costs only.

In the instance that councils were unable to provide an actual estimate they were given the two following options which both received a cost value of "zero":

- "n/a" (not applicable) if the functional area does not apply; or
- "unable" (unable to reliably estimate) if the functional area applies to council but council is unable to reliably estimate the cost.

Cost shifting ratio for each council

As a second step, the survey establishes the cost shifting ratio for each individual council by dividing the cost shifting amount established for the council by the council's total income from operations before capital amounts.[7]

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include the sub-classifications "regional town/city" and "fringe" if outside the Sydney metropolitan area; rural councils include all rural sub-classifications (R…).

[7] Total income from continuing operations less grants and contributions provided for capital purposes, less profit from disposal of assets, and less profit from interests in joint ventures & associates as shown in the income statement of council's financial statements.

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Cost shifting ratio for sample

As a third step, the survey establishes the cost shifting ratio for the sample councils by dividing the cost shifting amount established for the sample of councils by the sample's total income from operations before capital amounts.

Cost shifting amount for all councils in NSW

Finally, the survey extrapolates the total amount of cost shifting onto NSW local government by applying the established cost shifting ratio for the sample to the total income from operations before capital amounts of all NSW councils.

FINDINGS FOR INDIVIDUAL COUNCILS

Table 1 below shows the survey findings for individual councils, council groups and the total sample for the financial year 2015/16. The total cost shifting amount for the sample is $473,701,520 (ratio of 7.49%) including questions 24 and 25 and $434,295,823 (ratio of 6.87%) excluding questions 24 and 25.

Table 1: Cost shifting amounts and cost shifting ratios (cost shifting in relation to total income before capital amounts) for individual councils in the survey sample, sample groups of metropolitan, urban regional and rural councils and total sample; financial year 2015/16

Council	ACLG Cl.	Total income from operations before capital amounts in $	Including questions 24 and 25		Excluding questions 24 and 25	
			Total amount of cost shifting in $	Cost shifting in relation to total income	Total amount of cost shifting in $	Cost shifting in relation to total income
Metropolitan						
Ashfield Council (former, now Inner West Council)	UDM	37,531,000	6,520,850	17.37%	6,021,570	16.04%
Bankstown City Council (former, now Canterbury-Bankstown Council)	UDV	149,257,000	20,944,874	14.03%	19,872,945	13.31%
Blacktown City Council	UDV	291,280,000	17,130,080	5.88%	17,003,392	5.84%
Burwood Council	UDM	42,769,000	4,613,756	10.79%	4,328,912	10.12%
Camden Council	UFM	80,291,000	4,630,270	5.77%	4,630,270	5.77%
Campbelltown City Council	UFV	151,996,000	8,043,450	5.29%	8,043,450	5.29%
Canada Bay City Council	UDL	81,573,000	6,349,612	7.78%	6,018,107	7.38%
Canterbury City Council (former, now Canterbury-Bankstown Council)	UDV	108,162,000	13,488,013	12.47%	12,506,250	11.56%
Hornsby Shire Council	UFV	135,214,986	12,421,213	9.19%	11,671,213	8.63%
Hunters Hill Council	UDS	14,293,000	2,104,657	14.73%	1,637,583	11.46%
Ku-Ring-Gai Council	UDL	120,875,622	9,300,823	7.69%	9,226,486	7.63%
Leichhardt Municipal Council (former, now Inner West Council)	UDM	86,005,381	7,672,158	8.92%	6,335,937	7.37%
Liverpool City Council	UFV	173,040,000	13,177,749	7.62%	13,177,749	7.62%
Marrickville Council (former, now Inner West Council)	UDL	102,603,000	6,550,347	6.38%	6,408,933	6.25%

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Council	ACLG Cl.	Total income from operations before capital amounts in $	Including questions 24 and 25		Excluding questions 24 and 25	
			Total amount of cost shifting in $	Cost shifting in relation to total income	Total amount of cost shifting in $	Cost shifting in relation to total income
Mosman Council	UDS	44,425,000	4,552,589	10.25%	3,449,333	7.76%
Parramatta City Council	UDV	191,513,000	18,310,373	9.56%	14,224,373	7.43%
Randwick City Council	UDV	143,512,000	11,932,291	8.31%	10,859,027	7.57%
Ryde City Council	UDL	133,772,000	13,493,690	10.09%	11,945,568	8.93%
Sutherland Shire Council	UDV	224,215,000	17,752,808	7.92%	17,426,248	7.77%
The Hills Shire Council	UFV	154,456,000	10,735,504	6.95%	9,241,503	5.98%
Warringah Council (former, now Northern Beaches Council)	UDV	172,756,402	16,256,662	9.41%	14,690,305	8.50%
Summary Metropolitan		**2,639,540,391**	**225,981,769**	**8.56%**	**208,719,154**	**7.91%**
Urban Regional						
Albury City Council	URM	116,751,000	2,890,289	2.48%	2,890,289	2.48%
Ballina Shire Council	URM	78,873,000	3,316,600	4.20%	2,662,600	3.38%
Bathurst Regional Council	URM	82,595,000	3,082,457	3.73%	2,892,958	3.50%
Bega Valley Shire Council	URM	80,947,000	3,576,558	4.42%	2,697,385	3.33%
Blue Mountains City Council	UFL	105,731,000	9,976,768	9.44%	8,658,811	8.19%
Broken Hill City Council	URS	33,680,000	1,471,310	4.37%	1,376,224	4.09%
Byron Shire Council	URM	76,643,000	1,770,145	2.31%	1,758,644	2.29%
Cessnock City Council	URM	69,422,000	11,326,361	16.32%	9,936,173	14.31%
Clarence Valley Council	URM	117,778,000	7,641,641	6.49%	6,802,981	5.78%
Coffs Harbour City Council	URL	160,231,000	5,484,617	3.42%	4,975,231	3.11%
Dubbo City Council (former, now Dubbo Regional Council)	URM	93,472,000	3,593,144	3.84%	3,055,773	3.27%
Hawkesbury City Council	UFM	67,556,000	7,067,197	10.46%	7,061,009	10.45%
Kempsey Shire Council	URS	64,615,000	4,698,314	7.27%	4,146,456	6.42%
Lake Macquarie City Council	URV	207,672,000	19,692,492	9.48%	17,673,600	8.51%
Lismore City Council	URM	101,470,000	9,095,198	8.96%	7,000,909	6.90%
Maitland City Council	URL	86,915,000	13,878,564	15.97%	13,878,564	15.97%
Mid-Western Regional Council	URS	61,879,000	2,622,482	4.24%	1,846,279	2.98%
Newcastle City Council	URV	249,660,000	11,031,970	4.42%	11,031,970	4.42%

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Council	ACLG Cl.	Total income from operations before capital amounts in $	Including questions 24 and 25		Excluding questions 24 and 25	
			Total amount of cost shifting in $	Cost shifting in relation to total income	Total amount of cost shifting in $	Cost shifting in relation to total income
Orange City Council	URM	91,249,000	4,360,450	4.78%	3,326,062	3.65%
Port Macquarie-Hastings Council	URL	164,171,000	7,889,748	4.81%	7,889,748	4.81%
Shellharbour City Council	URM	92,299,000	11,341,126	12.29%	11,292,527	12.23%
Shoalhaven City Council	URL	211,855,000	17,135,796	8.09%	16,547,644	7.81%
Wagga Wagga City Council	URM	102,923,000	3,526,714	3.43%	2,911,714	2.83%
Wingecarribee Shire Council	URM	99,852,000	5,914,021	5.92%	4,594,065	4.60%
Wollondilly Shire Council	UFM	48,638,000	3,893,310	8.00%	3,563,853	7.33%
Wollongong City Council	URV	254,350,000	27,630,333	10.86%	24,185,175	9.51%
Wyong Shire Council (former, now Central Coast Council)	UFV	280,677,636	24,247,902	8.64%	22,921,768	8.17%
Summary Urban Regional		**3,201,904,636**	**228,155,507**	**7.13%**	**207,578,412**	**6.48%**
Rural						
Bogan Shire Council	RAM	17,797,000	499,412	2.81%	499,412	2.81%
Boorowa Council (former, now Hilltops Council)	RAM	9,509,000	464,784	4.89%	401,184	4.22%
Cabonne Shire Council	RAV	35,861,000	1,486,926	4.15%	1,486,926	4.15%
Coonamble Shire Council	RAM	19,756,000	534,205	2.70%	516,149	2.61%
Cowra Shire Council	RAV	33,896,000	1,048,040	3.09%	878,593	2.59%
Dungog Shire Council	RAL	15,316,000	1,454,593	9.50%	1,191,172	7.78%
Forbes Shire Council	RAL	35,087,000	946,356	2.70%	885,356	2.52%
Gunnedah Shire Council	RAV	42,687,000	1,120,665	2.63%	814,761	1.91%
Harden Shire Council (former, now Hilltops Council)	RAM	14,254,000	578,808	4.06%	530,840	3.72%
Inverell Shire Council	RAV	38,388,000	2,528,967	6.59%	2,195,924	5.72%
Kyogle Shire Council	RAL	23,579,000	981,372	4.16%	981,372	4.16%
Lockhart Shire Council	RAM	12,442,000	360,107	2.89%	351,107	2.82%
Muswellbrook Shire Council	RAV	43,087,000	2,601,002	6.04%	2,501,717	5.81%
Narrabri Shire Council	RAV	43,332,000	1,079,283	2.49%	1,079,283	2.49%
Temora Shire Council	RAL	16,721,000	847,491	5.07%	805,697	4.82%
Upper Lachlan Shire Council	RAL	29,267,981	932,222	3.19%	901,222	3.08%

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Council	ACLG Cl.	Total income from operations before capital amounts in $	Including questions 24 and 25		Excluding questions 24 and 25	
			Total amount of cost shifting in $	Cost shifting in relation to total income	Total amount of cost shifting in $	Cost shifting in relation to total income
Walgett Shire Council	RAL	30,104,000	977,626	3.25%	977,626	3.25%
Wellington Council (former, now Dubbo Regional Council)	RAL	22,584,000	1,122,385	4.97%	999,916	4.43%
Summary Rural		**483,667,981**	**19,564,244**	**4.04%**	**17,998,257**	**3.72%**
Total sample		**6,325,113,008**	**473,701,520**	**7.49%**	**434,295,823**	**6.87%**

GENERAL FINDINGS AND DISCUSSION

Survey ratio - baseline (questions 1 to 23)

The cost shifting ratio for the complete survey sample is 6.87% of total income before capital amounts. This ratio is significantly higher than ratios established for previous financial years:

- 6.35% for 2013/14;
- 5.60% for 2011/12;
- 5.70% for 2010/11;
- 5.72% for 2009/10 and 2008/09;
- 5.92% for 2007/08;
- 5.95% for 2006/07; and
- 5.84% for 2005/06.

Survey ratio - baseline plus additional questions 24 and 25

Including the examples contained in questions 24 and 25, the ratio increases to 7.49% of total income before capital amounts. This ratio is significantly higher than the equivalent ratios established for previous financial years:

- 6.96% for 2013/14;
- 6.26% for 2011/12;
- 6.34% for 2010/11; and
- 6.35% for 2009/10.

Question 25 alone adds $38,590,696 to the sample cost shifting amount.

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Cost shifting ratios of different council groups

The table below provides findings for each of the three groups of councils (metropolitan, urban regional and rural) compared to previous surveys.

Table 2: Cost shifting ratios for metropolitan, urban regional and rural for 2015/16 survey and compared to previous surveys

Year	Metropolitan councils		Urban regional councils		Rural council	
	Survey baseline	*Survey baseline plus questions 24 and 25*	*Survey baseline*	*Survey baseline plus questions 24 and 25*	*Survey baseline*	*Survey baseline plus questions 24 and 25*
2015/16	7.91%	8.56%	6.48%	7.12%	3.72%	4.04%
2013/14	6.56%	7.33%	6.60%	7.12%	3.64%	3.97%
2011/12	5.98%	6.82%	5.63%	6.18%	3.56%	3.95%
2010/11	6.20%	6.96%	5.49%	6.06%	3.88%	4.23%
2009/10	6.30%	6.98%	5.47%	6.09%	4.04%	4.45%
2008/09	6.21%	n/a	5.44%	n/a	4.11%	n/a
2007/08	6.62%	n/a	5.63%	n/a	4.22%	n/a
2006/07	6.30%	n/a	6.00%	n/a	4.50%	n/a
2005/06	6.10%	n/a	5.90%	n/a	4.50%	n/a

Total cost shifting amounts

By applying the established cost shifting ratio of 6.87% to the figure of total income from operations before capital for 2015/16 for all NSW councils ($10,948,154,844)[8,9], the amount of cost shifting onto local government in NSW (i.e. all 152 general purpose councils) is calculated to amount to $751,723,789. Including the new examples contained in questions 24 and 25, the amount of cost shifting onto local government in NSW (i.e. all 152 general purpose councils) is calculated as being $819,931,214 (ratio of 7.49%).

Discussion

The significant increase in the cost shifting ratio from 6.4% for 2013/14 to 6.9% of total income before capital amounts (survey baseline) or 7% for 2013/14 to 7.5% (survey baseline plus additional questions 24 and 25) is mainly driven by significant increases above total sample trend in cost shifting in the metropolitan council grouping associated with the waste levy (question 21). Accordingly, cost shifting ratios have increased in the metropolitan grouping and remained relatively stable in the urban regional and rural grouping. On a state-wide basis (i.e. all 152 general purpose councils), cost shifting associated with the waste levy has increased by 43.6% from $212,491,325 in 2013/14 to 305,072,543 in 2015/16.

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[8] The NSW Office of Local Government provided data on the total income from continuing operations before grants and contributions provided for capital purposes, gains from asset sales, and gains from interests in joint ventures as shown in the statement of financial performance for the financial year 2015/16 for 151 of the 152 NSW general purpose councils on 20 November 2017 ($10,824,321,549). Financial data for Botany Bay City Council was not available for 2015/16 and 2014/15. The survey used data from Botany Bay City Council's financial statements of 2013/14 and indexed it, reflecting income growth patterns of other metropolitan councils between 2013/14 and 2015/16 (i.e. $57,374,000 for 13/14 and 13.5% revenue growth equals $65,119,490).

[9] Total income from operations before capital figures for 2015/16 used in the survey are slightly different to the reported figures provided by OLG insofar as the survey uses income estimates for the whole financial year up to 30 June 2016 from three amalgamated councils (Leichhardt Municipal Council, Warringah Council and Wyong Shire Council) and one boundary-changed council (Hornsby Shire Council) instead of income amounts up to 12 May 2016 as required of amalgamated councils pursuant to financial reporting requirements.

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The group comparison also shows that metropolitan and urban regional councils suffer more from cost shifting than rural councils. This can be explained by a number of factors, including the greater exposure of urban regional councils and metropolitan councils to the waste levy (question 21), the provision of public libraries (question 5), and to a lesser degree, pensioner rate rebates (question 3) and the development application process (question 25).

The table in Appendix B shows the cost shifting ratios for the total sample and each council group in the sample for each individual cost shifting item.

Only a small portion of cost shifting can be attributed to the Australian Government ($834,659 for immigration and citizenship ceremonies (question 12); $1,108,345 for half of the funding shortfall in the flood mitigation program (question 16) and an unidentified proportion of the funding shortfall in community and human services amounting to $15,263,853 (question 20)).[10] The remainder is attributed to the NSW Government.

Significant cost shifting items

The table below provides the amount of cost shifting onto local government in NSW for selected significant cost shifting items as calculated from the survey sample.

Table 3: Amount of cost shifting for selected significant cost shifting items in 2015/16 compared to 2013/14

Cost shifting item	Amount in 2013/14	Amount in 2015/16
Waste levy paid by councils not returned to local government (question 21)	$212 million	$305 million
Shortfall in library funding (question 5)	$119 million	$130 million
Contribution to fire and emergency service funding (questions 1, 2, 2a)	$110 million	$127 million
Shortfall in cost recovery for DA process (question 25)	$58 million	$67 million
Only half reimbursement for pensioner rebates (question 3)	$55 million	$61 million
Shortfall in funding for companion animal regulation (question 7)	$22 million	$23 million
Shortfall in funding for noxious weed management (question 10)	$12 million	$12 million

The tables below provide the dollar amount of cost shifting onto local government per council category. These are based on the Federal Government Australian Classification of Local Governments' categories.

Table 4: Top five cost shifting items for metropolitan councils in 2015/16

Cost shifting item	Amount in 2015/16	% of total metro cost shifting
Waste levy paid by councils not returned to local government (question 21)	$160 million	38%
Shortfall in library funding (question 5)	$77 million	18%
Contribution to fire and emergency service funding (questions 1, 2, 2a)	$68 million	16%
Shortfall in cost recovery for DA process (question 25)	$31 million	7%
Only half reimbursement for pensioner rebates (question 3)	$27 million	6%

** Dollar values of survey sample councils are extrapolated to all councils.*

[10] Calculation based on baseline plus questions 24 and 25 scenario.

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Table 5: Top five cost shifting items for urban regional councils in 2015/16

Cost shifting item	Amount in 2015/16	% of total urban regional cost shifting
Waste levy paid by councils not returned to local government (question 21)	$138 million	42%
Contribution to fire and emergency service funding (questions 1, 2, 2a)	$43 million	13%
Shortfall in library funding (question 5)	$43 million	13%
Shortfall in cost recovery for DA process (question 25)	$30 million	9%
Only half reimbursement for pensioner rebates (question 3)	$29 million	9%

** Dollar values of survey sample councils are extrapolated to all councils.*

Table 6: Top five cost shifting items for rural councils in 2015/16

Cost shifting item	Amount in 2015/16	% of total rural cost shifting
Contribution to fire and emergency service funding (questions 1, 2, 2a)	$16 million	24%
Shortfall in library funding (question 5)	$10 million	15%
Shortfall in cost recovery for functions under the companion Animal Act (question 7)	$9 million	13%
Waste Levy paid by councils not returned to local government (only applies to North Coast NSW) (question 21)	$7 million	10%
Only half reimbursement for pensioner rebates (question 3)	$6 million	9%

** Dollar values of survey sample councils are extrapolated to all councils.*

Comparison with previous surveys

Table 7 outlines the results of the surveys undertaken so far by LGNSW.

Table 7: Ratio and total amount of cost shifting onto NSW local government

Financial year	Sample size (no. of councils)	Total income from operations before capital amounts for all NSW councils	Ratio and total amount of cost shifting			
			Survey baseline (questions 1 to 23)	*Baseline plus 2008 election cost shift*	*Baseline plus questions 24 and 25*	*Baseline plus questions 24 and 25 and 2008 election cost shift*
2015/16	66	$10,948,154,844	6.87% $751,723,789	n/a*	7.49% $819,931,214	n/a*
2013/14	72	$9,617,445,003	6.35% $610,650,884	n/a*	6.96% $669,654,954	n/a*
2011/12	73	$9,268,064,244	5.60% $519,236,368	5.63% $521,498,905	6.26% $579,981,213	6.28% $582,243,750
2010/11	76	$8,723,492,462	5.70% $497,038,850	5.72% $499,301,387	6.34% $553,033,109	6.37% $555,295,646
2009/10	84	$8,209,306,141	5.72% $469,191,741	5.74% $471,454,278	6.35% $521,626,171	6.38% $523,888,708
2008/09	69	$7,664,066,547	5.72% $438,007,674	5.74% $440,270,211	n/a**	n/a**
2007/08	65	$7,280,361,566	5.92% $431,284,746	n/a*	n/a**	n/a**

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Financial year	Sample size (no. of councils)	Total income from operations before capital amounts for all NSW councils	Ratio and total amount of cost shifting			
			Survey baseline (questions 1 to 23)	*Baseline plus 2008 election cost shift*	*Baseline plus questions 24 and 25*	*Baseline plus questions 24 and 25 and 2008 election cost shift*
2006/07	84	$6,928,487,164	5.95% $412,244,986	n/a*	n/a**	n/a**
2005/06	84	$6,502,482,000	5.84% $379,744,949	n/a*	n/a**	n/a**

*Cost shifting associated with the 2008 local government election is distributed among the relevant financial years 08/09, 09/10, 10/11 and 11/12.
**Questions 24 and 25 were included for the first time in the survey for 09/10.

As table 4 shows, in absolute terms, cost shifting on to NSW local government is estimated to have increased significantly to approximately $752 million ($820 million including the new questions 24 and 25) in 2015/16 from approximately:

- $380 million in 2005/06,
- $412 million in 2006/07,
- $431 million in 2007/08,
- $440 million in 2008/09,
- $471 million ($524 million including the new questions 24 and 25) in 2009/10,
- $499 million ($555 million including the new questions 24 and 25) in 2010/11
- $521 million ($582 million including the new questions 24 and 25) in 2011/12; and
- $611 million ($670 million including the new questions 24 and 25) in 2013/14;

Others

Finally, the cost shifting ratio and amount established by the survey can be regarded as conservative for several reasons:

- Although councils were encouraged to add financially significant examples, councils basically worked within the 26 functional areas identified in the survey.
- The survey asked councils to exclude corporate overheads from the individual cost estimates for each cost shifting area. The addition of corporate overheads could increase costs by around 10% based on the average corporate overheads ratio established by the Independent Inquiry into the Financial Sustainability of NSW local government in a separate survey.[11]
- If councils were not able to reliably estimate the cost of individual areas of cost shifting these areas were assigned a zero costing.[12]
- While most councils that were amalgamated as of 13 May 2016 adjusted their estimates to reflect the full financial year until 30 June 2016, a few councils provided estimates only up to 12 May 2016, understating the total cost shifting amount.

[11] DG & AB Maxwell, *Corporate Overheads of Local Government*, (2006), page 14; Local Government Inquiry, *Interim Report: Findings and Options*, table 10.2, page 201.
[12] Unless returned surveys were rejected because cost estimates could not be provided in more than 25 per cent of the 26 functional areas.

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APPENDIX A – LIST OF THE 26 FUNCTIONAL AREAS

Contribution to Fire and Rescue NSW
The amount of the emergency service levy invoice from the NSW Government.

Contribution to NSW Rural Fire Service
The relevant amount of the emergency service levy invoice from the Ministry for Police and Emergency Services.

Contribution to NSW State Emergency Service
The relevant amount of the emergency service levy invoice from the Ministry for Police and Emergency Services.

Pensioners rate rebates
NSW is the only state that requires councils to fund approximately half the cost of mandatory pensioner concessions (ss575-584 of the *Local Government Act (NSW) 1993)*.
This category thus refers to the net dollar cost incurred due to mandatory pensioners rebates for rates and charges (total amount of mandatory concession minus state reimbursement). However, it excludes rebates for water supply and sewerage charges, as these charges are subject to a separate fund and cost can be recovered across all users.

Voluntary conservation agreements
Pursuant to section 555 of the *Local Government Act (NSW) 1993*, land (or the proportion of the landholding) that is subject to a voluntary conservation agreement between the landowner and the relevant NSW Minister (environment portfolio) under section 69 of the *National Parks and Wildlife Act (NSW) 1974* is exempt from all council rates. This category thus relates to the net dollar cost incurred due to rate exemptions as a result of voluntary conservation agreements.

Public library operations
Dollar cost representing the proportion of operational expenditure that was not funded by the State Government but would have been funded had the original funding arrangement of a State Government subsidy of half the amount expended by council on the operation of libraries been applied (i.e. shortfall between actual State Government subsidies (prescribed amount pursuant to s13(4)(b) *Library Act (NSW) 1939* and the regulation) and the subsidy council would have been eligible for pursuant to s13(4)(a) *Library Act (NSW) 1939* (the original funding arrangement of a state subsidy of half the amount expended by council on the operation of libraries from rate income). This category excludes capital expenditure.

Shortfall in cost recovery for regulation of on-site sewerage facilities
Councils are required to regulate the installation, approve and monitor the operation and keep a register of all on-site sewage management systems (section 68 of the *Local Government Act (NSW) 1993*).
This category this covers the dollar cost of services/functions, less any revenue related to them (fees, state government payments/subsidies). It includes only necessary costs that cannot be recovered as a result of regulatory constraints and excludes capital expenditure.

Shortfall in cost recovery for regulatory functions/services under the *Companion Animal Act (NSW) 1998*
Councils' role was expanded from a pure enforcement role to a regulatory body with functions including preparation of companion animal management plan, operation of lifetime registration system, separation of cats and dogs, maintaining facilities, enforcement, and the collection of fees for the Office of Local Government which returns only a small proportion of those fees to local government. This category therefore covers the dollar cost of services or functions under the Act,

LOCAL GOVERNMENT NSW

minus any revenue related to them such as State Government grants or subsidies. The category excludes capital expenditure.

Shortfall in cost recovery for regulatory functions/services under the *Contaminated Land Management Act (NSW) 1997*
Councils are required to respond to contaminated land issues, undertake the administration, registration and mapping of contaminated sites not regulated by the NSW Environment Protection Authority, develop policies, and consider contamination in land-use planning processes. This category relates to the dollar cost of services/functions less any revenue related to them (fees, state government payments/subsidies), but excludes capital expenditure.

Shortfall in cost recovery for functions under the *Protection of the Environment Operations Act (NSW) 1997*
Councils are required to administer the licensing system and enforce protective regulation (issuing of environmental notices, prosecution of environmental offences, undertaking of environmental audits) in relation to all non-scheduled activities not regulated by the NSW Environment Protection Authority. This category relates to the dollar cost of regulatory services/functions less any revenue related to them (fees, state government payments/subsidies).

Shortfall in cost recovery for functions as control authority for noxious weed
Councils are required to regulate and control noxious weeds pursuant to the *Noxious Weeds Act (NSW) 1993* and s183 of the *Local Government Act (NSW) 1993*.

This category covers the dollar cost of regulatory services/functions less any revenue related to them (fees, state government payments/subsidies; e.g. grants from the NSW Department of Primary Industries) or cost in $ of net contributions to other authorities for reasonably necessary regulation of noxious weeds on land other than council land and council managed Crown land. Excludes capital expenditure, and cost of other environmental weeds control or general bushland care.

Functions under the Rural Fires Act (NSW) 1997
Councils are required to administer and remedy complaints about fire hazards on council property, and to map and administer bushfire prone land (e.g. asset protection work, fire trails). This category includes the net cost of assistance provided to the Rural Fire Service to fight bushfires declared under s44 of the *Rural Fires Act (NSW) 1997* on any land within the council area, minus any revenue related to them (e.g. fees, state government payments, or subsidies). It excludes capital expenditure, along with any contributions to the Rural Fie Service and/or NSW Fore Brigade (which were captured in Categories 1 and 2).

Immigration services and citizenship ceremonies
Councils conduct citizenship ceremonies under the *Australian Citizenship Act (Cth) 2007*. This category covers the dollar cost of providing these services less any revenue related to them (fees, state government payments/subsidies).

Shortfall in cost recovery in the administration of food safety regulation
Councils are required to undertake registration and inspection of food and food premises under the *Food Act (NSW) 2003*. This category covers the dollar cost of the relevant services/functions, less any revenue related to them (fees, state government payments/subsidies). It is limited to necessary costs that cannot be recovered as a result of regulatory constraints.

Provision of educational services
Net cost of providing educational services due to the State Government's withdrawal from providing educational services that should be state government responsibility (e.g. sporting facilities used by public schools, education programs, classes for disadvantages children in youth

LOCAL GOVERNMENT NSW

centres, but not child care). Excludes capital expenditure and council education programs for which the state government is not responsible for (e.g. waste and sustainability education). This category also excludes any proportion of operational or maintenance costs which could be allocated to use by other government organisations (e.g. public schools).

Crime prevention/policing
Net cost of crime prevention/policing services in public spaces necessitated by insufficient services by other spheres of government (e.g. CCTV surveillance, security patrols, crime prevention programs). This only applies to crime prevention or policing activities that should have been undertaken by other spheres of government (e.g. police). It does not include council activities to protect community from other risks (e.g. surfer and swimmer injuries or beach patrols), safety at council events, or security of council facilities). Also excludes capital expenditure.

Flood Mitigation program
Dollar cost representing the proportion of expenditure that was not funded by other levels of government but would have been funded had the original funding arrangement been applied (e.g. if the Federal and State Governments originally provided 80% of the required funds; but now the Australian Government provides one third and the State Government is required to provide another third, and the rest must be made up by council). This category is restricted to activities eligible for or receiving funding from other levels of government under the flood mitigation program.

Transfer of responsibilities for roads under RMS road reclassification reviews
Net cost (operational only) associated with all roads inherited due to reclassification of regionally important roads as local roads, state-important roads as regional or local (since the significant reclassifications in the early 1990s). This category measures the ongoing maintenance and depreciation cost (or annualised renewal cost) associated with all roads so transferred since the 1990s. The figure does not include any compensation received in association with a reclassification.

Medical services
Net cost in $ of providing medical services necessary because of insufficient services by other levels of government (e.g. retaining general practitioners, nurses and dentists; aboriginal and other medical services required by the community). Excludes capital expenditure.

Road safety
Net cost of road safety officer/road safety program necessary due to the NSW Government's (RMS) withdrawal of funding or cost of net contribution to other authorities that provide such officer/program. Does not include capital expenditure.

Community and human services
Community and human services include children service programs, aged and disabled care programs, community development/liaison programs, youth development programs, aboriginal community programs, cultural development programs etc.

Net cost of all programs necessary to the community where other levels of government have initiated the program and initially provided adequate funds but now provide inadequate funds or have withdrawn completely; e.g. State Government contribution do not increase in line with these actual costs (e.g. employment cost). This category covers the shortfall between adequate and actual funding for such programs that were initiated by other levels of government but excludes capital expenditure.

Waste levy

LOCAL GOVERNMENT NSW

The waste levy applies to the Sydney metropolitan area; the Illawarra, Hunter and Central Coast area (extended regulated area); and the area including the Blue Mountains, Wollondilly and local government areas along the coast north of Port Stephens to the Queensland border (regional regulated area). The category includes the dollar cost of the levy paid to the NSW Government (dependent on the amount of waste produced by council), less any amounts recovered through "Waste Less Recycle More" program grants

Net costs for the 2015/16-scheme have been calculated on the basis of a levy of $133.10 per tonne (Sydney metro), $133.10 (extended regulated area), and $76.70 (regional regulated area).

Sewerage treatment system license fee
Councils are required to pay this fee as polluter under the *Protection of the Environment Operations Act (NSW) 1997*. This category therefore relates to the dollar cost of the load-based and administrative license fee paid to the State Government in relation to sewer effluent discharge.

Waste management site license fee
Councils are required to pay this fee as polluters under the *Protection of the Environment Operations Act (NSW) 1997*, so this category covers the cost of license fee (administrative, not load-based) paid to State Government.

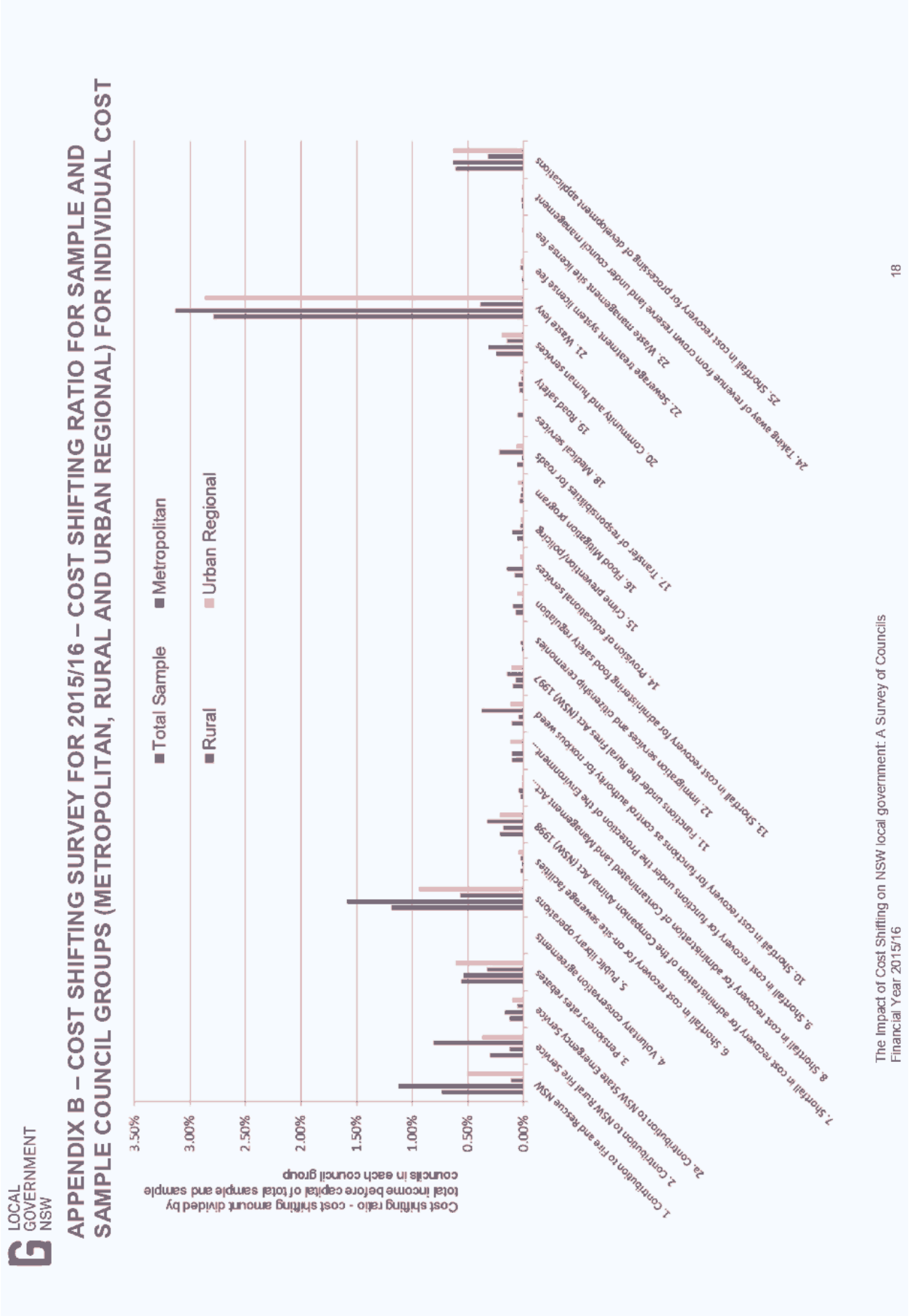
Taking away of revenue from crown reserve land under council management
Under the *Crown Land Act (NSW) 1989*, councils have full responsibility to maintain crown reserves under council management and are expected to subsidise shortfalls in maintenance cost from general revenue. This is considered appropriate as the benefits from crown reserves under council management generally accrue to the local community.

However, as a result, councils should also be entitled to any current or potential revenue from crown reserves that is required to cover maintenance and improvement cost (e.g. revenue from refreshment facilities, telecommunication facilities). Any action by the State Government to limit revenue raising capacity or require the transfer revenue to the State Government is considered cost shifting.

This category covers the cost associated with the NSW Government assuming allowable revenue raising activities on council-managed crown reserve land, or with requirements to transfer revenue from council-managed crown reserve land to the NSW Government. This does not represent the total net cost of managing (maintaining) crown lands, and excludes. transfers associated with the caravan park levy, along with any surplus revenue over and above the total amount of maintenance and improvement cost.

Shortfall in cost recovery for processing of development applications
Cost of processing development applications under the *Environmental Planning and Assessment Act (NSW) 1979* and associated regulations, less any revenue related to this function (e.g. development application fees, state government payments/subsidies).

This category is limited to the costs of processing development applications that cannot be recovered through development application fees or any other related income, but does include costs associated with services by other agencies (e.g. initial fire safety reports from the NSW Fire Brigades, s144 of the *Environmental Planning and Assessment Regulation (NSW) 2000*).


LOCAL GOVERNMENT NSW
APPENDIX B – COST SHIFTING SURVEY FOR 2015/16 – COST SHIFTING RATIO FOR SAMPLE AND SAMPLE COUNCIL GROUPS (METROPOLITAN, RURAL AND URBAN REGIONAL) FOR INDIVIDUAL COST
Total Sample
Metropolitan
Rural
Urban Regional
Cost shifting ratio - cost shifting amount divided by total income before capital of total sample and sample councils in each council group
3.50%
3.00%
2.50%
2.00%
1.50%
1.00%
0.50%
0.00%
1. Contribution to Fire and Rescue NSW
2. Contribution to NSW Rural Fire Service
2a. Contribution to NSW State Emergency Service
3. Pensioners rates rebates
4. Voluntary conservation agreements
5. Public library operations
6. Shortfall in cost recovery for on-site sewerage facilities
7. Shortfall in cost recovery for administration of the companion Animal Act (NSW) 1998
8. Shortfall in cost recovery for administration of contaminated land Management Act...
9. Shortfall in cost recovery for functions under the protection of the Environment...
10. Shortfall in cost recovery for functions under the Rural Fires Act (NSW) 1997
11. Functions under the control authority for noxious weed
12. Immigration services and citizenship ceremonies
13. Shortfall in cost recovery for administering food safety regulation
14. Provision of educational services
15. Crime prevention/policing
16. Flood Mitigation program
17. Transfer of responsibilities for roads
18. Medical services
19. Road safety
20. Community and human services
21. Waste levy
22. Sewerage treatment system license fee
23. Waste management site license fee
24. Taking away of revenue from crown reserve land under council management
25. Shortfall in cost recovery for processing of development applications
The Impact of Cost Shifting on NSW local government: A Survey of Councils
Financial Year 2015/16
18

AUSTRALIAN
LOCAL GOVERNMENT
ASSOCIATION

10 January 2019

Mr Craig Swift-McNair
General Manager
Port Macquarie-Hastings Council
PO Box 84
PORT MACQUARIE NSW 2444

Dear Mt Swift-McNair

Thank you for your correspondence relating to cost shifting and seeking advice on the position of the Australian Local Government Association (ALGA) on this issue. I also note the text of the council motion you included in your correspondence which seeks advice on the history of cost shifting.

ALGA's general position on cost shifting

Local government values the opportunity to work in partnership with all levels of government in Australia. These partnerships must, however, be meaningful and substantive and not place undue financial imposts on members of the partnership.

Cost shifting on to local government remains a major problem affecting councils in Australia. If local government is to inherit new functions or assets from other levels of government, or comply with new laws and regulations set down by them, or deliver new and higher standards of service at the behest of other levels of government, it must be consulted about the changes and provided with the necessary funding support to implement them.

It is well documented that in the past, cost and responsibility shifting from other levels of government have produced serious financial sustainability threats for some councils. Ultimately, it is the members of our local and regional communities who have suffered as cost squeezes are made and downgrading of services and/or maintenance has occurred in order to balance the books. The *Fair Share* report on cost shifting and local government finances, tabled in the Australian Parliament in November 2003 by the House of Representatives Standing Committee on Economics, Finances and Public Administration, conclusively found that cost shifting had been placing significant pressure on councils for some time, and was costing as much as $1.1 billion to the sector each year.

8 Geils Court Deakin ACT 2600 PHONE 02 6122 9400 FAX 02 6122 9401 EMAIL alga@alga.asn.au WEB www.alga.asn.au ABN: 31 008 613 876

Following the report, all members of the former Local Government and Planning Ministers' Council signed an Intergovernmental Agreement to prevent cost shifting. The *Intergovernmental Agreement Establishing Principles Guiding Intergovernmental Relations of Local Government Matters 2006* ('the IGA') was designed to establish an ongoing framework to address cost shifting.

ALGA remains committed to the IGA as it underlines the importance of effective intergovernmental collaboration and processes to avoid and prevent cost shifting practices. This is essential to maximising local government's own efforts to enhance financial sustainability particularly where there is little scope available to local governments to increase own-source revenue in order to meet the additional costs that come with responsibility shifting.

Under the terms of the IGA it was to be reviewed after five years of operation and ALGA welcomed the commitment to review the IGA announced by the then Minister for Local Government, the Hon Simon Crean, on 16 November 2011. In 2012, the Government decided that an "in house" review was to be undertaken by the Federal Department of Regional Development and Local Government. The review was undertaken and completed without a call for public submissions. It did not recommend any changes to the IGA.

It is ALGA's view that the IGA must be continued and strengthened so that all levels of government agree to comply with its principles whenever new or additional functions, or new or increased service standards affecting local government, are being considered.

Following the 2013 Federal Election, the Government's broad focus moved to a White Paper on the Reform of the Federation, championed by Prime Minister Abbott, which was to include a review of roles and responsibilities and, through its parallel White Paper on Taxation, a realignment of funding with those roles and responsibilities. This process would potentially have directly addressed the underlying issues of cost shifting between the different levels of government.

In the event, the White Paper processes were not completed and they ceased after the change of Prime Minister in 2015.

One of ALGA's key priorities remains the strengthening of Local Government's financial sustainability and this includes opposing rate capping and cost shifting.

In its 2018 Action Plan, the ALGA Board agreed, in addressing the financial sustainability of Local Government, to focus its immediate efforts on advocating for Financial Assistance Grants to be increased to a level equal to at least 1% of Commonwealth Taxation Revenue.

With regard to the opportunity to pursue advocacy on rate capping and cost shifting the Board of ALGA noted that the Council of the Australian Federation (comprising the state and territory governments) announced at the February 2018 Council of Australian Governments press conference that it would be examining tax reform proposals including a tangible proposal to put to the Commonwealth at a future time.

The issue of cost shifting is expected to be discussed at the forthcoming 2019 Strategic Planning Meeting of the ALGA Board to be held on 13-14 February. At that meeting the Board will also consider the priorities it wishes to pursue in its 2019 Action Plan. In meetings with the current and recent Federal Ministers for Local Government, ALGA has advocated for the re-establishment of regular meetings of local government ministers to discuss significant local government issues of national importance, including cost shifting. This may well be part of an agenda to be pursued with the incoming government following the 2019 Election.

I hope this response is useful in the development of your report back to Council.

Yours sincerely

Adrian Beresford-Wylie
Chief Executive

Port Macquarie - Hastings Council

Notes to the financial statements
30 June 2018
(continued)

Note 3 Income from continuing operations (continued)

	Operating		Capital	
	Actual	Actual	**Actual**	Actual
	2018	2017	**2018**	2017
	$'000	$'000	**$'000**	$'000
(e) Grants				
General purpose (untied)				
Financial assistance	4,536	8,577	-	-
Financial assistance received in advance	4,649	4,423	-	-
Pensioners' rates subsidies:				
- General	834	856	-	-
Special purpose (tied)				
Pensioners' rate subsidies:				
- Water	247	486	-	-
- Sewer	346	350	-	-
- Domestic waste management	281	284	-	-
Airport	-	-	454	44
Aquatic Facilities	-	-	750	750
Clean energy future grants	-	-	-	-
Community services and education	57	109	50	50
Economic affairs	30	32	-	-
Environment	22	-	4	-
Employment and training programmes	-	14	-	-
Health	116	128	-	-
Housing and community amenities	364	281	84	-
Library	146	144	72	257
NSW Rural Fire Service	564	519	235	262
The Glasshouse	89	70	136	-
State Emergency Services	-	-	138	68
Recreation and culture	54	4	549	2,622
Roads and bridges	189	(4)	3,274	9,831
Roads to Recovery	2,483	2,880	-	-
LIRS Interest Subsidy	61	75	-	-
Sewerage services	-	-	-	280
Street lighting	141	138	-	-
Stormwater	-	-	6	-
Waste management	336	345	-	20
Water supplies	-	76	-	-
Total grants	15,545	19,787	5,752	14,184
Comprising:				
- Commonwealth funding	11,691	16,008	-	2,448
- State funding	3,854	3,779	5,752	11,736
	15,545	19,787	5,752	14,184

Leslie Williams MP

MEMBER FOR PORT MACQUARIE ELECTORATE

20th December 2018

Mr Craig Swift-McNair
General Manager
Port Macquarie Hastings Council
P.O. Box 84
PORT MACQUARIE 2444

Our Ref: LW19240

Dear Mr ~~Swift-McNair~~ Craig

Thank you for taking the time to write to me regarding Council resolution in relation to cost shifting.

I have noted the matters you have raised and understand the various challenges Council is confronted with. This problem is one that has existed between levels of governments for some time. In fact, many of my colleagues have highlighted significant cases where costs have shifted from the State and Territory level back to the Commonwealth.

These issues require all levels of government to work together through the Council of Australian Governments (COAG) to achieve not only "best practice" in service delivery, but also contributions consistent with constitutional responsibility.

The NSW State Government continues to support local infrastructure programs that are operated by local councils because we have seen the benefit of allowing local communities being involved in prioritising local projects.

The Liberals Nationals Government are committed to providing a variety of funding models each year to assist local governments manage and maintain Council assets. Our Fixing Country Roads program and our Regional Growth Fund are available for repairs and upgrades to local and regional roads to support the movement of shipments to key freight hubs. Council's can use this funding for road repairs and sealing of unsealed roads, road widening and construction of new roads.

PORT MACQUARIE HASTINGS
CRM No
31 JAN 2019
S19/152

portmacquarie@parliament.nsw.gov.au
Suite 6, 27 Grant Street
Port Macquarie NSW 2444
ph 02 6584 0977

Our Stronger Country Communities Fund and our Community Building Partnerships program focus entirely on regional investment for local projects to improve the quality of life for people living in regional areas. The Port Macquarie electorate has already benefited with $2,640,000 worth of funded projects invested solely into community facilities who would otherwise rely on Council grants to continue their great work in our region.

Through our Government's Regional Growth Fund of $1.3 billion we have set aside $500 million for the Growing Local Economies program to invest back into regional communities. In addition, our Sporting Infrastructure Grants continue to provide sporting opportunities to our local sports clubs and tourism advancement for Port Macquarie.

The record funding for Public Libraries across the State is easing the burden for Council's who would normally fund upgrades and expansions.
An unprecedented investment of $60 million for Libraries in New South Wales ensures our cultural and educational experiences and our children's learning are supported right through their primary, secondary, TAFE and university education.

The Liberals Nationals are investing record levels of funding in our state, as we continue to tackle the lack of infrastructure investment inherited from the former Labor Government to ensure economic development and opportunities for families living in places like Port Macquarie remain successful and prosperous into the future.

Yours sincerely

Leslie Williams MP
Member for Port Macquarie
Parliamentary Secretary for Regional and Rural Health

LUKE HARTSUYKER MP

Federal Member for Cowper

THE NATIONALS for Regional Australia

Mr Craig Swift-McNair
General Manager
Port Macquarie-Hastings Shire Council
PO Box 84
PORT MACQUARIE NSW 2444

Dear Mr Swift-McNair

Thank you for your most recent letter regarding the financial impact of cost shifting on Port Macquarie-Hastings Council.

I note the Resolution of the Ordinary Council meeting held on 21 November 2018 and the associated information presented. I understand from the report that the Federal Government impact for the Council has remained relatively steady over the five-year reporting period and is primarily attributed to Pensioner Rates Rebates.

On 20 June 2018, the Government made an early payment of 50% of the 2018-19 Financial Assistance Grant funding. This early cash injection provided councils the opportunity to start work immediately on approved projects. Councils have also been able to benefit from interest on these funds pending future expenditure.

I have been pleased to support funding for the Port Macquarie-Hastings Council through a number of additional targeted funding programs such as Roads to Recovery, Bridges Renewal, Building Better Regions Fund and the Stronger Communities Program.

I remain committed to working with the Port Macquarie-Hastings Council in any way possible for the ongoing benefit of the region.

Yours sincerely

HON LUKE HARTSUYKER MP
Nationals' Federal Member for Cowper

18 December 2018
LH:EN

PORT MACQUARIE HASTINGS
TRIM No
- 2 JAN 2019
Keyword
Activity
Subject
Folder SF 19/80

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PORT MACQUARIE HASTINGS

Authorised by:	<authority>
Authorised date:	DD/MM/YYYY
Effective date:	DD/MM/YYYY
Next review date:	12 months from approval
File Number:	D2017/138714

Investment Policy

1. INTRODUCTION

The Investment Policy establishes the framework within which Council's cash and investment portfolio will be managed, monitored and reported on. This policy has been established in compliance with section 625 of the Local Government Act 1993 and provides guidance for the investment of Council's funds, with consideration given to the following primary objectives:

- Preservation of capital. Preservation of capital is the principal objective of the investment portfolio. Investments are to be placed in a manner that seeks to safeguard Council's cash and investments portfolio. This includes managing credit and interest rate risk within identified thresholds and parameters;
- Maximise investment returns within Council's risk appetite as outlined within this policy. Investments are expected to achieve a market average rate of return in line with the Council's risk tolerance;
- Manage Council's cash resources to ensure sufficient liquidity to meet Council's business objectives over the short, medium and long term.

The policy reinforces Council's ongoing commitment to maintain a conservative risk and return portfolio, an important component of its ongoing prudent financial management practices.

2. POLICY STATEMENT AND SCOPE

2.1 Funds for Investment

Investment are maintained to meet specified business needs, including:

- strategic purposes consistent with Council's long term strategic plan;
- holding short-term investments for working capital requirements;
- holding investments that are necessary to carry our Council operations consistent with annual long-term plans.

2.2 Legislative Authority for Investments

All investments are to be made in accordance with:

- Australian Accounting Standards;
- NSW Office of Local Government Investment Circulars;
- NSW Office of Local Government Investment Policy Guidelines;
- Local Government (General) Regulation 2005 - Clause 212;
- Local Government Act 1993 (particularly section 625);
- NSW Local Government Code of Accounting Practice & Financial Reporting;
- Minister's Investment Order (gazetted);
- The Trustee Amended (Discretionary Investments) Act 1997 – Sections 14A(2), 14C(1) & (2).

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2.3 Investment Governance

The following internal control practices are in place to ensure adequate governance and allow transparent and clear performance measurement for the management of the Council's cash and investment portfolio:

- financial planning and cash flow management;
- delegated authorities and investment approval;
- measurement of investment performance;
- performance benchmarks;
- reporting and review;
- audit oversight.

2.4 Delegation of Authority

Authority for the implementation of the Investment Policy is delegated by Council to the General Manager in accordance with the *Local Government Act 1993*.

The General Manager (GM) has delegated the day-to-day management of Council's investment portfolio, including authority to invest surplus funds as follows:

- Director Corporate Performance (DCP);
- Group Manager Financial Services (GMFS);
- Other senior financial officers who have the requisite skills to undertake investment functions (as per the Delegations Register).

Officers with delegated authority are required to acknowledge they have received a copy of this policy and understand their obligations in this role.

2.5 Prudent Person Standard

The investment portfolio will be managed with the care, diligence and skill that a prudent person would exercise. As trustees of public monies, officers are to manage Council's investment portfolio to safeguard the portfolio in accordance with the spirit of this Investment Policy, and not for speculative purposes.

2.6 Ethics and Conflicts of Interest

Officers shall refrain from personal activities that would conflict with the proper execution and management of Council's investment portfolio. Any potential conflicts of interest should be appropriately disclosed in accordance with Council's Code of Conduct.

Independent advisors are also to declare that they have no actual or perceived conflicts of interest and receive no inducements in relation to Council's investments.

2.7 Approved Investments

Current investment regulations require Councils to invest with either the NSW Treasury Corporation (NSW TCorp) or Approved Deposit-taking Institutions (ADI) such as Australian banks or branches of foreign owned banks, credit unions and/or building societies as it acknowledges the additional assurance that arises from their regulation by the Australian Prudential Regulation Authority (APRA).

Investments are limited to those allowed by any current Ministerial Investment Order that has been issued by the NSW Minister for Local Government.

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2.8 Prohibited Investments

In accordance with any current Ministerial Investment Order, this investment policy prohibits but is not limited to any investment carried out for speculative purposes, including:

- Derivative based instruments;
- Principal only investments or securities that provide potentially nil or negative cash flow; and
- Standalone securities issued that have underlying futures, options, forward contracts and swaps of any kind.

This policy also prohibits the use of leveraging (borrowing to invest) of an investment.

2.9 Investment Advisor

In managing its investments Council may engage the services of an independent investment advisor, licensed by the Australian Securities and Investment Commission for the purpose of achieving the aims of this policy. Independence includes receiving no commissions or other benefits in relation to the investments being recommended or reviewed, except as fully rebated to Council, promptly.

The independent advisor will review and assess the market value of the investment portfolio on a monthly basis.

Council's investment advisor is required to provide written confirmation that they do not have any actual or potential conflicts of interest in relation to the investments they are recommending or reviewing, including that they are not receiving any commissions or other benefits from the product providers in relation to the investments being recommended or reviewed.

2.10 Mandatory Investment Criteria

2.10.1 Scope
Investments must comply with the legislative authorities as described in the **Legislative Authority for Investments** paragraph of this policy.

2.10.2 Currency
Investments must be denominated in Australian Dollars.

2.10.3 Ownership
Investments must be held in Port Macquarie Hastings Council name.

2.10.4 Term / Maturity
The term to maturity of investments may not exceed the periods shown below:

Investment	Maximum term
Fixed Rate Term Deposits	5 years
Floating Rate Notes (FRNs)	5.5 years
Other Investments	10 years

2.10.5 Risk Management Framework
Council's risk profile in relation to investing surplus funds is to be relatively prudent, conservative and risk averse. The profile will be achieved by effectively managing within the investment portfolio:

- the diversity of the investments;
- the creditworthiness of the investments.

Diversity is achieved by placing limits on the maximum exposure Council may have to individual funds or financial institutions and individual credit rating bands.

Creditworthiness of investments is primarily determined using industry standard credit ratings.

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Investments are to comply with three key risk management criteria:

- **Overall Portfolio Credit Framework**: limit overall credit exposure of the portfolio;
- **Institutional Credit Framework**: limit exposure to individual institutions based on their rating;
- **Term to Maturity Framework**: limits based on maturity of securities.

Overall Portfolio Credit Framework

To control the credit quality of the entire portfolio, the following credit framework limits the percentage of the total portfolio exposed to particular credit rating categories.

Credit rating agencies apply short-term ratings to investments with 12 months or less to maturity and long-term ratings to those with greater than 12 months to maturity.

Short-term credit rating	Long-term credit rating	Overall portfolio exposure (as a % of Total Portfolio)
A-1+	AAA	100%
A-1	AA	100%
A-2	A	60%
A-3	BBB	30%
Unrated	Unrated	10%
NSW Treasury Corp Deposits and TCorpIM Funds (allowable under the Ministerial Order)		20%

- Credit ratings apply to both products and institutions. This policy requires the rating applicable to the institution responsible for the product (e.g. guarantor) to be taken as the relevant rating given this represents the underlying risk to the Council.
- Credit risk investment parameters are based on credit rating bands as published by the credit rating agencies (e.g. S&P, Moody's, Fitch). If an investment is rated by more than one ratings agency, the credit rating to be used will be based on the order of S&P, Moody's and then Fitch. In the event of disagreement between agencies as to the rating band ("split ratings") Council shall use the higher in assessing compliance with portfolio policy limits, but for conservatism shall apply the lower in assessing new purchases.
- Where the principal amount and accrued interest of any investment with a financial institution are directly guaranteed by the Australian Federal Government for full repayment, the exposure of the total portfolio to credit ratings lower than AAA may be exceeded, provided that the excess amount comprises only guaranteed investments. As a result, investments directly guaranteed by the Australian Federal Government may comprise the total investment portfolio. Management should ensure that any excess of investments over the parameters specified in the table above that is comprised of Australian Federal Government guaranteed investments can be managed back to within the specified parameter levels prior to the expiration of any such guarantee.

Institutional Credit Framework

Council's exposure to an individual institution will be restricted by their credit rating so that single entity exposure is limited.

Where Council has short-term and long-term holdings with the same institution, the limit associated to the institution's short-term rating will be used.

Short-term credit rating	Long-term credit rating	Individual institution exposure (as a % of Total Portfolio)
A-1+	AAA	40%
A-1	AA	30%
A-2	A	20%
A-3	BBB	10%
Unrated	Unrated	5%
NSW Treasury Corp Deposits and TCorpIM Funds (allowable under the Ministerial Order)		20%

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- Credit ratings apply to both products and institutions. This policy requires the rating applicable to the institution responsible for the product (e.g. guarantor) to be taken as the relevant rating given this represents the underlying risk to the Council.
- Credit risk investment parameters are based on credit rating bands as published by the credit rating agencies (e.g. S&P, Moody's, Fitch). If an investment is rated by more than one ratings agency, the credit rating to be used will be based on the order of S&P, Moody's and then Fitch. In the event of disagreement between agencies as to the rating band ("split ratings") Council shall use the higher in assessing compliance with portfolio policy limits, but for conservatism shall apply the lower in assessing new purchases.
- Where the principal amount and accrued interest of any investment with a financial institution are directly guaranteed by the Australian Federal Government for full repayment, the exposure to individual institutions may exceed the stated limits provided that the excess amount comprises only guaranteed investments.

Term to Maturity Framework

The term to maturity framework specifies the maximum amounts or percentages of Council's total investment portfolio that can be held within the various investment maturity bands.

Maximum thresholds are set to control the proportion of the total portfolio that can be invested into longer term investments to ensure that Council has adequate access to short and medium term liquidity to satisfy its business objectives. The maximum thresholds reduce as the maturity horizon extends further into the future.

	< 1 Year	1 to 3 Years	3 to 5.5 Years	> 5.5 Years
Maximum % of Total Portfolio	100%	60%	40%	20%

Minimum thresholds are set to ensure that there will always be an adequate amount of liquidity available for ongoing working capital purposes. Remaining funds are invested across the various investment horizons, seeking the best relative value at the time of investment.

	< 1 Year
Minimum % of Total Portfolio	40%

2.10.6 Breaches of Criteria

This policy imposes limits and thresholds in relation to the acquisition and holding of investments. However, situations may occur where inadvertent breaches of these limitations or thresholds arise, other than from the acquisition of investments. For example:

- amendments to regulatory directives or legislation;
- changes in the total value or amount of Council's investment portfolio which consequently changes any of the threshold limits so that they no longer meet the portfolio liquidity parameters.

If the credit ratings of any of Council's investments are downgraded to an extent that they no longer fall within the investment policy limits, they will be divested as soon as practicable having regard to potential losses resulting from early redemption and subject to minimising any loss of capital that may arise from compliance with this provision.

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When limitations or thresholds are breached due to amendments to regulatory directives or legislation, the investment portfolio must be managed in accordance with the respective amendments. Where the amendments enable retention and grandfathering of existing investments, Council may continue to actively manage those investments within the portfolio in accordance with all other regulations and policies applicable to such investments. This includes a strategy of holding or divesting such investments in accordance with regular investment considerations.

Where limitations or thresholds are breached due to a change in the overall size of the total investment portfolio, the following process will apply:

- an immediate freeze is imposed on the acquisition of new investments in the relevant category until the portfolio can be effectively managed back to accord with the requirements of this policy;
- the relevant category of investments must be managed back in accord with the policy limits within a period that takes into account any adversity created by market liquidity, current valuations of these investments and the risks of default.

The immediate forced sale of the investments in breach of the limits or thresholds will not be required.

2.11 Measurement of Investment Performance

Investment performance includes both interest returns and any change in the underlying capital value of the investments.

Interim fluctuations of capital value are excluded from the monthly measurement of investment performance on the basis that:

- investments are mainly acquired with the intention of holding them through to maturity, although some liquid assets may be sold prior to maturity should it be to the benefit of Council;
- cash liquidity requirements are structured and managed to ensure that Council is not in a financial position that will require a forced sale of these assets.

Notwithstanding the above, changes in capital value are important and the monthly investment report will therefore provide Council with indicative market valuations of each investment. In the event that the capital value of any investment becomes impaired, or a capital gain or loss is actually realised (through disposal), the gain or loss of value will be recognised within that month's financial accounts.

Investment performance will be measured monthly against the chosen benchmarks in relation to both current month and 12-month rolling returns.

The GMFS will approve the use of independently determined benchmarks. Where Council changes independently determined benchmarks, monthly reports for the month of change and the next five months thereafter shall contain reporting of investment returns against benchmark for both the following:

- the benchmark that is being replaced; and
- the new benchmark, backdated on a twelve month basis.

Council currently uses two performance benchmarks:

- Bloomberg AusBond Bank Bill Index (formerly known as UBSA Bank Bill Index) – the Bank Bill Index represents the performance of a notional rolling parcel of bills averaging 45 days and is the widely used benchmark for local councils and other institutional cash investments;

- 30 day Bank Bill Rate – provides a fair indicator of the risk free rate of return so that Council can understand the return that has been earned from diversifying its investment portfolio and accepting conservative levels of risk.

2.12 Reporting and Review

Council will maintain a separate record of money it has invested under section 625 of the *Local Government Act 1993*, in accordance with the criteria defined by the *Local Government Code of Accounting Practice and Financial Reporting*.

All investments are to be appropriately recorded in Council's financial records and reconciled at least on a monthly basis.

Pursuant to the *Local Government (General) Regulation 2005* (clause 212), the GMFS will provide a monthly report to Council on investments. The monthly report to Council will detail the investment portfolio in terms of performance and rate of return on the overall portfolio for the period and will detail the purchase price, face value, current (market) value, credit rating and coupon / yield for each individual investment.

For audit purposes, the GMFS will obtain certificates from the banks or fund managers confirming the amounts of investment held on Council's behalf at 30 June each year.

The Investment Policy will be reviewed at least once a year or as required in the event of legislative changes.

3. REFERENCES

Laws and standards	• Australian Accounting Standards • NSW Office of Local Government – Local Government Code of Accounting Practice & Financial Reporting • NSW Office of Local Government Investment Circulars • Office of Local Government Investment Policy Guidelines • Local Government (General) Regulation 2005 • Local Government Act 1993 • Minister's Investment Order (gazetted) • The Trustee Amended (Discretionary Investments) Act 1997 – Sections 14A(2), 14C(1) & (2)
Policies and procedures	• Code of Conduct • Disciplinary Policy & Procedures • Fraud & Corruption Internal Reporting Policy • Investment Strategy

4. DEFINITIONS

Term	Meaning
Total investments	Total investments comprise: • call accounts • term deposits • floating rate notes • bonds with an active secondary market with government (including NSW T-Corp) and Authorised Deposit-taking Institutions (ADIs). Investments also include grandfathered structured investments with other institutions as defined.
Active investments	Active investments are a part of total investments and comprise: • call accounts

	• term deposits • floating rate notes • bonds with an active secondary market
Grandfathered investments	Grandfathered investments are a part of total investments and comprise: • investments where new investment activity is prohibited by regulation • other investments over which new investment activity is temporarily prohibited due to unintentional breaches of investment thresholds and limitations that arise due to changes in the level of unrelated investments within the portfolio, (the prohibition only remains as long as the breaches remain in place).
Impairment	The impairment of an investment represents the amount of the original cost of the investment that is not expected to be recovered at the investment's maturity date due to current adverse economic or investment conditions that impact on the investment's financial performance.
Approved Deposit-taking Institution (ADI)	An institution that is authorised under the *Banking Act 1959* to accept term deposits and conduct banking activities in accordance with that Act and under the prudential supervision of the Australian Prudential Regulation Authority (APRA).
Active secondary market	A market where investors purchase securities or assets from other investors, rather than from issuing companies themselves on an arms length (independent) basis.
Benchmark rates	Benchmark rates comprise: • Bloomberg AusBond Bank Bill Index - The Australian Bloomberg (formally UBSA) Bank Bill index is constructed as a benchmark to represent the performance of a passively managed short-term money market portfolio. It comprises thirteen Bank Bills of equal face value, each with a maturity seven days apart. The average term to maturity is approximately 45 days. A Bank Bill is a non-interest bearing security issued by a bank whereby the bank takes on an obligation to pay an investor a fixed amount (face value) at a fixed future date. It is sold to an investor at a discount to the face value. Bank Bills are short-term money market investments with maturities usually between 30 days and 180 days. • 30 Day Bank Bill Index - The Bank Bill Index is designed to measure the performance of the Australian short-term money market and consists of 13 weekly maturities out to varying dates. Interest rates applied to these maturities are interpolated from cash and Bank Bill Swap (BBSW) rates. BBSW rates are administered by the Australian Stock Exchange (ASX).
Call funds	Call funds are closely linked with investments but do not constitute investments. Call funds are used to meet immediate operational cash needs and may be retained in Council cheque accounts and call accounts at an ADI. Call funds must be accessible immediately or up to a maximum of 24 hours notice within normal ADI operating hours.

5. PROCESS OWNER

Group Manager Financial Services

6. AMENDMENTS

Changes that have been made in reference since the last version (ORD 15/11/2017) include:

- Updated order and formatting
- Added following sections: 'Funds for Investment', 'Legislative Authority for Investments', 'Investment Governance', ;Breaches of Criteria'
- Expanded performance management section
- Combined 'Responsibilities and Authorities' and 'Delegation of Authority' sections. Removed investment authorisation requirements and detail of responsibilities attached to individual staff
- Consolidated 'Approved Investments' section
- Removed S&P ratings descriptions
- Added scope, currency, ownership, term / maturity sections to mandatory investment criteria
- Added short-term credit rating approval category
- Removed minimum portfolio exposure requirement
- Portfolio exposure: changed A rating to 60% (from 55%) and BBB rating to 30% (from 15%)
- Institutional exposure: changed AAA rating to 40% (from 45%), AA rating to 30% (from 40%) and A rating to 20% (from 15%)
- Maturity: changed 3 to 5 years from 30% to 40% (and to 5.5 years)
- Maturity: changed 5 years and greater from 15% to 20% (and to 5.5. years)
- Inclusion of Floating rate Notes as an investment option

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Port Macquarie-Hastings Council
Budget Review for the quarter ended 31 December 2018
Income & Expenses

	ANNUAL						YEAR TO DATE			CURRENT QUARTER		
	Original Budget 2018/19	Original Budget including Carry-over 2018/19 (000's)	Approved Changes Jul-Aug 18 Reviews (000's)	Approved Changes Sep-Nov 18 Reviews (000's)	Revised Budget	Projected year end result 2018/19 (000's)	YTD Actuals (000's)	YTD Budget (000's)	Actuals as a % of Budget	Oct 18 - Dec 18 Actuals	Oct 18 - Dec 18 Budget	Oct 18 - Dec 18 Actuals as a % of Budget
Income												
Rates and annual charges	97,248	97,248			97,248	97,248	93,213	93,314	99.9%	2,076	1,947	106.6%
User charges and fees	36,825	36,825	(10)		36,815	36,815	16,477	15,833	104.1%	9,349	9,044	103.4%
Interest and investment revenue	7,643	7,643			7,643	7,643	4,438	3,816	116.3%	2,276	1,913	119.0%
Other revenues	5,701	5,701	(108)		5,593	5,593	2,873	2,674	107.4%	1,427	1,396	102.2%
Grants and contributions - operating	14,944	15,447	611	147	16,205	16,205	7,978	5,242	152.2%	4,547	2,377	191.3%
Grants and contributions - capital	28,282	35,716	1,580	1,319	38,615	38,615	11,963	9,714	123.2%	6,333	5,574	113.6%
Total income from continuing operations	**190,643**	198,580	2,073	1,466	202,119	202,119	136,942	130,593	104.9%	26,008	22,251	116.9%
Expenses												
Employee costs	55,960	55,973	(3,041)	(49)	52,883	52,883	25,380	27,384	92.7%	12,723	13,537	94.0%
Borrowing costs	2,994	2,994			2,994	2,994	1,495	1,470	101.7%	996	971	102.6%
Materials and contracts	37,252	40,235	3,492	(825)	42,902	42,902	16,824	19,228	87.5%	10,469	10,911	95.9%
Depreciation	44,395	44,395			44,395	44,395	24,297	22,198	109.5%	13,198	11,099	118.9%
Other expenses	14,030	14,030	50	200	14,280	14,280	6,442	4,975	129.5%	3,097	1,938	159.8%
Net Loss/(Profit) from disposal of assets	3,000	3,000			3,000	3,000	163	1,500	10.9%	163	1,499	0.0%
Total expenses from continuing operations	**157,631**	160,627	501	(674)	160,454	160,454	74,601	76,755	97.2%	40,646	39,955	101.7%
Net operating result from continuing operations - Surplus/(Deficit)	**33,012**	37,953	1,572	2,140	41,665	41,665	62,341	53,838	115.8%	(14,638)	(17,704)	82.7%
Net operating result before capital items - Surplus/(Deficit)	**4,730**	2,237	(8)	821	3,050	3,050	50,378	44,124	114.2%	(20,971)	(23,278)	90.1%

Port Macquarie-Hastings Council
Budget Review for the quarter ended 31 December 2018
Capital Budget (excluding Commitments)

	Original Budget 2018/19	Carry-over (000's)	Approved Changes Jul-Aug 18 Reviews (000's)	Approved Changes Sep-Nov 18 Reviews (000's)	Revised Budget	Projected year end result 2018/19 (000's)	YTD Actuals (000's)	YTD Budget (000's)	Actuals as a % of Budget	Oct 18 - Dec 18 Actuals	Oct 18 - Dec 18 Budget	Oct 18 - Dec 18 Actuals as a % of Budget
Capital Funding												
General fund rates and environmental levy	17,879	3,405	23	1,098	22,405	22,405	9,692	10,615	91.3%	6,919	8,251	83.9%
Capital grants and contributions	14,397	7,124	1,953	1,293	24,767	24,767	3,184	4,548	70.0%	2,834	3,514	80.6%
Internal Restrictions	9,257	5,710	4,410	(2,381)	16,996	16,996	4,954	7,584	65.3%	2,247	4,174	53.8%
External Restrictions	24,271	3,449	(2,808)	6,587	31,499	31,499	4,407	12,713	34.7%	3,506	9,524	36.8%
S94/64 funds	7,540	4,131	256		11,927	11,927	3,825	5,495	69.6%	3,219	3,783	85.1%
Loans	1,500	2,904			4,404	4,404	964	1,825	52.8%	805	1,000	80.5%
Total Capital Funding	74,844	26,723	3,834	6,597	111,998	111,998	27,026	42,780	63.2%	19,530	30,246	64.6%
Capital Expenditure												
General fund asset purchases/construction	34,587	22,351	3,834	2,412	63,184	63,184	14,565	22,698	64.2%	9,520	15,366	62.0%
Waste management asset purchases/construction	1,050	501			1,551	1,551	89	365	24.4%	51	250	20.4%
Water supply asset purchases/construction	10,381	1,711		3,300	15,392	15,392	4,906	7,234	67.8%	4,246	5,337	79.6%
Sewerage services asset purchases/construction	17,712	2,160		885	20,757	20,757	1,828	6,819	26.8%	1,480	5,034	29.4%
Capital Expenditure excluding Loans	63,730	26,723	3,834	6,597	100,884	100,884	21,388	37,116	57.6%	15,297	25,987	58.9%
Loan Repayments (principal)	11,114		0		11,114	11,114	5,638	5,664	99.5%	4,233	4,259	99.4%
Total Capital Expenditure	74,844	26,723	3,834	6,597	111,998	111,998	27,026	42,780	63.2%	19,530	30,246	64.6%

Port Macquarie-Hastings Council
Budget Review for the quarter ended 31 December 2018
Cash & Investments

	Original Budget 2018/19 (000's)	Carry-over (000's)	Approved Changes Jul-Aug 18 Reviews (000's)	Approved Changes Sep-Nov 18 Reviews (000's)	Revised Budget	Projected year end result 2018/19 (000's)	YTD Actuals (000's)
Unrestricted	(512)		147		(365)	(365)	
Externally restricted							
Developer Contributions (Incl Water & Sewer)	99,790	(4,131)	(222)	(4,225)	91,212	91,212	
Unexpended contributions	71				71	71	
Unexpended grants	5,650				5,650	5,650	
Unexpended loans	0	(2,941)			(2,941)	(2,941)	
Water Supply	57,201	(432)			56,769	56,769	
Sewerage Services	29,713	(2,097)			27,616	27,616	
Employee Leave Entitlements (Restricted)	1,155				1,155	1,155	
Special Rates	1,467				1,467	1,467	
Domestic Waste Management	13,864	(501)		(200)	13,163	13,163	
Stormwater Management	834	(80)			754	754	
Deposits & Bonds	6,888				6,888	6,888	
Total externally restricted	216,633	(10,182)	(222)	(4,425)	201,804	201,804	
Internally restricted							
Operational Reserves							
Committed Works	6,944	(3,044)		(20)	3,880	3,880	
Employee Leave Entitlements	5,717				5,717	5,717	
Office Building & Equipment	258	(542)	(95)		(379)	(379)	
Plant Replacement	5,047	(1,900)			3,147	3,147	
Working Capital	8,427	(1,183)			7,244	7,244	
	26,393	(6,669)	(95)	(20)	19,609	19,609	0
Quarantined Funds							
Crown Reserves	256	(10)			246	246	
Environment Levy	1,817	(1,368)		(131)	318	318	
Onsite Effluent	606				606	606	
Surf Clubs	701				701	701	
Tourism & Industry Promotion	355	(102)	36		289	289	
Wauchope Heated Indoor Pool	0	0			0	0	
	3,735	(1,480)	36	(131)	2,160	2,160	0
Roads & Infrastructure							
Asset Revaluation	135		(40)		95	95	
The Glasshouse	457				457	457	
Ferries Maintenance	1,187				1,187	1,187	
Infrastructure Priorities	1,375	(232)			1,143	1,143	
Lake Road Upgrade	182	(20)			162	162	
Major Buildings Renewals	332	(71)	(239)		22	22	
Playing Fields	300				300	300	
PM Town Centre Masterplan	1,335	(650)			685	685	
Road Environmental Works	75				75	75	
Regional Road Infrastructure	7,478		(338)		7,140	7,140	
Transport Infrastructure Renewal	5,294	(1,661)	(150)		3,483	3,483	
Works Associated with Developments	200				200	200	
	18,350	(2,634)	(767)	0	14,949	14,949	0
Council Business Units							
Airport	4,022	(164)	(10)		3,848	3,848	
Crematorium & Lawn Cemetery	1,087				1,087	1,087	
Property Investment	3,678	(28)	(1,204)		2,446	2,446	
	8,787	(192)	(1,214)	0	7,381	7,381	0
Coastal & Estuary Management							
Canal Maintenance	222	(573)			(351)	(351)	
Lake Cathie Dredging	14				14	14	
Town Beach Sand Nourishment/4WD Access	600				600	600	
	836	(573)	0	0	263	263	0
Other							
Council Election	236				236	236	
Cultural Activities	230	(80)			150	150	
HACC Greenmeadows	0				0	0	
PM Handa Sister City	0				0	0	
Street Lighting	780				780	780	
Town Bands	98				82	82	
	1,344	(80)	0	0	1,248	1,248	0
Total internally restricted	59,445	(11,628)	(2,040)	(151)	45,610	45,610	
Total restricted	276,078	(21,810)	(2,262)	(4,576)	247,414	247,414	
Total cash and investments	275,566	(21,810)	(2,115)	(4,576)	247,049	247,049	293,260
Available cash	(512)	0	147	0	(365)	(365)	

Total Cash & Investments per the Trial Balance	293,260
less Cash at Bank & on Hand	(3,389)
Total funds invested per the Investment Report	296,649

Responsible Accounting Officer Statement
All restricted funds are invested in accordance with Council's Investment Policy.
Council's cash has been reconciled to the bank statement to the 31 December 2018
The YTD Total Cash and Investments have been reconciled with funds invested and Cash at Bank.

Port Macquarie-Hastings Council

Budget Review for the quarter ended 31 December 2018

TCORP Ratios

T-Corp Ratios

Ratio	Purpose	Definition	Benchmark	June 2018 Actual Result	Projected June 2019 Position: Original 2018/19 Budget	Projected June 2019 Position: Revised 2018/19 Budget	Internal Target - Short Term (1-2 yrs)	Fit for the Future Submission by 18/19 (General Fund Only & averaged)	CALCULATION METHOD
Operating Performance	This ratio measures Council's achievement of containing operating expenditure within operating revenue.	(Operating Revenue excluding capital grants and contributions - operating expenses) / (Operating Revenue excluding capital grants and contributions)	Greater than 0	4.66%	4.79%	3.30%	>0%	-2.60%	Budget
Own Source Revenue	This ratio measures fiscal flexibility. It is the degree of reliance on external funding sources such as operating grants and contributions. A Council's financial flexibility improves the higher the level of its own source revenue.	Operating Revenue excluding all grants and contributions/ Total Revenue including all grants and contributions	Greater than 60%	66.14%	77.33%	73.09%	60.00%	78.48%	Budget
Unrestricted Current Ratio	This ratio is designed to represent Council's ability to meet short term obligations as they fall due.	Current assets less all external restrictions/ current liabilities less specific purpose liabilities	Greater than 1.5	2.05	2.23	1.74	>1.5	NA	Estimate
Debt Service Cover	This ratio measures the availability of operating cash to service debt including interest, principal and lease payments.	(Op results before capital excluding interest & depn, impairment, amortisation) / (Principal repayments + borrowing costs)	Greater than 2	3.98	3.91	3.74	>2	9.38	Estimate
Rates and Annual Charges Outstanding Percentage	To assess the impact of uncollected rates and annual charges on liquidity and the adequacy of recovery efforts.	Rates and annual charges outstanding/ Rates and annual charges collectible	<5% metro and <10% rural	4.88	5.50	5.50	< 5.5%	NA	Estimate
Cash Expenses Cover	This liquidity ratio indicates the number of months a Council can continue paying for its immediate expenses without additional cash flow.	(Current year's cash equivalents + term deposits)/ (Payments from cash flow of operating and financing activities) x 12	Greater than 3 months	26.14	24.52	22.56	> 3 months	NA	Estimate
Building and Infrastructure Renewals Ratio	This ratio compares the proportion spent on infrastructure asset renewals and the asset's deterioration measured by its accounting depreciation.	Asset renewals (building, infrastructure and other structures/Depreciation, amortisation and impairment (building, infrastructure and other structures)	100%	87.64%	48.51%	88.17%	>45%	63.32%	Estimate
Infrastructure Backlog Ratio	This ratio shows what proportion the backlog is against the total value of Council's infrastructure.	Estimated cost to bring assets to a satisfactory condition/ Total value of infrastructure, building, other structures and depreciable land improvement assets.	Less than 2%	5.63%	5.36%	5.15%	<6%	8.20%	Estimate
Asset Maintenance	This ratio compares actual versus required annual maintenance, as detailed in Special Schedule 7 (of the annual financial statements).	Actual asset maintenance/Required asset maintenance	Greater than 1	0.91	0.93	0.93	>.9	0.97	Estimate

Meets ratio benchmark
Close to meeting ratio benchmark
Does not meet benchmark

Port Macquarie-Hastings Council
Budget Review for the quarter ended 31 December 2018
Consultancy and Legal Expenses

	Expenditure YTD excluding GST	Budgeted Y/N
Expense		
Legal Fees	447,062	Yes
Audit Fees	3,100	Yes
Business Consultant	291,969	Yes
Engineering Consulting	674,796	Yes
Environmental Consulting	98,103	Yes
IT Consulting	164,414	Yes
Property Development	48,623	Yes
Total Expense	1,728,067	

Port Macquarie-Hastings Council
Budget Review for the quarter ended 31 December 2018
Contracts entered into during the September quarter.

Division	Contractor	Contract detail & purpose	Contract value	Commencement Date	Duration of Contract	Budgeted Y/N	Explanation as to why not budgeted.
Infrastructure	Eire Constructions Pty Ltd	T-18-41 Extension of Sewer Rising Main's and Water Main - Dunbogan Tip Access Road	$826,547	19-Oct-18	Complete on delivery	Yes	Not Applicable
Corporate Performance	Regional Publishers Pty Ltd t/a Port Macquarie News	T-18-28 Port Macquarie-Hastings Council Advertising - Community Now Notices	$118,488	1-Nov-18	two years + one x one year option	Yes	Not Applicable
Infrastructure	Terex Australia Pty Ltd	T-18-44 Supply and Delivery of a Lift and Carry 4WD Crane	$336,950	22-Nov-18	Complete on delivery	Yes	Not Applicable
Infrastructure	Coffs Harbour City Council t/as Coastal Works	T-18-47 Laurieton Sewer Rising Main SPS No.1	$747,695	22-Nov-18	Complete on finalisation of project	Yes	Not Applicable
Infrastructure	Public Works Advisory	Kew Sewage Treatment Plant Upgrade - Public Works Advisory Project Management Engagement	$1,219,295	22-Nov-18	Complete on finalisation of project	Yes	Not Applicable
Infrastructure	Birdon Pty Ltd	T-18-12 Provision of Dredging Services - Settlement Shores Estate Canal Maintenance Dredging (Part B)	$780,863	22-Nov-18	Complete on finalisation of project	Yes	Not Applicable
Infrastructure	AMAC Holdings Pty Ltd t/as Alfresco Shade	T-18-36 Port Macquarie Town Square Shade Structures	$186,800	22-Nov-18	Complete on finalisation of project	Yes	Not Applicable
Infrastructure	Sims Group Australia Holdings Ltd t/as Sims Metal Management	T-18-39 Collection, Sorting and Removal of Ferrous and Non-Ferrous Scrap Metal and Used Lead Acid Batteries (ULAB)	as required	1-Dec-18	two years + two x one year options	Yes	Not Applicable
Infrastructure	Glen & Cathy Barnett t/as B&B Wheelie Bin Wash	T-18-40 Pressure Cleaning of Street Litter Bins	as required	1-Dec-18	three years + two x one year options	Yes	Not Applicable
Infrastructure	RPS Manidis Pty Ltd t/as straight Talk	T-18-43 Orbital Road Communications Strategy and Community Engagement for Phase two	$106,525	1-Dec-18	Complete on finalisation of project	Yes	Not Applicable
Infrastructure	Rees Electrical Pty Ltd	T-18-24 Sports Field Lighting Installation Program Part A: Wayne Richards Park Hockey Precinct	$200,300	1-Dec-18	Complete on finalisation of project	Yes	Not Applicable
Infrastructure	Rees Electrical Pty Ltd	T-18-24 Sports Field Lighting Installation Program Part B: Port Macquarie Regional Sports Stadium	$113,000	1-Dec-18	Complete on finalisation of project	Yes	Not Applicable

Port Macquarie-Hastings Council
Budget Review for the quarter ended 31 December 2018
Contracts entered into during the September quarter.

Division	Contractor	Contract detail & purpose	Contract value	Commencement Date	Duration of Contract	Budgeted Y/N	Explanation as to why not budgeted.
Infrastructure	Davis Earthmoving & Quarrying Pty Ltd	T-18-33 Concrete, Bricks and Masonry Processing	as required	1-Jan-19	two years + three x one year options	Yes	Not Applicable

Responsible Accounting Officer Statement

It is my opinion that the Quarterly Budget Review Statement for Port Macquarie-Hastings Council for the quarter ended 31 December 2018 indicates that Council's projected financial position at 30 June 19 will be satisfactory at year end, having regard to the projected estimates of income and expenditure and the original budgeted income and expenditure.

At the end of each quarter this financial year budget review meetings will be undertaken with all Managers to ensure any budget deficit is addressed.

Nicole Spencer January 31, 2019

Responsible Accounting Officer - Port Macquarie-Hastings Council

BUDGET VARIATIONS - JANUARY 2019

Section	Project	Project Description	Capital/ Operating	Item	Report Note No	Full Year Original Budget	Full Year Current Budget	Actuals to 31 January 2019	New Yearly Proposed Budget - January 2019	Movement	Funding Source	EFFECT ON FUNDING POSITIO	Comment
Corporate Performance													
Work Health & Safety	41896	Koala Street Depot Clean Up	Operating	1	2	0	0	0	30,000	30,000	Reserve	0	Clean up of the Depot required to ensure ongoing workplace health and safety standards.
Work Health & Safety	NEW GL NUMBER	Transfer from Reserve	Operating	1	2	0	0	0	-30,000	-30,000	Reserve	0	Funding to be drawn from the plant and fleet reserve.
Property & Leasing	10190	Land/Property Sales	Operating	2	7	0	0	-158,957	-158,957	-158,957	Sale of Assets	0	Proceeds from the sale of 6 Enterprise Place, Wauchope.
Property & Leasing	10190	Land/Property Sales	Operating	2	7	0	0	-27,187	-27,187	-27,187	Sale of Assets	0	Proceeds from the sale of closed road being Lot 1 Hockey Place, Port Macquarie
Property & Leasing	19637	Transfer from Reserve	Operating	2	7	0	0	0	186,144	186,144	Reserve	0	Transfer the proceeds from property sales and sale of closed roads to the Property Development Reserve
Corporate	80049	Investment Trust Fund	Operating	3	7	0	0	0	-14,000	-14,000	Reserve	0	Distribution of part of PMHC contribution to MIDROC as per Council Resolution at December 2018 Meeting.
General Manager	00280	General Manager	Operating	3	7	0	0	0	14,000	14,000	Reserve	0	Commissioning of the "Why Local Government Matters" Report through the Mid North Coast Joint Organisation as per Council Resolution.
Corporate Performance Total										**0**		**0**	
Strategy and Growth													
Community Place	00407	Place Facilitators	Operating	4	6	390,501	390,501	167,002	365,501	-25,000	Revenue	0	Transfer funding to Short Street Car Park to fund the 'Boundless Exceloo' project as recommended by the Access Committee.
Community Place	40212	Disabled Accesses	Capital	4	6	106,100	147,784	0	41,784	-106,000	Revenue	0	Transfer funding to Short Street Car Park to fund the 'Boundless Exceloo' project as recommended by the Access Committee.
Community Place	40212	Disabled Accesses	Capital	4	6	106,100	41,784	0	11,784	-30,000	Revenue	0	Transfer funds to Facilities for the provision of DDA compliant refit of the current Comboyne Public Amenities next to Comboyne Hall.
Communications	00285	Communications	Operating	5	3	578,350	578,350	302,197	584,150	5,800	Revenue	0	Surplus funds from Bus Shelter Revenue to be utilised for Communication campaigns.
Library	40935	Library Local Priority Grant	Capital	6	1	60,000	145,870	13,330	45,029	-100,841	Grants	0	Reduction in expenditure as a result of the reduced amount to grant funding received.
Library	19172	Grants W/P Capital - Library	Capital	6	1	-60,000	-145,870	-45,029	-45,029	100,841	Grants	0	Reduction in the budget for the Local Priority Grant received from the NSW State Library.
Strategy and Growth Total										**-155,200**		**0**	

BUDGET VARIATIONS - JANUARY 2019

Section	Project	Project Description	Capital/ Operating	Item	Report Note No	Full Year Original Budget	Full Year Current Budget	Actuals to 31 January 2019	New Yearly Proposed Budget - January 2019	Movement	Funding Source	EFFECT ON FUNDING POSITIO	Comment
Development & Environment													
Parks & Recreation	41761	Westport Park Riverwall and Pathway Upgrade	Capital	7	6	0	302,312	775,353	777,305	474,993	Various	0	Construction of a new 3m wide shared pathway and associated foreshore upgrades at Westport Park between the Marine Rescue building and boat ramp adjacent to Livvi's Place playground.
Parks & Recreation	41702	Port Macquarie Coastal Walk	Capital	7	6	1,265,000	1,265,000	52,293	909,000	-356,000	Various	0	Coastal Walk funds reallocated to the Westport Park Riverwall and Pathway Upgrade project.
Parks & Recreation	19280	Transfer from Reserve	Capital	7	6	0	0	0	-118,993	-118,993	Reserve	0	Reserve funding related to the Coastal Walk funds reallocation to the Westport Park Riverwall and Pathway Upgrade project.
Facilities	41850	Short Street Carpark Reserve	Capital	4	6	255,030	255,030	408	386,030	131,000	Transfers	0	Funds transferred from Community Place budgets to funds the 'Boundless Exceloo' disabled access toilet project as recommended by the Access Committee.
Facilities	40415	Building Rectification Works	Capital	4	6	314,300	314,300	3,415	344,300	30,000	Transfers	0	Funds transferred from Community Place budgets to funds the refit the current Comboyne Public Amenities next to Comboyne Hall.
Aquatic Facilities	41246	Port Macquarie Pool	Capital	13	2	500,000	500,000	10,620	50,000	-450,000	Reserves	0	These funds are currently sitting the 2018-19 budget. Transfer remaining funds back to reserve to for inclusion in the 2019-20 financial year budget.
Aquatic Facilities	NEW GL NUMBER	Transfer to Reserve	Capital	13	2	0	0	0	450,000	450,000	Reserves	0	Transfer remaining funds back to reserve to for inclusion in the 2019-20 financial year budget.
Parks & Recreation	19288	Loan Funding - Parks & Gardens	Capital	14	2	-1,500,000	-1,500,000	0	0	1,500,000	Loan Funding	0	Transfer remaining funds for the Hastings Regional Sporting Complex back to reserve to for inclusion in the 2019-20 financial year budget.
Development & Environment Total										**1,661,000**		**0**	
Infrastructure													
Drainage	41768	Stormwater Renewal Program	Capital	7	6	646,930	774,994	182,007	656,001	-118,993	Reserve	0	Budget allocation transferred to Westport Park Riverwall and Pathway Upgrade for associated stormwater drainage works.
Drainage	19399	Transfer From Reserve	Capital	7	6	-2,021,930	-2,075,171	0	-1,956,178	118,993	Reserve	0	Associated reserve funding from the Stormwater Renewal Reserve for works performed under the Westport Park Riverwall and Pathway Upgrade.
Transport and Traffic	41673	Bulli Creek Bridge Replacement Construction	Capital	8	5	0	0	5,731	50,000	50,000	Reserve	0	Establishment of an easement in relation to the Bulli Creek Bridge Replacement project.

BUDGET VARIATIONS - JANUARY 2019

Section	Project	Project Description	Capital/ Operating	Item	Report Note No	Full Year Original Budget	Full Year Current Budget	Actuals to 31 January 2019	New Yearly Proposed Budget - January 2019	Movement	Funding Source	EFFECT ON FUNDING POSITIO	Comment
Transport and Traffic	11272	Transfer from Reserve	Capital	8	5	-571,000	-571,000	0	-621,000	-50,000	Reserve	0	Funding from the roads renewal reserve for the establishment of an easement in relation to the Bulli Creek Bridge Replacement.
Drainage	41765	Settlement Shores Canals	Operating	9	7	600,000	1,172,576	6,235	20,000	-1,152,576	Reserve	0	At the November 2018 Council meeting a tender for the dredging of the Settlement Shores canals was resolved. An option from the contractor to start in July 2019 was chosen.
Drainage	19399	Transfer from Reserve	Operating	9	7	-2,906,930	-4,232,561	0	-3,079,985	1,152,576	Reserve	0	These funds are currently sitting the 2018-19 budget. Funds to be kept in reserve and used in the 2019/20 Financial Year. This variation is a decrease in the current years transfer from reserve.
Water Supply	29251	Annual Renewals and Minor Works Allocation	Capital	10	6	919,800	919,800	133,415	326,566	-593,234	Reserve	0	Water Supply works associated with the SRM Extension to Dunbogan STP Inlet project. Budget allocation merged with P30161 for project management purposes.
Sewerage Services	30161	Sewer Rising Main Extension to Dunbogan STP Inlet	Capital	10	6	139,000	337,156	142,156	930,390	593,234	Reserve	0	Water Supply works associated with the SRM Extension to Dunbogan STP Inlet project. Budget allocation merged with P30161 for project management purposes.
Sewerage Services	30118	Camden Haven Reticulation Augmentation	Capital	11	6	511,000	1,607,806	0	756,201	-851,605	Reserve	0	Laurieton Sewer Rising Main budget allocation segregated to separate project number due to size of project.
Sewerage Services	30168	Laurieton Sewer Rising Main SPS#1 to Dunbogan Bridge	Capital	11	6	0	0	14,425	851,605	851,605	Reserve	0	Laurieton Sewer Rising Main budget allocation in the Camden Haven Reticulation Augmentation budget segregated to separate project number due to size of project.
Transport and Traffic	11270	Traffic & Traffic Income	Operating	5	3	-24,600	-24,600	-38,781	-76,400	-51,800	Revenue	0	Revenue received through the advertising on Council owned Bus Shelters.
Transport and Traffic	00664	Roads Furnishings	Operating	5	3	46,100	46,100	16,936	92,100	46,000	Revenue	0	Undertake safety upgrade at school bus stops as well was general maintenance funded from revenue generated through adverting.
Network & Project Planning	41894	Distracted Driver Action Plan Implementation	Operating	12	1	0	0	0	2,700	2,700	Grants	0	Road Safety Officer projects funded through RMS Grants
Network & Project Planning	41895	Safety Around Schools	Operating	12	1	0	0	1,339	8,300	8,300	Grants	0	Road Safety Officer projects funded through RMS Grants
Network & Project Planning	19931	Grants W/P Operational - Traffic & Road Safety	Operating	12	1	0	-3,336	-3,648	-14,336	-11,000	Grants	0	RMS Funding for Road Safety Program (LGRSP)

BUDGET VARIATIONS - JANUARY 2019

Section	Project	Project Description	Capital/ Operating	Item	Report Note No	Full Year Original Budget	Full Year Current Budget	Actuals to 31 January 2019	New Yearly Proposed Budget - January 2019	Movement	Funding Source	EFFECT ON FUNDING POSITIO	Comment
Asset Design	41723	Hastings Regional Sportiong Complex	Capital	14	2	1,500,000	2,520,000	179,939	500,000	-2,020,000	Reserve	0	These funds are currently sitting the 2018-19 budget. Transfer remaining funds back to reserve to for inclusion in the 2019-20 financial year budget.
Asset Design	19326	S94 Funding - Survey & Design	Capital	14	2	0	-1,020,000	0	-500,000	520,000	Reserves	0	Transfer remaining funds back to reserve to for inclusion in the 2019-20 financial year budget.
Infrastructure Total										-1,505,800		0	

ORGANISATIONAL TOTAL - THIS REVIEW 0

FORECAST FOR FINANCIAL YEAR ENDED 30 JUNE 2019

Original Budget as at 1 July 2018	Shortfall	-511,873
Plus: Adjustments		
July Review	Balanced	0
August Review	Balanced	0
September Review	Balanced	0
October Review	Surplus	147,265
November Review	Balanced	0
December Review	-	0
January Review	Balanced	0
FORECAST FOR 30 JUNE 2019	Shortfall	-364,608

Notes:

1. The result shown above is the general fund result. All surpluses/deficits in the water, sewerage and waste funds are transferred to/from reserves.
2. Reserve are internal restrictions that hold funds for a specific purpose, e.g. The airport has its own reserve and all income and expenditure relating to the airport is credited/debited to that reserve.
3. Council projects are funded from a variety of funding sources. Below is a definition of the various types of funding that are used to fund projects.

Revenue - All funds that are generated through rates, annual charges, fees and charges, interest etc. These funds are untied and can be expended on any project that Council considers appropriate.

Grants - Government grants can either be monetary or otherwise and may be tied or untied. Tied grants are required to be used for a specific purpose such as the construction of a road. Untied grants may be applied for any purpose council considers appropriate.

Contributions - Contributions are non-reciprocal transfers to Council in the sense that Council is not required to give value in exchange for the contributions directly to the contributor. Examples are contributions given by ratepayers towards capital works in their vicinity.

Reserves - Reserves are internal restrictions held for a specific purpose, e.g. The airport has its own reserve and all income and expenditure relating to the airport is credited/debited to that reserve.

S7.11 and S64 Contributions - Section 7.11 of the NSW Environmental and Planning Act (1979) and section 64 of the Local Government Act (1993) provides NSW local government with a formal legal framework for levying developers for the provision of infrastructure, services and amenities - known as developer contributions.

4. Some projects are funded by multiple funding sources, e.g. a capital project may be funded by s7.11 funds, grants and revenue. The effect on capital column will only show the revenue funding adjustment as the other types of funding will have an income line budget adjustment shown in the report.

PORT MACQUARIE-HASTINGS
COUNCIL

Monthly Investment Report

December 2018

IMPERIUM MARKETS

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Executive Summary

Compliance

Compliance Measure	Within Policy Limits (Y/N)	Reason if Not Compliant
Term to Maturity	Yes – Compliant	n/a
Counterparty	Yes – Compliant	n/a
Credit Quality	Yes – Compliant	n/a

Performance

As at 31/12/2018	1m (actual)	1m (% p.a.)	FYTD (actual)	FYTD (% p.a.)
AusBond Bank Bill Index	0.15%	1.81%	0.99%	1.98%
Council's Portfolio^	**0.25%**	**3.02%**	**1.50%**	**3.00%**
Outperformance	0.10%	1.21%	0.51%	1.02%

^Total portfolio performance excludes Council's cash account holdings. Overall returns would be lower if cash was included.

Council's Portfolio

Asset Allocation

The entire portfolio is directed to fixed term deposits (92.70%) and the 31 day Notice Saver Account with Westpac (7.30%). With credit securities widening, we suggest Council consider introducing liquid senior floating rate notes (FRNs) into the portfolio. This will not only offer additional upside with regards to the portfolio's investment returns, but also provide additional liquidity (FRNs are saleable – generally accessible within 2 business days).

Term to Maturity

All maturity limits (minimum and maximum) comply with the Investment Policy. Medium-Term (3-5 years) assets account for around 9% of the total investment portfolio, with capacity of around $61m at month-end.

Where there is (counterparty) capacity to invest in attractive 3-5 year investments, we recommend this be allocated to new senior FRN issues and fixed or floating rate term deposits (refer to respective sections below).

Compliant	Horizon	Invested ($)	Invested (%)	Min. Limit (%)	Max. Limit (%)	Available ($)
✓	0 – 365 days	$128,648,871	43.37%	40%	100%	$168,000,000
✓	1 – 3 years	$140,000,000	47.19%	0%	60%	$37,989,322
✓	3 – 5 years	$28,000,000	9.44%	0%	30%	$60,994,661
✓	5 – 10 years	$0	0.00%	0%	15%	$44,497,331
		$296,648,871	**100.00%**			

Counterparty

As at the end of December, Council did not have an overweight position to any single ADI. Overall, the portfolio is diversified across the investment grade credit spectrum (rated BBB- or higher), with no exposure to unrated ADIs.

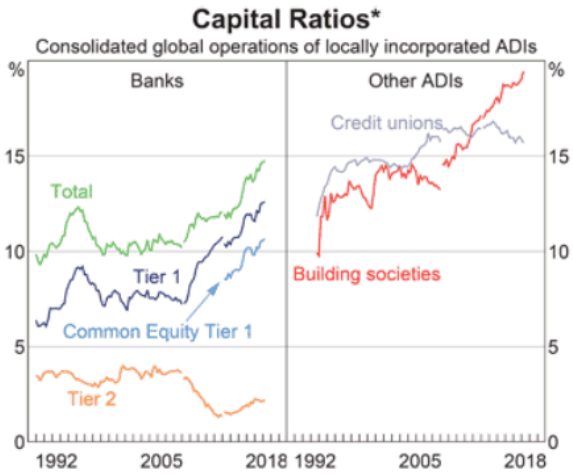
Compliant	Issuer	Rating	Invested ($)	Invested (%)	Max. Limit (%)	Available ($)
✓	CBA	AA-	$3,000,000	1.01%	40.00%	$115,659,548
✓	NAB	AA-	$51,000,000	17.19%	40.00%	$67,659,548
✓	WBC (St George)	AA-	$103,648,871	34.94%	40.00%	$15,010,678
✓	Rabobank	A+	$21,000,000	7.08%	20.00%	$38,329,774
✓	AMP	A	$5,000,000	1.69%	20.00%	$54,329,774
✓	ICBC Sydney	A	$41,000,000	13.82%	20.00%	$18,329,774
✓	ING Bank	A	$36,000,000	12.14%	20.00%	$23,329,774
✓	BOQ	BBB+	$10,000,000	3.37%	10.00%	$19,664,887
✓	Bendigo	BBB+	$11,000,000	3.71%	10.00%	$18,664,887
✓	ME Bank	BBB	$9,000,000	3.03%	10.00%	$20,664,887
✓	Newcastle PBS	BBB	$6,000,000	2.02%	10.00%	$23,664,887
			$296,648,871	**100.00%**		

We remain supportive of the regional and unrated ADI sector (and have been even throughout the GFC period). They continue to remain solid, incorporate strong balance sheets, while exhibiting high levels of capital – typically, much higher compared to the higher rated ADIs. Some unrated ADIs have up to 25-40% more capital than the domestic major banks, and well above the Basel III requirements.

APRA's Chairman affirmed that the banks had satisfactorily moved towards an '*unquestionably strong*' capital position and that bank's stress testing contingency plans were now far better positioned that was previously the case years ago. APRA's stress test which hypothetically increased the unemployment rate to 11% (around double the current rate) and for house prices to fall 35% showed the banks remained above the minimum capital levels. We note that APRA's latest discussion paper also highlighted that the domestic major banks were required to raise more capital while the lower rated ADIs were already deemed to be at a satisfactory level.

Overall, the lower rated ADIs (BBB and unrated) are generally now in a better financial position then they have been historically (see the Capital Ratio figure below). We believe that deposit investments with the lower rated ADIs should be continued going forward, particularly when they offer 'above market' specials. Not only would it diversify the investment portfolio and reduce credit risk, it would also improve the portfolio's overall returns.

In the current environment of high regulation and scrutiny, all domestic ADIs continue to carry high levels of capital, particularly amongst the lower ("BBB") and unrated ADIs. There is minimal (if any) probability of any ADI defaulting on their deposits going forward – this was stress tested during the GFC.



* Per cent of risk-weighted assets; break in March 2008 due to the introduction of Basel II for most ADIs; break in March 2013 due to the introduction of Basel III for all ADIs

Source: APRA

IMPERIUM MARKETS

Credit Quality

The portfolio remains lightly diversified from a credit ratings perspective. The portfolio is entirely directed to the investment grade ADIs (BBB- or higher), with zero allocation to unrated ADIs. There is high capacity to invest in the higher rated ADIs (A or higher), particularly after the downgrades of BoQ and Bendigo-Adelaide Bank in May 2017, which now fall back into the "BBB" rated category.

The "BBB" rated category remains marginally below maximum limits (capacity of around ~$8.5m). The capacity within this category is also dependent on the overall portfolio's balances i.e. cash position.

We note that in the previous revision of the Investment Policy on 15 November 2017, Council decided to keep the maximum aggregate limit for "BBB" rated ADIs at 15% of the total investment portfolio. We believe Council's maximum limit of 15% in aggregate with the "BBB" rated ADIs is very low compared to some other NSW local government clients who have a maximum limit of up to 50%. This, at times has forced Council to invest with ADIs offering rates well below market and therefore reduced Council's overall interest income.

Given the large number of "BBB" rated ADIs currently in the market (and conversely, the low number of "A" or higher rated ADIs), we suggest Council increase this particular limit at its next Policy review. We note that it is within this category where the most value is currently experienced. Above market 'specials' are frequently offered in this sector.

In mid-April 2018, we provided Council a draft Investment Policy to address the current situation. Council is currently in the process of reviewing and adopting a new Policy following our presentation to Council in mid-September 2018.

All ratings categories are within the Policy limits:

Compliant	Credit Rating	Invested ($)	Invested (%)	Max. Limit (%)	Available ($)
✓	AA Category	$157,648,871	53.14%	100%	$139,000,000
✓	A Category	$103,000,000	34.72%	60%	$74,989,322
✓	BBB Category	$36,000,000	12.14%	15%	$8,497,331
✓	Unrated ADIs	$0	0.00%	10%	$29,664,887
		$296,648,871	**100.00%**		

IMPERIUM MARKETS

Performance

Council's performance for the month ending 31 December 2018 is summarised as follows:

Performance	1 month	3 months	6 months	FYTD	1 year
Official Cash Rate	0.13%	0.38%	0.75%	0.75%	1.50%
AusBond Bank Bill Index	0.15%	0.48%	0.99%	0.99%	1.92%
Council's Portfolio^	**0.25%**	**0.74%**	**1.50%**	**1.50%**	**3.02%**
Outperformance	**0.10%**	**0.27%**	**0.51%**	**0.51%**	**1.10%**

^Total portfolio performance excludes Council's cash account holdings. Overall returns would be lower if cash was included.

For the month of December, the deposit portfolio provided a solid return of +0.25% (actual), outperforming the benchmark AusBond Bank Bill Index return by +0.10% (actual). The strong performance continues to be driven by the handful of deposits still yielding above 3½% p.a. However, most of these individual deposits have now matured and will be reinvested at lower prevailing rates.

Over the 2018 calendar year, the deposit portfolio returned +3.02% p.a., outperforming bank bills by 1.10% p.a. and more than double the official cash rate of 1½%. This has been relatively strong given deposit rates reached their all-time lows and margins have generally contracted over the past 2 years.

Investors using the Imperium Markets platform have reduced the invisible costs associated with brokerage, and thereby lift client portfolio returns as investors are able to deal in deposits directly with the ADIs and execute at the best price possible. Council has experienced this over the past 6 months, receiving on average, 2-4bp higher for every deposit dealt on the platform.

IMPERIUM MARKETS

Council's Term Deposit Portfolio & Recommendation

As at the end of December 2018, Council's deposit portfolio was yielding 3.02% p.a. (unchanged from the previous month), with an average duration of ~1.6 years. Where possible, we recommend Council extends or at least maintains this average duration. In the low interest rate environment, the biggest collective risk that the local government sector has faced over the post-GFC era has been the dramatic fall in interest rates - from 7¼% to the current historical low levels of 1½%.

As the past decade has highlighted (post-GFC era), we have seen too many portfolios' roll a high proportion of their deposits between 3-6 months, resulting in their deposits being reinvested at lower prevailing rates. That is, depositors have generally not insured themselves against the low interest rate environment by diversify their funding across various tenors (out to 5 years) but rather placed all their 'eggs in one basket' and kept all their deposits short. **Reinvestment risk has collectively been and continues to be the biggest detriment to depositors' interest income over the post-GFC period**.

At the time of writing (early January), we see value in:

ADI	LT Credit Rating	Term	T/D Rate
Police CU SA	Unrated	3 years	~3.10% p.a.
Police CU SA	Unrated	2 years	~3.00% p.a.
Australian Military Bank	Unrated	3 years	~3.00% p.a.
BoQ	BBB+	2 years	2.90% p.a.

For those investors that have capacity issues with the "BBB" and unrated ADI sector, we see value in:

ADI	LT Credit Rating	Term	T/D Rate
AMP	A	3 years	^3.05% p.a.
AMP	A	2 years	^2.95% p.a.
ICBC Sydney Branch	A	2 years	2.87% p.a.
ING	A	2 years	2.80% p.a.

^ AMP T/Ds – these are grossed up rates which includes a 0.20% p.a. rebated commission from Imperium Markets. $5m cap applies per individual investor.

The above deposits are suitable for investors looking to provide some income protection and mitigate reinvestment/rollover risk in the low interest rate environment.

For terms under 12 months, we believe the strongest value is currently being offered by a number of lower and unrated ADIs offering above-market specials (dependent on daily funding requirements):

ADI	LT Credit Rating	Term	T/D Rate
Australian Military Bank	Unrated ADI	12 months	2.95% p.a.
Bank of Sydney	Unrated ADI	12 months	2.94% p.a.
Police CU SA	Unrated ADI	12 months	2.94% p.a.
Police CU SA	Unrated ADI	9 months	2.89% p.a.
Bank of Sydney	Unrated ADI	6 months	2.86% p.a.
Australian Military Bank	Unrated ADI	6 months	2.85% p.a.
Bank of Sydney	Unrated ADI	3 months	2.82% p.a.
BoQ	BBB+	6 months	2.80% p.a.

Amongst the higher rated ADIs ("A" rated or higher), the following deposits remain attractive for terms under 12 months:

ADI	LT Credit Rating	Term	T/D Rate
ICBC Sydney Branch	A	12 months	2.87% p.a.
NAB	AA-	12 months	2.75% p.a.
NAB	AA-	5-11 months	2.70%-2.73% p.a.
AMP	A	6-12 months	^2.95% p.a.
Suncorp	A+	3 months	2.65% p.a.
NAB	AA-	3 months	2.65% p.a.

^ AMP T/Ds – these are grossed up rates which includes a 0.20% p.a. rebated commission from Imperium Markets. $5m cap applies per individual investor.

IMPERIUM MARKETS

Senior FRNs & Recommendations

Over December, amongst the senior major bank FRNs, physical credit securities were marked wider across the curve, mainly on the back of the liquidity squeeze and ongoing selloff in financial markets. **We see good value for a new 5 year major bank FRN (now closer to +109bp)**, given the slight premium offered in the primary market, and particularly once factoring in the potential capital gains which could be realised from as early as two years after being launched. The grossed up returns would be slightly above +140bp over a 2 year holding period in a relatively stable credit environment, over and above where the highest margins are paying compared to the medium to longer-dated deposits.

We continue to see better value in longer tenors (i.e. favour 5 year terms over 3 year terms) amongst the "AA" rated ADIs due to their high liquidity and ability to 'roll down the curve' over a 2-3 year holding period. Overall, over the three weeks of December, amongst the "AA" rated sector, the 5 and 3 year part of the curve were marked around +4bp wider.

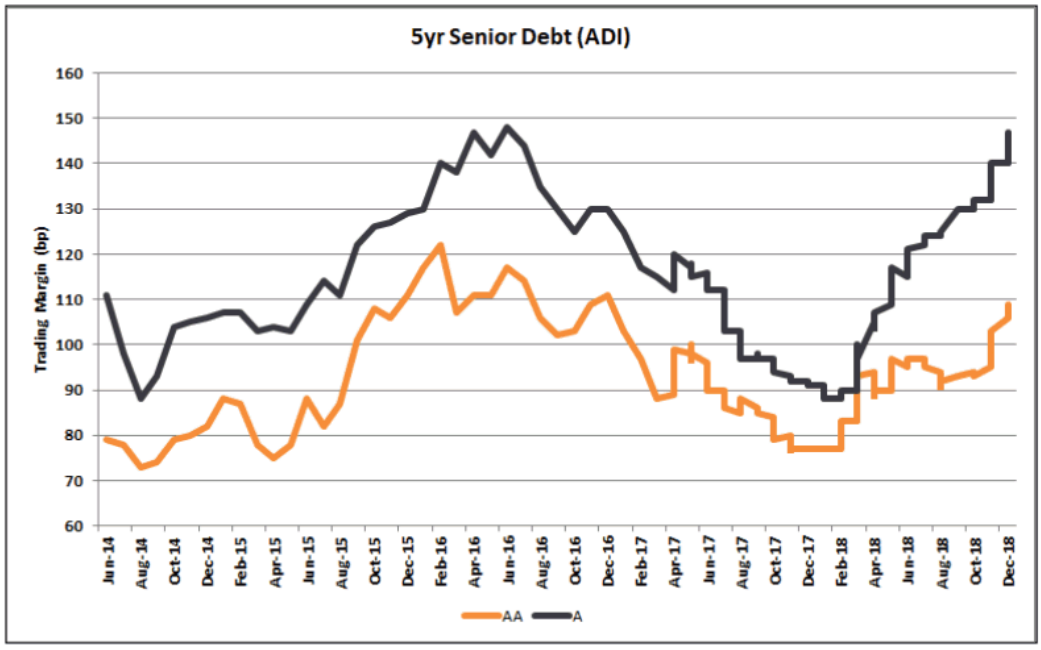
Amongst the "A" rated sector, 3 and 5 year senior paper widened another +7bp and +8bp respectively, following the broad widening experienced amongst the entire ADI sector.

There has been little issuance amongst the "BBB" rated cohort over recent months. Spreads remain fairly stable with very little turnover (traditionally) in the secondary market amongst the lower regional ADIs. Senior securities were marked around +5bp wider amongst the "BBB" rated ADIs.

Overall, credit remains relatively tight on a historical basis but much more attractive after the slight correction experienced in credit markets since the start of the year. The relative movement in spreads between medium-longer dated deposits and FRNs has seen the latter become much more attractive over the past few months.

Senior FRNs (ADIs)	31/12/2018	30/11/2018
"AA" rated – 5yrs	+109bp	+103bp
"AA" rated – 3yrs	+87bp	+82bp
"A" rated – 5yrs	+147bp	+140bp
"A" rated – 3yrs	+123bp	+115bp
"BBB" rated – 3yrs	+135bp	+130bp

Source: IBS Capital



Source: IBS Capital

We generally recommend switches ('benchmark' issues only) into new primary issues, out of the following senior FRNs that are maturing:

- On or before 2021 for the "AA" rated ADIs (domestic major banks);
- On or before 2019 for the "A" rated ADIs; and
- Within 12 months for the "BBB" rated ADIs (consider case by case).

Investors holding onto the above senior FRNs in their last 1-2 years are now generally holding sub-optimal investments and are not maximising returns by foregoing realised capital gains. In the current low interest rate environment, any boost in overall returns should be locked in when it is advantageous to do so.

We recommend Council starts introducing liquid senior FRNs into the portfolio, potentially starting with the domestic major banks.

IMPERIUM MARKETS

Economic Commentary Review

International Market

Global share markets experienced a rout in December, with ongoing trade wars, a partial US government shutdown and Brexit again taking centre stage. **A partial US government shutdown** commenced on 21st December after the Senate failed to give Trump his $5bn worth of wall funding for the Mexican border.

Reports of the Trump administration preparing a report calling out China's stealing of US technology did not help sentiment either. Trump also said it would be "*foolish*" for the Fed to hike rates again on December 19, demanding help in his trade fight with the Chinese.

In the US, equity markets were close to suffering an official correction for the month of December with the S&P 500 Index plummeting -9.18% (representing the worst December return since 1931), while the NASDAQ plunged -9.48%. For the calendar year, the S&P 500 finished -6.24% lower, its worst annual performance since the GFC. European shares followed the US, led by Germany's DAX (-6.20%), France's CAC (-5.46%) and UK's FTSE (-3.61%).

The US Fed lifted the Fed Funds rate target by 25bp to a range of 2.25%-2.50%. The median dot plots was lowered by 25bp for each of 2019, 2020, 2021 and also in the 'longer run' (the latter representing estimates of the so called 'neutral' rate).

In the US, November payrolls came in below expectations at +154k, with an unchanged unemployment and participation rate of 3.7% and 62.9% respectively, coupled with still-benign earnings growth (+3.1%). November core CPI inflation came in line with expectations at +0.2% m/m, with the annual core coming in at +2.2% y/y. Q3 US GDP was revised to +3.4% from +3.5%.

In early December, the market had been widely touting the likelihood the Brexit vote would not get passed. Prime Minister May postponed the vote and headed back to Brussels, as the bill was likely to be defeated by a significant margin, mainly due to MPs' concerns about the Norther Irish backstop.

The Bank of England (BoE) kept rate on hold in a unanimous decision. The BoE is waiting for greater clarity on Brexit and is ready to adjust rates where appropriate in either direction.

Core Euro-area inflation slipped back down to +1.0% y/y in November while the unemployment rate held up at 8.1% against expectations of a nudge down. Italy's economy remains weak, highlighted by their Q3 GDP figure of -0.1%, inflation at +1.7% and unemployment rate at 10.6% for November.

The RBNZ proposed that New Zealand's large banks lift their total capital from 10.5% to 18%.

The MSCI World ex-AUS fell -7.82% for the month to be down -10.30% for the calendar year.

Index	1m	3m	1yr	3yr	5yr	10yr
S&P 500 Index	-9.18%	-13.97%	-6.24%	+7.04%	+6.28%	+10.75%
MSCI World ex-AUS	-7.82%	-13.81%	-10.30%	+4.33%	+2.74%	+7.52%
S&P ASX 200 Accum. Index	-0.12%	-8.24%	-2.84%	+6.69%	+5.63%	+9.00%

Source: S&P, MSCI

IMPERIUM MARKETS

Domestic Market

The RBA kept interest rates on hold at 1.50% in its meeting in December, awaiting further progress in "*reducing unemployment and having inflation return to target*". The Bank's view remains unchanged, as the "*outlook for the labour market remains positive*", with inflation expected to reach 2¼% in 2019.

GDP growth eased to +0.3% q/q and the annual rate of growth declined to +2.8%, well below the RBA's forecast of +3.5% growth this year and next. Headline company profits were weaker-than-expected, growing by +1.9% q/q (market expecting +2.8%), as mining profit growth disappointed.

Overall, the Board's outlook remains upbeat, forecasting above-trend growth and ongoing improvement in the labour market. The Bank still expects that the next move in rates is more likely to be up, rather than down, but is now monitoring some additional risks, including slower global growth and tighter domestic home lending.

Retail sales came in at market, recording a +0.3% m/m growth in October. Surprisingly, NSW was a considerable drag in the month (-0.4% m/m) though the ABS report reflected poor weather conditions. Meanwhile, the trade surplus for October revealed a lower than expected level at $2.316bn.

The OECD has warned that a "*hard landing*" in the housing market could end the long period of above-average economic performance in Australia, urging a build-up of budget surpluses, overdue tax reform and stable energy policies to underpin the next phase of growth.

APRA announced the removal of its 30% restriction on the share of new residential home lending that can be made up of interest only loans, with effect 1 January 2019.

The headline number of owner-occupied loan volumes rose by a better than expected +2.2% in October, more than offsetting the -1.0% reading in September.

The unemployment rate ticked up to 5.1% in November, the first time since April in which the rate was above expectations. The participation rate moved higher by 0.2% to 65.7%.

The Australian dollar fell significantly this month, finishing at US70.58 cents (from US73.16 cents the previous month).

Credit Market

The main global credit indices were again marked wider over December as risk markets remained volatile as ongoing trade wars, geo-politics and the pace of US interest rate hikes all drove sentiment. Credit spreads are now back to where they were around three years ago (early 2016):

Index	December 2018	November 2018
CDX North American 5yr CDS	88bp	75bp
iTraxx Europe 5yr CDS	88bp	81bp
iTraxx Australia 5yr CDS	95bp	86bp

Source: Markit

IMPERIUM MARKETS

Fixed Interest Review

Benchmark Index Returns

Index	December 2018	November 2018
Bloomberg AusBond Bank Bill Index (0+YR)	+0.15%	+0.15%
Bloomberg AusBond Composite Bond Index (0+YR)	+1.50%	+0.24%
Bloomberg AusBond Credit FRN Index (0+YR)	+0.12%	+0.09%
Bloomberg AusBond Credit Index (0+YR)	+0.90%	+0.08%
Bloomberg AusBond Treasury Index (0+YR)	+1.92%	+0.32%
Bloomberg AusBond Inflation Gov't Index (0+YR)	+1.29%	-0.17%

Source: Bloomberg

Other Key Rates

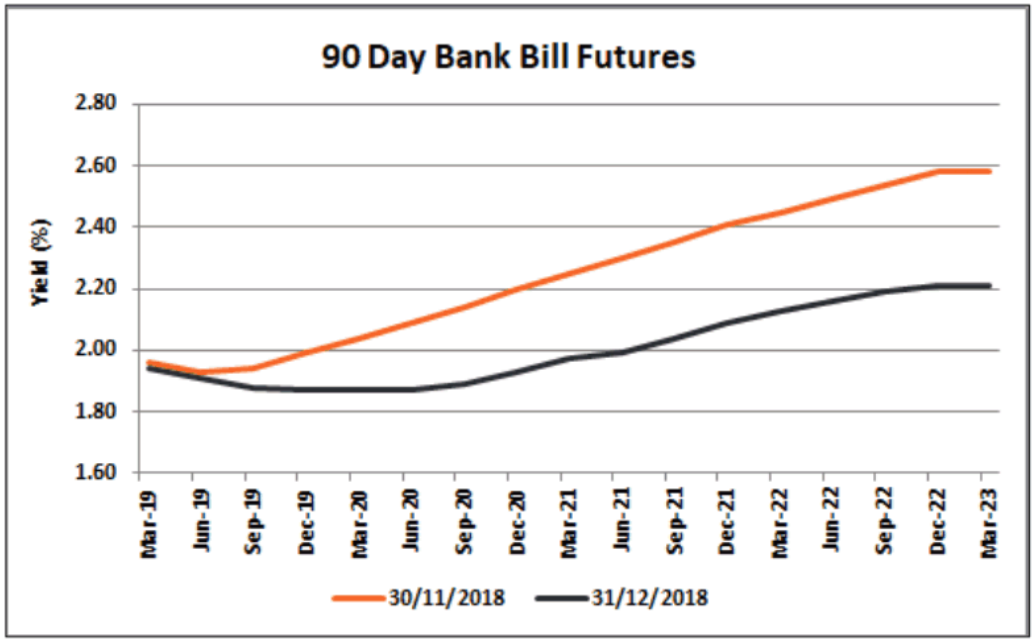
Index	December 2018	November 2018
RBA Official Cash Rate	1.50%	1.50%
90 Day BBSW Rate	2.09%	1.95%
3yr Australian Government Bonds	1.83%	2.06%
10yr Australian Government Bonds	2.32%	2.59%
US Fed Funds Rate	2.25%-2.50%	2.00%-2.25%
10yr US Treasury Bonds	2.69%	3.01%

Source: RBA, AFMA, US Department of Treasury

IMPERIUM MARKETS

90 Day Bill Futures

Over December, bill futures fell significantly across the board, following the rally in global bonds (yields falling). With the RBA's forward guidance signalling their current neutral stance on monetary policy, the futures market continues to push back the RBA's first interest rate rise to late-2020. In fact, the bill futures market is now starting to factor in the small possibility that the RBA's next move may be a rate cut:



Source: ASX

Fixed Interest Outlook

Following its latest rate hike in December 2018, the US Fed's median dot plots was lowered by 25bp for each of 2019, 2020, 2021 and also in the 'longer run' (the latter representing estimates of the so called 'neutral' rate).

In addressing the potential of when the unwinding of QE would begin, the European Central Bank (ECB) said that it will continue to reinvest principal payments from maturing securities "*for an extended time after the end of its net asset purchases*" to "*an extended period of time past the date when we start raising the key ECB interest rates and for as long as necessary to maintain favourable liquidity conditions and an ample degree of monetary accommodation*".

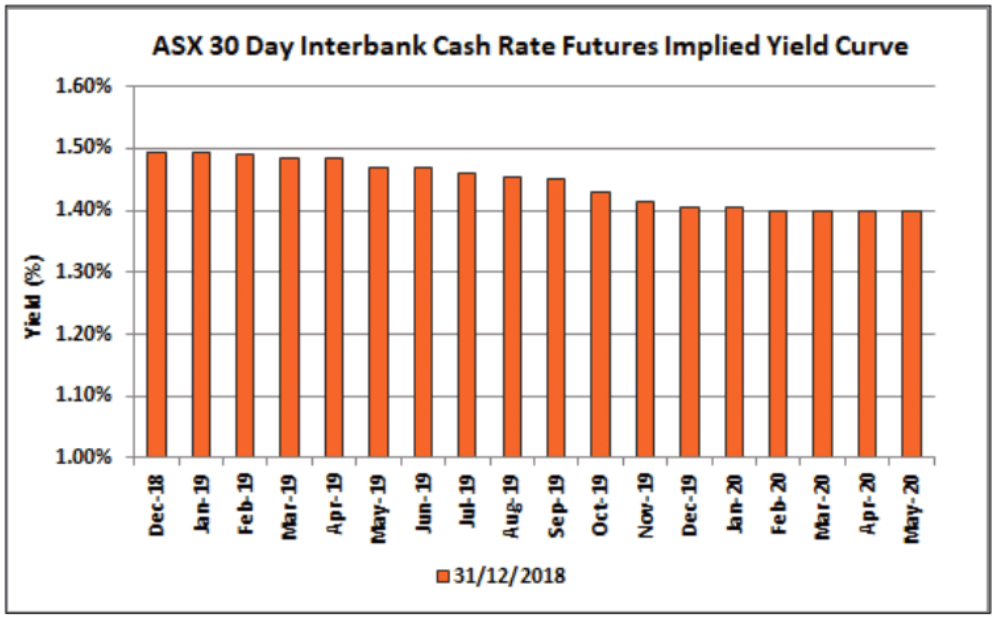
The Bank of England (BoE) is waiting for greater clarity on Brexit and is ready to adjust rates where appropriate in either direction. On a smooth Brexit deal it is clear the BoE is ready to hike rates. Markets price very little from BoE with only a 50% chance of a rate hike by August 2019 and do not fully price a rate hike until early 2020.

Domestically, the RBA reaffirmed that the next move in interest rates was more likely to be up than down. Housing concerns appears to be contained as house prices in the main capital cities are trending downwards, although the level of household debt continues to be monitored closely. The major banks have also carried their 'out of cycle' rate hikes which has assisted in cooling the domestic property market.

The key risks for the RBA stem from the impact of trade wars, US inflation, domestic employment, wage growth, housing and consumption. As a result of these uncertainties, the Bank continues to be cautious and remain neutral, opting to be a "*source of stability*".

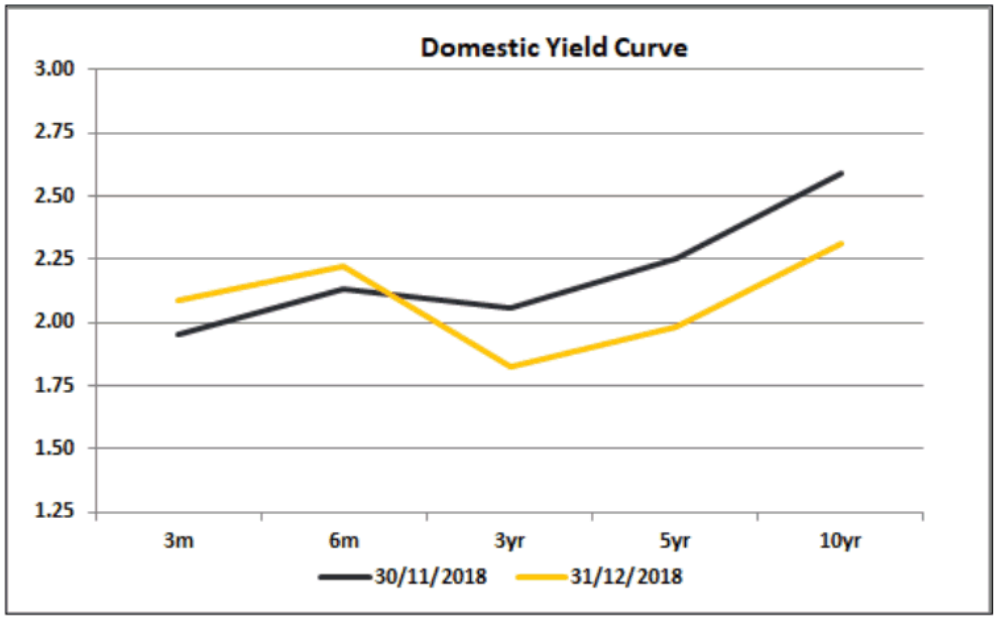
Deputy Governor Debelle indicated that although the RBA's policy guidance was unchanged, if circumstances do change, "*there is still scope for further reductions in the policy rate. It is the level of interest rates that matter.....can still move lower*".

The broader market also currently does not support any near-term monetary policy action by the RBA. **In fact, the futures market currently prices in a flat interest rate outlook over the coming 18 months, with the first rate rise pushed back until late 2020, with now some possibility of a rate cut factored in 2019:**



Source: ASX

Longer-term, the bond market continues to suggest a 'lower-for-longer' period of interest rates. The domestic yield curve rose at the short-end of the curve during December, with yields rising between 15-18bp on the back of the quarter-end liquidity squeeze. In contrast, at the longer-end of the curve, yields fell significantly by up to 27bp as domestic bond yields plummeted, following their global peers:



Source: AFMA, RBA

Disclaimer

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Portfolio as at : 31/12/2018

Type	Rating	Issuer	Allocation	Frequency	Principal	Purchase	Maturity	Rate	Accrued	Accr MTD	Reference
TD	A+	Rabobank Australia Branch	GENERAL	Annual	2,000,000	20/01/2015	20/01/2019	3.9000	73,512.33	6,624.66	12744
TD	AA-	Westpac	GENERAL	Annual	5,000,000	19/01/2017	21/01/2019	3.1700	150,683.56	13,461.64	032-586 518451
TD	AA-	Westpac	GENERAL	Annual	2,000,000	24/01/2017	24/01/2019	3.1500	59,030.14	5,350.68	032-586 518670
TD	BBB	Newcastle Permanent	GENERAL	Annual	2,000,000	08/03/2016	08/03/2019	3.6000	58,980.82	6,115.07	29806
TD	BBB+	Bendigo and Adelaide	GENERAL	Annual	4,000,000	15/03/2017	15/03/2019	3.1000	99,200.00	10,531.51	2214551
TD	AA-	Westpac	GENERAL	Annual	2,000,000	27/03/2017	27/03/2019	3.0100	46,180.82	5,112.88	032-586 521159
TD	BBB+	Bendigo and Adelaide	GENERAL	Annual	2,000,000	27/03/2017	27/03/2019	2.9500	45,260.27	5,010.96	2224894
TD	BBB+	Bendigo and Adelaide	GENERAL	Annual	3,000,000	11/04/2017	11/04/2019	3.0000	65,342.47	7,643.84	2240503
TD	BBB	Members Equity Bank	GENERAL	Annual	4,000,000	27/04/2017	27/04/2019	2.9300	79,952.88	9,953.97	24460
TD	A	AMP Bank	GENERAL	At Maturity	5,000,000	17/05/2018	07/05/2019	2.7500	86,267.12	11,678.08	TD364564047-478891
TD	BBB	Members Equity Bank	GENERAL	Annual	3,000,000	19/05/2017	20/05/2019	2.8700	53,075.34	7,312.60	24821
TD	A+	Rabobank Australia Branch	GENERAL	Annual	6,000,000	23/05/2016	23/05/2019	3.1500	115,471.23	16,052.05	18843
TD	AA-	Westpac	GENERAL	Quarterly	3,000,000	29/05/2018	11/06/2019	2.7100	7,350.41	6,904.93	6775257
TD	BBB+	Bendigo and Adelaide	GENERAL	Annual	2,000,000	07/07/2016	08/07/2019	3.1500	30,378.08	5,350.68	1986640
TD	AA-	NAB	GENERAL	At Maturity	2,000,000	17/07/2018	16/07/2019	2.7800	25,591.23	4,722.19	GMI-DEAL-10549241
TD	AA-	Westpac	GENERAL	Annual	4,000,000	24/07/2017	24/07/2019	2.9400	51,872.88	9,987.95	032-697 114230
TD	AA-	Westpac	GENERAL	Annual	3,000,000	15/08/2016	15/08/2019	3.1000	35,416.44	7,898.63	032-586 511-284
TD	BBB	Newcastle Permanent	GENERAL	Annual	2,000,000	15/08/2016	15/08/2019	3.0000	22,849.32	5,095.89	31125
TD	AA-	Westpac	GENERAL	Annual	3,000,000	22/08/2017	22/08/2019	2.9000	31,463.01	7,389.04	032-697 115436
TD	A	ING Direct	GENERAL	Annual	5,000,000	22/08/2017	22/08/2019	2.7500	49,726.03	11,678.08	26932
TD	AA-	Commonwealth Bank	GENERAL	Annual	3,000,000	04/09/2017	29/08/2019	2.7300	26,701.64	6,955.89	B37942904.6
TD	AA-	Westpac	GENERAL	Annual	3,000,000	04/09/2017	04/09/2019	2.9600	28,951.23	7,541.92	032-697 115 794
TD	AA-	St George Bank	GENERAL	Annual	5,000,000	08/09/2016	08/09/2019	3.2000	49,534.25	13,589.04	355290684
TD	AA-	St George Bank	GENERAL	Annual	4,000,000	27/09/2016	27/09/2019	3.2000	33,665.75	10,871.23	355333138
TD	AA-	NAB	GENERAL	Annual	3,000,000	11/07/2018	15/10/2019	2.8500	40,758.90	7,261.64	GMI-DEAL-10547992
TD	A	ICBC Sydney Branch	GENERAL	Annual	4,000,000	31/10/2018	29/10/2019	2.8300	19,228.49	9,614.25	00001
TD	A	ICBC Sydney Branch	GENERAL	At Maturity	5,000,000	20/11/2018	12/11/2019	2.8600	16,454.79	12,145.21	0125001100000186702
TD	A	ICBC Sydney Branch	GENERAL	Annual	4,000,000	13/11/2018	19/11/2019	2.8600	15,357.81	9,716.16	00003
TD	A	ICBC Sydney Branch	GENERAL	Annual	5,000,000	28/11/2018	26/11/2019	2.8200	13,134.25	11,975.34	00006
TD	AA-	Westpac	GENERAL	Annual	3,000,000	14/12/2018	10/12/2019	2.7300	4,038.90	4,038.90	7389786
TD	AA-	Westpac	GENERAL	Annual	4,000,000	14/12/2018	17/12/2019	2.7300	5,385.21	5,385.21	7389774
TD	BBB	Members Equity Bank	GENERAL	Annual	2,000,000	24/01/2017	24/01/2020	3.2600	61,091.51	5,537.53	22835
TD	A	ING Direct	GENERAL	Annual	4,000,000	15/02/2018	17/02/2020	2.8700	100,646.58	9,750.14	30810

Type	Rating	Issuer	Allocation	Frequency	Principal	Purchase	Maturity	Rate	Accrued	Accr MTD	Reference
TD	A	ING Direct	GENERAL	Annual	4,000,000	28/02/2018	03/03/2020	2.8900	97,230.68	9,818.08	378133
TD	BBB	Newcastle Permanent	GENERAL	Annual	2,000,000	10/03/2016	10/03/2020	3.7000	59,808.22	6,284.93	29843
TD	A	ING Direct	GENERAL	Annual	4,000,000	02/03/2018	17/03/2020	2.8800	96,263.01	9,784.11	378677
TD	BBB+	BOQ	GENERAL	Annual	3,000,000	19/05/2017	19/05/2020	3.0000	55,479.45	7,643.84	453470
TD	A	ING Direct	GENERAL	Annual	4,000,000	22/05/2018	26/05/2020	2.9400	72,170.96	9,987.95	403498
TD	A	ING Direct	GENERAL	Annual	3,000,000	29/05/2018	09/06/2020	2.8800	51,366.58	7,338.08	6775257
TD	AA-	Westpac	GENERAL	Quarterly	5,000,000	06/06/2018	16/06/2020	2.9100	10,364.38	10,364.38	6795148
TD	AA-	NAB	GENERAL	Annual	5,000,000	03/07/2018	07/07/2020	2.9000	72,301.37	12,315.07	10545823
TD	AA-	NAB	GENERAL	Annual	3,000,000	11/07/2018	14/07/2020	2.9200	41,760.00	7,440.00	GMI-DEAL-10547993
TD	A	ING Direct	GENERAL	Annual	4,000,000	21/08/2018	25/08/2020	2.8500	41,539.73	9,682.19	424329
TD	A	ING Direct	GENERAL	Annual	4,000,000	13/09/2018	08/09/2020	2.8700	34,597.26	9,750.14	429068
TD	AA-	Westpac	GENERAL	Annual	3,000,000	13/09/2017	14/09/2020	3.1700	28,660.27	8,076.99	032-697 116017
TD	A	ING Direct	GENERAL	Annual	4,000,000	13/09/2018	22/09/2020	2.8700	34,597.26	9,750.14	429067
TD	AA-	NAB	GENERAL	Annual	4,000,000	17/10/2018	13/10/2020	2.7800	23,153.97	9,444.38	GMI-DEAL-10573417
TD	A	ICBC Sydney Branch	GENERAL	Annual	6,000,000	31/10/2018	27/10/2020	2.9300	29,861.92	14,930.96	00002
TD	A	ICBC Sydney Branch	GENERAL	Annual	5,000,000	13/11/2018	10/11/2020	2.9300	19,667.12	12,442.47	00004
TD	A	ICBC Sydney Branch	GENERAL	Annual	2,000,000	05/12/2018	08/12/2020	2.8600	4,231.23	4,231.23	0125001100000186702
TD	A	ICBC Sydney Branch	GENERAL	Annual	6,000,000	14/12/2018	15/12/2020	2.8900	8,551.23	8,551.23	00009
TD	BBB+	BOQ	GENERAL	Annual	2,000,000	24/01/2017	25/01/2021	3.6500	68,400.00	6,200.00	438425
TD	AA-	Westpac	GENERAL	Annual	2,000,000	21/02/2017	22/02/2021	3.3900	58,326.58	5,758.36	032-586 519825
TD	BBB+	BOQ	GENERAL	Annual	3,000,000	10/03/2016	10/03/2021	3.8000	92,136.99	9,682.19	391843
TD	AA-	Westpac	GENERAL	Quarterly	4,000,000	22/03/2018	23/03/2021	3.0200	2,647.67	2,647.67	6791206
TD	AA-	Westpac	GENERAL	Quarterly	4,000,000	22/05/2018	25/05/2021	3.1000	13,589.04	10,531.51	6927394
TD	A+	Rabobank Australia Branch	GENERAL	Annual	5,000,000	08/06/2017	07/06/2021	3.0200	85,635.62	12,824.66	25359
TD	AA-	Westpac	GENERAL	Quarterly	3,000,000	06/06/2018	15/06/2021	3.1000	6,624.66	6,624.66	6795153
TD	AA-	NAB	GENERAL	Annual	4,000,000	03/07/2018	22/06/2021	3.0000	59,835.62	10,191.78	10545826
TD	AA-	NAB	GENERAL	Annual	3,000,000	03/07/2018	06/07/2021	3.0000	44,876.71	7,643.84	083-375 99-999-9947
TD	AA-	Westpac	GENERAL	Quarterly	5,000,000	17/07/2018	13/07/2021	3.0400	31,649.32	12,909.59	7052868
TD	AA-	NAB	GENERAL	Annual	4,000,000	26/07/2018	20/07/2021	3.0400	52,970.96	10,327.67	GMI-DEAL-10552065
TD	AA-	NAB	GENERAL	Annual	5,000,000	02/08/2018	03/08/2021	3.0700	63,923.29	13,036.99	GMI-DEAL-10554251
TD	AA-	Westpac	GENERAL	Quarterly	5,000,000	13/09/2018	14/09/2021	2.8800	7,495.89	7,495.89	7180013
TD	AA-	NAB	GENERAL	Annual	5,000,000	27/09/2018	28/09/2021	3.0500	40,109.59	12,952.05	GMI-DEAL-10568550
TD	AA-	Westpac	GENERAL	Quarterly	5,000,000	13/09/2018	12/10/2021	2.8900	7,521.92	7,521.92	7179943
TD	A	ICBC Sydney Branch	GENERAL	Annual	4,000,000	05/12/2018	07/12/2021	3.0100	8,906.30	8,906.30	0125001100000186702
TD	AA-	Westpac	GENERAL	Annual	2,000,000	21/02/2017	21/02/2022	3.6100	62,111.78	6,132.05	23294
TD	AA-	NAB	GENERAL	Annual	5,000,000	21/02/2017	21/02/2022	3.4600	148,827.40	14,693.15	10420935

Type	Rating	Issuer	Allocation	Frequency	Principal	Purchase	Maturity	Rate	Accrued	Accr MTD	Reference
TD	BBB+	BOQ	GENERAL	Annual	2,000,000	15/03/2017	15/03/2022	3.8000	60,800.00	6,454.79	445483
TD	A+	Rabobank Australia Branch	GENERAL	Annual	5,000,000	08/06/2017	07/06/2022	3.2200	91,305.85	13,673.97	25360
TD	AA-	NAB	GENERAL	Annual	4,000,000	02/08/2018	02/08/2022	3.2200	53,637.26	10,939.18	GMI-DEAL-10554252
TD	AA-	NAB	GENERAL	Annual	4,000,000	16/08/2018	16/08/2022	3.0500	46,126.03	10,361.64	GMI-DEAL-10557367
TD	A+	Rabobank Australia Branch	GENERAL	Annual	3,000,000	13/09/2017	13/09/2022	3.3800	30,558.90	8,612.05	27388
TD	AA-	Westpac	GENERAL	Annual	3,000,000	13/09/2017	13/09/2022	3.4100	30,830.14	8,688.49	032-697 116 009
CASH	AA-	Westpac	GENERAL	Monthly	21,648,870.5	31/05/2017	31/12/2018	2.2000	40,450.77	40,450.77	WESTPAC COMMERCIAL BANK 31 DAY NOTICE SAVER ACCOUNT
TOTALS					$296,648,870.5				$3,554,311.71	$711,355.13	

PORT MACQUARIE-HASTINGS
COUNCIL

Monthly Investment Report

January 2019

IMPERIUM MARKETS

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Executive Summary

Compliance

Compliance Measure	Within Policy Limits (Y/N)	Reason if Not Compliant
Term to Maturity	Yes – Compliant	n/a
Counterparty	Yes – Compliant	n/a
Credit Quality	Yes – Compliant	n/a

Performance

As at 31/01/2019	1m (actual)	1m (% p.a.)	FYTD (actual)	FYTD (% p.a.)
AusBond Bank Bill Index	0.18%	2.14%	1.18%	2.01%
Council's Portfolio^	**0.25%**	**3.02%**	**1.76%**	**3.00%**
Outperformance	0.07%	0.88%	0.58%	0.99%

^Total portfolio performance excludes Council's cash account holdings. Overall returns would be lower if cash was included.

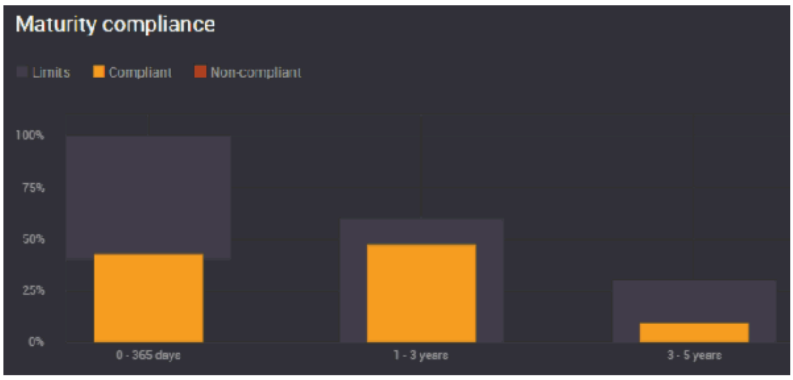
Council's Portfolio

Asset Allocation

The entire portfolio is directed to fixed term deposits (93.23%) and the 31 day Notice Saver Account with Westpac (6.77%). With credit securities widening, we suggest Council consider introducing liquid senior floating rate notes (FRNs) into the portfolio. This will not only offer additional upside with regards to the portfolio's investment returns, but also provide additional liquidity (FRNs are saleable – generally accessible within 2 business days).

Term to Maturity

All maturity limits (minimum and maximum) comply with the Investment Policy. Medium-Term (3-5 years) assets account for around 9½% of the total investment portfolio, with capacity of around $59m at month-end.



Where there is (counterparty) capacity to invest in attractive 3-5 year investments, we recommend this be allocated to new senior FRN issues and fixed or floating rate term deposits (refer to respective sections below).

Compliant	Horizon	Invested ($)	Invested (%)	Min. Limit (%)	Max. Limit (%)	Available ($)
✓	0 – 365 days	$124,679,135	42.89%	40%	100%	$166,000,000
✓	1 – 3 years	$138,000,000	47.48%	0%	60%	$36,407,481
✓	3 – 5 years	$28,000,000	9.63%	0%	30%	$59,203,741
✓	5 – 10 years	$0	0.00%	0%	15%	$43,601,870
		290,679,135	**100.00%**			

Counterparty

As at the end of January, Council did not have an overweight position to any single ADI. Overall, the portfolio is diversified across the investment grade credit spectrum (rated BBB- or higher), with no exposure to unrated ADIs.

Compliant	Issuer	Rating	Invested ($)	Invested (%)	Max. Limit (%)	Available ($)
✓	CBA	AA-	$3,000,000	1.03%	40.00%	$113,271,654
✓	NAB	AA-	$51,000,000	17.55%	40.00%	$65,271,654
✓	WBC (St George)	AA-	$99,679,135	34.29%	40.00%	$16,592,519
✓	Rabobank	A+	$19,000,000	6.54%	20.00%	$39,135,827
✓	AMP	A	$5,000,000	1.72%	20.00%	$53,135,827
✓	ICBC Sydney	A	$41,000,000	14.10%	20.00%	$17,135,827
✓	ING Bank	A	$36,000,000	12.38%	20.00%	$22,135,827
✓	BOQ	BBB+	$10,000,000	3.44%	10.00%	$19,067,914
✓	Bendigo	BBB+	$11,000,000	3.78%	10.00%	$18,067,914
✓	ME Bank	BBB	$9,000,000	3.10%	10.00%	$20,067,914
✓	Newcastle PBS	BBB	$6,000,000	2.06%	10.00%	$23,067,914
			$290,679,135	**100.00%**		

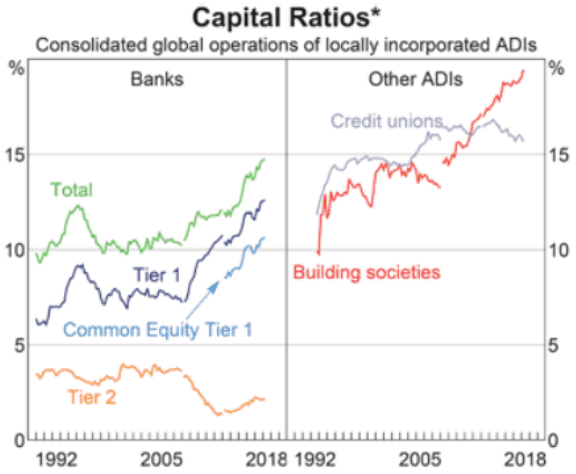
We remain supportive of the regional and unrated ADI sector (and have been even throughout the GFC period). They continue to remain solid, incorporate strong balance sheets, while exhibiting high levels of capital – typically, much higher compared to the higher rated ADIs. Some unrated ADIs have up to 25-40% more capital than the domestic major banks, and well above the Basel III requirements.

APRA's Chairman affirmed that the banks had satisfactorily moved towards an '*unquestionably strong*' capital position and that bank's stress testing contingency plans were now far better positioned that was previously the case years ago. APRA's stress test which hypothetically increased the unemployment rate to 11% (more than double the current rate) and for house prices to fall 35% showed the banks remained above the minimum capital levels. We note that APRA's latest discussion paper also highlighted that the domestic major banks were required to raise more capital while the lower rated ADIs were already deemed to be at a satisfactory level.

Overall, the lower rated ADIs (BBB and unrated) are generally now in a better financial position then they have been historically (see the Capital Ratio figure below). We believe that deposit investments with the lower rated ADIs should be continued going forward, particularly when they offer 'above market' specials. Not only would it diversify the investment portfolio and reduce credit risk, it would also improve the portfolio's overall returns.

In the current environment of high regulation and scrutiny, all domestic ADIs continue to carry high levels of capital, particularly amongst the lower ("BBB") and unrated ADIs. There is minimal (if any) probability of any ADI defaulting on their deposits going forward – this was stress tested during the GFC.

The biggest single risk that depositors face in the current low interest rate environment is not credit risk, but reinvestment risk.



* Per cent of risk-weighted assets; break in March 2008 due to the introduction of Basel II for most ADIs; break in March 2013 due to the introduction of Basel III for all ADIs

Source: APRA

IMPERIUM MARKETS

Credit Quality

The portfolio remains lightly diversified from a credit ratings perspective. The portfolio is entirely directed to the investment grade ADIs (BBB- or higher), with zero allocation to unrated ADIs. There is high capacity to invest in the higher rated ADIs (A or higher), particularly after the downgrades of BoQ and Bendigo-Adelaide Bank in May 2017, which now fall back into the "BBB" rated category.

The "BBB" rated category remains marginally below maximum limits (capacity of around ~$7.6m). The capacity within this category is also dependent on the overall portfolio's balances i.e. cash position.

We note that in the previous revision of the Investment Policy on 15 November 2017, Council decided to keep the maximum aggregate limit for "BBB" rated ADIs at 15% of the total investment portfolio. We believe Council's maximum limit of 15% in aggregate with the "BBB" rated ADIs is very low compared to some other NSW local government clients who have a maximum limit of up to 50%. This, at times has forced Council to invest with ADIs offering rates well below market and therefore reduced Council's overall interest income.

Given the large number of "BBB" rated ADIs currently in the market (and conversely, the low number of "A" or higher rated ADIs), we suggest Council increase this particular limit at its next Policy review. We note that it is within this category where the most value is currently experienced. Above market 'specials' are frequently offered in this sector.

In mid-April 2018, we provided Council a draft Investment Policy to address the current situation. Council is currently in the process of reviewing and adopting a new Policy following our presentation to Council in mid-September 2018.

All ratings categories are within the Policy limits:

Compliant	Credit Rating	Invested ($)	Invested (%)	Max. Limit (%)	Available ($)
✓	AA Category	$153,679,135	52.87%	100%	$137,000,000
✓	A Category	$101,000,000	34.75%	60%	$73,407,481
✓	BBB Category	$36,000,000	12.38%	15%	$7,601,870
✓	Unrated ADIs	$0	0.00%	10%	$29,067,914
		$290,679,135	**100.00%**		

IMPERIUM MARKETS

Performance

Council's performance for the month ending 31 January 2019 is summarised as follows:

Performance	1 month	3 months	6 months	FYTD	1 year
Official Cash Rate	0.13%	0.38%	0.75%	0.88%	1.50%
AusBond Bank Bill Index	0.18%	0.49%	0.98%	1.18%	1.95%
Council's Portfolio^	**0.25%**	**0.75%**	**1.50%**	**1.76%**	**3.02%**
Outperformance	**0.07%**	**0.27%**	**0.52%**	**0.58%**	**1.07%**

^Total portfolio performance excludes Council's cash account holdings. Overall returns would be lower if cash was included.

For the month of January, the deposit portfolio provided a solid return of +0.25% (actual), outperforming the benchmark AusBond Bank Bill Index return by +0.07% (actual). The strong performance continues to be driven by the handful of deposits still yielding above 3½% p.a. However, most of these individual deposits have now matured and will be reinvested at lower prevailing rates.

Over the past year, the deposit portfolio returned +3.02% p.a., outperforming bank bills by 1.07% p.a. and more than double the official cash rate of 1½%. This has been relatively strong given deposit rates reached their all-time lows and margins have generally contracted over the past 2-2½ years.

Investors using the Imperium Markets platform have reduced the invisible costs associated with brokerage, and thereby lift client portfolio returns as investors are able to deal in deposits directly with the ADIs and execute at the best price possible. Council has experienced this over the past 6-9 months, receiving on average, 2-4bp higher for every deposit dealt on the platform.

IMPERIUM MARKETS

Council's Term Deposit Portfolio & Recommendation

As at the end of January 2019, Council's deposit portfolio was yielding 3.01% p.a. (down 1bp from the previous month), with an average duration of ~1.5 years. Where possible, we recommend Council extends or at least maintains this average duration. In the low interest rate environment, the biggest collective risk that the local government sector has faced over the post-GFC era has been the dramatic fall in interest rates - from 7¼% to the current historical low levels of 1½%.

As the past decade has highlighted (post-GFC era), we have seen too many portfolios' roll a high proportion of their deposits between 3-6 months, resulting in their deposits being reinvested at lower prevailing rates. That is, depositors have generally not insured themselves against the low interest rate environment by diversify their funding across various tenors (out to 5 years) but rather placed all their 'eggs in one basket' and kept all their deposits short. **Reinvestment risk has collectively been and continues to be the biggest detriment to depositors' interest income over the post-GFC period**.

At the time of writing (early February), we see value in:

ADI	LT Credit Rating	Term	T/D Rate
Newcastle Permanent BS	BBB	3 years	~3.05% p.a.
Police CU SA	Unrated	2 years	~2.95% p.a.
Newcastle Permanent BS	BBB	2 years	~2.95% p.a.
BoQ	BBB+	2 years	2.90% p.a.

For those investors that have capacity issues with the "BBB" and unrated ADI sector, we see value in:

ADI	LT Credit Rating	Term	T/D Rate
AMP	A	3 years	^2.95% p.a.
AMP	A	2 years	^2.95% p.a.
ICBC Sydney Branch	A	2 years	~2.83% p.a.

^ AMP T/Ds – these are grossed up rates which includes a 0.20% p.a. rebated commission from Imperium Markets. $5m cap applies per individual investor.

The above deposits are suitable for investors looking to provide some income protection and mitigate reinvestment/rollover risk in the low interest rate environment.

For terms under 12 months, we believe the strongest value is currently being offered by a number of lower and unrated ADIs offering above-market specials (dependent on daily funding requirements):

ADI	LT Credit Rating	Term	T/D Rate
Summerland CU	Unrated ADI	12 months	2.90% p.a.
Nexus Mutual	Unrated ADI	12 months	2.90% p.a.
Bank of Sydney	Unrated ADI	12 months	2.90% p.a.
Police CU SA	Unrated ADI	12 months	2.89% p.a.
Bank of Us	Unrated ADI	12 months	2.87% p.a.
Auswide	BBB	6 months	2.85% p.a.
Summerland CU	Unrated ADI	6 months	2.85% p.a.
Nexus Mutual	Unrated ADI	6-7 months	2.85% p.a.
Bank of Us	Unrated ADI	5-9 months	2.85% p.a.
Australian Military Bank	Unrated ADI	12 months	2.83% p.a.
Bank of Us	Unrated ADI	4 months	2.82% p.a.
Summerland CU	Unrated ADI	3 months	2.80% p.a.
BoQ	BBB+	6 months	2.80% p.a.
Auswide Bank	BBB	6 months	2.80% p.a.
ME Bank	BBB	3-12 months	2.75% p.a.

Amongst the higher rated ADIs ("A" rated or higher), the following deposits remain attractive for terms under 12 months:

ADI	LT Credit Rating	Term	T/D Rate
AMP	A	6-9 months	^3.00% p.a.
ICBC Sydney Branch	A	12 months	2.84% p.a.
NAB	AA-	12 months	2.75% p.a.
NAB	AA-	4-11 months	2.70%-2.73% p.a.
NAB	AA-	3 months	2.70% p.a.

^ AMP T/Ds – these are grossed up rates which includes a 0.20% p.a. rebated commission from Imperium Markets. $5m cap applies per individual investor.

IMPERIUM MARKETS

Senior FRNs & Recommendations

Over January, amongst the senior major bank FRNs, physical credit securities remained relatively flat across the board. There were new issuances from three major banks during the month including CBA (AA-) issuing a 5 year deal at +113bp, which was soon followed by Westpac's (AA-) 5¼ year issue at +114bp. Late in the month, ANZ (AA-) issued a dual 3 and 5 year senior FRN deal at +88bp and +110bp respectively.

We see good value for a new 5 year major bank FRN (at around +110bp), given the slight premium offered in the primary market, and particularly once factoring in the potential capital gains which could be realised from as early as two years after being launched. The grossed up returns would be around +140-145bp over a 2 year holding period in a relatively stable credit environment, over and above where the highest margins are paying compared to the medium to longer-dated deposits.

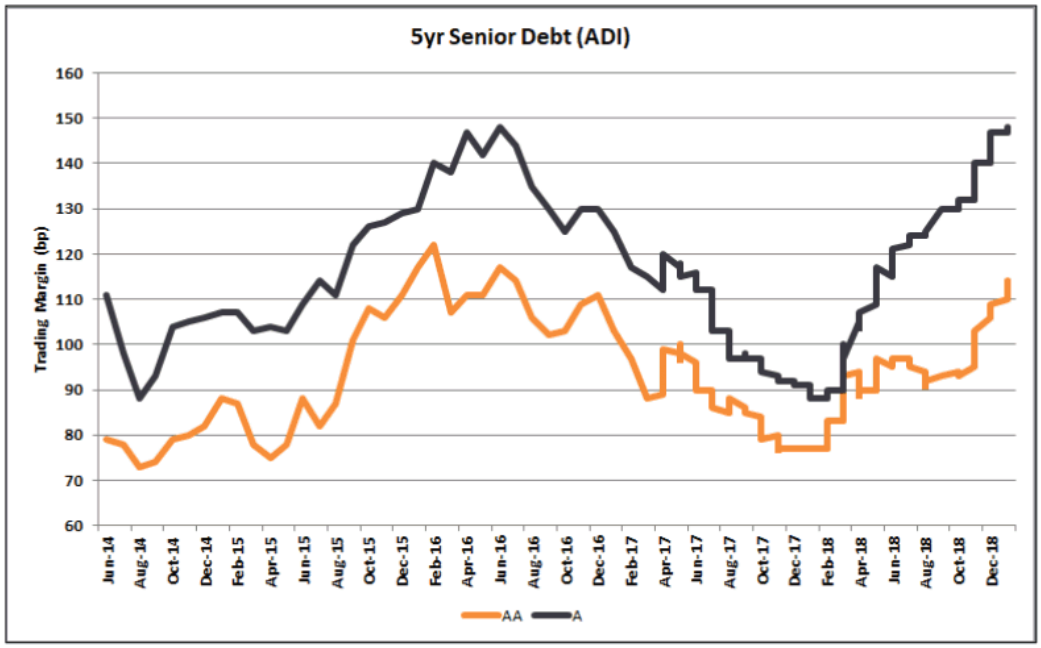
We continue to see better value in longer tenors (i.e. favour 5 year terms over 3 year terms) amongst the "AA" rated ADIs due to their high liquidity and ability to 'roll down the curve' over a 2-2½ year holding period.

Collectively, over the month, the "A" rated and "BBB" rated cohorts remained flat with very little turnover (traditionally) in the secondary market amongst the lower regional ADIs.

Overall, credit remains relatively tight on a historical basis but much more attractive after the recent correction experienced in credit markets over December / early January. The relative movement in spreads between medium-longer dated deposits and FRNs has seen the latter become much more attractive over the past few months.

Senior FRNs (ADIs)	31/01/2019	31/12/2018
"AA" rated – 5yrs	+110bp	+109bp
"AA" rated – 3yrs	+86bp	+87bp
"A" rated – 5yrs	+148bp	+147bp
"A" rated – 3yrs	+123bp	+123bp
"BBB" rated – 3yrs	+133bp	+135bp

Source: IBS Capital



Source: IBS Capital

We generally recommend switches ('benchmark' issues only) into new primary issues, out of the following senior FRNs that are maturing:

- On or before 2021 for the "AA" rated ADIs (domestic major banks);
- On or before 2019 for the "A" rated ADIs; and
- Within 12 months for the "BBB" rated ADIs (consider case by case).

Investors holding onto the above senior FRNs in their last 1-2 years are now generally holding sub-optimal investments and are not maximising returns by foregoing realised capital gains. In the current low interest rate environment, any boost in overall returns should be locked in when it is advantageous to do so.

We recommend Council starts introducing liquid senior FRNs into the portfolio, potentially starting with the domestic major banks.

Economic Commentary Review

International Market

Global share markets rebounded strongly over January after reassuring developments over the US-China trade war, the temporary end to the US government shutdown, as well as the US Fed signalling they would remain patient with regards to future monetary policy action.

In the US, **equity markets rallied strongly with the S&P 500 Index gaining +7.68%, while the NASDAQ surged +9.74%**. European equity markets followed the US lead, with **Germany's DAX up +5.82%, France's CAC +5.54% and UK's FTSE +3.58%**. Despite Italy technically falling into a recession over the second half of 2018 (contracted -0.2% in Q4 2018 following -0.1% fall in Q3 2018), Italy's share market rallied +7.68% for the month of January.

US headline CPI came in at -0.1% in December on lower oil prices, while core CPI came in at +0.2% for an unchanged +2.2% annual rate. The US unemployment rate rose from 3.7% to 3.9% in December, but this was due to a surge in the labour force (+419k) which in turn lifted the participation rate up by 0.2% to 63.1%.

The **UK Brexit 'Withdrawal Agreement' was defeated by a crushing 432 to 202**, with Labour tabling a no confidence motion. The extension of Article 50 and a possible second referendum are the singularly most likely ways forward from here.

Eurozone core inflation for December came in as expected at +1.0% y/y. Headline inflation though missed by one-tenth at +1.6% y/y against +1.7% expected.

The **International Monetary Fund (IMF) downgraded its global growth forecasts for the second time in three months, to 3.5% from 3.7%** in October. Germany's economy was downgraded by -0.6%, with the IMF seeing the outlook skewed to the downside, citing trade tariffs, renewed tightening financial conditions, a 'no-deal' Brexit and a bigger than anticipated slowdown in China.

China's Q4 GDP rose +6.4% y/y from +6.5% in Q3. The government announced a 1% cut to the Reserve Requirement Ratio, applicable to all banks and to be enacted in two stages but very close together (Jan 15th and 25th). China's December trade data came in well below expectations. Total exports fell to US$221.25bn, down -1.4% from November and -4.4% over the year. Imports were down -7.6% over the year against expectations of +4.5%. The fall in exports is symptomatic of weaker global demand that transcends the impact of US tariffs, with weaker exports to both the Eurozone as well as the US. Weaker imports was viewed as evidence of an even sharper slowdown in China's economy.

The **MSCI World ex-AUS gained +7.70%** for the month of January.

Index	1m	3m	1yr	3yr	5yr	10yr
S&P 500 Index	+7.87%	-0.28%	-4.24%	+11.70%	+8.69%	+12.59%
MSCI World ex-AUS	+7.70%	+0.25%	-8.24%	+9.17%	+5.06%	+9.32%
S&P ASX 200 Accum. Index	+3.87%	+1.45%	+1.37%	+10.09%	+7.10%	+9.96%

Source: S&P, MSCI

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Domestic Market

RBA credit growth came in line with expectations in November at +0.3% m/m and +4.4% y/y. Housing credit growth was unchanged at +0.3% m/m and business credit growth was unchanged at +0.5% m/m. Owner-occupied housing credit is still up +6.8% y/y while investor housing credit is up just +1.1% y/y. Total housing credit is up +4.9% y/y.

Building approvals fell -9.1% m/m in November and -33% for the year, showing a significant pullback in residential apartment approvals. This was a sign that builders, unsurprisingly, are less keen to add to the residential pipeline in an environment of falling prices in Sydney and Melbourne. Approvals overall are now declining at a rate of -2.3% per month in trend terms.

The November trade balance ($1,925m) shrank, from a revised down October surplus of $2,013m, but continues to suggest Australian exports growth is robust.

Retail sales for November came in at +0.4% m/m. While the data is not as soft as the market had feared, it is probably still not enough to offset concerns of a soft Q4 outcome for consumer spending, given reports of a weak December period.

The unemployment rate fell to 5.0% in December (from 5.1% in November), assisted by solid employment growth of 22k (+25k in full-time and -3k in full-time jobs), and a pullback in the volatile participation rate.

Q4 2018 headline CPI grew +0.53%, bringing the year-end inflation to +1.8% y/y. The **trimmed mean came in at +0.43% q/q, resulting in the year-end core inflation at +1.8% y/y. This marks a record three years of core inflation below the RBA's target band of 2-3%**.

The Australian dollar reversed its trend this month, gaining close to +3%, finishing at US72.68 cents (from US70.58 cents the previous month).

Credit Market

The main global credit indices reversed their recent trend and **significantly tightened between 18-25%** over the month of January. Credit spreads remain close to where they were around two years ago (early 2017):

Index	January 2019	December 2018
CDX North American 5yr CDS	66bp	88bp
iTraxx Europe 5yr CDS	71bp	88bp
iTraxx Australia 5yr CDS	78bp	95bp

Source: Markit

IMPERIUM MARKETS

Fixed Interest Review

Benchmark Index Returns

Index	January 2019	December 2018
Bloomberg AusBond Bank Bill Index (0+YR)	+0.18%	+0.15%
Bloomberg AusBond Composite Bond Index (0+YR)	+0.64%	+1.50%
Bloomberg AusBond Credit FRN Index (0+YR)	+0.28%	+0.12%
Bloomberg AusBond Credit Index (0+YR)	+0.52%	+0.90%
Bloomberg AusBond Treasury Index (0+YR)	+0.71%	+1.92%
Bloomberg AusBond Inflation Gov't Index (0+YR)	+1.15%	+1.29%

Source: Bloomberg

Other Key Rates

Index	January 2019	December 2018
RBA Official Cash Rate	1.50%	1.50%
90 Day BBSW Rate	2.07%	2.09%
3yr Australian Government Bonds	1.75%	1.83%
10yr Australian Government Bonds	2.24%	2.32%
US Fed Funds Rate	2.25%-2.50%	2.25%-2.50%
10yr US Treasury Bonds	2.63%	2.69%

Source: RBA, AFMA, US Department of Treasury

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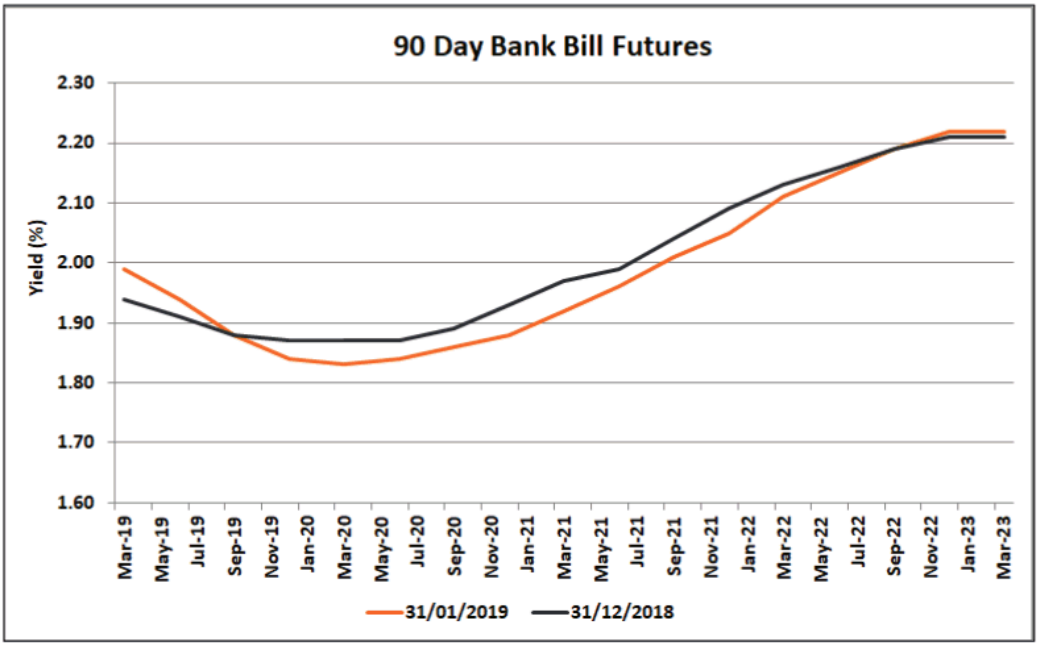
90 Day Bill Futures

Over January, bill futures fell significantly across the board despite financial markets rebounding strongly. Global bond yields fell on expectations that the US Fed will now be more data-dependent before even considering further rate hikes. Domestically, the futures market is now factoring in around a 50% chance of a rate cut by the end of 2019 which also contributed to the reduction in the bill futures curve over the month:



Source: ASX

Fixed Interest Outlook

After the US Fed stood pat in its meeting late January, the Committee pledged to be patient on further adjustments to their target range, citing "*global economic and financial developments and muted inflation pressures*".

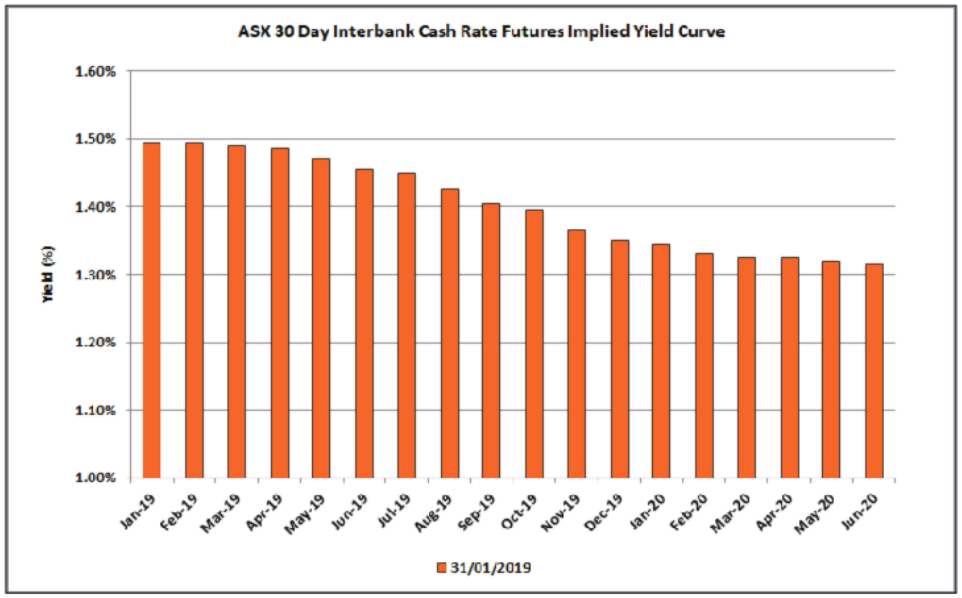
The Bank of England (BoE) is waiting for greater clarity on Brexit and is ready to adjust rates where appropriate in either direction. On a smooth Brexit deal it is clear the BoE is ready to hike rates.

Domestically, the RBA still believes that the next move in interest rates was more likely to be up than down although the market is trending towards the opposite view. Housing concerns continue to be monitored as house prices in the main capital cities are trending downwards, while the level of household debt continues to remain relatively high. The banks have also carried their 'out of cycle' rate hikes, citing increased cost of funding due to weaker credit markets, which in turn has assisted in the cooling of the domestic property market.

The key risks for the RBA stem from the impact of trade wars, US inflation, domestic employment, wage growth, housing and consumption. As a result of these uncertainties, the Bank continues to be cautious and remain neutral, opting to be a "*source of stability*".

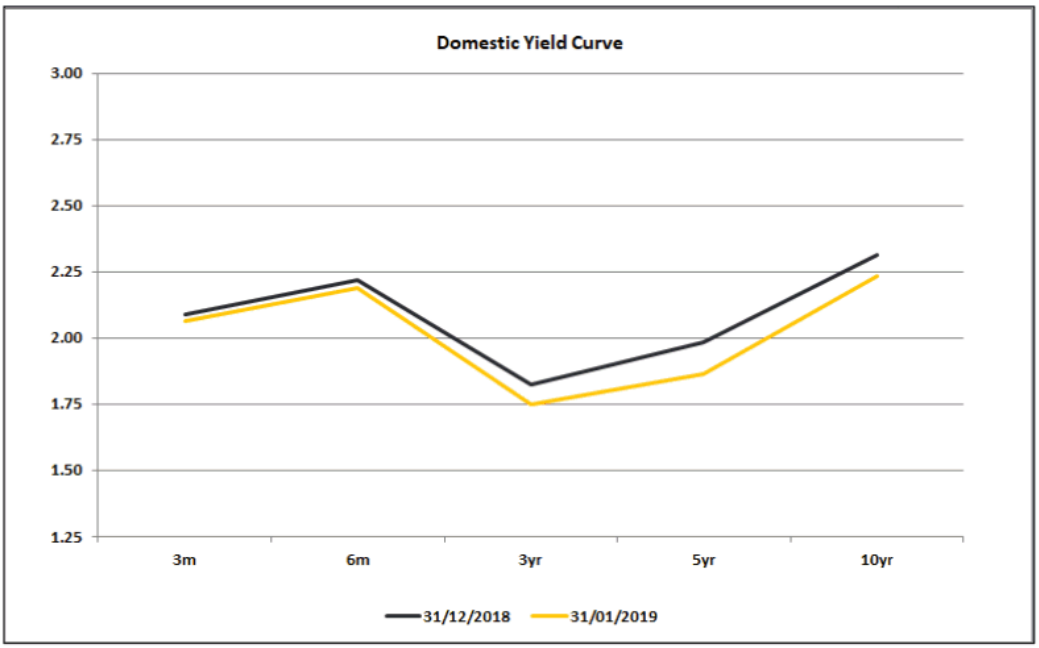
Late last year, Deputy Governor Debelle indicated that although the RBA's policy guidance was unchanged, if circumstances do change, "*there is still scope for further reductions in the policy rate. It is the level of interest rates that matter.....can still move lower*".

The broader market also currently does not support any near-term rate hikes by the RBA. **In fact, the futures market sees the prospect of an interest rate cut in late 2019 as a 50% scenario**, with some forecasters predicting an RBA cut given expectations of a slowdown in the economy, household finances impacting consumer confidence and a further downturn in residential property.



Source: ASX

Longer-term, the bond market continues to suggest a 'lower-for-longer' period of interest rates. The domestic yield curve fell across the board during January, with yields falling as much as 13bp, mainly on the back of the market factoring in a rate cut later in the year.



Source: AFMA, RBA

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Portfolio as at : 31/01/2019

Type	Rating	Issuer	Allocation	Frequency	Principal	Purchase	Maturity	Rate	Accrued	Accr MTD	Reference
TD	BBB	Newcastle Permanent	GENERAL	Annual	2,000,000	08/03/2016	08/03/2019	3.6000	65,095.89	6,115.07	29806
TD	BBB+	Bendigo and Adelaide	GENERAL	Annual	4,000,000	15/03/2017	15/03/2019	3.1000	109,731.51	10,531.51	2214551
TD	AA-	Westpac	GENERAL	Annual	2,000,000	27/03/2017	27/03/2019	3.0100	51,293.70	5,112.88	032-586 521159
TD	BBB+	Bendigo and Adelaide	GENERAL	Annual	2,000,000	27/03/2017	27/03/2019	2.9500	50,271.23	5,010.96	2224894
TD	BBB+	Bendigo and Adelaide	GENERAL	Annual	3,000,000	11/04/2017	11/04/2019	3.0000	72,986.30	7,643.84	2240503
TD	BBB	Members Equity Bank	GENERAL	Annual	4,000,000	27/04/2017	27/04/2019	2.9300	89,906.85	9,953.97	24460
TD	A	AMP Bank	GENERAL	At Maturity	5,000,000	17/05/2018	07/05/2019	2.7500	97,945.21	11,678.08	TD364564047-478891
TD	BBB	Members Equity Bank	GENERAL	Annual	3,000,000	19/05/2017	20/05/2019	2.8700	60,387.95	7,312.60	24821
TD	A+	Rabobank Australia Branch	GENERAL	Annual	6,000,000	23/05/2016	23/05/2019	3.1500	131,523.29	16,052.05	18843
TD	AA-	Westpac	GENERAL	Quarterly	3,000,000	29/05/2018	11/06/2019	2.7100	14,255.34	6,904.93	6775257
TD	BBB+	Bendigo and Adelaide	GENERAL	Annual	2,000,000	07/07/2016	08/07/2019	3.1500	35,728.77	5,350.68	1986640
TD	AA-	NAB	GENERAL	At Maturity	2,000,000	17/07/2018	16/07/2019	2.7800	30,313.42	4,722.19	GMI-DEAL-10549241
TD	AA-	Westpac	GENERAL	Annual	4,000,000	24/07/2017	24/07/2019	2.9400	61,860.82	9,987.95	032-697 114230
TD	BBB	Newcastle Permanent	GENERAL	Annual	2,000,000	15/08/2016	15/08/2019	3.0000	27,945.21	5,095.89	31125
TD	AA-	Westpac	GENERAL	Annual	3,000,000	15/08/2016	15/08/2019	3.1000	43,315.07	7,898.63	032-586 511-284
TD	AA-	Westpac	GENERAL	Annual	3,000,000	22/08/2017	22/08/2019	2.9000	38,852.05	7,389.04	032-697 115436
TD	A	ING Direct	GENERAL	Annual	5,000,000	22/08/2017	22/08/2019	2.7500	61,404.11	11,678.08	26932
TD	AA-	Commonwealth Bank	GENERAL	Annual	3,000,000	04/09/2017	29/08/2019	2.7300	33,657.53	6,955.89	B37942904.6
TD	AA-	Westpac	GENERAL	Annual	3,000,000	04/09/2017	04/09/2019	2.9600	36,493.15	7,541.92	032-697 115 794
TD	AA-	St George Bank	GENERAL	Annual	5,000,000	08/09/2016	08/09/2019	3.2000	63,123.29	13,589.04	355290684
TD	AA-	St George Bank	GENERAL	Annual	4,000,000	27/09/2016	27/09/2019	3.2000	44,536.99	10,871.23	355333138
TD	AA-	NAB	GENERAL	Annual	3,000,000	11/07/2018	15/10/2019	2.8500	48,020.55	7,261.64	GMI-DEAL-10547992
TD	A	ICBC Sydney Branch	GENERAL	Annual	4,000,000	31/10/2018	29/10/2019	2.8300	28,842.74	9,614.25	00001
TD	A	ICBC Sydney Branch	GENERAL	At Maturity	5,000,000	20/11/2018	12/11/2019	2.8600	28,600.00	12,145.21	0125001100000186702
TD	A	ICBC Sydney Branch	GENERAL	Annual	4,000,000	13/11/2018	19/11/2019	2.8600	25,073.97	9,716.16	00003
TD	A	ICBC Sydney Branch	GENERAL	Annual	5,000,000	28/11/2018	26/11/2019	2.8200	25,109.59	11,975.34	00006
TD	AA-	Westpac	GENERAL	Quarterly	3,000,000	14/12/2018	10/12/2019	2.7300	10,994.79	6,955.89	7389786
TD	AA-	Westpac	GENERAL	Quarterly	4,000,000	14/12/2018	17/12/2019	2.7300	14,659.73	9,274.52	7389774
TD	AA-	Westpac	GENERAL	Quarterly	5,000,000	14/01/2019	14/01/2020	2.7200	6,706.85	6,706.85	7448784
TD	BBB	Members Equity Bank	GENERAL	Annual	2,000,000	24/01/2017	24/01/2020	3.2600	1,429.04	1,429.04	22835
TD	A	ING Direct	GENERAL	Annual	4,000,000	15/02/2018	17/02/2020	2.8700	110,396.71	9,750.14	30810
TD	A	ING Direct	GENERAL	Annual	4,000,000	28/02/2018	03/03/2020	2.8900	107,048.77	9,818.08	378133
TD	BBB	Newcastle Permanent	GENERAL	Annual	2,000,000	10/03/2016	10/03/2020	3.7000	66,093.15	6,284.93	29843
TD	A	ING Direct	GENERAL	Annual	4,000,000	02/03/2018	17/03/2020	2.8800	106,047.12	9,784.11	378677

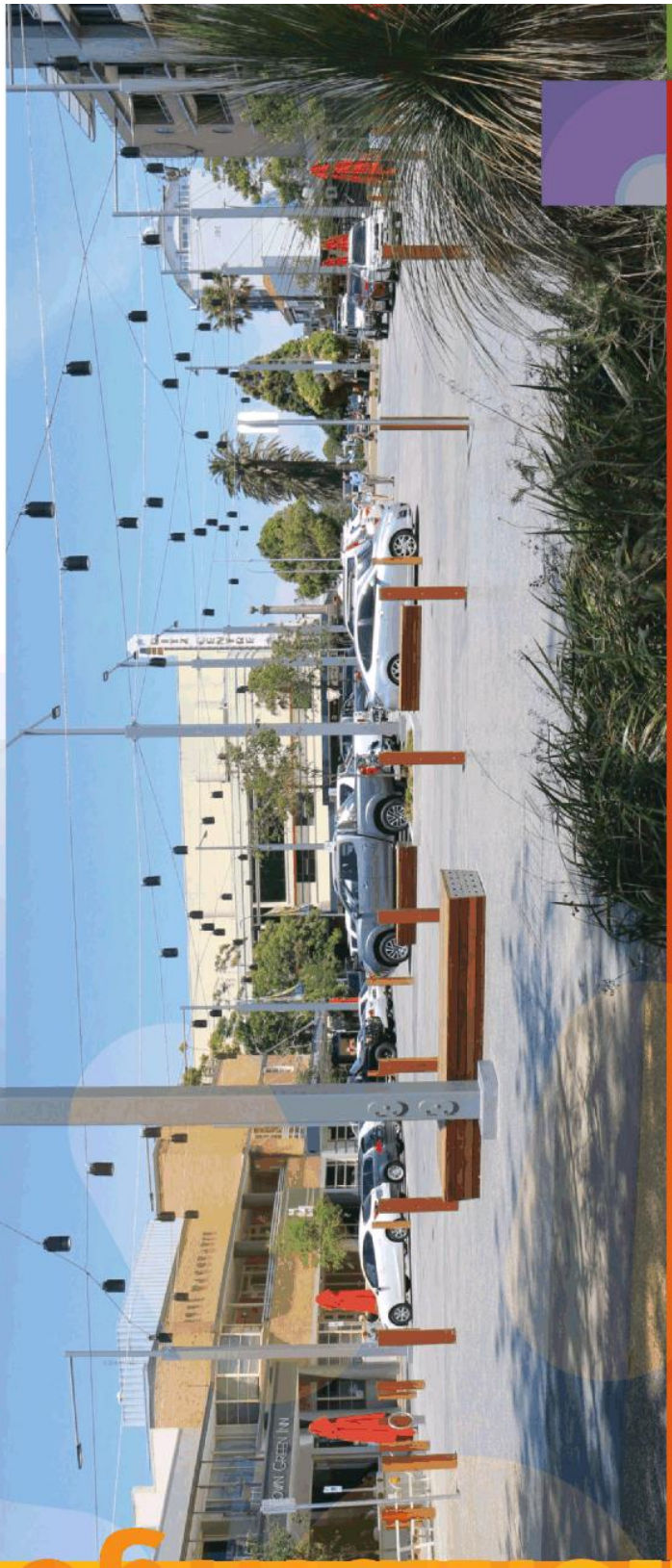
Type	Rating	Issuer	Allocation	Frequency	Principal	Purchase	Maturity	Rate	Accrued	Accr MTD	Reference
TD	BBB+	BOQ	GENERAL	Annual	3,000,000	19/05/2017	19/05/2020	3.0000	63,123.29	7,643.84	453470
TD	A	ING Direct	GENERAL	Annual	4,000,000	22/05/2018	26/05/2020	2.9400	82,158.90	9,987.95	403498
TD	A	ING Direct	GENERAL	Annual	3,000,000	29/05/2018	09/06/2020	2.8800	58,704.66	7,338.08	6775257
TD	AA-	Westpac	GENERAL	Quarterly	5,000,000	06/06/2018	16/06/2020	2.9100	22,721.92	12,357.53	6795148
TD	AA-	NAB	GENERAL	Annual	5,000,000	03/07/2018	07/07/2020	2.9000	84,616.44	12,315.07	10545823
TD	AA-	NAB	GENERAL	Annual	3,000,000	11/07/2018	14/07/2020	2.9200	49,200.00	7,440.00	GMI-DEAL-10547993
TD	A	ING Direct	GENERAL	Annual	4,000,000	21/08/2018	25/08/2020	2.8500	51,221.92	9,682.19	424329
TD	A	ING Direct	GENERAL	Annual	4,000,000	13/09/2018	08/09/2020	2.8700	44,347.40	9,750.14	429068
TD	AA-	Westpac	GENERAL	Annual	3,000,000	13/09/2017	14/09/2020	3.1700	36,737.26	8,076.99	032-697 116017
TD	A	ING Direct	GENERAL	Annual	4,000,000	13/09/2018	22/09/2020	2.8700	44,347.40	9,750.14	429067
TD	AA-	NAB	GENERAL	Annual	4,000,000	17/10/2018	13/10/2020	2.7800	32,598.36	9,444.38	GMI-DEAL-10573417
TD	A	ICBC Sydney Branch	GENERAL	Annual	6,000,000	31/10/2018	27/10/2020	2.9300	44,792.88	14,930.96	00002
TD	A	ICBC Sydney Branch	GENERAL	Annual	5,000,000	13/11/2018	10/11/2020	2.9300	32,109.59	12,442.47	00004
TD	A	ICBC Sydney Branch	GENERAL	Annual	2,000,000	05/12/2018	08/12/2020	2.8600	9,089.32	4,858.08	0125001100000186702
TD	A	ICBC Sydney Branch	GENERAL	Annual	6,000,000	14/12/2018	15/12/2020	2.8900	23,278.36	14,727.12	00009
TD	BBB+	BOQ	GENERAL	Annual	2,000,000	24/01/2017	25/01/2021	3.6500	1,600.00	1,600.00	438425
TD	AA-	Westpac	GENERAL	Annual	2,000,000	21/02/2017	22/02/2021	3.3900	64,084.93	5,758.36	032-586 519825
TD	BBB+	BOQ	GENERAL	Annual	3,000,000	10/03/2016	10/03/2021	3.8000	101,819.18	9,682.19	391843
TD	AA-	Westpac	GENERAL	Quarterly	4,000,000	22/03/2018	23/03/2021	3.0200	12,907.40	10,259.73	6791206
TD	AA-	Westpac	GENERAL	Quarterly	4,000,000	22/05/2018	25/05/2021	3.1000	24,120.55	10,531.51	6927394
TD	A+	Rabobank Australia Branch	GENERAL	Annual	5,000,000	08/06/2017	07/06/2021	3.0200	98,460.27	12,824.66	25359
TD	AA-	Westpac	GENERAL	Quarterly	3,000,000	06/06/2018	15/06/2021	3.1000	14,523.29	7,898.63	6795153
TD	AA-	NAB	GENERAL	Annual	4,000,000	03/07/2018	22/06/2021	3.0000	70,027.40	10,191.78	10545826
TD	AA-	NAB	GENERAL	Annual	3,000,000	03/07/2018	06/07/2021	3.0000	52,520.55	7,643.84	083-375 99-999-9947
TD	AA-	Westpac	GENERAL	Quarterly	5,000,000	17/07/2018	13/07/2021	3.0400	6,246.58	6,246.58	7052868
TD	AA-	NAB	GENERAL	Annual	4,000,000	26/07/2018	20/07/2021	3.0400	63,298.63	10,327.67	GMI-DEAL-10552065
TD	AA-	NAB	GENERAL	Annual	5,000,000	02/08/2018	03/08/2021	3.0700	76,960.27	13,036.99	GMI-DEAL-10554251
TD	AA-	Westpac	GENERAL	Quarterly	5,000,000	13/09/2018	14/09/2021	2.8800	19,726.03	12,230.14	7180013
TD	AA-	NAB	GENERAL	Annual	5,000,000	27/09/2018	28/09/2021	3.0500	53,061.64	12,952.05	GMI-DEAL-10568550
TD	AA-	Westpac	GENERAL	Quarterly	5,000,000	13/09/2018	12/10/2021	2.8900	19,794.52	12,272.60	7179943
TD	A	ICBC Sydney Branch	GENERAL	Annual	4,000,000	05/12/2018	07/12/2021	3.0100	19,132.05	10,225.75	0125001100000186702
TD	AA-	NAB	GENERAL	Annual	5,000,000	21/02/2017	21/02/2022	3.4600	163,520.55	14,693.15	10420935
TD	AA-	Westpac	GENERAL	Annual	2,000,000	21/02/2017	21/02/2022	3.6100	68,243.84	6,132.05	23294
TD	BBB+	BOQ	GENERAL	Annual	2,000,000	15/03/2017	15/03/2022	3.8000	67,254.79	6,454.79	445483
TD	A+	Rabobank Australia Branch	GENERAL	Annual	5,000,000	08/06/2017	07/06/2022	3.2200	104,980.82	13,673.97	25360
TD	AA-	NAB	GENERAL	Annual	4,000,000	02/08/2018	02/08/2022	3.2200	64,576.44	10,939.18	GMI-DEAL-10554252

Type	Rating	Issuer	Allocation	Frequency	Principal	Purchase	Maturity	Rate	Accrued	Accr MTD	Reference
TD	AA-	NAB	GENERAL	Annual	4,000,000	16/08/2018	16/08/2022	3.0500	56,487.67	10,361.64	GMI-DEAL-10557367
TD	AA-	Westpac	GENERAL	Annual	3,000,000	13/09/2017	13/09/2022	3.4100	39,518.63	8,688.49	032-697 116 009
TD	A+	Rabobank Australia Branch	GENERAL	Annual	3,000,000	13/09/2017	13/09/2022	3.3800	39,170.96	8,612.05	27388
CASH	AA-	Westpac	GENERAL	Monthly	19,679,135	31/05/2017	31/01/2019	2.2000	36,770.33	36,770.33	WESTPAC COMMERCIAL BANK 31 DAY NOTICE SAVER ACCOUNT
TOTALS					$290,679,135				$3,781,921.48	$708,865.66	

PORT MACQUARIE-HASTINGS
COUNCIL

A R Bluett Memorial Award Winner 2017
'Most progressive Council in NSW'

The Bluett AWARD



2018-2019 OPERATIONAL PLAN
QUARTERLY PROGRESS REPORT AS AT 31 DECEMBER 2018

pmhc.nsw.gov.au

COMMUNITY THEME 1 Leadership and Governance

What we are trying to achieve

A collaborative community that works together and uses opportunities for community participation in decision making that is defined as ethically, socially and environmentally responsible.

Community Strategic Plan: 1.1 Inform and engage with the community about what Council does using varied communication channels

Delivery Program Objective: 1.1.1 Use a variety of tools to engage with the community in a manner that is transparent, effective, relevant and inclusive

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
1.1.1.1 Use engagement methods to facilitate community involvement in decision making	Community Place	1. Capture the number of engagement activities undertaken during the year and numbers of participants	1. 100%	1. 100%	On target.A number of face-to-face engagements have been undertaken during the reporting period some of which include: Draft Engineer Review workshops (Auspec), Wauchope Main Street Upgrade: Over 60 face-to-face conversations with business holders, Bold Street Laurieton Pedestrian Crossing - 27 conversations with business owners and major stakeholders, Orbital Road - Face-to-face and telephone conversations with over 60 households, Town Beach and Blair Reserve Playground Engagement - pop-up engagements at each site a total of 35 conversations with residents and community groups) and Rural Halls - Meeting of Rural Halls network (6 halls represented).

Community Strategic Plan: 1.1 Inform and engage with the community about what Council does using varied communication channels

Delivery Program Objective: 1.1.1 Use a variety of tools to engage with the community in a manner that is transparent, effective, relevant and inclusive

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
		2. Increased community participation on Council's Have your Say online portal	2. 100%	2. 100%	On target. The total registered users on the "Have your Say" online portal as at 31 December 2018 is 3,732. An increase from 3,625 as at 30 September 2018. A range of projects on 'Have Your Say' have surveys completed, providing valuable feedback and have included: Lake Cathie Ocean Drive Upgrade, Draft Markets Policy, Draft Unsealed Roads Policy, Draft Smoke Free Outdoor Areas Policy, Wall Reserve Playground Upgrade, Draft Alcohol Use on Public Reserves and Beaches Policy, Port Macquarie Orbital Road, Tastings on Hastings Community Survey, Playground Upgrade at Blair St Reserve, Draft Kooloonbong Creek Camp Management Plan for Flying Foxes, Exciting New Playground at Town Beach, Town and Village Signage, Health and Education Precinct Master Plan, Amendments to Risk Management Policies and Planning Proposal: Proposed rezoning of land at Homedale Road, Kew.
1.1.1.2 Ensure community lead decision making through engagement	Economic Development and Communications	1. Deliver regular, positive and engaging media messaging	1. 100%	1. 100%	On target. 354 media releases, statements, events, alerts, announcements and reactive responses were issued from July to December 2018. These appeared through a mix of different media channels, and included a combination of driving positive messaging on Council services and projects, Mayoral messages and managing media enquiries.

Community Strategic Plan: 1.1 Inform and engage with the community about what Council does using varied communication channels

Delivery Program Objective: 1.1.1 Use a variety of tools to engage with the community in a manner that is transparent, effective, relevant and inclusive

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
		2. Increase community engagement with Council's digital channels	2. 100%	2. 100%	On target. During the reporting period from July to December 2018, there were over 402,700 unique visitors and over 476,000 total visits to the corporate website. Likes for the corporate Facebook account increased from 8,218 to 8,552 and You Tube video views exceeded over 21,600 for the reporting period. The most popular pages viewed were job vacancies, contact us, make a payment, Development application tracker and sports field closures.
1.1.1.3 Research and analyse customer preferred communication methods	Economic Development and Communications	1. Research on customer preferred communication methods undertaken	1. 100%	1. 100%	On target. Monthly analysis of community engagement via digital channels is ongoing. Further broad research is planned during 2018/19

Delivery Program Objective: 1.1.2 Support community involvement in decision making through education around Council matters and services

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
1.1.2.1 Facilitating community involvement and understanding of Council's programs and projects through engagement	Community Place	1. Undertake engagement using a variety of engagement tools and communication methods	1. 100%	1. 100%	On target. The following tools and methods have been used to engage with the community: Face to Face engagement sessions, Community Think Tank Workshops, Postcard surveys and 'Have Your Say online' engagement. Details of these have been reported in previous Performance Indicators.

Community Strategic Plan: 1.1 Inform and engage with the community about what Council does using varied communication channels

Delivery Program Objective: 1.1.2 Support community involvement in decision making through education around Council matters and services

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
1.1.2.2 Work with the community to write and implement place based community plans	Community Place	1. Community Plans complete and implementation commenced	1. 100%	1. 100%	On target. Five new Community Plans commenced with the Community including think tanks workshops in: Laurieton/Camden Haven area, Thrumster/ Ascot Park/ Lake Innes area, Comboyne and surrounds, Kew/Kendall/Lorne and Herons creek and North Shore. Also commenced the establishment of the Community Council Action teams that will help drive the development of the plan. Trache 2 will commence in March 2019

Community Strategic Plan: 1.1 Inform and engage with the community about what Council does using varied communication channels

Delivery Program Objective: 1.1.2 Support community involvement in decision making through education around Council matters and services

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
1.1.2.3 Deliver the Community Planning Program	Community Place	1. Delivery of the Community Planning Program undertaken	1. 100%	1. 100%	On target. Community Planning activity continued according to schedule during November & December. The following activities were undertaken: Bonny Hills: Community-Council Action Team established with 13 representatives. First meeting held with review of draft plan and action plan underway. North Shore: Community-Council Action Team established with 15 representatives. First meeting held with review of draft plan and action plan underway. Laurieton & Surrounding Communities: Community-Council Action Team established with 7 representatives 1st CCAT meeting scheduled for January 2019 Thrumster & Surrounding Communities: 2nd Community Think Tank held Call out for Nominations for Community-Council Action Team underway Kew/Kendall & Surrounding Communities: 1st and 2nd Community Think Tanks Held Call out for Nominations for Community-Council Action Team underway Comboyne & Surrounding Communities: 1st and 2nd Community Think Tanks Held Call out for Nominations for Community-Council Action Team underway

Community Strategic Plan: 1.1 Inform and engage with the community about what Council does using varied communication channels

Delivery Program Objective: 1.1.3 Engage with the community on impacts and changes to services.

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
1.1.3.2 Develop a community engagement and education program to enable community involvement in decision making	Community Place	1. Development of the community engagement and education program is complete	1. 100%	1. 100%	On target. We continue to develop the "Working Together' approach to Communications, Engagement and Educations that will provide the organisation with a holistic approach and the tools to support implementation.

Delivery Program Objective: 1.1.4 Provide easy to understand and accessible community reporting.

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
1.1.4.1 Produce and submit the annual report in accordance with Local Government Act requirements	Organisational Performance	1. Have annual report adopted by Council and submitted to the Office of Local Government (OLG) by 30 November	1. 100%	1. 0%	Achieved. The 2017-2018 Annual Report was presented to the 21 November 2018 Ordinary Council Meeting and submitted to the office of Local Government in line with legislation.
		2. Publish community report card (Part A); statutory report (Part B); and financial statements (Part C) for distribution	2. 100%	2. 100%	Achieved. The 2017-2018 Annual Report was presented and adopted at the 21 November 2018 Ordinary Council Meeting. Hard copies have been distributed to Council offices and Libraries in Laurieton, Port Macquarie and Wauchope. The report is also available on Councils website.

Community Strategic Plan: 1.1 Inform and engage with the community about what Council does using varied communication channels

Delivery Program Objective: 1.1.4 Provide easy to understand and accessible community reporting.

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
1.1.4.2 Provide progress reports on implementation of the Delivery Program in accordance with Local Government Act requirements	Organisational Performance	1. Provide Delivery Program progress report to Council on a six monthly basis	1. 100%	1. 100%	On target. The Delivery Program six monthly progress report was presented to the September 2018 Ordinary Council Meeting. That report outlined Council's progress in delivering activities, actions and projects against the 2017-2021 Delivery Program and 2017-2018 Operational Plan and reports on the period from January to June 2018. The next six monthly report will be presented to the March 2019 Ordinary Council Meeting.
1.1.4.3 Undertake development of the one year Operational Plan (2019-2020) in accordance with Local Government Act requirements	Organisational Performance	1. Have an annual operational plan adopted by 30 June	1. 100%	1. 100%	On target. Preparation for the development of the 2019-2020 Operational Plan is underway and ongoing.
1.1.4.4 Review the current corporate reporting tool	Organisational Performance	1. Complete the review of the corporate reporting tool	1. 100%	1. 100%	On target. Currently undertaking a review of existing corporate reporting tool functionality.
1.1.4.5 Undertake review of Resourcing Strategy in accordance with Local Government Act requirements	Organisational Performance	1. Organised Resourcing Strategy working group to deliver reviewed Resourcing Strategy	1. 100%	1. 100%	On target. A working group has been established to commence the review of the Resourcing Strategy in the coming months.

Delivery Program Objective: 1.1.5 Develop an effective and coordinated community focused Communications Strategy

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
1.1.5.1 Develop and implement a strategic approach to Council communications	Economic Development and Communications	1. Commence implementation of identified actions	1. 100%	1. 100%	On target. Councillors have endorsed a strategic approach to communication and engagement. Implementation planning currently in progress

Community Strategic Plan: 1.1 Inform and engage with the community about what Council does using varied communication channels

Delivery Program Objective: 1.1.5 Develop an effective and coordinated community focused Communications Strategy

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
1.1.5.2 Deliver marketing/education campaigns	Economic Development and Communications	1. Continuous improvement in campaign engagement results	1. 100%	1. 100%	On target. National Recycling Week occurred during November, and marketing and education focussed on the recycling message. Council staff were actively out in the community at shopping centre pop-ups, educating our community and conducting surveys on recycling practices. Significant media exposure was also achieved, incorporating television, radio, press and social media. December messaging has focussed on marine litter, avoiding and managing Christmas waste including using the right bin plus promoting the extra Christmas yellow recycling bin collection. There were more than 1,600 visits to the bins page on the website during November/December, which is a 60% increase on the same period in 2017. Waste-related messaging on Facebook reached 52,057 people during November/December.
		2. Deliver education program by 30 June	2. 100%	2. 100%	On target. Delivery of the the 2018-19 Waste Management education campaign is continuing. Broader education messaging is being programmed in Council communications as appropriate.

Community Strategic Plan: 1.1 Inform and engage with the community about what Council does using varied communication channels

Delivery Program Objective: 1.1.6 Continue to promote access by the community to Councillors

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
1.1.6.1 Develop a Councillor professional development program	Governance and Procurement	1. Develop a Councillor professional development program	1. 100%	1. 100%	On target. The Councillor Professional Development Program is currently being managed as needs are identified and as per the adopted policy. The Office of Local Government have reviewed the proposed Councillor Induction and Professional Development Guidelines, these were gazetted 14/12/18. Currently researching opportunities such as the Company Director course that is delivered by the Australian Institute of Company Directors and the solutions provided by LGNSW.
1.1.6.2 Deliver the Take the Council to the Community program	Governance and Procurement	1. Hold two off-site Council meetings during the year (March Wauchope, October Laurieton)	1. 100%	1. 100%	On target. Laurieton Ordinary Council meeting was held in October 2018.

Community Strategic Plan: 1.2 Maintain strong partnerships between all stakeholders — local, state and federal — so that they are affective advocates for the community

Delivery Program Objective: 1.2.1 Promote Council participation and build linkages in local, state and federal initiatives, forums and opportunities to support Council's continued planning for the growth of the region

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
1.2.1.1 Convene meetings with local business chambers for the Mayor and Senior Staff	Strategy and Growth	1. Schedule meetings throughout the year (with local business chambers for the Mayor and Senior Staff)	1. 100%	1. 100%	On target. Meetings held with Camden Haven, Port Macquarie and Wauchope Chambers of Commerce. Communications with the various chambers are ongoing.

Community Strategic Plan: 1.2 Maintain strong partnerships between all stakeholders — local, state and federal — so that they are affective advocates for the community

Delivery Program Objective: 1.2.1 Promote Council participation and build linkages in local, state and federal initiatives, forums and opportunities to support Council's continued planning for the growth of the region

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
1.2.1.2 Convene meetings with State and Federal Members for the Mayor and Senior Staff	General Manager's Office	1. Schedule meetings throughout the year (with State and Federal Members for the Mayor and Senior Staff)	1. 100%	1. 100%	On target. Meetings held with Leslie Williams MP on 12 November 2018 and 10 December 2018. Attendance by Luke Hartsuyker MP and the Deputy Prime Minister at an inspection of the Port Macquarie Airport terminal building upgrade on 19 November 2018, Meeting attended with Deputy Premier in Sydney on 21 November as part of the Regional Cities group and a meeting was held with Councillors, Leslie Williams and NSW Treasurer Dominic Perrottet on 4 December 2018.

Community Strategic Plan: 1.3 Demonstrate leadership

Delivery Program Objective: 1.3.1 Provide effective leadership and equity

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
1.3.1.1 Participate in the North Coast Joint Organisation (JO)/Mid North Coast Regional Organisation of Councils (MIDROC)	General Manager's Office	1. Attendance at the Regional Joint Organisation meetings	1. 100%	1. 100%	On target. MNCJO Board Meetings held 5 October 2018 and 5 December 2018 and GMAC Meeting held on 16 November 2018. The General Manager of Port Macquarie-Hastings Council has been appointed the Interim Executive Officer for the MNCJO therefore has also attended several Joint Organisation Teleconferences and a Joint Organisation Executive Officers network meeting was attended in Sydney on 26 November 2018.

Community Strategic Plan: 1.3 Demonstrate leadership

Delivery Program Objective: 1.3.2 Build trust and improve Council's reputation through transparency, good decision making and living Council's Values

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
1.3.2.1 Manage the Legislative Compliance Register	Governance and Procurement	1. Undertake annual review and report on it	1. 100%	1. 100%	On target. The Legislative Compliance review for 2017-2018 was presented to the August 2018 Audit, Risk and Improvement Committee Meeting and then presented to the September 2018 Ordinary Council Meeting. Another review will commence in the early calendar year.
1.3.2.2 Produce and submit the annual Code of Conduct complaints report in accordance with Office of Local Government requirements	Governance and Procurement	1. Report prepared annually and presented to Council no later than 31 December	1. 100%	1. 100%	Achieved. Presented at the December Ordinary Council meeting.
1.3.2.3 Produce and submit the annual Government Information Public Access (GIPA) Report in accordance with the GIPA Act requirements	Governance and Procurement	1. Submit GIPA annual report to Information and Privacy Commission no later than 31 October	1. 100%	1. 100%	Achieved. Information is collected and entered in to the online Information and Privacy Commission (IPC) database on a monthly basis. The 2017/18 Annual Report was submitted in August 18.
1.3.2.4 Coordinate lodgement of annual Disclosure of Interest Returns	Governance and Procurement	1. Annually update Disclosure Register by 30 September	1. 100%	1. 100%	Achieved. Disclosure register updated and made available at the October Ordinary Council meeting.
1.3.2.5 Review the payment of expenses and provision of facilities for Councillors Policy	Governance and Procurement	1. Review policy in line with Australian Taxation Office determination	1. 100%	1. 100%	Achieved. The policy web link to the Australian Tax Office (ATO) determination was updated in August, to ensure Councillors are directed to the correct ATO website.
1.3.2.6 Report on Public Interest Disclosures (PID)	Governance and Procurement	1. Report biannually in July and February on any Public Interest Disclosures (PIDs)	1. 100%	1. 100%	On target. Information was collected and entered in to the Ombudsman's database (and an email sent) in August 2018.
		2. Submit PID annual report to NSW Ombudsman by 31 October	2. 100%	2. 100%	Achieved. Submitted to the NSW Ombudsman in August.

Community Strategic Plan: 1.3 Demonstrate leadership

Delivery Program Objective: 1.3.2 Build trust and improve Council's reputation through transparency, good decision making and living Council's Values

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
1.3.2.7 Submit annual performance reporting for the water and sewer business to NSW Office of Water for benchmarking comparisons	Water and Sewer	1. Collate and forward performance reporting data to NSW Office of Water annually	1. 100%	1. 100%	Achieved. Annual performance indicator data has been submitted to NSW Department of Industry for 2017/18.

Delivery Program Objective: 1.3.3 Ensure there is appropriate management of risk to mitigate impact for Council and the community

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
1.3.3.1 Review the Corporate Risk Register	Governance and Procurement	1. Review the risk register on a quarterly basis and report to the Audit Committee	1. 100%	1. 100%	On target. The Corporate Risk Register was presented at the November 2018 Audit, Risk and Improvement Committee Meeting.
1.3.3.2 Manage the Risk Management Action Plan, as part of the state wide continuous improvement program	Governance and Procurement	1. Review and implement the Risk Management Action Plan on a quarterly basis and report to Executive	1. 100%	1. 100%	On target. The Insurance Risk Management Action Plan (IRMAP) is being developed.
1.3.3.3 Conduct an annual review of insurance coverage	Governance and Procurement	1. Complete annual review and ensure insurance renewals are in place	1. 100%	1. 100%	Achieved. The insurance policies are in place for the 2018/2019 financial year. The renewals process will begin next calendar year.
1.3.3.4 Implement improvements to the Project Management Framework	Governance and Procurement	1. Commenced implementation (improvements to the Project Management Framework)	1. 100%	1. 100%	On target. The Project Management Framework has been implemented with training complete. Ongoing improvements to the Project Management Framework are being captured on the Continuous Improvement Log, assessed and managed to completion.
1.3.3.5 Align corporate Risk Management Framework to ISO 3100 standards	Governance and Procurement	1. Complete Risk Management Framework alignment in line with project milestones	1. 100%	1. 100%	On target. The draft Risk Management policy was endorsed in May 2018 at the Audit, Risk and Improvement meeting, presented to the Nov Council meeting and is on public exhibition 18 Nov to 9 Jan 19.

Community Strategic Plan: 1.3 Demonstrate leadership

Delivery Program Objective: 1.3.3 Ensure there is appropriate management of risk to mitigate impact for Council and the community

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
1.3.3.6 Capture high risk electrical assets in Council's asset management system	Assets and Property Investment	1. Complete electrical asset data survey by 30 June 2019	1. 100%	1. 100%	On target. Map layers including asset attributes have been created for asset capture. All above ground terminal electrical assets in public open space have been recognised. Recognition of high-risk electrical assets underground in public open space is progressing. New works with electrical assets in open space are now captured in the GIS layers upon receipt of completion reports.

Delivery Program Objective: 1.3.4 Manage our workforce to deliver community outcomes

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
1.3.4.1 Implement workplace strategies and processes to continue to improve Human Resources	Organisational Performance	1. Implementation of Workforce Management Strategy actions	1. 100%	1. 100%	On target. Workplace Management Strategy action items for 2018-19 are being implemented.
1.3.4.2 Implement workplace strategies and processes to continue to improve Work, Health and Safety.	Organisational Performance	1. Implementation of Work, Health Safety Strategy actions	1. 100%	1. 0%	Yet to commence. Implementation of strategy actions will take place after strategy is adopted. The strategy is in draft.
1.3.4.3 Implement workplace strategies and processes to continue to improve Learning and Development	Organisational Performance	1. Implementation of Learning and Development Strategy actions	1. 100%	1. 0%	Yet to commence. Implementation of strategy actions will take place once the strategy is adopted.
1.3.4.4 CW Construct new works depot in Port Macquarie (multi-year project in 2017-18 linked to 1.3.4.5 CW)	Assets and Property Investment	1. Deliver project according to approved project plan (Works Depot in Port Macquarie)	1. 100%	1. 0%	Yet to commence. Deliverable dependant on OP item 1.3.4.5 - pre construction and design of works depot.

Community Strategic Plan: 1.3 Demonstrate leadership

Delivery Program Objective: 1.3.4 Manage our workforce to deliver community outcomes

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
1.3.4.5 CW Works Depot relocation - preconstruction/design (multi-year project in 2017-18 linked to 1.3.4.4 CW)	Assets and Property Investment	1. Deliver project according to approved project plan (Works Depot relocation)	1. 100%	1. 75%	Behind schedule. Land negotiations commencing.

Delivery Program Objective: 1.3.5 Build an engaged workforce

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
1.3.5.1 Continue the development of a highly engaged workforce who are solutions focused	Organisational Performance	1. Deliver annual Employee Engagement Days	1. 100%	1. 100%	On target. Planning for the annual 2018-19 Employee Engagement Days has commenced and will take place in May 2019. Working Group is meeting regularly to plan for the event.
		2. Embed, streamline and measure Employee Engagement Process (EEP) and implement identified areas of improvement	2. 100%	2. 100%	On target. The intranet has been updated with relevant tools and is ongoing, providing support to staff for future conversations. An Employee Engagement Roadshow is currently under development to support managers / supervisors with this process.
		3. Identify new employee engagement opportunities	3. 100%	3. 100%	On target. Opportunities for new ways to engage with employees are consistently being identified. An example is the series of Millennial' s workshops of which the last has been conducted in October 2018. The presentation was provided to the Executive Team in December 2018 and work on the endorsed projects will continue through the first half of 2019.
		4. Implement 2018 Employee Engagement Survey	4. 100%	4. 100%	On target. Planning for the 2019 Annual Employee Engagement Survey has started with plans for the survey to be rolled out in February 2019.

Community Strategic Plan: 1.3 Demonstrate leadership

Delivery Program Objective: 1.3.5 Build an engaged workforce

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
1.3.5.3 Implement the Human Resource Information System (HRIS)	Organisational Performance	1. Commenced implementation of HRIS system	1. 100%	1. 0%	Behind schedule. Yet to commence. Council Executive has determined that this project is on hold, with review in February 2019.
		2. Commenced training of HRIS system	2. 100%	2. 0%	Behind schedule. Yet to commence. Council Executive has determined that this project is on hold, with review in February 2019.

Community Strategic Plan: 1.4 Use innovative, efficient and sustainable practices

Delivery Program Objective: 1.4.1 Provide efficient technology and inclusive digital systems that are easy to use and easy to access

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
1.4.1.1 CW Renew technology infrastructure to provide secure and responsive Information Communication Technology (ICT) systems (ICT - Projects - multi-year project) Allocated Amount 2018-19 $1,600,000	Digital Technology	1. Deliver project according to approved project plan (ICT - Projects)	1. 100%	1. 90%	Behind schedule: Customer experience projects are currently in planning and assessment phase, prior to commence. Other projects are on target as per DT Roadmap.
1.4.1.2 CW Undertake delivery of ICT projects (Information and Communications Technology - Renewals - multi-year project) - Allocated Amount 2018 -19 $200,000	Digital Technology	1. Deliver project according to approved project plan (ICT - Renewals)	1. 100%	1. 100%	On target. Current projects are all on track as per the ICT renewal plan. Skype for business is deployed and the microwave network project has been finalised. InfoCouncil migration and close out are the final tasks to complete in early 2019.
1.4.1.3 Provide Geographic Information Systems (GIS) to the organisation and to the community in a timely and effective manner	Digital Technology	1. Receive less than five complaints received relating to GIS data accuracy as captured in the Customer Record Management (CRM) system	1. 100%	1. 100%	On target. Nil complaints received to date.

Community Strategic Plan: 1.4 Use innovative, efficient and sustainable practices

Delivery Program Objective: 1.4.1 Provide efficient technology and inclusive digital systems that are easy to use and easy to access

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
1.4.1.5 Develop asset design and as constructed templates as part of the Asset Data Standards Review	Assets and Property Investment	1. Develop an Auto CAD file template for asset design and as-constructed plans that meets Asset Design As Constructed (ADAC) standards by 30 June 2019	1. 100%	1. 0%	Yet to commence. Following on from feedback from the development industry at the Asset Delivery and Information Workshops in November and December additional workshop will be scheduled in the New Year.

Delivery Program Objective: 1.4.2 Deliver agreed services at the agreed service level at best value

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
1.4.2.1 Work across the organisation to facilitate the implementation of the Business Improvement Strategy	Organisational Performance	1. Plan developed to support embedding a culture of continuous improvement	1. 100%	1. 100%	On target. Work has commenced on developing a plan to promote and embed a culture of continuous improvement in partnership with Organisational Development.
		2. Provide updates to the Executive, the Risk, Audit and Improvement Committee and Councillors	2. 100%	2. 100%	On target. Regular updates are being provided on the progress of the Business Improvement Office to the Executive and the Risk, Audit and Improvement Committee.
		3. Undertake process improvements	3. 100%	3. 100%	On target. The Business Improvement Office is assisting various service areas to progress their process improvement initiatives.
		4. Undertake service reviews	4. 100%	4. 100%	On target. The Business Improvement Office is working on creating a program of service reviews to commence in 2019.

Community Strategic Plan: 1.4 Use innovative, efficient and sustainable practices

Delivery Program Objective: 1.4.3 Deliver a customer focused service that provides the community a consistent experience of Council

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
1.4.3.1 Deliver high quality customer interactions through the Customer Service Centers and Call Centre within service level standards	Community Place	1. Answer 75% of calls within service level standards (currently 20 seconds)	1. 75%	1. 76%	On target. 76% of calls answered which exceeds the service standard set target of 75%.
		2. Complete greater than 75% of customer initial interactions at first point of contact	2. 75%	2. 90%	On target. 90% of initial customer interactions were dealt with at first point of contact through customer service centres. Over 44,700 counter enquiries, over 38,600 calls and over 16,000 emails were received during July to December 2018.
		3. Ensure call abandonment rate is 3% or lower	3. 3%	3. 3%	On target. Percentage of abandon calls were kept at the set 3% target.
1.4.3.2 Review and evaluate referrals, compliments and complaints on an annual basis	Community Place	1. Report annually to Council	1. 100%	1. 100%	On target. Report prepared in September 2018 and presented to Council.
1.4.3.3 Manage the 'Our Customer Experience' Project and commence implementation		1. "Our Customer Experience' Project complete and implementation commenced	1. 100%	1. 90%	Monitoring Required The Customer Experience Plan has been finalised. The project is continuing although lost some momentum when determining priority projects. Project Plans are currently being developed for the key projects and work on them will commence in the new calendar year.

Community Strategic Plan: 1.5 Ensure strong corporate and financial management that is transparent and accountable

Delivery Program Objective: 1.5.1 Manage Council's financial assets and provide accurate, timely and reliable information

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
1.5.1.1 Monitor and accurately report on Council's financial position in accordance with Local Government Act requirements	Financial Services	1. Lodge audited financial statements with OLG by 31 October	1. 100%	1. 100%	Achieved. 2017/18 audited financial statements lodged with OLG by due date.

Community Strategic Plan: 1.5 Ensure strong corporate and financial management that is transparent and accountable

Delivery Program Objective: 1.5.1 Manage Council's financial assets and provide accurate, timely and reliable information

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
		2. Submit three quarterly budget review statements and an annual report to Council	2. 100%	2. 100%	On target. No QBRS due in December. 1st quarter report presented to Council in November.
1.5.1.2 Manage Council's investment portfolio to optimise investment returns within the constraints of the policy, the Local Government Act and Regulations	Financial Services	1. Exceed benchmark for investment return	1. 100%	1. 100%	On target. Investment return exceeded benchmark for both month and FYTD.
		2. Table report to Council as required	2. 100%	2. 100%	On target. Investment reports presented monthly.
1.5.1.3 Develop annual Operational Plan budget and review the Long Term Financial Plan (LTFP)	Financial Services	1. Develop the draft annual budget in line with Integrated Planning and Reporting timeframes	1. 100%	1. 100%	On target. Preparation of annual budget underway.
		2. Have final budget adopted by Council by 30 June	2. 100%	2. 100%	On target. 19/20 budget preparations underway - on track for adoption by 30 June 2019.
		3. Review the Long Term Financial Plan in line with the budget	3. 100%	3. 100%	On target. Preparation of 19/20 budget and LTFP underway.
1.5.1.4 Prepare monthly financial reports for Council	Financial Services	1. Present financial reports to Council as required	1. 100%	1. 100%	On target. Monthly Financial Reports presented to Council as required.
1.5.1.6 Partridge Creek residential development planning	Assets and Property Investment	1. Amend and update existing Development Application to enable relocation of the neighbourhood centre zone within the Partridge Creek residential development at Thrumster	1. 100%	1. 0%	Yet to commence. Commencement of 2018-19 action items are subject to finalisation of lodged Development Application.

Community Strategic Plan: 1.5 Ensure strong corporate and financial management that is transparent and accountable

Delivery Program Objective: 1.5.1 Manage Council's financial assets and provide accurate, timely and reliable information

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
		2. Obtain updated land valuation for Partridge Creek residential development upon receipt of updated Development Approval	2. 100%	2. 0%	Yet to commence. Commencement of 2018-19 action items are subject to finalisation of lodged Development Application.
		3. Provide report to Council outlining Partridge Creek residential development options upon receipt of updated land valuation	3. 100%	3. 0%	Yet to commence. Commencement of 2018-19 action items are subject to finalisation of lodged Development Application.
1.5.1.7 Greenmeadows Drive residential development planning	Assets and Property Investment	1. Develop concept plan for Greenmeadows Drive development	1. 100%	1. 50%	Behind schedule. Site use options currently under review. Concept planning to commence early 2019.
		2. Lodge Development Approval application for Greenmeadows Drive development	2. 100%	2. 50%	Behind schedule. Site use options currently under review. Concept planning to commence early 2019.
1.5.1.8 Conduct asset revaluation of land under roads, stormwater, flood and foreshore assets	Assets and Property Investment	1. Complete asset revaluation by 30 June 2019	1. 100%	1. 100%	On target. 2018-2019 Revaluation project commenced with Project Management Framework. Project Charter and Project Plan signed off by Project Sponsor. Specification for quote is with Asset Accountant for review and comment. Review of useful lives and unit rates for each asset type by the Asset Owners is overdue and steps have been made to get them back on track.

Community Strategic Plan: 1.5 Ensure strong corporate and financial management that is transparent and accountable

Delivery Program Objective: 1.5.2 Use procurement, tendering, purchasing and contract management approaches that are transparent and equitable

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
1.5.2.1 Continue to implement and monitor the procurement strategy action items	Governance and Procurement	1. Completion of audit action items as per agreed timelines with quarterly reporting to the Audit Committee	1. 100%	1. 100%	On target. Audit recommendations are presented at each Audit, Risk and Improvement meeting.
		2. Completion of Procurement Strategy Implementation Plan actions within agreed timeframes	2. 100%	2. 100%	On target. The procurement strategy action items will be reported to the February Procurement Steering Group.
1.5.2.2 CW Ensure plant purchases are in line with the plant replacement program - multi-year project - Allocated Amount 2018-19 $2,500,000	Transport and Stormwater Network	1. Plant replacement program delivered according to approved schedule	1. 100%	1. 100%	On target. Plant Replacement Program is on target with one tender currently advertised.
1.5.2.3 Manage and maintain Council's Plant and Fleet to support the operational activities of Council	Transport and Stormwater Network	1. Plant and Fleet managed and maintained in accordance with adopted program and budget	1. 100%	1. 100%	On target. Income and expenditure is ahead of target. Down time for plant has remained minimal.
1.5.2.4 Renew Council's procurement of rural aerial imagery data	Digital Technology	1. Rural aerial imagery data renewed by 30 June 2019	1. 100%	1. 100%	On target. Review of requirements for rural imagery is underway.

Delivery Program Objective: 1.5.3 Develop, manage and maintain Council Business Units through effective commercial management

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
1.5.3.1 Increase operating revenue at the Airport, the Glasshouse, the Environmental Laboratory and the Crematorium	Commercial Business Units	1. Increase operating revenue by 3% per annum per business unit (Airport)	1. 3%	1. 2%	Behind target. Income impacted due to passenger numbers being down approx. 5% on the corresponding period last year.

Community Strategic Plan: 1.5 Ensure strong corporate and financial management that is transparent and accountable

Delivery Program Objective: 1.5.3 Develop, manage and maintain Council Business Units through effective commercial management

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
		2. Increase operating revenue by 3% per annum per business unit (Crematorium)	2. 3%	2. 29%	On target. While the number of cremations and burials continues to reduce, there has been a significant increase in reservations and memorialisations which have resulted in increased income over this period. Income is variable, and while the increase for the first half of the financial year compared to the same period last financial year is 29%, the increase compared to the corresponding period in 2016-17 is around 0.2%.
		3. Increase operating revenue by 3% per annum per business unit (Environmental Laboratory)	3. 3%	3. 9%	On target. Income associated with external testing has increased by approx. 40%.
		4. Increase operating revenue by 3% per annum per business unit (Glasshouse)	4. 3%	4. 8%	On target. Increase due to a number of factors. Seasonal variation in events, income assoc with Archibald Exhib and some delays in processing income Q1&2.
1.5.3.2 Review and update the Glasshouse Strategic Plan	Commercial Business Units	1. Deliver actions according to adopted Glasshouse Strategic Plan	1. 100%	1. 100%	On target. The review of the Glasshouse Strategic Plan has commenced and input has been sought from the Cultural Steering Group, in accordance with the recently adopted Cultural Plan.
		2. Present biannual reports to Council	2. 100%	2. 100%	On target. The Glasshouse presented its bi-annual report at the August 2018 council meeting. The next report is due in February 2019.
		3. Review the Glasshouse Podium Fee by September 2018	3. 100%	3. 100%	Achieved. Review completed and reported to the November 2018 meeting of the Cultural Steering Group.

Community Strategic Plan: 1.5 Ensure strong corporate and financial management that is transparent and accountable

Delivery Program Objective: 1.5.3 Develop, manage and maintain Council Business Units through effective commercial management

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
1.5.3.6 Manage Council's property management, leasing and licencing, and statutory property functions for the most appropriate return to Council and the community	Commercial Business Units	1. Maintain Council's Land and Leasing Registers according to Statutory Requirements	1. 100%	1. 100%	On target. 162 commercial leases operating (including airport, waste, telecommunications, residential, outdoor dining/ trading and temporary licences). 71 community leases operating.
1.5.3.7 Continue to implement and monitor the property investment strategy	Assets and Property Investment	1. Provide six monthly update reports to Council on the status of the Property Investment Portfolio	1. 100%	1. 100%	On target. Six monthly update report tabled at November 2018 Ordinary Council Meeting. Next six monthly update report scheduled for the May 2019 Ordinary Council Meeting.
1.5.3.8 CW Land Acquisitions for Council Roads - Survey, Valuation and Land Transactions	Commercial Business Units	1. Deliver projects according to approved project plan (Land Acquisitions for Council Roads - Survey, Valuation and Land Transactions)	1. 100%	1. 100%	On target. Land matters are progressed as required.

Delivery Program Objective: 1.5.4 Identify new commercially viable revenue sources

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
1.5.4.1 Review current revenue sources and investigate the commercial viability of identified new revenue sources	Commercial Business Units	1. Identify new revenue sources	1. 100%	1. 100%	On target. Review of revenue sources continuing in conjunction with the development of the 2019-2020 Schedule of Fees and Charges.

COMMUNITY THEME 2 Your Community Life

What we are trying to achieve

A healthy, inclusive and vibrant community.

Community Strategic Plan: 2.1 Create a community that feels safe

Delivery Program Objective: 2.1.1 Support Community Safety initiatives

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
2.1.1.1 Manage the contract for approved lifeguard services	Recreation and Buildings	1. Deliver approved lifeguard services	1. 100%	1. 100%	On target. Lifeguard patrols are continuing at Town, Flynn's, Lighthouse, Lake Cathie, Rainbow and North Haven beaches.
		2. Deliver lifeguard education programs to schools and community groups (target 2500 students)	2. 100%	2. 100%	On target. The lifeguard education program commenced in term 4 in schools across our LGA. To date, 48 presentations have been delivered with 4,454 students participating in the program.
2.1.1.2 Support and promote the Hastings Liqueur Accord	Community Place	1. Capture the number of Programs/initiatives supported	1. 100%	1. 100%	On target. Council continues to support the Liquor Accord with their campaigns. New monthly meetings have now been established with the Local Area Command to assist in this relationship. In November Council adopted a new Alcohol use on Parks, Reserves and Beaches on which we engaged with the Liquor Accord members to change the previous policy and timings.

Community Strategic Plan: 2.1 Create a community that feels safe

Delivery Program Objective: 2.1.1 Support Community Safety initiatives

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
		2. Support Hastings Liquor Accord projects as required	2. 100%	2. 100%	On target. Council continues to support the Liquor Accord with their campaigns. New monthly meetings have now been established with the Local Area Command to assist in this relationship. In November Council adopted a new Alcohol use on Parks, Reserves and Beaches on which we engaged with the Liquor Accord members to change the previous policy and timings. The Christmas and New Years Campaign is the focus for December with a follow up campaign around Australia Day in the New year.
2.1.1.3 Delivery the Graffiti Blasters Program	Community Place	1. Capture the number of removals and volunteer time (hrs)	1. 100%	1. 100%	On target. Approx 200 tags per month removed during July to December 2018. Noting that in December 2018 approx 300 tags were removed. Approx 200 hours of volunteer time has been donated per month on average.
		2. Deliver Graffiti Blasters Program	2. 100%	2. 100%	On target. Graffiti removal process is ongoing.

Delivery Program Objective: 2.1.2 Advocate for, support and coordinate emergency services

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
2.1.2.1 CW Council supports Emergency Management Operations and Agencies	Infrastructure	1. Provide coordination and support to emergency service units as required	1. 100%	1. 100%	On target. Emergency operations support provided as and when required.
2.1.2.2 Pappinbarra Fires - Disaster funding	Transport and Stormwater Network	1. Undertake works associated with the Pappinbarra Fires - Disaster funding	1. 100%	1. 100%	Achieved. Culvert replaced.

Community Strategic Plan: 2.1 Create a community that feels safe

Delivery Program Objective: 2.1.2 Advocate for, support and coordinate emergency services

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
2.1.2.3 Hannam Vale Road - Flood Damage - Natural Disaster	Transport and Stormwater Network	1. Undertake works associated with the Hannam Vale Floods	1. 100%	1. 100%	On target. Planning complete. Working with RMS to confirm funding amount and scope of works prior to appointing a contractor.

Delivery Program Objective: 2.1.3 Conduct regulatory and educational activities which safeguard public and environmental health, and ensures compliance with planning and building standards

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
2.1.3.1 Monitor and take action as appropriate to ensure compliance with development approvals and building, environmental, public health and on-site sewage standards	Regulatory Services	1. Respond to greater than 80% of complaints relating to building, environmental, public health and on-site sewage issues within set customer service standards	1. 80%	1. 87%	On target.
		2. Undertake 1,000 on-site sewage inspections	2. 1,000#	2. 474#	Monitoring required.
		3. Undertake 250 pool inspection	3. 250#	3. 161#	Monitoring required.
		4. Undertake a minimum of 40 fire safety inspections	4. 40#	4. 25#	On target.
		5. Undertake195 public health inspections	5. 195#	5. 89#	Monitoring required.
2.1.3.3 Provide ranger and law enforcement services to ensure compliance with legislation, regulations and Council policies relating to parking, beach patrols, illegal signage, sale of goods on roads	Regulatory Services	1. Capture the number of companion animal incidents	1. 0#	1. 708#	On target.
		2. Capture the number of offences detected during proactive patrols	2. 0#	2. 1,168#	On target.

Community Strategic Plan: 2.1 Create a community that feels safe

Delivery Program Objective: 2.1.3 Conduct regulatory and educational activities which safeguard public and environmental health, and ensures compliance with planning and building standards

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
		3. Respond to greater than 80% of complaints regarding compliance with parking, beach patrols, illegal signage, sale of goods on roads, building site sediment control and companion animal management	3. 80%	3. 86%	On target.
2.1.3.4 Manage Council's Environmental Laboratory and provide sampling, analysis, reporting and professional advice of water quality analysis in accordance with operational and regulatory requirements	Commercial Business Units	1. Complete all sampling, analysis and reporting of operational and regulatory requests in accordance with approved budgets	1. 100%	1. 100%	On target. All sampling, analysis and reporting conducted within budget.
		2. Complete greater than 90% of all sampling, analysis and reporting of operational and regulatory requests in accordance with the required service standards	2. 90%	2. 98%	On target. 98.1% of finalised reports met the required service standard. All reports for urgent request and non-compliant results were met within the agreed service standard.
		3. Maintain National Association of Testing Authorities (NATA) corporate accreditation	3. 100%	3. 100%	On target. NATA accreditation maintained.
2.1.3.5 Provide a safe water supply in accordance with Australian Drinking Water Quality Guidelines	Water and Sewer	1. Have nil reportable incidents in accordance with NSW Health agreed protocols	1. 100%	1. 99%	Behind target. One reportable Faecal Coliform detect during the reporting period. Repeat sample was all clear with no detection of faecal coliforms.

Community Strategic Plan: 2.2 Advocate for social inclusion and fairness

Delivery Program Objective: 2.2.1 Support and advocate for all community sectors

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
2.2.1.1 Provide opportunities for young people to learn and develop through 'youth-focused' initiatives in line with the Community Inclusion Plan	Community Place	1. Coordinate Youth Advisory Council activities	1. 100%	1. 100%	On target. A new approach to the Youth Advisory Council and will be a focus in 2019
		2. Hold Youth Week annually	2. 100%	2. 100%	On target. Planning in progress looking to engage with Youth people early in the new year to finalise calendar of events and activities
		3. Youth week actions developed and delivered as part of the Community Inclusion plan	3. 100%	3. 100%	Monitoring required. The Community Inclusion plan is behind schedule, draft actions around youth activities has been developed. An final document will be determined early in the new year
2.2.1.3 Coordinate the grants program to assist the community to deliver projects that contribute to a sense of place	Community Place	1. Deliver Community Grants Program through two rounds per year	1. 100%	1. 100%	On target. Round 1 of the 2018-2019 Community Grant Program delivered to 24 successful community groups in November 2018. Over $130,000 distributed.
		2. Undertake a review the current Community Grants program to meet the needs of a changing community	2. 100%	2. 100%	On target Review undertaken in early 2018. Another review to be undertaken in early 2019.
2.2.1.6 Finalise a new Port Macquarie Hastings Events Plan	Community Place	1. Commence implementation of actions relating to community events	1. 100%	1. 90%	Monitoring required. Work still underway on finalising the draft plan and the subsequent actions. This will be presented to Exec early in the new year
		2. Finalise Events Plan	2. 100%	2. 90%	Monitoring required. Work still underway on finalising the draft plan and the subsequent actions. This will be presented to Exec early in the new year
2.2.1.7 Finalise the Community Inclusion Plan, that determines focused actions for Seniors, Youth, Aboriginal Communities, Diversy, Multicultualism and LGBTIQ groups	Community Place	1. Implement the Community Inclusion Plan actions	1. 100%	1. 90%	On target. The development of the Community Inclusion plan is nearing completion. A draft will be presented to the Executive Team in February.

Community Strategic Plan: 2.3 Provide quality programs, community facilities and public spaces, e.g. for example, Community community halls, parks and vibrant town centres

Delivery Program Objective: 2.3.1 Ensure access to community facilities and activities: including access to natural environment

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
2.3.1.1 CW Implement the Disability Inclusion Action Plan and inclusive programs (Disabled Accesses - Buildings/Recreation Facilities - multi-year project) Allocated Amount 2018-19 $106,100	Community Place	1. Implement the Disability Inclusion Action Plan (including Disabled Accesses - Buildings/Recreation Facilities)	1. 100%	1. 100%	On target.The end of the calendar year saw another concerted effort to help our community be more disability friendly. Highlights include: - The Access Committee and Mayor celebrated International Day of People with Disability with the 45 volunteers plus clients of SailAbility at McInherney Park. - Access Committee undertook an Access Friendly visit to the Lake Road Shops including Anaconda, Spotlight and Supercheap Auto. - Onsite engagement with Bold Street Laurieton businesses about the proposed pedestrian crossing to be installed in 2019. - Engagement with Wauchope businesses about the main street upgrade including re-location of the two pedestrian crossings. - Onsite review of proposed locations for bench seats at Laurieton and Clifton Drive shops. - Coordination of the Access Committee December meeting. - Onsite engagement for inclusive playground upgrades at Blair Street Reserve and Town Beach playgrounds. - Review of design plans for the wheelchair friendly Lake Cathie fish cleaning table (Council has received a Dept Primary Industries grant for purchase and install).

Community Strategic Plan: 2.3 Provide quality programs, community facilities and public spaces, e.g. for example, Community community halls, parks and vibrant town centres

Delivery Program Objective: 2.3.2 Provide a range of inclusive sporting and recreational opportunities and facilities to encourage a healthy and active lifestyle

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
2.3.2.1 Continue implementation of the Recreation Action Plan 2015-2025 (including Town Green Central and West - Preconstruction)	Recreation and Buildings, (Infrastructure Delivery)	1. Delivery Project according to approved project plan (Town Green Central and West - Preconstruction)	1. 100%	1. 100%	On target. Design phase ongoing including extensive heritage and cultural assessments, Construction phase of this project subject to additional funding being secured. This project will continue into 2019/20 FY.

Delivery Program Objective: 2.3.2 Provide a range of inclusive sporting and recreational opportunities and facilities to encourage a healthy and active lifestyle

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
		2. Implement the identified actions from the Recreation Action Plan	2. 100%	2. 90%	Monitoring required. Stuart Park - Install sub-soil drainage: This project forms part of Council's successful Regional Sport Infrastructure Fund (RSIF) application for significant upgrading of Stuart Park and Wood Street sports fields. Funding Deed is under development. Port Macquarie Off Leash Dog Exercise Park - Design and construct: Concept Plan has been developed for a facility at Stuart Park. This project also forms part of Council's RSIF project. Hastings Regional Sporting Facility - Stage 1 development: Detailed design for the facility is progressing. Port Macquarie Pool Upgrade: Yet to commence. Project commencement is subject to completion of the site selection process and development of facility concept plans. Undertake Camden Haven River recreational boating upgrade improvements: Detailed design for the upgrade of Bruce Porter Reserve and Dunbogan Reserve boat ramps finalised. Construction contractors have been engaged for both projects with works scheduled for February to June 2019. Sancrox/Thrumster Sports Fields: Project planning has commenced. Engagement of a consultant to commence the detailed design for the facility is subject to finalisation of a Development Application for fill for the site being approved by Council. Westport Park - Riverwall and pathway upgrade: Project complete. Hastings River, Port Macquarie: Detailed design and approvals for new recreational boating facility: Draft concept plans have been developed for this project.

Community Strategic Plan: 2.3 Provide quality programs, community facilities and public spaces, e.g. for example, Community community halls, parks and vibrant town centres

Delivery Program Objective: 2.3.2 Provide a range of inclusive sporting and recreational opportunities and facilities to encourage a healthy and active lifestyle

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
2.3.2.2 CW Deliver sporting facility renewal and upgrades program across the LGA	Recreation and Buildings	1. Deliver renewal and upgrades as per schedule and reported according to seasonal sports	1. 100%	1. 100%	On target. Blackbutt Park Facility Upgrade and replacement of Park Furniture: Project scope has been finalised. Works are scheduled to commence early 2019. Stuart Park Install sub-soil drainage to fields 1 and 2: This project is linked to Council's successful Regional Sport Infrastructure Fund application for major improvements for the Stuart Park sports precinct. The Funding Deed associated with this grant is under development. Port Macquarie Hastings Hockey Facility - install lighting to Field 2: Contractor engaged for delivery of this project. Port Macquarie Regional Sports Stadium - construction of new training field including lighting: Contractor engaged for delivery of lighting component of this project. Remaining project scope being finalised. Oxley Oval - Sporting Infrastructure Upgrade: electrical easement confirmed for power upgrade. Quotation for works currently being sought. Commencement of sports clubhouse construction has been delayed while project partners seek finalisation of funding deed.
2.3.2.3 Manage the Mayor's Sporting Fund	Community Place	1. Distribute funds as required and coordinate fundraising events	1. 100%	1. 100%	On target. Monthly meeting held and funds distributed. Fourth and final Fund Raising event for the MSF held on 23 November 2018 with over $6,000 Nett raised from the event.

Community Strategic Plan: 2.3 Provide quality programs, community facilities and public spaces, e.g. for example, Community community halls, parks and vibrant town centres

Delivery Program Objective: 2.3.2 Provide a range of inclusive sporting and recreational opportunities and facilities to encourage a healthy and active lifestyle

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
2.3.2.4 Undertake regional master planning for recreational facilities	Recreation and Buildings	1. Commence Master Plan development for the Vince Inmon Sporting Complex (Adopted Ord Council Meeting 21 Nov18)	1. 100%	1. 100%	On target. Project planning complete. Draft plan development will commence in February in consultation with Vince Inmon user group.
		2. Commence master planning for Bain Park, Wauchope	2. 100%	2. 0%	Yet to commence. This project is to be aligned with development of the Wauchope Community Plan.
		3. Continue master planning for Flynns Beach	3. 100%	3. 50%	Behind schedule. Draft Flynns Beach Master Plan is to be presented to the Council in early 2018 to seek support for public exhibition of the draft plan.
2.3.2.5 CW Undertake Camden Haven River recreational boating upgrade improvements, incl Bruce Porter Reserve and Dunbogen Reserve - Boat Ramp upgrades - multi-year project - Adopted 2017-18 - $500,000	Recreation and Buildings (Infrastructure Delivery)	1. Deliver project according to approved project plan (Camden Haven River recreational boating upgrade incl Bruce Porter Reserve)	1. 100%	1. 100%	On target. The upgrade of Bruce Porter Reserve boat ramp and Dunbogan boat ramp are projects that have continued from 2017/18 FY. The design and pre-construction approvals for these ramps are complete. Construction of both upgrades is proposed to commence after the busy summer boating season in Mar 2019 and be complete by Jul 2019.
2.3.2.6 CW Hastings River recreational boating improvements - Undertake design/pre-construction for provision of new facility as per Boating Needs Investigation Allocated Amount 2018-19 - $310,000	Recreation and Buildings, (Infrastructure Delivery)	1. Deliver project according to approved project plan (Hastings River recreational boating improvements)	1. 100%	1. 80%	Behind schedule. This project remains in the initiation phase. Design phase commencement is pending negotiations re land acquisition and traffic/intersection planning. No construction is proposed on this project during the 2018/19 FY, This project will continue into the 2019/20 FY.

Community Strategic Plan: 2.3 Provide quality programs, community facilities and public spaces, e.g. for example, Community community halls, parks and vibrant town centres

Delivery Program Objective: 2.3.3 Develop and implement management of operational and maintenance programs for open space, recreational and community facilities

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
2.3.3.01 CW Undertake the maintenance program for parks, reserves, sporting fields and beaches (including parks signage, Riverfront and Rowing Club Rerve, Bunny's Corner and Settlement Point erosion)	Recreation and Buildings	1. Deliver maintenance program, including beach cleaning and playground inspections according to approved maintenance schedules	1. 100%	1. 100%	On target. During November and December focus has been on: - maintaining park furniture in the Wauchope and Port Macquarie area, sports field preparation for weekly fixtures and mowing of our parks and reserves. - preparing sites for events during this period. e.g markets, Christmas celebrations etc - garden maintenance in the Port Macquarie CBD area including pruning and mulching for the influx of tourists over the Christmas school holidays - Inspection of all playgrounds and repairs made for school holidays -Field preparations for Regional Stadium and Tuffins Lane for the State Cup touch football - cleaning of bin hides and bubbler's across the local government area. -Mowing of Cemeteries for the Christmas holidays. - recruitment for Park Attendants and Trainees
2.3.3.02 CW Undertake scheduled and reactive maintenance programs of all Council-owned buildings including office furniture replacement - Allocated Amount 2018-19 - $45,600	Recreation and Buildings	1. Deliver projects according to facilities works program	1. 100%	1. 100%	On target. Works are being carried out as per our current maintenance schedules and reporting mechanisms
2.3.3.03 CW Undertake building rectification works in line with Council Asset Management - multi-year project - Allocated Amount 2018-19 - $314,300	Recreation and Buildings	1. Deliver project according to approved project plan (building rectification works)	1. 100%	1. 100%	On target .Works are being carried out in line with the 2018-19 Building Asset Management Plan
2.3.3.04 Provide, maintain and manage public aquatic facilities	Recreation and Buildings	1. Oversee the management of Council's public aquatic facilities in accordance with lease obligation checklist	1. 100%	1. 100%	On target. All four aquatic facilities are being managed in accordance with the pool management and operational guidelines.

Community Strategic Plan: 2.3 Provide quality programs, community facilities and public spaces, e.g. for example, Community community halls, parks and vibrant town centres

Delivery Program Objective: 2.3.3 Develop and implement management of operational and maintenance programs for open space, recreational and community facilities

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
		2. Undertake annual off-season facility maintenance in accordance with approved program	2. 100%	2. 100%	On target. Programmed and reactive maintenance continues to be undertaken as required across the four pools.
2.3.3.05 Deliver park furniture renewals across the local government area, including donated seats program, North Haven Boat Ramp and Aqua Reserve Lake Cathie Fish Cleaning Table upgrades	Recreation and Buildings	1. Deliver Park furniture replacement program according to approved schedule	1. 100%	1. 100%	On target. Furniture renewal is being delivered as per program.
2.3.3.06 CW Carry out playground equipment replacement program (incl Herons Creek Resv, Wall Resv, Foreshore Resv and Pioneer Park Comboyne)	Recreation and Buildings	1. Deliver the Playground Equipment Replacement program according to approved schedule (including Herons Creek Reserve and Wall Reserve)	1. 100%	1. 100%	On target. Concept designs for the upgrade of Wall Reserve and Heron's Creek playgrounds have been finalised. Construction of the Heron's Creek works will commence early 2019.
2.3.3.08 CW Deliver recreational walkway replacement program across the local government area including Kooloonbung Creek Nature Park- Allocated Amount - $40,000	Recreation and Buildings	1. Deliver Recreational walkway program (including Kooloonbung Creek Nature Park) according to approved project plan	1. 100%	1. 100%	On target. Works have commenced on upgrading a section of walkway in Kooloonbung Creek Nature Park during this reporting period.
2.3.3.09 Implement maintenance programs for boat ramps, wharves and jetties	Transport and Stormwater Network	1. Deliver programs according to approved maintenance and schedule (for boat ramps, wharves and jetties)	1. 100%	1. 100%	On target. Works delivered on budget. Works schedule based on inspections and assessment criteria from Council's road risk rating and road hierarchy systems.
2.3.3.10 CW Undertake the maintenance program for beaches	Recreation and Buildings	1. Undertake beach and beach access maintenance as per program	1. 100%	1. 100%	On target. Beach accesses maintained and cleaned as required for summer season. Detailed beach grooming undertaken at all high profile beaches prior to the start of the school holiday period.

Community Strategic Plan: 2.3 Provide quality programs, community facilities and public spaces, e.g. for example, Community community halls, parks and vibrant town centres

Delivery Program Objective: 2.3.3 Develop and implement management of operational and maintenance programs for open space, recreational and community facilities

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
		2. Undertake inspections of beach access signs	2. 100%	2. 100%	On target. Signs inspected, repaired and replaced as required.
2.3.3.11 CW Rocks Ferry Reserve - Riverbank revetment extension - Adopted 2017-18 - $150,000	Recreation and Buildings (Infrastructure Delivery)	1. Deliver project according to approved project plan (Rocks Ferry Reserve)	1. 100%	1. 100%	On target This project continues from 2017/18 FY. Construction practically complete during Oct 2018 within anticipated budget. Additional scope of works to extend rock armouring has been agreed to take advantage of remaining budget. The lead time of the approvals of the additional scope is expected to be 6 months. This project may therefore continue into 2019/20FY.
2.3.3.12 CW Sancrox/Thrumster Sports Fields - Detailed design and approvals - multi-year project - Adopted 2017-18 - $300,000	Recreation and Buildings (Infrastructure Delivery)	1. Deliver project according to approved project plan (Sancrox/Thrumster Sports Fields - design and approvals)	1. 100%	1. 100%	Behind schedule This project continues from 2017/18 FY. This design phase only project is progressing towards design finalisation in late 2019. The design phase of this project is pending the Development Approval (private developer) for the filling of the sports field site. timing TBC. No construction budget allocation has been made to this project at this stage.
2.3.3.13 CW Westport Park - Riverwall and pathway upgrade - multi-year project- Adopted 2017-18 - $375,000	Recreation and Buildings (Infrastructure Delivery)	1. Deliver project according to approved project plan (Westport Park - Riverwall and pathway upgrade)	1. 100%	1. 100%	On target. Construction underway from 2017/18 FY. Construction completed on target during Oct 2018. Project completion administration ongoing
2.3.3.14 CW Undertake the Public Amenities Renewals Program - Allocated Amount 2018-19 - $255,030 Short Street Car Park Reserve	Recreation and Buildings	1. Deliver project according to approved project plan (Public Amenities Renewals program incl Short Street Car Park Reserve)	1. 100%	1. 100%	On target. Submissions for T-18-26 Short Street Plaza Car Park Port Macquarie - upgrade of public amenities have been received. Tender was adopted at the September Ordinary Council meeting. Delivery time frames for this project are consistent with signed funding agreement.

Community Strategic Plan: 2.3 Provide quality programs, community facilities and public spaces, e.g. for example, Community community halls, parks and vibrant town centres

Delivery Program Objective: 2.3.3 Develop and implement management of operational and maintenance programs for open space, recreational and community facilities

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
2.3.3.15 CW Kendall Skatepark – renewal of facility at end of useful life – Design and construct Allocated Amount 2018-19 - $150,000	Recreation and Buildings, (Infrastructure Delivery)	1. Deliver project according to approved project plan (Kendall Skatepark renewal)	1. 100%	1. 100%	Behind schedule. The initiation phase of this project dependent on confirmation of land availability for the proposed skatepark. Construction of this project by the targeted end date of June 2019 is at risk. No monthly report.
2.3.3.16 Manage burial, cremation and memorialisation services at Innes Garden Memorial Park, Wauchope, Laurieton and other outlying cemeteries	Commercial Business Units	1. Carry out services in accordance with legislative and customer requirements	1. 100%	1. 100%	On target. All cremation and burial services performed in accordance with legislation and customer requests.
2.3.3.17 CW Carry out improvement and expansion works at Innes Garden Memorial Park, Wauchope and Laurieton cemeteries Allocated Amount 2018-19 - $15,000 Wauchope Cemetery – Install New Shelter	Commercial Business Units	1. Deliver projects according to approved project plan (improvement and expansion works at cemeteries)	1. 100%	1. 100%	On target. Planning for construction is underway.
2.3.3.18 Administration of public roads, public spaces, events and customer engagement:Section 138 Road Applications, Road Encroachments, Customer Enquiries and Statutory Road functions	Transport and Stormwater Network	1. Deliver works in accordance with Council's Policies and Procedures	1. 100%	1. 100%	On target. Tasks being undertaken as per established procedures.
2.3.3.19 CW Crestwood Park – Construct new park Allocated Amount 2018-19 - $370,670	Recreation and Buildings	1. Deliver project according to approved project plan (Crestwood Park)	1. 100%	1. 100%	On target. Construction of the new park has commenced with works scheduled for completion January 2019.

Delivery Program Objective: 2.3.4 Plan, investigate, design and construct open spaces, recreational and community facilities

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
2.3.4.02 CW Port Macquarie Coastal Walk — upgrade as per adopted master plan - Allocated Amount 2018-19 - $1,265,000	Recreation and Buildings	1. Deliver project according to approved project plan (Port Macquarie Coastal Walk)	1. 100%	1. 100%	On target. The Westport Park segment of the Coastal Walk upgrade was completed in November 2018. Works on the Charlie Uptin and Doctors Walk segments are currently in design phase of this project.

Community Strategic Plan: 2.3 Provide quality programs, community facilities and public spaces, e.g. for example, Community community halls, parks and vibrant town centres

Delivery Program Objective: 2.3.4 Plan, investigate, design and construct open spaces, recreational and community facilities

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
2.3.4.03 Wayne Richards Park — Stage 3B detailed design and approvals - Adopted 2016-17 - $300,000	Recreation and Buildings (Infrastructure Delivery)	1. Deliver project according to approved project plan (Wayne Richards Park — Stage 3B)	1. 100%	1. 100%	On target. Multi year project. Design underway for this multi year project and is expected to continue into the 2019/20FY with estimated design completion in May 2020. The construction phase would then be subject to depot relocation and budget allocation.
2.3.4.06 CW Flynn's Beach — upgrade sea wall - multi-year project - Adopted 2015-16 - $668,006	Recreation and Buildings (Infrastructure Delivery)	1. Deliver project according to approved project plan (Flynn's Beach — upgrade sea wall)	1. 100%	1. 100%	On target. This project continues from 2017/18 FY. Following changes to NSW environmental legislation this project now requires a formal Development Application (DA). This DA is expected to be submitted to Council in November 2019. Construction of this project is programmed to commence in April 2019 following the busy summer period and be complete by November 2019.
2.3.4.07 CW Googik Track - construct shared walkway/cycleway, Stage 2 - multi-year project - Adopted 2017-18 - $75,696	Recreation and Buildings	1. Deliver project according to approved project plan (Googik Track - construct shared walkway/cycleway, Stage 2)	1. 100%	1. 20%	Behind schedule. The next stage of works associated with the Googik Track was confirmed by National Parks at the August 2018 Googik Track Working Group Meeting. Design timelines are to be confirmed by National Parks.
2.3.4.08 CW Hastings Regional Sporting Facility - Stage 1 development - multi-year project - Allocated Amount 2018-19 - $1,500,000	Recreation and Buildings (Infrastructure Delivery)	1. Deliver project according to approved project plan (Hastings Regional Sporting Facility - Stage 1)	1. 100%	1. 100%	On target. This project continues from the 2017/18 FY. Design works are progressing towards an anticipated design completion in May 2019. Minor preliminary works to receive fill from RMS on site are now complete. Construction works planning and associated phasing are currently being developed.

Community Strategic Plan: 2.3 Provide quality programs, community facilities and public spaces, e.g. for example, Community community halls, parks and vibrant town centres

Delivery Program Objective: 2.3.4 Plan, investigate, design and construct open spaces, recreational and community facilities

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
2.3.4.09 CW Town Centre Master Plan - Kooloonbung Creek Foreshore - Gordon to Hayward Street upgrade - Adopted 2017-18 - $371,565	Recreation and Buildings, (Infrastructure Delivery)	1. Deliver project according to approved project plan (Town Centre Master Plan - Kooloonbung Creek Foreshore)	1. 100%	1. 100%	On target This project continues from 2017/18 FY. Construction planning being finalised ahead of construction commencement. Environmental assessment pending internal expert review prior to determination.
2.3.4.12 CW Port Macquarie Town Centre Master Plan (TCMP) Improvements Banner Poles, Clarence St - Tree and Understorey Replanting, Foreshore Landscaping - General Embellishment, Gordon St Bridge	Recreation and Buildings	1. Deliver project according to approved project plan (PMQ TCMP Improvements)	1. 100%	1. 100%	On target. TCMP improvements are ongoing. Banner poles have now been replaced. Minor reinstatement works to be completed early January. Gordon Street Bridge underpass currently in detailed design phase. Other TCMP Priority Projects are currently on hold to consider prioritisation of Foreshore Projects.
2.3.4.13 CW Develop off leash dog exercise parks in Port Macquarie and Wauchope - Allocated Amount 2018-19 - $120,000	Recreation and Buildings	1. Deliver project according to approved project plan (Develop off leash dog exercise parks in Port Macquarie and Wauchope)	1. 100%	1. 100%	On target. The Port Macquarie facility now forms part of the broader upgrade of the Stuart Park Regional Sporting Precinct project. Wauchope Dog Off Leash Park has commenced with works scheduled for completion early 2019.
2.3.4.14 CW Port Macquarie Pool - Detailed design and approvals - Allocated Amount 2018-19 - $500,000	Recreation and Buildings	1. Deliver project according to approved project plan (Port Macquarie Pool - Detailed design and approvals)	1. 100%	1. 0%	Yet to commence. Commencement of this project is contingent on finalisation of a facility concept plan and resolution of preferred site.
2.3.4.15 CW Mrs Yorks Garden – Concept Plan development - Allocated Amount 2018-19 - $50,000	Recreation and Buildings	1. Deliver project according to approved project plan (Mrs Yorks Garden – Concept Plan development)	1. 100%	1. 100%	On target. The draft Master Plan was presented to the December 2018 Ordinary Council Meeting and is being exhibited to allow for community feedback until late January 2019. A further report will be presented to Council in March 2019.

Community Strategic Plan: 2.3 Provide quality programs, community facilities and public spaces, e.g. for example, Community community halls, parks and vibrant town centres

Delivery Program Objective: 2.3.4 Plan, investigate, design and construct open spaces, recreational and community facilities

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
2.3.4.16 CW Wayfinding Signage Implementation (Town and Villiage Signage) - Allocated Amount 2018-19 - $50,000	Community Place	1. Deliver project according to approved project plan (Wayfinding Signage Implementation - Town and Villiage signage)	1. 100%	1. 100%	On target. Stage two of the signage roll out planning is underway. An engagement platform on Have you say has been developed and we are asking for community feedback on the symbolism and will be accepted up until 30 November 2018. Signs will be installed in the following communities in the 2018 - 2019 period: Wauchope, Lorne, Comboyne, Byabarra, Bagnoo, Herons Creek, Camden Head. Signs will be installed in 2019 prior to June.

Delivery Program Objective: 2.3.5 Plan and deliver innovative Library Services which cater for new technology and growing population

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
2.3.5.1 CW Provide a range of library programs and lending services across the local government area (including Library Furnishings, Fittings and Equip; Library Local Priority Grant)	Community Place	1. Annual library events program delivered	1. 100%	1. 100%	On target. A range of children's and adult programs were provided during this period.
		2. Increase Library membership	2. 100%	2. 100%	On target. Membership is currently at 33,423 as at December, an increase from 33,124 as at September 2018.
2.3.5.2 CW Purchase of Library Books - multi-year project - Allocated Amount 2018-19 - $264,900	Community Place	1. Complete book purchases	1. 100%	1. 100%	On target. Budget is being spent as allocated.
2.3.5.3 Library Development – New Spaces – users and staff (study room and Technology space)	Community Place	1. Completion of the new library spaces	1. 100%	1. 100%	On target. Building work has been completed. The new study rooms are in use and the Portal has been officially launched by the mayor and the local member. Only awaiting some outdoor furniture for the project to be completed.
2.3.5.4 Undertake development of a Library Strategic Plan	Community Place	1. Library Strategic Plan development complete	1. 100%	1. 100%	On target. Draft plan has been completed and is now with the Group Manager.

Community Strategic Plan: 2.3 Provide quality programs, community facilities and public spaces, e.g. for example, Community community halls, parks and vibrant town centres

Delivery Program Objective: 2.3.5 Plan and deliver innovative Library Services which cater for new technology and growing population

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
2.3.5.5 CW Library - Webpage Upgrade - Allocated Amount 2018-19 - $26,000	Community Place	1. Library webpage upgrades complete	1. 100%	1. 100%	On target. A project plan is being developed.

Delivery Program Objective: 2.3.6 Support a range of inclusive community activities and programs

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
2.3.6.2 Develop a strategic approach to Community Programs and activities that align with organisational strategies, particularly the community inclusion plan	Community Place	1. Implement community programs and activities	1. 100%	1. 100%	On target. The Council delivered/supported a number of activities and programs to our community including: 2019 Countdown to Xmas, approximately 10,000 people attended the annual event. The event included the Mascot Race, entertainment, Xmas Street parade, lighting of the Xmas Tree and fireworks. International Day of Disabled Persons was celebrated with a morning tea to recognise the volunteers who support Sailability - sailing for those with a disability. Bi-monthly Access Committee meeting, Rural Halls Network Meeting at Rollands Plains Hall - 6 halls represented.

Community Strategic Plan: 2.4 Empower the community through encouraging active involvement in projects, volunteering and events

Delivery Program Objective: 2.4.1 Work with the community to identify and address community needs, to inform Council processes, services and projects

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
2.4.1.1 Promote and coordinate volunteer involvement in Council programs and activities as part of the Community Inclusion Plan	Community Place	1. Promote and coordinate volunteer involvement in Council programs and activities as part of the Community Inclusion Plan	1. 100%	1. 100%	On target. Continuing to build and strengthen the volunteer opportunities within the local area, engaging with local schools to promote the value of volunteering.

Community Strategic Plan: 2.5 Promote a creative and culturally rich community

Delivery Program Objective: 2.5.1 Support cultural activities within the community

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
2.5.1.1 Implement the Cultural Plan	Community Place	1. Implement Cultural Plan actions	1. 100%	1. 100%	On target. The 2018 - 2021 Cultural Plan was adopted at the September 2018 Ordinary Council Meeting. The Cultural Steering Group meets monthly to review progress and prioritise actions. The Plan has 30 actions to be achieved by 2021. An annual report on the 2018 - 2019 actions will be reported at the Ordinary Council Meeting planned for September 2019. An application for grant funding was lodged under the Building Better Regions Fund to assist in the development of a Cultural Economy Plan. Additional budget for 2019 - 2020 is also being sought to assist with implementation of the Plan.
2.5.1.2 CW Undertake Glasshouse back of house maintenance (Plant and Equipment Purchases; Technical Equipment Purchases - multi-year project)	Commercial Business Units	1. Undertake Glasshouse back of house maintenance as required	1. 100%	1. 100%	On target. Building and equipment maintenance undertaken as per the Planned Preventative Maintenance Program at the Glasshouse includes: Stairs to Auditorium modified to reduce manual handling risks Installation of quick change curtain and track to the scene dock Lift service and repairs Rigging inspection completed Meeting rooms repainted Additional kitchen storage installed Emergency lights in the stairwells replaced with LED Chair upholstery and carpets cleaned throughout the venue

Community Strategic Plan: 2.5 Promote a creative and culturally rich community

Delivery Program Objective: 2.5.1 Support cultural activities within the community

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
2.5.1.3 Manage the delivery of a range of high quality performing and visual arts events at the Glasshouse	Commercial Business Units	1. Number of performing arts events presented by 30 June	1. 100%	1. 100%	On target. The Glasshouse Performing Arts Program presented the following events as per the annual season program: Afternoons Tonight! with James Valentine, George's Marvellous Medicine, Opera Australia - Madame Butterfly, Playhouse Creatures, Julian Gargiulo Josephine Wants To Dance, Always Patsy Cline, Manhatten Short Film Festival, Sydney Comedy Festival and From Broadway to Ballroom. The Glasshouse Performing Arts Program operates within the calendar year and ended in November 2018. The 2019 program will be launched on 31 January 2019 and will recommence as per the annual touring schedule
		2. Number of visual arts events presented by 30 June	2. 100%	2. 100%	On target. As per the annual Visual Arts Program, the Glasshouse Regional Gallery presented the following exhibitions: Northern Exposure exhibition, Jason Wing - Artist in Residence, Primavera at 25 - HSC student workshop, Archibald Prize - 2017 Regional Tour and ArtExpress, The Presence of Absence - Jason Wing, Silence and Solitude - Nicole Welch, Inhabiting Space - curated by Dr Elizabeth Shaw, Fiona Lowry - The Trees, they whisper and YES YES YES YES - Graphics from the 1960's and 1970's.

COMMUNITY THEME 3 Your Business and Industry

What we are trying to achieve

The Port Macquarie-Hastings region is a successful place that has a vibrant, diversified and resilient regional economy for people to live, learn, work, play and invest.

Community Strategic Plan: 3.1 Embrace business and a stronger economy

Delivery Program Objective: 3.1.1 Assist the growth of local business and industry, ensuring this is a central consideration of Council activities

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
3.1.1.1 Implement actions from the 2017-2021 Economic Development Strategy to lead, create and proactively support an environment that stimulates sustainable industry, business and investment growth	Economic Development and Communications	1. Implement actions from the Economic Development Strategy	1. 100%	1. 100%	On target. Highlights have included The Hub pop-up co-working and business space plus associated events, completion of Business Confidence Survey, significant progress on Health and Education Precinct planning, completion of the Local Skills Audit.
		2. Meet the charter requirements of the Small Business Friendly Council Program	2. 100%	2. 100%	On target. The major initiatives as part of the Small Business Friendly Council program include the Local Preference Policy (LPP) and Outdoor Dining Policy. The LPP trial concluded in September with a report to Council in Oct. The Outdoor Dining trial was extended for a further 12 months following a favourable review.
		3. Undertake and report on an annual business confidence survey	3. 100%	3. 100%	On target. Over 400 businesses participated in the 2018 Business Confidence Survey. The positive results have been analysed, shared with the Economic Development Steering Group and circulated to participants and the broader business community.

Community Strategic Plan: 3.1 Embrace business and a stronger economy

Delivery Program Objective: 3.1.2 Optimise the use of appropriately zoned land for business uses

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
3.1.2.1 Finanlise Local Environmental Plan (LEP) and Development Control Plan (DCP) amendments in relation to a business park near Port Macquarie Airport	Strategic Land Use Planning	1. Report to Council regarding adoption of LEP and DCP amendments by 31 Dec	1. 100%	1. 50%	Behind schedule. Airport Biodiversity Certification gazetted on 7 September 2018. Proposed location for a future airport business park reported to the November 2018 Council meeting. Further report to be presented to the February 2019 Council meeting in relation to a Planning Proposal for the proposed airport precinct business park.
3.1.2.2 Investigate the capacity of land at the intersection of Ocean Drive and Houston Mitchell Drive Lake Cathie, for potential service industrial development	Strategic Land Use Planning	1. Review of information submitted by landowners and progress report to Council by 31 December 2018	1. 100%	1. 97%	Monitoring required. Site Specific Planning Proposal request submitted by land owner proposing the rezoning of the land for potential industrial development and under assessment. Assessment and reporting of the Planning Proposal request to Council is pending the submission of additional information from the Proponent.

Delivery Program Objective: 3.1.3 Implement Major Events Strategy

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
3.1.3.2 Finalise and implement a new Port Macquarie-Hastings Events Plan	Economic Development and Communications	1. Commence implementation of actions relating to 'Major Events'	1. 100%	1. 100%	On target. Council supported 11 major events during the July to December 2018. The Event Sponsorship Program has awarded funding to successful recipients for events held in the first half of 2019.
		2. Finalise Events Plan	2. 100%	2. 99%	Monitoring required. The Events Plan has been reviewed with final updates underway with implementation planned from January 2018.

Community Strategic Plan: 3.1 Embrace business and a stronger economy

Delivery Program Objective: 3.1.4 Implement the Destination Management Plan

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
3.1.4.1 Deliver actions from the Destination Management Plan (DMP) in accordance with the identified strategic outcomes	Economic Development and Communications	1. Implement actions within the Destination Management Plan (DMP)	1. 100%	1. 100%	On target. During the second quarter of FY 18-19 delivery of DMP actions was ongoing and included, * Nine operators visited DNSW head office in Sydney for a Port Macquarie Product Showcase. With 30 staff members from Tourism Australia, Business Events Sydney and DNSW in attendance. * DNSW provided an overview of future opportunities available for the group that are working towards becoming international ready and listing their product online and with Inbound Tour Operators. As a result of this development for the first time Port Macquarie product will be showcased at the Australian Tourism Exchange Expo in Perth in April 2019. * Ongoing support and participation in the Destination North Coast Nature Investment Strategy development. * Ongoing conversations with both National Parks and Wild Service and Forestry Corporation around local nature attractions, activation and collaboration. * Destination Visitor Profiling and Satisfaction Survey is reaching finalisation. * Ongoing support to Destination North Coast regarding the creation of a Business Events Bureau for the North Coast. * Stakeholder meetings with Virgin, Qantas and Study NSW. * The destination public relations program secured famils from Broadsheet.com, Australian Womens Weekly and travel2next.com. Coverage also appeared in Australian Traveller.

Community Strategic Plan: 3.1 Embrace business and a stronger economy

Delivery Program Objective: 3.1.4 Implement the Destination Management Plan

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
		2. Increase new monthly visits to the website by more than 15% in 12 months	2. 100%	2. 100%	On target .Visits to the destination website so far for the second quarter show an increase of 19.12% year on year. This represents an increase in users from 52,114 in 2017 to 62,077 in 2018.
		3. Review and update the Destination Management Plan	3. 100%	3. 100%	On target.Review of the Destination Management Plan (DMP) is underway now that the Destination North Coast has lodged the regional North Coast Destination Management Plan with Destination NSW. The Economic Development team are currently finalising the Visitor Profiling and Satisfaction Survey. The Destination Audit and Analysis report is underway with 2 progress reports completed that include the situational analysis, product audit spreadsheet and field visit overview. Once finalised these two key reports will underpin the review process.

Community Strategic Plan: 3.2 Create vibrant and desirable places

Delivery Program Objective: 3.2.1 Support vibrant commercial, tourism, recreational and or community hubs across the region

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
3.2.1.1 Continue installation of town and village signage installation	Community Place	1. Deliver project according to approved project plan (installation of town and village signage)	1. 100%	1. 100%	On target. Community Engagement was undertaken on the Symbolism for the next stage of the signs. the manufacturing and installation is programs for later in the financial year

Community Strategic Plan: 3.2 Create vibrant and desirable places

Delivery Program Objective: 3.2.1 Support vibrant commercial, tourism, recreational and or community hubs across the region

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
3.2.1.2 Support towns and villages initiatives that will provide activation and economic return	Economic Development and Communications	1. Identify initiatives and secure stakeholder support	1. 100%	1. 100%	On target. Creative Wauchope and Motorcycle Friendly Wauchope activity continuing. Community Planning project commenced with a range of towns and villages engagement to occur incoming two years.

Community Strategic Plan: 3.3 Embrace opportunity and attract investment to support the wealth and growth of the community

Delivery Program Objective: 3.3.1 Develop, manage and maintain Port Macquarie Airport as a key component of the regional transport network and continue to grow the airport's contribution to the regional economy

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
3.3.1.1 Continue to monitor, plan and implement the Port Macquarie Airport Master Plan to meet demand and regulatory requirements - multi-year project	Commercial Business Units	1. Deliver identified actions from the Airport Master Plan according to approved plan	1. 100%	1. 100%	On target. Terminal Building Upgrade - construction commenced. Parallel Taxiway - concept design finalised. Environmental approval pathway to be confirmed. Biodiversity Certification Agreement - progressing with implementation post approval. Council Biobanking Agreement Application submitted to OEH.
3.3.1.2 Support, facilitate and advocate for regular public transport (RPT) airline services at Port Macquarie Airport	Commercial Business Units	1. Increase in passenger numbers compared to previous year	1. 100%	1. 94%	Monitoring required. Passenger numbers for December 2018 are 6.5% behind December 2017, and passenger numbers for the 2018 calendar year are 5% behind the 2017 calendar year.
3.3.1.3 CW Port Macquarie Airport Terminal Upgrade - finalise construction - multi-year project - Allocated Amount 2018-19 $3,500,000	Commercial Business Units (Infrastructure Delivery)	1. Deliver project according to approved project plan (Port Macquarie Airport Terminal Upgrade)	1. 100%	1. 100%	On target. Terminal Building Upgrade - construction commenced

Community Strategic Plan: 3.3 Embrace opportunity and attract investment to support the wealth and growth of the community

Delivery Program Objective: 3.3.1 Develop, manage and maintain Port Macquarie Airport as a key component of the regional transport network and continue to grow the airport's contribution to the regional economy

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
3.3.1.4 New Port Macquarie Airport Parallel Taxiway Stage 1 and General Aviation pavement renewal – finalise detailed design	Commercial Business Units (Infrastructure Delivery)	1. Deliver project according to approved project plan (Port Macquarie Airport Parallel Taxiway Stage 1 and GA Pavement Renewal)	1. 100%	1. 100%	On target. Parallel Taxiway - concept design finalised. Environmental approval pathway to be confirmed.
3.3.1.5 Continue to monitor, plan and implement the Port Macquarie Airport Bio certification Strategy - multi-year project	Commercial Business Units, Environmental Services	1. Deliver identified actions from the Bio certification Strategy according to approved project plan	1. 100%	1. 100%	On target. Biodiversity Certification Agreement - progressing with implementation post approval. Council Biobanking Agreement Application submitted to OEH.
3.3.1.6 Operate and maintain Port Macquarie Airport in accordance with regulatory and safety requirements	Commercial Business Units	1. Carry out daily aerodrome inspections according to regulatory requirements	1. 100%	1. 100%	On target. All inspections carried out in accordance with regulatory requirements.
		2. Ensure airport operational manuals are reviewed by 30 June	2. 100%	2. 100%	On target. The Airport Operational Manuals are updated progressively throughout the year as required.
3.3.1.7 Airport Business Precinct development planning	Assets and Property Investment, Commercial Business Units	1. Commence infrastructure concept planning upon receipt of Council rezoning decision	1. 100%	1. 0%	Yet to commence. Commencement subject to receipt of Council rezoning decision.

Delivery Program Objective: 3.3.2 Promote investment, education and lifestyle opportunities

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
3.3.2.1 Promote local growth and opportunities within and outside the region	Economic Development and Communications	1. Ensure the Investment Prospectus is up to date	1. 100%	1. 100%	On target. Prospectus reviewed and re-printed, next update to be designed and released in Q2 2019.

Community Strategic Plan: 3.3 Embrace opportunity and attract investment to support the wealth and growth of the community

Delivery Program Objective: 3.3.2 Promote investment, education and lifestyle opportunities

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
		2. Include broader place opportunity messaging through marketing channels	2. 100%	2. 100%	On target. New video in the live, work, invest relocation campaign published. "Economic Development" newsletter published.

Community Strategic Plan: 3.4 Partner for success with key stakeholders in business, industry, government, education and the community

Delivery Program Objective: 3.4.2 Support local business networks

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
3.4.2.1 Work closely with local business networks and organisations to build their capacity and facilitate the growth of existing enterprises.	Economic Development and Communications	1. Ongoing engagement with, and support for local business networks	1. 100%	1. 100%	On target. The Business Hub is meeting regularly with 75% attendance and is actively involved with The Hub business and co-working space.

Delivery Program Objective: 3.4.3 Encourage innovation that will support our growth as a regional city including smart community technology

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
3.4.3.2 Prioritise, advocate and implement projects that enhance the local digital environment.	Economic Development and Communications	1. Expand the local free Council WiFi network	1. 100%	1. 25%	Behind target. Initial investigations placed on hold during this quarter due to a reduction in team resources and higher priorities.
		2. Support the delivery of projects which enhance local digital engagement and 'smart' technology roll out.	2. 100%	2. 100%	On target. On-going support via The Hub Business and Co-Working Space events, in particular the commencement of aHackathon, in partnership with Charles Sturt University and local businesses, engagement with the Digital Australian Small Business Advisory Service, encourage use of Australian Tourism Data Warehouse with local tourism industry.

COMMUNITY THEME 4 **Your Natural and Built Environment**

What we are trying to achieve

A connected, sustainable, accessible community and environment that is protected now and into the future.

Community Strategic Plan: 4.1 Provide (appropriate) infrastructure and services including water cycle management, waste management, and sewer management

Delivery Program Objective: 4.1.1 Plan, investigate, design and construct water supply assets ensuring health, safety, environmental protection and security of supply for the future growth of the region

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.1.1.01 CW Commencement of the construction of the Sancrox to Thrumster trunk main (DN750), Thrumster - Adopted Amount 2017-18 - $1,500,000	Water and Sewer, (Infrastructure Delivery)	1. Deliver project according to approved project plan (Sancrox Reservoir to Area 13 - 750 mm)	1. 100%	1. 100%	On target. This project continues from 2017/18 FY. Design phase progressing well, target design completion in Jan 2019 with construction phase to follow into 2019. The construction phase of this project is expected to continue into 2019/20FY and require some carry over of project budget.
4.1.1.04 CW Installation of new water supply services to residential and business premises - to cater for new development - Allocated Amount 2018-19 - $408,800 Annual installation of New Services	Water and Sewer	1. Deliver project according to approved project plan (new water supply services to residential and business premises)	1. 100%	1. 100%	On target. New water and reclined services installed to meet development. 63% of budget spend.
4.1.1.09 CW Undertake future water supply design works as required - Allocated Amount 2018-19 $102,200	Water and Sewer	1. Complete future water supply design works as required	1. 100%	1. 100%	On target. Works being carried out as required.
4.1.1.11 CW Koree Island HV incoming electrical upgrade (33KV) - Adopted 2017-18 - $150,000	Water and Sewer	1. Deliver project according to approved project plan (Koree Island HV incoming electrical upgrade)	1. 100%	1. 100%	Achieved. High voltage upgrade complete.

Community Strategic Plan: 4.1 Provide (appropriate) infrastructure and services including water cycle management, waste management, and sewer management

Delivery Program Objective: 4.1.1 Plan, investigate, design and construct water supply assets ensuring health, safety, environmental protection and security of supply for the future growth of the region

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.1.1.13 CW Commence construction of Area 14 reclaimed outlet trunk main (DN250), Bonny Hills - Adopted 2017-18 - $950,000	Water and Sewer, (Infrastructure Delivery)	1. Deliver project according to approved project plan (Area 14 Reclaimed trunk main)	1. 100%	1. 100%	On target. (to continue into 2019/20FY) Project design completed and construction planning underway. Construction works expected to commence early 2019. The construction of this project is programmed to extend into the 2019/20 FY and require some carry over of the 2018/19 project budget.
4.1.1.16 CW Thrumster Reclaimed Water Interim Supply - Rising Main to Thrumster Reservoir - undertake construction - Adopted 2017-18 - $5,850,000	Water and Sewer (Infrastructure Delivery)	1. Deliver project according to approved project plan (Thrumster Reclaimed Water Interim Supply)	1. 100%	1. 100%	On target. Design phase being finalised presently. Target construction tender advertisement early 2019, ahead of construction commencement. The construction phase of this project will continue into 2019/20FY and require some carry over of the project budget.
4.1.1.17 CW Beechwood Rosewood Reservoir - Beechwood connection - Undertake Construction/Delivery of Voluntary Planning Agreement (VPA) Council funded works - Adopted 2017-18 - $1,850,000	Water and Sewer (Infrastructure Delivery)	1. Deliver project according to approved project plan (Beechwood Rosewood Reservoir)	1. 100%	1. 100%	On target. Construction commenced and progressing well and is on track.

Community Strategic Plan: 4.1 Provide (appropriate) infrastructure and services including water cycle management, waste management, and sewer management

Delivery Program Objective: 4.1.1 Plan, investigate, design and construct water supply assets ensuring health, safety, environmental protection and security of supply for the future growth of the region

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.1.1.18 CW Commence construction of the Wauchope to Sancrox Trunk Main - Allocated Amount 2018-19 - $1,285,574	Water and Sewer (Infrastructure Delivery)	1. Deliver project according to approved project plan (Construction of the Wauchope to Sancrox Trunk Main)	1. 100%	1. 60%	Behind schedule. This project is in the finalisation of the design phase. During the reporting period the environmental assessment pathway for the proposed watermain was reviewed and it has been established that the need for an Environmental Impact Statement (EIS) and Development Application (DA) may be required for a portion of the propose route. These additional environmental assessment processes are estimated to delay the completion of the project design phase until mid 2019, hence delaying the potential construction commencement until the start of the 2019/20 FY at earliest. This project budget will consequently require some carry over into the 2019/20FY.
4.1.1.20 CW Construction of the Southern Arm Trunk Main (DN900) - Cowarra Balance tank to Pacific Hwy - Allocated Amount 2018-19 - $4,599,000	Water and Sewer (Infrastructure Delivery)	1. Deliver project according to approved project plan (Construction of the Southern Arm Trunk Main (DN900)	1. 100%	1. 100%	On target Project continues from 2017/18 FY. Construction underway and expected to be completed ahead of program in early 2019.
4.1.1.25 CW Commence Port Macquarie Sewerage Pumping Station (SPS) #64 Electrical upgrade works - Allocated Amount 2018-19 - $165,000	Water and Sewer	1. Deliver project according to approved project plan (Port Macquarie Sewerage Pumping Station (SPS) #64)	1. 100%	1. 100%	On target. Upgrade works have commenced and are progressing as scheduled.

Community Strategic Plan: 4.1 Provide (appropriate) infrastructure and services including water cycle management, waste management, and sewer management

Delivery Program Objective: 4.1.2 Develop and implement annual maintenance and preventative works program for water supply assets

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.1.2.1 CW Conduct water asset replacement and renewal programs for live water mains, water meters, renewals and minor works and switchboards	Water and Sewer	1. Deliver programs according to approved schedule (Live water mains, water meters, renewals and minor works, pumps, switchboards and flow meters)	1. 100%	1. 100%	On target. Annual allocations for operational works to replace water supply assets based on operational, condition, age and unplanned events in accordance with approved project plans. Water Meters - Replacements ongoing delivery targeting 200 x 20mm meters per month, 8% of annual allocation spend to date; Renewals and Minor Works - Delivery of Prioritised works, 10% of annual allocation spend to date; Live Water Mains Renewals - prioritised replacement of water mains based on condition, age & defects 4% of annual allocation spend to date; Construction resources prioritised with delivering other projects funded alternative to this reoccurring allocation; Relocations - Relocations associated with capital works for Infrastructure Delivery and Transport and Stormwater Groups, 44% of annual allocation spend to date.
4.1.2.2 CW Upgrade disinfection dosing system at various locations - Allocated Amount 2018-19 - $204,400	Water and Sewer	1. Deliver project according to approved project plan (Upgrade disinfection dosing system at various locations)	1. 100%	1. 50%	Behind target. Sourcing additional quotes for this work (Chlorine gas installation at Telegraph Point Water Treatment Plant) from alternative suppliers. Works to commence in Q3 2018/19.

Community Strategic Plan: 4.1 Provide (appropriate) infrastructure and services including water cycle management, waste management, and sewer management

Delivery Program Objective: 4.1.3 Plan, investigate, design and construct sewerage assets ensuring health, safety, environmental protection and the future growth of the region

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.1.3.01 CW Commence construction of the Port Macquarie Sewer rising main (PMSP71), Port Macquarie - Adopted 2017-18 - $1,388,749	Water and Sewer (Infrastructure Delivery)	1. Deliver project according to approved project plan (Port Macquarie Sewer Pump Station 71)	1. 100%	1. 100%	On target. This project continues from 2017/18 FY. Detailed design phase near completion, and construction phase planning progressing towards commencement in early 2019 and will continue into 2019/20FY and require some project budget carry over.
4.1.3.03 CW Small towns sewerage program - provision of centralised sewerage systems for Comboyne - multi-year project - Allocated Amount 2018 -19 $4,000,000	Water and Sewer (Infrastructure Delivery)	1. Deliver project according to approved project plan (Small towns sewerage program - provision of centralised sewerage systems for Comboyne)	1. 100%	1. 100%	On target. This project continues from previous FY's. A tender for the construction of the 3 villages Sewer Schemes was awarded at the August Ordinary Council meeting. Construction commencement Oct 2018 and continue to 2020.
4.1.3.04 CW Small towns sewerage program - provision of centralised sewerage systems for Long Flat - multi-year project- Allocated Amount 2018-19 - $4,000,000	Water and Sewer (Infrastructure Delivery)	1. Deliver project according to approved project plan (Small towns sewerage program - provision of centralised sewerage systems for Long Flat)	1. 100%	1. 100%	On target. This project continues from previous FY's. A tender for the construction of the 3 villages Sewer Schemes was awarded at the August Ordinary Council meeting. Construction commencement Oct 2018 and continue to 2020.
4.1.3.05 CW Small towns sewerage program - provision of centralised sewerage systems for Telegraph Point - multi-year project - Allocated Amount 2018-19 - $4,000,000	Water and Sewer (Infrastructure Delivery)	1. Deliver project according to approved project plan (Small towns sewerage program - provision of centralised sewerage systems for Telegraph Point)	1. 100%	1. 100%	On target. This project continues from previous FY's. A tender for the construction of the 3 villages Sewer Schemes was awarded at the August Ordinary Council meeting. Construction commencement Oct 2018 and continue to 2020.

Community Strategic Plan: 4.1 Provide (appropriate) infrastructure and services including water cycle management, waste management, and sewer management

Delivery Program Objective: 4.1.3 Plan, investigate, design and construct sewerage assets ensuring health, safety, environmental protection and the future growth of the region

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.1.3.06 CW Area 15 (Lakewood/Kew) - sewerage upgrade to provide for future development - multi-year project - Allocation Amount - $424,000	Water and Sewer (Infrastructure Delivery)	1. Deliver project according to approved project plan (Area 15 (Lakewood/Kew) - sewerage upgrade)	1. 100%	1. 100%	On target. (to continue into 2019/20 and through into 2020/21) PMHC partnering with NSW Public Works Advisory for the delivery of this project. NSW Public Works Advisory progressing with project management for the detailed design and delivery of this STP upgrade. The design and investigations phase is programmed to continue into the 2019/20FY. The construction phase of this project is estimated to commence not before early 2020 based on current project status.
4.1.3.13 CW Undertake future Sewerage design works as required - Allocated Amount 2018-19 - $102,200	Water and Sewer	1. Complete future sewerage design works as required	1. 100%	1. 100%	On target. Works being carried out as required.
4.1.3.15 CW Commencement of the construction of the Area 14 reclaimed Inlet trunk main (DN250), Bonny Hills - Allocated Amount 2018-19 - $1,100,000	Water and Sewer, (Infrastructure Delivery)	1. Deliver project according to approved project plan (Reclaimed Water - Area 14 Reclaimed Trunk Main)	1. 100%	1. 100%	See item 4.1.1.13 CW
4.1.3.17 CW Construction of Sewer Rising Main from Camden Haven Sewer Pump Station #1 to Dunbogan Bridge and Sewer Rising Main Extension to Dunbogan Sewer Treatment Plant	Water and Sewer (Infrastructure Delivery)	1. Deliver project according to approved project plan (Sewer Rising Main from Camden Haven Sewer Pump Station #1)	1. 100%	1. 100%	On target. This project will be incorporate the upgrade to the sewer rising main and water main servicing the Dunbogan STP. A tender for the construction of portion 1 of this project has awarded at the Oct 2018 ordinary Council meeting. Portion 2 of this project (Laurieton side of the the river) is planned to be awarded at the Nov 2018 ordinary Council meeting,

Community Strategic Plan: 4.1 Provide (appropriate) infrastructure and services including water cycle management, waste management, and sewer management

Delivery Program Objective: 4.1.3 Plan, investigate, design and construct sewerage assets ensuring health, safety, environmental protection and the future growth of the region

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.1.3.18 CW Preconstruction of Thrumster Sewerage treatment Plant (Area 13) - Phase 1 - 20000EP - Allocated Amount 2018-19 - $511,000	Water and Sewer	1. Deliver project according to approved project plan (Preconstruction of Thrumster Sewerage Treatment Plant (Area 13)	1. 100%	1. 95%	Monitoring required. During production of the project charter it has been determined that the project scope can be better defined by including it with optioneering to be undertaken as part of Integrated Water Cycle Management revision. Preliminary discussions underway to determine procurement pathways and are ongoing.
4.1.3.19 CW Sewer Treatment Plant (STP) Road Resurfacing	Water and Sewer	1. Deliver project according to approved project plan (Sewer Treatement Plant (STP) Road Resurfacing)	1. 100%	1. 100%	On target. Road resurfacing at Port Macquarie and Bonny Hills Wastewater Treatment Plants to be carried out during February 2019.
4.1.3.20 CW Wauchope Sewer Treatment Plant (STP) Office Construction	Water and Sewer	1. Deliver project according to approved project plan (Wauchope Sewer Treatment Plant (STP) Office Construction)	1. 100%	1. 100%	Achieved. Wauchope Wastewater Treatment Plant demountable office has been installed and is now functional.

Delivery Program Objective: 4.1.4 Develop and implement annual maintenance and preventative works program for sewerage assets

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.1.4.1 CW Programmed replacement of Sewer Pumps and Electrical switchboards at Sewage Pump Stations	Water and Sewer	1. Deliver project according to approved project plan (Programmed replacement of Sewer Pumps and Electrical switchboards at Sewage Pump Stations)	1. 100%	1. 100%	On target. Works are progressing as per the replacement program schedule.

Community Strategic Plan: 4.1 Provide (appropriate) infrastructure and services including water cycle management, waste management, and sewer management

Delivery Program Objective: 4.1.4 Develop and implement annual maintenance and preventative works program for sewerage assets

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.1.4.4 CW Carry out programmed replacement of Sewer Treatment Plant electrical and mechanical assets including instruments	Water and Sewer	1. Deliver project according to approved project plan (Carry out programmed replacement of Sewer Treatment Plant electrical and mechanical assets)	1. 100%	1. 100%	On target. Programmed replacement/refurbish of electrical assets at Councils Sewage Treatment Plants.
4.1.4.5 CW Conduct sewer assets replacement and maintenance program for odour control installations, Sewer Rehabilitation Renewal and Relining Works	Water and Sewer	1. Deliver project according to approved project plan (Conduct sewer assets replacement and maintenance program)	1. 100%	1. 100%	On target. Annual allocations for operational works to replace Sewerage assets based on operational, condition, age and unplanned events in accordance with project plan. Sewer Rehabilitation - Delivery of Prioritised works, 9% of annual allocation spend to date. Sewer Relining - Delivery of Prioritised works, 78% of annual allocation spend to date.

Delivery Program Objective: 4.1.5 Work towards planning, investigation, design, construction of stormwater assets

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.1.5.06 CW Black Swan Terrace - Stormwater detention facility - Adopted 2017-18 - $300,000	Transport and Stormwater Network	1. Deliver project according to approved project plan (Black Swan Terrace - Stormwater detention facility)	1. 100%	1. 80%	Behind schedule. Design is currently being amended with recommendations from the Dam Safety Review.
4.1.5.07 CW Continue stormwater remediation - Calwalla Crescent - Allocated Amount 2018-19 - $275,000	Transport and Stormwater Network, (Infrastructure Delivery)	1. Deliver project according to approved project plan (Continue stormwater remediation - Calwalla Crescent)	1. 100%	1. 100%	On target. Design phase complete. Construction planning underway targeting commencement in early 2019 an completion prior to end of FY.

Community Strategic Plan: 4.1 Provide (appropriate) infrastructure and services including water cycle management, waste management, and sewer management

Delivery Program Objective: 4.1.6 Develop and implement annual maintenance and renewal programs for stormwater assets

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.1.6.01 CW Stormwater line maintenance and repairs, Andrew's Park Wauchope - Adopted 2017-18 - $100,000	Transport and Stormwater Network	1. Deliver program according to approved schedule (Andrews Park, Wauchope)	1. 100%	1. 100%	On target. The 2018-19 Stormwater Renewal program includes the following projects and status: Planning Phase (Stormwater Relining): Fairmont Gardens, Wauchope Completed (Stormwater Relining): 559 Ocean Dr, North Haven Bell St, Dunbogan 5 Cook St, North Haven Andrews Park, Wauchope (OP Item) Repairs to the stormwater line underneath Andrews Park, Wauchope were completed in November 2018. The Fairmont Gardens stormwater line contains many sinkholes under the sportsfield, the project requires further investigation (stormwater camera) before quotation and the commencement of works. The programme is on track for completion in June 2019.
4.1.6.02 Settlement Shores canals - undertake maintenance as required	Transport and Stormwater Network	1. Settlement shore canal maintenance undertake in accordance with customer requests on a reactive basis	1. 100%	1. 100%	On target. Tasks being undertaken as per established procedures.
4.1.6.04 Broadwater canals - undertake maintenance	Transport and Stormwater Network	1. Undertake canal maintenance works in accordance with the rolling priority program and risk management processes.	1. 100%	1. 100%	On target. Maintenance undertaken as required.
4.1.6.05 Settlement Shores canals - Major Maintenance and Dredging	Transport and Stormwater Network	1. Complete Settlement Shores canals dredging	1. 100%	1. 100%	On target. Contractor selected and endorsed at November 2018 Council Meeting. Contractor will begin works in July 2019 - note that this will automatically result in a carryover of funding into the 2019-2020 financial year.

Community Strategic Plan: 4.1 Provide (appropriate) infrastructure and services including water cycle management, waste management, and sewer management

Delivery Program Objective: 4.1.6 Develop and implement annual maintenance and renewal programs for stormwater assets

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.1.6.07 CW Carry out the Stormwater Renewal Program - Allocated Amount 2018-19 - $646,930	Transport and Stormwater Network	1. Deliver program according to approved schedule (Stormwater Renewal)	1. 100%	1. 100%	On target. The 2018-19 Stormwater Renewal program includes the following projects and status: Planning Phase (Stormwater Relining): Fairmont Gardens, Wauchope Completed (Stormwater Relining): 559 Ocean Dr, North Haven Bell St, Dunbogan 5 Cook St, North Haven Andrews Park, Wauchope (OP Item) Repairs to the stormwater line underneath Andrews Park, Wauchope were completed in November 2018. The Fairmont Gardens stormwater line contains many sinkholes under the sportsfield, the project requires further investigation (stormwater camera) before quotation and the commencement of works. The programme is on track for completion in June 2019.
4.1.6.08 CW Investigation of Stormwater Remediation Options - Panorama Drive Catchment - Allocated Amount 2018-19 - $50,000	Transport and Stormwater Network, (Infrastructure Delivery)	1. Deliver project to approved project plan (Stormwater Remediation Options - Panorama Drive Catchment)	1. 100%	1. 100%	On target. This project involves the development of a concept design only to address stormwater issues at this location. Design phase is expected to commence in Feb 2019 and be complete by mid 2019.
4.1.6.09 CW Construction of Stormwater Flooding Mitigation measures - Rodley Street Bonny Hills - Allocated Amount 2018-19 - $700,000	Transport and Stormwater Network, (Infrastructure Delivery)	1. Deliver project to approved project plan (Stormwater Flooding Mitigation measures - Rodley Street Bonny Hills)	1. 100%	1. 100%	On target. Design phase underway from 2017/18 FY. Construction expected to commence early 2019 and be complete by mid 2019. No monthly report
4.1.6.10 Stormwater Asset Management Condition Rating of stormwater assets	Transport and Stormwater Network	1. Deliver project to approved project plan (Condition Rating of stormwater assets)	1. 100%	1. 100%	On target. Council's stormwater CCTV condition assessment crew have commenced the 2018-2019 pipeline inspection program, undertaking the assessment of approximately 4km of stormwater pipeline to date.

Community Strategic Plan: 4.1 Provide (appropriate) infrastructure and services including water cycle management, waste management, and sewer management

Delivery Program Objective: 4.1.6 Develop and implement annual maintenance and renewal programs for stormwater assets

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.1.6.11 CW Investigation of Stormwater Remediation options - Bellbowrie/Bay Street Catchment Allocated Amount 2018-19 - $50,000	Transport and Stormwater Network, (Infrastructure Delivery)	1. Deliver project to approved project plan (Stormwater Remediation options - Bellbowrie/Bay Street)	1. 100%	1. 100%	On target. This design only project is underway and progressing towards completion in 2019.
4.1.6.12 CW Stormwater Remediation Designs – various Designs of drainage improvement works - Allocated Amount 2018-19 - $20,000	Transport and Stormwater Network	1. Deliver project to approved project plan (Stormwater Remediation Designs – various designs)	1. 100%	1. 100%	On target. Designs to be prioritised and completed in response to operational needs identified during the financial year in accordance with the established stormwater drainage risk assessment process.
4.1.6.13 CW Construction of Stormwater Remediation measures - Stage 2 - Batar Creek Road Kendall - Allocated Amount 2018-19 - $320,000	Transport and Stormwater Network, (Infrastructure Delivery)	1. Deliver project to approved project plan (Stormwater Remediation measures - Stage 2 - Batar Creek Road Kendall)	1. 100%	1. 100%	Achieved. Construction commenced during Aug 2018 and be completed by Oct 2018. Supplementary works also completed Dec 2018.
4.1.6.15 CW Detailed Designs of Stormwater Remediation measures identified in the Westport Stormwater Management Plan - Gordon Street to Buller Street PMQ - Allocated Amount 2018-19 - $300,000	Transport and Stormwater Network, (Infrastructure Delivery)	1. Deliver project to approved project plan (Detailed Designs of Stormwater - Gordon Street to Buller Street Port Macquarie) - Allocated Amount 2018 -19 - $300,000	1. 100%	1. 100%	On target. Stormwater catchment analysis and design phase progressing.
4.1.6.16 CW Stormwater Remediation - 10 Dilladerry Cr, Port Macquarie - Detailed Design - Adopted 2017-2018 - $125,056	Transport and Stormwater Network, (Infrastructure Delivery)	1. Deliver project to approved project plan (Stormwater Remediation - 10 Dilladerry Cr, Port Macquarie)	1. 100%	1. 100%	On target. This design only project continues from 2017/18 FY. Design completion expected Jan 2019. The construction phase of this project will be delivered in conjunction with the Calwalla Cr project.

Community Strategic Plan: 4.1 Provide (appropriate) infrastructure and services including water cycle management, waste management, and sewer management

Delivery Program Objective: 4.1.6 Develop and implement annual maintenance and renewal programs for stormwater assets

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.1.6.17 CW Stormwater Remediation - Lincoln Rd/Racewyn Close - Detailed Design - Adopted 2017-2018 - $100,000	Transport and Stormwater Network, (Infrastructure Delivery)	1. Deliver project to approved project plan (Stormwater Remediation - Lincoln Rd/Racewyn Close - Detailed Design)	1. 100%	1. 100%	On target. Design underway since 2017/18 FY. Design completion expected Jan 2019. No construction phase presently proposed for this project.

Delivery Program Objective: 4.1.7 Develop and implement effective waste management strategies

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.1.7.01 CW Kingfisher Waste Depot - Commence construction for expansion (upgrade and expansion - multi-year project) Allocated Amount 2018-19 - $1,000,000	Environmental Services, (Infrastructure Delivery)	1. Deliver project according to approved project plan (Kingfisher Waste Depot - Commence construction for expansion)	1. 100%	1. 100%	On target. Detailed design phase initiated. The design phase is expected to continue until early 2019 with construction to continue into 2019-20 FY. This is a multi-year project. No monthly report.
4.1.7.02 Deliver a resident, commercial & industrial education program to encourage source separation of waste	Environmental Services	1. Deliver the Waste Education program by 30 June	1. 100%	1. 100%	On target. On education through TV, Radio, Digital billboard and social media. The school education program complete.
4.1.7.03 Ensure continuing kerb-side domestic waste collection	Environmental Services	1. Deliver domestic waste collection service	1. 100%	1. 100%	On target.
4.1.7.04 Provide drop-off waste services and recycling facilities at Kingfisher, Kew, Cairncross, Comboyne, Wauchope	Environmental Services	1. Deliver drop-off waste services – waste transfer stations	1. 100%	1. 100%	On target.
4.1.7.05 Provision of commercial waste collection services	Environmental Services	1. Deliver commercial waste collection service	1. 100%	1. 100%	On target.
4.1.7.06 Operate Kingfisher and Cairncross Waste Depots to process and dispose of waste to landfill	Environmental Services	1. Processing and disposal of waste including organics	1. 100%	1. 100%	On target.
4.1.7.07 Continue to provide waste collection for public places – town centres and parks and provide waste collection for public events (as required)	Environmental Services	1. Deliver public space waste collection service	1. 100%	1. 100%	On target.

Community Strategic Plan: 4.1 Provide (appropriate) infrastructure and services including water cycle management, waste management, and sewer management

Delivery Program Objective: 4.1.7 Develop and implement effective waste management strategies

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.1.7.08 CW Wauchope Transfer Station - Replacement of three transfer bins - Allocated Amount 2018-19 - $50,000	Environmental Services	1. Deliver project according to approved project plan (Wauchope Transfer Station - Replacement of three transfer bins)	1. 100%	1. 100%	On target. Project progressing as planned.
4.1.7.09 Illegal Dumping Clean Up / Prevention Program	Environmental Services	1. Illegal Dumping Clean Up / Prevention Program delivered	1. 100%	1. 100%	On target. Further communication marketing planned for 2019.
4.1.7.10 Preparation for Multi Dwelling Organics Recovery Project	Environmental Services	1. Preparation of the Multi Dwelling Organics Recovery Project underway	1. 100%	1. 0%	Not available. This project has been deferred until 2019-2020 due to China National Sword (recycling).
4.1.7.11 CW Kingfisher Waste Depot - Finalise Development Application and Design	Environmental Services (Infrastructure Delivery)	1. Deliver project according to approved project plan (Kingfisher Waste Depot - Finalise Designs)	1. 100%	1. 100%	On target. Detailed design phase initiated. The design phase is expected to continue until early 2019 with construction to continue into 2019-20 FY. This is a multi-year project. No monthly report.
4.1.7.12 CW Cairncross Waste Depot - Facility Upgrade and Expansion Approvals	Environmental Services	1. Deliver project according to approved project plan (Cairncross Waste Depot - Facility Upgrade and Expansion Approvals)	1. 100%	1. 100%	On target . Response to public submissions completed.
4.1.7.13 Port Macquarie Hastings Fishing Litter Project	Environmental Services	1. Port Macquarie Hastings Fishing Litter Project delivered	1. 100%	1. 100%	On target. Communication planned for early 2019. Engagement underway.

Community Strategic Plan: 4.2 Aim to minimise the impact of natural events and climate change, for example, floods, bushfires and coastal erosion

Delivery Program Objective: 4.2.1 Develop and implement Coastal, Estuary, Floodplain, and Bushfire management plans

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.2.1.01 Deliver annual maintenance programs for bushfire risk mitigation works on Council land in accordance with the Bush Fire Risk Management Plan (BFRMP) - adopted by NSW Rural Fire Service	Environmental Services	1. Deliver project according to approved project plan (Annual maintenance programs for bushfire risk mitigation works on council land)	1. 100%	1. 100%	On target.
4.2.1.02 Continue to implement Floodplain Risk Management Plan	Environmental Services	1. Implementation of Floodplain risk management actions underway	1. 100%	1. 0%	Refer to 4.2.1.4 and 4.2.1.5.
4.2.1.03 Undertake development of Coastal Management Plans (Coastal Management Program)	Environmental Services	1. Development of Coastal Management Plans complete (Coastal Management Program)	1. 100%	1. 0%	Behind schedule. Development of the over arching Coastal Management Program is dependent on funding. Grant funding being sought.
		2. Development of Estuary Management Plans complete (Coastal Management Program)	2. 100%	2. 0%	Behind schedule. Development of the over arching Coastal Management Program is dependent on funding. Grant funding being sought.
4.2.1.04 Wrights and Yarranabee Creeks Flood Study - Update to include Urban Drainage Systems	Environmental Services	1. Wrights and Yarranabee Creeks Flood Study complete	1. 100%	1. 100%	On target. Flood study presented to the December 2018 Ordinary Council Meeting and adopted.
4.2.1.05 North Brother Local Catchments Flood Study	Environmental Services (Transport and Stormwater Network)	1. North Brother Local Catchments Flood Study underway	1. 100%	1. 100%	On target. Draft Flood Study due for submission during December.
4.2.1.06 Undertake the Flood Mitigation Maintenance Program	Environmental Services (Transport and Stormwater Network)	1. Flood Mitigation Maintenance Program delivered	1. 100%	1. 100%	On target. Works have been programmed for completion by Operational Maintenance team.

Community Strategic Plan: 4.2 Aim to minimise the impact of natural events and climate change, for example, floods, bushfires and coastal erosion

Delivery Program Objective: 4.2.1 Develop and implement Coastal, Estuary, Floodplain, and Bushfire management plans

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.2.1.07 CW Implementation of strategies of Lake Cathie Coastal Zone Management Plan - Stormwater Repair	Environmental Services	1. Implementation of strategies of Lake Cathie Coastal Zone Management Plan underway - Stormwater Repairs	1. 100%	1. 100%	On target . REF complete (Middle Rock and Chapana St stormwater outlets repair). Works ongoing.
4.2.1.08 CW Lake Cathie Illaroo Road Revetment Wall Funding Model	Environmental Services	1. Lake Cathie Illaroo Road Revetment Wall Funding Model complete	1. 100%	1. 100%	On target. Cost benefit analysis underway and ongoing.
4.2.1.09 Undertake Detailed Hibbard Floodway Investigations	Environmental Services	1. Detailed Hibbard Floodway Investigations commenced	1. 100%	1. 100%	On target. Floodway blockage modelling complete. With further works progressing.

Community Strategic Plan: 4.3 Facilitate development that is compatible with the natural and built environment

Delivery Program Objective: 4.3.1 Undertake transparent and efficient development assessment in accordance with relevant legislation

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.3.1.1 Ensure development assessment, building certification and subdivision certification activities are completed efficiently and in accordance with legislation	Development Assessment	1. Capture the number of applications and processing times, together with a commentary on development trends and report to Council quarterly	1. 100%	1. 100%	On target. Determined applications for July to December 2018 period include: 531 Development Applications with an average processing time of 38 days, 81 Development Applications Modifications (S4.55) with an average processing time of 34 days, 258 Building Construction Certificates with an average processing time of 8 days and 55 Complying Development Certificates with an average processing time of 11 days.
4.3.1.2 Ensure the Development Assessment Panel operates in accordance with their charter and all applications are accurately determined	Development Assessment	1. Have no successful legal appeals relating to process errors	1. 100%	1. 100%	On target. No legal appeals have been received during the reporting period from July to December 2018.

Community Strategic Plan: 4.4 Plan for integrated transport systems that helps people get around and link our communities

Delivery Program Objective: 4.4.1 Plan, investigate, design and construct transport assets which address pedestrians, cyclist and vehicular needs to cater for the future growth of the region

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.4.1.02 Develop a Regional Integrated Transport Strategy - multi-year project	Transport and Stormwater Network	1. Deliver project according to approved project plan (Develop a Regional Integrated Transport Strategy)	1. 100%	1. 80%	Behind schedule. Project has been delayed due to the Orbital Community Engagement Project.
4.4.1.03 CW Construct multiple footpath/cycleway projects throughout the local government area (LGA) - Allocated Amount 2018-19 - $500,000	Transport and Stormwater Network, (Infrastructure Delivery)	1. Deliver program according to approved schedule (Construct multiple footpath/cycleway projects)	1. 100%	1. 100%	On target. Works completed on priority footpath construction works at Central Road, and Hill St Port Macquarie and Ocean Dr, North Haven and Kendall Rd at Kew so far in 2018. Preliminary works to continue into 2019 on stage 2 of footpath works on Hill Street Port Macquarie.
4.4.1.05 CW Wauchope Main Street, Improvements to pedestrian amenity - Stage 1 Construction - multi-year project - Adopted 2017-18 - $126,000	Transport and Stormwater Network, (Infrastructure Delivery)	1. Deliver project according to approved project plan (Wauchope Main Street - Improvements to pedestrian amenity - Stage 1 Construction)	1. 100%	1. 100%	On target. Construction commenced and services adjustments ongoing. This project will continue into 2019/20FY.
4.4.1.06 CW Comboyne Road – Continue construction to replace bridge over Harty's Creek Id No.09 - multi-year project - Allocated Amount 2018-19 - $700,000	Transport and Stormwater Network, (Infrastructure Delivery)	1. Deliver project according to approved project plan (Comboyne Road - Commence construction to replace bridge over Hartys Creek Id No.09)	1. 100%	1. 100%	On target This project continued from the 2017/18FY. Construction works now complete with the 10 day full road closure for the installation of the new bridge structure successfully completed during Nov 2018. Project completion administration and contract finalisation will be ongoing into early 2019.
4.4.1.10 CW Lake Road - continuation of detailed design of dual lanes - Jindalee to Fernhill intersections and Chestnut Road to Ocean Drive - multi-year project	Transport and Stormwater Network, (Infrastructure Delivery)	1. Deliver project according to approved project plan (Lake Road - continuation of detailed design of dual lanes)	1. 100%	1. 100%	On target. This design only project continues from 2017/18 FY. Design progressing towards anticipated completion in Mar 2019.

Community Strategic Plan: 4.4 Plan for integrated transport systems that helps people get around and link our communities

Delivery Program Objective: 4.4.1 Plan, investigate, design and construct transport assets which address pedestrians, cyclist and vehicular needs to cater for the future growth of the region

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.4.1.12 CW Beechwood Road - continue the design for Stages 5 and 6 of Beechwood Road reconstruction - Riverbreeze to Waugh Street - multi-year project	Transport and Stormwater Network, (Infrastructure Delivery)	1. Deliver project according to approved project plan (Design Stages 5 and 6 of Beechwood Road reconstruction)	1. 100%	1. 80%	Behind schedule. This design only project continues from the 2017/18 FY. Design works ongoing including Yippen Creek crossing remain on the revised target of completion by Apr 2019.
4.4.1.13 CW Hastings River Drive - Hughes Place to Boundary Street upgrade - Detailed design - multi-year project - Adopted 2017-18 - $800,000	Transport and Stormwater Network, (Infrastructure Delivery)	1. Deliver project according to approved project plan (Hastings River Drive - Hughes Place to Boundary Street upgrade)	1. 100%	1. 100%	On target. This project continues from 2017/18 FY. Design phase works presently progressing towards completion in late 2019. This project will continue into the 2019/20 FY. The construction of this segment of Hastings River Dr is subject to additional funding being allocated/secured.
4.4.1.14 CW Continue construction for Hastings River Drive - Newport Island Road roundabout - Adopted 2017-18 - $2,700,000	Transport and Stormwater Network, (Infrastructure Delivery)	1. Deliver project according to approved project plan (Hastings River Drive - Newport Island Road roundabout)	1. 100%	1. 100%	Achieved. Project complete and re opened to traffic ahead of schedule in Nov 2018.
4.4.1.21 CW Dunbogan Bridge - Reid Street - undertake substructure rehabilitation - multi-year project - Allocated Amount 2018-19 - $1,500,000	Transport and Stormwater Network	1. Deliver project according to approved project plan (Dunbogan Bridge - Reid Street - undertake substructure rehabilitation)	1. 100%	1. 100%	On target. Detailed design contract awarded in September 2018. Design underway, scheduled for completion in February 2019 with construction contract planned to be awarded in June 19.
4.4.1.22 CW Kindee Bridge - structural repairs and Bridge Replacement optioneering - multi-year project - Adopted 2017-18 - $550,000	Transport and Stormwater Network	1. Deliver project according to approved project plan (Kindee Bridge - structural repairs (multi-year project)	1. 100%	1. 100%	On target. Initial repairs complete. Work progress for the strategic management plan for the bridge.

Community Strategic Plan: 4.4 Plan for integrated transport systems that helps people get around and link our communities

Delivery Program Objective: 4.4.1 Plan, investigate, design and construct transport assets which address pedestrians, cyclist and vehicular needs to cater for the future growth of the region

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.4.1.23 CW Roads Maritime Service Grants (RMS) - Safety Program and Active Transport Program (subject to grant funding, includes shared footpaths) Allocated Amount 2018-19 - $500,000	Transport and Stormwater Network	1. Deliver project according to approved project plan (Roads Maritime Service Grants (RMS) - Safety Program and Active Transport Program)	1. 100%	1. 100%	On target. Funds being transferred to Wauchope Main Street upgrade project.
4.4.1.29 CW Diamond Head Rd/The Boulevard Flood Access raising road (Dependant on success of grant funding application) Allocated Amount 2018-19 - $1,500,000 (Floodplain Risk Mangt Plan Action)	Transport and Stormwater Network, (Infrastructure Delivery)	1. Deliver project according to approved project plan (Diamond Head Rd/The Boulevard Flood Access raising road)	1. 100%	1. 80%	Behind schedule. This project continues from 2017/18 FY and is pending finalisation of the environmental assessment and grant funding being announced. Construction not anticipated to commence prior to 2019.
4.4.1.30 Undertake review of the Parking Strategy	Transport and Stormwater Network	1. Complete Parking Strategy review	1. 100%	1. 0%	Deferred. Project has been deferred to 2019-20 financial year in line with the Regional Integrated Transport Strategy development.
4.4.1.31 CW Deliver Bold Street Pedestrian Crossing Laurieton - Allocated Amount 2018-19 - $347,000	Transport and Stormwater Network, (Infrastructure Delivery)	1. Deliver project according to approved project plan (Bold Street - Pedestrian Crossing Laurieton)	1. 100%	1. 100%	On target. Design and investigations underway targeting completion in early 2019. Construction commencement is currently expected to be May 2019 with construction completion expected late in 2019. The 2018/19FY project budget will require some carry over into 18/19FY.
4.4.1.32 Continue corridor planning - Kendall Road - Ocean Drive - Hastings River Drive regional road corridor (MR538 /MR600) - multi-year project	Transport and Stormwater Network	1. Corridor planning - Kendall Road - Ocean Drive- Hastings River Drive regional road corridor commenced	1. 100%	1. 100%	On target. Project scoping phase. Traffic counts planned for February 2019.

Community Strategic Plan: 4.4 Plan for integrated transport systems that helps people get around and link our communities

Delivery Program Objective: 4.4.1 Plan, investigate, design and construct transport assets which address pedestrians, cyclist and vehicular needs to cater for the future growth of the region

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.4.1.33 CW Continue detailed designs - north of Miala Street to Orana Drive Lake Cathie - Adopted 2017-18 - $250,000	Transport and Stormwater Network (Infrastructure Delivery)	1. Deliver project according to approved project plan (Detailed designs - north of Miala Street to Orana Drive Lake Cathie)	1. 100%	1. 100%	On target. This design only project continues from 2017/18 FY. The design engagement process is progressing and a community engagement session has been completed and a council report was presented to the Dec 2018 Ordinary Council meeting summarising the community feedback. The council have resolved to update the concept design to include parking lanes and a supplementary community engagement activity is proposed to inform the community of the updated designs once completed. The detailed design for the project will then follow for section A (Southern portion of works, Miala to Fiona Crs) and continue in 2019/20FY. Target design completion is Sept 2019 subject to community engagement outcomes.
4.4.1.34 CW Kew Main Street - Continue identified works. Detailed investigation and designs for car parking and assoc infrastructure works-Nancy Bird Walton Drv and Kendall Rd Adopted 2017-18 $100,000	Transport and Stormwater Network, (Infrastructure Delivery)	1. Deliver project according to approved project plan (Kew Main Street - undertake identified works)	1. 100%	1. 100%	On target. This project continues from 2017/18 FY. Design phase of this project is ongoing and is expected to be completed in mid 2019 ahead of construction works. The construction of this project would not commence prior to Jul 2019 based on current status.
4.4.1.35 Complete broad analysis of priorities for sealing of unsealed roads - multi-year project	Transport and Stormwater Network	1. Report outcomes to Council October 2018	1. 100%	1. 100%	Achieved. Unsealed roads policy be presented to November 2018 Ordinary Council Meeting.

Community Strategic Plan: 4.4 Plan for integrated transport systems that helps people get around and link our communities

Delivery Program Objective: 4.4.1 Plan, investigate, design and construct transport assets which address pedestrians, cyclist and vehicular needs to cater for the future growth of the region

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.4.1.37 CW Local Roads Proactive Transport Program – Funds provided for the proactive maintenance of lower trafficked roads throughout the LGA - Allocated Amount 2018-19 - $1,000,000	Transport and Stormwater Network	1. Deliver project according to approved project plan (Local Roads Proactive Transport Program)	1. 100%	1. 100%	On target. The 2018-19 Road Rehabilitation program includes the following projects and status: Planning Phase: Burrawan Dr, Wauchope Fairmont Dr, Wauchope Range St, Wauchope Bransdon St, Wauchope Colonial Cct, Wauchope Bay St, Port Macquarie Bellbowrie St, Port Macquarie Completed: Bago Rd (Milligans to Herons Creek), Herons Creek (OP item) - final bitumen seal in March 2019 Beechwood Rd (Riverbreeze to Waugh), Wauchope (OP item) - final bitumen seal in March 2019 The road stabilisation contract was endorsed by Council in the September meeting and contractor commenced works on Bago Rd in October. The rehabilitation programme is on programme. The 2018-19 Reseal Programme includes the following projects and status: Reseal Preparation Phase: Lighthouse Beach Local Roads, Port Macquarie The reseals are planned for commencement in January 2019 and will be progressively undertaken as areas are prepared until March / April 2019 (dependent on high pavement temperatures). Council crews have commenced preparation works (gravel patching, jetpatching etc) which will continue until March / April 2019.

Community Strategic Plan: 4.4 Plan for integrated transport systems that helps people get around and link our communities

Delivery Program Objective: 4.4.1 Plan, investigate, design and construct transport assets which address pedestrians, cyclist and vehicular needs to cater for the future growth of the region

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.4.1.40 CW Bago Road - Pavement Rehabilitation Programme (Milligans Rd to Pacific Highway) Allocated Amount 2018-19 - $2,037,243	Transport and Stormwater Network	1. Deliver project according to approved project plan (Bago Road - Pavement Rehabilitation Programme)	1. 100%	1. 100%	On target. The 2018-19 Road Rehabilitation program includes the following projects and status: Planning Phase: Burrawan Dr, Wauchope Fairmont Dr, Wauchope Range St, Wauchope Bransdon St, Wauchope Colonial Cct, Wauchope Bay St, Port Macquarie Bellbowrie St, Port Macquarie Completed: Bago Rd (Milligans to Herons Creek), Herons Creek (OP item) - final bitumen seal in March 2019 Beechwood Rd (Riverbreeze to Waugh), Wauchope (OP item) - final bitumen seal in March 2019 The road stabilisation contract was endorsed by Council in the September meeting and contractor commenced works on Bago Rd in October. The rehabilitation programme is on programme. The 2018-19 Reseal Programme includes the following projects and status: Reseal Preparation Phase: Lighthouse Beach Local Roads, Port Macquarie The reseals are planned for commencement in January 2019 and will be progressively undertaken as areas are prepared until March / April 2019 (dependent on high pavement temperatures). Council crews have commenced preparation works (gravel patching, jetpatching etc) which will continue until March / April 2019.

Community Strategic Plan: 4.4 Plan for integrated transport systems that helps people get around and link our communities

Delivery Program Objective: 4.4.1 Plan, investigate, design and construct transport assets which address pedestrians, cyclist and vehicular needs to cater for the future growth of the region

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.4.1.41 CW Beechwood Road – Pavement rehabilitation east of Riverbreeze Drive	Transport and Stormwater Network	1. Deliver project according to approved project plan (Beechwood Road – Pavement rehabilitation)	1. 100%	1. 100%	On target. The 2018-19 Road Rehabilitation program includes the following projects and status: Planning Phase: Burrawan Dr, Wauchope Fairmont Dr, Wauchope Range St, Wauchope Bransdon St, Wauchope Colonial Cct, Wauchope Bay St, Port Macquarie Bellbowrie St, Port Macquarie Completed: Bago Rd (Milligans to Herons Creek), Herons Creek (OP item) - final bitumen seal in March 2019 Beechwood Rd (Riverbreeze to Waugh), Wauchope (OP item) - final bitumen seal in March 2019 The road stabilisation contract was endorsed by Council in the September meeting and contractor commenced works on Bago Rd in October. The rehabilitation programme is on programme. The 2018-19 Reseal Programme includes the following projects and status: Reseal Preparation Phase: Lighthouse Beach Local Roads, Port Macquarie The reseals are planned for commencement in January 2019 and will be progressively undertaken as areas are prepared until March / April 2019 (dependent on high pavement temperatures). Council crews have commenced preparation works (gravel patching, jetpatching etc) which will continue until March / April 2019.

Community Strategic Plan: 4.4 Plan for integrated transport systems that helps people get around and link our communities

Delivery Program Objective: 4.4.1 Plan, investigate, design and construct transport assets which address pedestrians, cyclist and vehicular needs to cater for the future growth of the region

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.4.1.42 CW John Oxley Drive Upgrade – Detailed Design – The Ruins Way to Wrights Road (Oxley Highway) - Allocated Amount 2018-19 - $500,000	Transport and Stormwater Network, (Infrastructure Delivery)	1. Deliver project according to approved project plan (John Oxley Drive Upgrade – Detailed Design)	1. 100%	1. 100%	On target. This design only project is presently initiating and is expected to continue into 2019 in conjunction with Council's broader transport network strategic planning and prioritisation. Traffic study to be updated following the opening of new Bunnings and fed into design considerations.
4.4.1.44 Conduct sealed road network condition survey	Assets and Property Investment	1. Complete transport asset data survey by 30 June 2019	1. 100%	1. 100%	On target. Project scope developed. Contractor engaged and data collection commenced. High-speed data and visual data collection complete. Falling weight deflectometer data collection and additional data analysis outstanding. Anticipated completion December 2018.
4.4.1.45 CW Ocean Drive duplication - Matthew Flinders Drive to Greenmeadows - multi-year project - Allocated Amount 2018-19 - $360,000	Transport and Stormwater Network	1. Deliver project according to approved project plan (Ocean Drive duplication - Matthew Flinders Drive to Greenmeadows)	1. 100%	1. 80%	Behind schedule. An issue has been identified with the traffic modelling which has delayed the business case development. This issue is being worked through.
4.4.1.46 CW Design and investigations for Gordon Street Pavement Reconstruction and Service Relocations - between Ocean Drive and Horton Street - Allocated Amount 2018-19 - $200,000	Transport and Stormwater Network, (Infrastructure Delivery)	1. Deliver project according to approved project plan (Design and investigations for Gordon Street Pavement Reconstruction)	1. 100%	1. 100%	On target. The design phase commenced during Oct 2018 and will continue into 2019
4.4.1.48 Development Contribution Plan (Roads) Review and Update	Transport and Stormwater Network	1. Deliver project according to approved project plan (Development Contribution Plan (Roads) Review and Update)	1. 100%	1. 50%	Behind schedule. Project scoping has been delayed due to other higher priority program activities.

Community Strategic Plan: 4.4 Plan for integrated transport systems that helps people get around and link our communities

Delivery Program Objective: 4.4.1 Plan, investigate, design and construct transport assets which address pedestrians, cyclist and vehicular needs to cater for the future growth of the region

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.4.1.49 CW Transport and Traffic various design works - additional Transport and Stormwater Designs - Allocated Amount - 2018-19 - $200,000	Transport and Stormwater Network	1. Deliver project according to approved project plan (Transport and Traffic various design works - additional Transport and Stormwater Designs)	1. 100%	1. 100%	On target. Project planning underway for three additional design projects and include Kew Main Street upgrade design, various intersection upgrades and Laurieton United Servicemans Club entrance upgrade designs. Remaining funds to be transferred to Lake Road design project.
4.4.1.50 CW Wall Reserve car park sealing - Seal the access road to Wall Reserve - Allocated Amount – 2018-19 - $71,000	Transport and Stormwater Network	1. Deliver project according to approved project plan (Wall Reserve Car park Sealing)	1. 100%	1. 100%	Achieved. Works completed in November 2018.
4.4.1.51 CW Installation of new bus shelters as per the Community Passenger Transport Infrastructure Grant Scheme (CPTIGS) Program - Allocated Amount 2018-19 - $90,000	Transport and Stormwater Network	1. Bus shelter installations completed as per the program	1. 100%	1. 100%	On target. The 2018-19 New Bus Shelter program includes the following projects and status: Planning Phase: 1 x Port Macquarie Airport Completed: 1 x High St, Wauchope 1 x Cameron St, Wauchope 2 x Beechwood Rd, Beechwood 1 x Pacific Dr, Port Macquarie 1 x Ocean Dr, Port Macquarie 2 x Ocean Dr, Lake Cathie 1 x Granite St, Port Macquarie 3 x Greenmeadows Dr, Port Macquarie 1 x Hastings River Dr, Port Macquarie 1 x Pacific Dr, Port Macquarie 1 x High St, Wauchope 1 x Ocean Dr, West Haven The programme is on track for completion in June 2019.
4.4.1.52 AUS-SPEC Review - Undertake a comprehensive review of Councils full suite of design and construction specifications - multi-year project	Transport and Stormwater Network	1. Deliver project according to approved project plan (AUS-SPEC Review)	1. 100%	1. 100%	On target. Initial consultation with industry has been completed.

Community Strategic Plan: 4.4 Plan for integrated transport systems that helps people get around and link our communities

Delivery Program Objective: 4.4.1 Plan, investigate, design and construct transport assets which address pedestrians, cyclist and vehicular needs to cater for the future growth of the region

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.4.1.53 Settlement Point Ferry and Hibbard Ferry - upgrade to ferry access and the installation of extra signage	Transport and Stormwater Network	1. Deliver project according to approved project plan (Settlement Point Ferry and Hibbard Ferry - upgrade to ferry access and the installation of extra signage)	1. 100%	1. 100%	On target. Information has been submitted and decisions on information required on signage currently being discussed.
4.4.1.54 North South Link Road - ongoing design/preconstruction (multi-year project) (including Orbital Road Study - Ocean Drive - Hastings River Drive)	Transport and Stormwater Network	1. Deliver project according to approved project plan (North South Link Road - ongoing design/preconstruction - including Orbital Road Study - Ocean Drive - Hastings River Drive)	1. 100%	1. 100%	On target. Feasibility study complete, community engagement underway.
4.4.1.55 CW Beach to Beach - shared path project at Camden Haven	Transport and Stormwater Network (Infrastructure Delivery)	1. Deliver project according to approved project plan (Beach to Beach - shared path project at Camden Haven)	1. 100%	1. 100%	On target. GHD have been engaged to undertake an alignment feasibility study and environmental pathways assessment for the remaining sections of path. An initial site inspection has been completed and the works should be complete mid March. Following this a consultant will be engaged to complete the detailed design.
4.4.1.56 CW Wrights Road to Port Macquarie CBD - shared path	Transport and Stormwater Network (Infrastructure Delivery)	1. Deliver project according to approved project plan (Wrights Road to Port Macquarie CBD - shared path)	1. 100%	1. 100%	On target. This project is being completed internally by Council. An initial site inspection has been completed and draft maps of the existing infrastructure have been developed. A basis of design report will be completed in January 2019.

Community Strategic Plan: 4.4 Plan for integrated transport systems that helps people get around and link our communities

Delivery Program Objective: 4.4.1 Plan, investigate, design and construct transport assets which address pedestrians, cyclist and vehicular needs to cater for the future growth of the region

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.4.1.57 CW Lighthouse Road Tourism Connectivity Project - Commence Lighthouse road east upgrades - Matthew Flinders Drive to The Lighthouse	Transport and Stormwater Network	1. Deliver project according to approved project plan (Commence Lighthouse Road east upgrades - Matthew Flinders Drive to The Lighthouse)	1. 100%	1. 100%	On target. Project being delivered in accordance with project plan.
4.4.1.58 Orbital Road Engagements - Undertake Orbital Road Community Engagement	Transport and Stormwater Network	1. Orbital Road Community Egagegment undertaken	1. 100%	1. 100%	On target. Community engagement commenced, with further engagement planned for early 2019.
4.4.1.59 CW Gordon/Horton Street - intersection upgrade - details designs	Transport and Stormwater Network	1. Deliver project according to approved project plan (Gordon/Horton Street - intersection upgrade - details designs)	1. 100%	1. 100%	On target: Project planning, survey and concept development complete. Design work now commenced.

Community Strategic Plan: 4.4 Plan for integrated transport systems that helps people get around and link our communities

Delivery Program Objective: 4.4.2 Develop and implement annual maintenance and renewal programs for transport assets

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.4.2.1 CW Undertake road resurfacing and rehabilitation works throughout the local government area in accordance with the rolling priority program and roads maintenance hierarchy	Transport and Stormwater Network	1. Complete road resurfacing and rehabilitation works in accordance with the rolling priority program and roads maintenance hierarchy	1. 100%	1. 100%	On target. The 2018-19 Road Rehabilitation program includes the following projects and status: Planning Phase: Burrawan Dr, Wauchope Fairmont Dr, Wauchope Range St, Wauchope Bransdon St, Wauchope Colonial Cct, Wauchope Bay St, Port Macquarie Bellbowrie St, Port Macquarie Completed: Bago Rd (Milligans to Herons Creek), Herons Creek (OP item) - final bitumen seal in March 2019 Beechwood Rd (Riverbreeze to Waugh), Wauchope (OP item) - final bitumen seal in March 2019 The road stabilisation contract was endorsed by Council in the September meeting and contractor commenced works on Bago Rd in October. The rehabilitation programme is on programme. The 2018-19 Reseal Programme includes the following projects and status: Reseal Preparation Phase: Lighthouse Beach Local Roads, Port Macquarie The reseals are planned for commencement in January 2019 and will be progressively undertaken as areas are prepared until March / April 2019 (dependent on high pavement temperatures). Council crews have commenced preparation works (gravel patching, jetpatching etc) which will continue until March / April 2019.

Community Strategic Plan: 4.4 Plan for integrated transport systems that helps people get around and link our communities

Delivery Program Objective: 4.4.2 Develop and implement annual maintenance and renewal programs for transport assets

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.4.2.2 Carry out annual unsealed road maintenance program including resheeting, grading, drainage and vegetation and rural roadside vegetation clearing	Transport and Stormwater Network	1. In accordance with adopted programs and reactive maintenance requirements based on risk (annual unsealed road maintenance program)	1. 100%	1. 100%	On target. Works delivered on budget. Works schedule based on inspections and assessment criteria from Council's road risk rating and road hierarchy systems.
4.4.2.3 Carry out annual sealed road network maintenance program including resurfacing, heavy patching, vegetation management, roadside furnishing and drainage	Transport and Stormwater Network	1. In accordance with adopted programs and reactive maintenance requirements based on risk (annual sealed road network maintenance program)	1. 100%	1. 100%	On target. Works delivered on budget. Works schedule based on inspections and assessment criteria from Council's road risk rating and road hierarchy systems.
4.4.2.4 Undertake bridges and culverts maintenance and repair program including inspections, monitoring and bridge repair works	Transport and Stormwater Network	1. In accordance with adopted programs and reactive maintenance requirements based on risk (bridges and culverts maintenance and repair program)	1. 100%	1. 100%	On target. Works delivered on budget. Works schedule based on inspections and assessment criteria from Council's road risk rating and road hierarchy systems.
4.4.2.5 Carry out reactive maintenance to Koala Food Trees and Koala Fencing on Link Rd (Ocean Dr)	Transport and Stormwater Network	1. In accordance with adopted programs and reactive maintenance requirements based on risk (reactive maintenance to Koala Food Trees and Koala Fencing)	1. 100%	1. 100%	On target. Works delivered on budget. Works schedule based on inspections and assessment criteria from Council's road risk rating and road hierarchy systems.
4.4.2.6 Bridgeworks and Road Rehabilitation Program - Undertake regular bridge and geotechnical road pavement tests to inform and develop programme	Transport and Stormwater Network	1. Deliver project according to approved project plan (Bridgeworks and Road Rehabilitation Program)	1. 100%	1. 100%	On target. Works delivered on budget. Works schedule based on inspections and assessment criteria from Council's bridge and road risk rating and road hierarchy systems.

Community Strategic Plan: 4.4 Plan for integrated transport systems that helps people get around and link our communities

Delivery Program Objective: 4.4.3 Develop and implement traffic and road safety programs

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.4.3.1 Develop a Road Safety Action Plan and undertake associated safety education and awareness programs identified in the plan (incl Westport Public School Zone installation and Bike Week)	Transport and Stormwater Network	1. Undertake road safety educational programs	1. 100%	1. 100%	On target. The following two projects are in progress and will be were delivered in accordance with Transport for NSW and Roads and Maritime Services guidelines: Distracted Driver Action Plan Implementation and Safety Around Schools.
4.4.3.2 Install and maintain street lights in accordance with identified priorities	Transport and Stormwater Network	1. Deliver street lighting program according to approved schedule and prioritisation	1. 100%	1. 100%	On target. Upgrade investigation, design and delivery undertaken in accordance with program.
4.4.3.3 Area-wide traffic study (multi-year project)	Transport and Stormwater Network	1. Deliver project according to approved project plan (Area-wide traffic study)	1. 100%	1. 100%	Achieved. The detailed traffic model simulation and final reporting have been delivered to Council, including training of Council Staff on the use of the model. A summary report will be reported to Council in 2019.

Community Strategic Plan: 4.5 Plan for integrated and connected communities across the Port Macquarie-Hastings area

Delivery Program Objective: 4.5.1 Carry out strategic planning to manage population growth and provide for co-ordinated urban development

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.5.1.07 Investigate LEP and DCP amendments for the proposed Yippin Creek urban release area to the west of Wauchope	Strategic Land Use Planning	1. Report recommended draft planning outcomes to Council by 30 June	1. 100%	1. 100%	On target. Initial land owner consultation held in October 2018 and project update report to be presented to Council in Quarter 3 2019.
4.5.1.08 Commence preparation of Local Environmental Plan (LEP), Development Control Plan (DCP) and Contributions Plan (CP) provisions for the Port Macquarie Health and Education Precinct	Strategic Land Use Planning	1. Completion of a Project Plan for the LEP, DCP and CP process by 31 December 2018	1. 100%	1. 100%	On target. Draft Master Plan presented to the Council Meeting in November 2018 and on public exhibition from 26 November 2018 to 21 February 2019. Project planning to be undertaken following completion of draft Master Plan.

Community Strategic Plan: 4.5 Plan for integrated and connected communities across the Port Macquarie-Hastings area

Delivery Program Objective: 4.5.1 Carry out strategic planning to manage population growth and provide for co-ordinated urban development

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
		2. Implementation of key Stage 1 actions in accordance with the Project Plan by 30 June 2019	2. 100%	2. 100%	On target. Awaiting adoption of the draft Master Plan by Council as a pre-curser to the preparation of Local Environmental Plan, Development Control Plan and Contributions Plan provisions for the Health and Education Precinct. It is proposed a report will be tabled at the April 2019 Council Meeting detailing the submissions received during the public exhibition of the draft Master Plan.
4.5.1.09 Commence Stage 1 of a comprehensive review of the Port Macquarie-Hastings Development Control Plan 2013 for completion in 2019-20	Strategic Land Use Planning	1. Completion of project planning, stakeholder engagement and support studies by 30 June 2019	1. 100%	1. 0%	Yet to commence. Project Planning to commence in Quarter 3 2019. The NSW Department of Planning & Environment is developing a Standard DCP format that will be used by councils to guide the development of new DCPs into the future. This work will help inform the review of Council's DCP.
4.5.1.10 Commence a review of housing related Local Environmental Plan (LEP) and Development Control Plan (DCP) provisions to promote housing choice options	Strategic Land Use Planning	1. Preliminary support studies complete to inform the review by 30 June 2019	1. 100%	1. 100%	On target. Project Planning commenced and a review of Local Environmental Plan and Development Control Plan housing related provisions underway.
4.5.1.11 Preparation of Local Environmental Plan (LEP), Development Control Plan (DCP) and Contributions Plan (CP) provisions for the “gateway sites” at the intersection of the Pacific and Oxley Hwy	Strategic Land Use Planning	1. Report to Council regarding proposed LEP, DCP and CP outcomes by 30 June 2019	1. 100%	1. 100%	On target. Council endorsed draft Development Control Plan (DCP) provisions - Highways Gateway Sites for public authority consultation and public exhibition with the Planning Proposal at its meeting in November 2018. Details of vehicle access to and from the site to be resolved prior to public exhibition commencing. Further report to be presented to the March 2019 Council Meeting.

Community Strategic Plan: 4.5 Plan for integrated and connected communities across the Port Macquarie-Hastings area

Delivery Program Objective: 4.5.2 Plan for infrastructure that supports population growth

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.5.2.2 Commence a review of the Major Roads Contributions Plan and Water and Sewerage Development Servicing Plans for completion in 2020	Strategic Land Use Planning	1. Preliminary support studies complete to inform the review and an update provided to Council by 30 June 2019	1. 100%	1. 90%	Monitoring required. Project start has been delayed due to lack of available resources to prepare key project inputs (review completed works, prepare new works schedule). Project start not expected until first half 2019 calendar year.

Community Strategic Plan: 4.6 Restore and protect natural areas

Delivery Program Objective: 4.6.1 Develop and implement a range of programs for the environmental management of lands within the local government area

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.6.1.01 Undertake weed management program according to the Mid North Coast Invasive Plant Species Strategy 2012, working in partnership with community groups such as Landcare	Environmental Services	1. 20% of all plant nurseries in the local government area (LGA) inspected for invasive weeds	1. 100%	1. 0%	Behind schedule. Due to resourcing constraints, however this is a priority action for first quarter 2019.
		2. 240 ha land treated for invasive weeds	2. 100ha	2. 168ha	On target.
		3. 300 properties inspected for invasive weeds	3. 300#	3. 121#	Monitoring required. Due to resources constraints and undertaking the recruiting process, the program has been delayed.
		4. 600 km weed dispersal routes treated	4. 600km	4. 751km	On target. Achieving beyond target.
4.6.1.02 Control feral animals on Council-controlled land	Environmental Services	1. Undertake feral animal control	1. 100%	1. 100%	On target. Works will be ongoing throughout the year and have commenced.
4.6.1.03 Implement riparian restoration works	Environmental Services	1. Undertake a minimum of 70 km (lineal) control	1. 70#	1. 370#	On target. Riparian work commenced.
4.6.1.04 In collaboration with community groups, such as Landcare, implement the Bushland Regeneration Program	Environmental Services	1. 1,200ha of bushland under active management	1. 1,200ha	1. 564ha	On target

Community Strategic Plan: 4.6 Restore and protect natural areas

Delivery Program Objective: 4.6.1 Develop and implement a range of programs for the environmental management of lands within the local government area

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.6.1.06 Inform and educate residents, industry and community groups about Council's tree management requirements within the Port Macquarie-Hastings 2013 Development Control Plan (DCP)	Recreation and Buildings	1. Develop and implement educational material and delivery program	1. 100%	1. 100%	On target. Educational material delivered via correspondence and conversations regarding different legislative requirements, including civil advice letters, Local Land Services, Office of Environment and Heritage jurisdiction, meetings with contractors and residents regarding Development Control Plan provisions and application process. Informal advice on tree management requirements was provided on 20 occasions during the reporting period.
		2. Provide advice in accordance with service standards and industry best practice	2. 100%	2. 61%	Behind target. Total number of Customer Requests is 600. 462 (Public), 106 (Private) and 33 (Illegal tree removal/pruning). Additional information: 192 enquires (164 public and 28 private phone and email enquires). This does not include calls transferred from call centre to mobile or landline. In addition, there were 112 internal enquiries, Two subdivision out of defection inspections and Two tree impact assessments for new project conducted. Multiple storm events resulted in an increase of customer requests during the reporting period.
		3. Undertake investigations in relation to all reported illegal tree works	3. 100%	3. 100%	On target. 33 illegal tree incidents reported and investigated during this reporting period from July to December 2018.

Community Strategic Plan: 4.6 Restore and protect natural areas

Delivery Program Objective: 4.6.1 Develop and implement a range of programs for the environmental management of lands within the local government area

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.6.1.08 Undertake implementation of the Koala Management Strategy incl the Koala Management Project - Fire & Biodiversity Consort, the Koala Road Strike Project, Flood Mitigation Maintenance Prog	Environmental Services	1. Commence implementation of the identified actions in the Koala Management Strategy (incl Fire & Biodiversity Consort and Koala Road Strike Project)	1. 100%	1. 100%	On target.
4.6.1.09 Complete preparation of a Comprehensive Koala Plan of Management (CKPoM) for coastal areas in the Port Macquarie-Hastings	Strategic Land Use Planning	1. Report to Council following exhibition of a draft CKPoM by 30 September 2018	1. 100%	1. 90%	Monitoring required. Project has been delayed due to need to clarify the effect of the Biodiversity Conservation Act offset requirements. Completion of the project is now expected in 2019.
4.6.1.10 Estuarine Lake Linkages - Protecting the Islands and Foreshores of the Camden Haven	Environmental Services	1. Undertake the Estuarine Lake Linkages program	1. 100%	1. 100%	On target. Consultant in place and on ground work in kind from bush regeneration team.
4.6.1.11 Hastings River Streamflow and Rainfall Gauges	Environmental Services	1. Hastings River Streamflow and Rainfall Gauges	1. 100%	1. 100%	On target

Community Strategic Plan: 4.7 Provide leadership in the development of renewable energy opportunities

Delivery Program Objective: 4.7.1 Promote renewable energy outcomes within Council

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.7.1.2 CW Install solar energy systems at the Kew Waste Transfer Station and the Port Macquarie Reclaimed Water Treatment Plant	Environmental Services, Water and Sewer	1. Solar system installation at the Kew Waste Transfer Station complete	1. 100%	1. 0%	Deferred. Project and funding deferred to 2019-2020 financial year.

Community Strategic Plan: 4.7 Provide leadership in the development of renewable energy opportunities

Delivery Program Objective: 4.7.1 Promote renewable energy outcomes within Council

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
		2. Solar system installation at the Port Macquarie Reclaimed Water Treatment Plant complete	2. 100%	2. 30%	Behind target. Public works have been engaged to develop tender specifications. Tender for solar installation at the Port Macquarie Reclaimed Water Treatment Plant is likely to be issued in early 2019 due to delays with Public Works. Installation targeted for the end 2018/19.
4.7.1.4 CW Undertake LED lighting upgrade to the Port Macquarie Council Office building and other public buildings - Allocated Amount 2018-19 - $25,000	Recreation and Buildings	1. Complete LED lighting upgrade to the Port Macquarie Council office building	1. 100%	1. 0%	Achieved.
4.7.1.6 CW Install solar energy systems at selected existing Council facilities - Allocated Amount 2018-19 - $100,000	Recreation and Buildings	1. Install solar energy systems at identified Council facilities	1. 100%	1. 100%	On target .Building Services has investigated the Wauchope Office Solar options. Due to the requirement to relocate the Main Switch Board this would not be the best viable solution with the funds available. On this basis, staff are designing Photovoltaic systems for Wauchope and Kendall Pools and plan to have these quoted shortly. Wauchope Pool - PV generation assessment completed - DA lodged Kendall Pool - PV generation assessment completed - incoming supply and MSB upgrade started
4.7.1.7 Develop feasibility for bulk street lighting upgrade to LED (Category V)	Assets and Property Investment	1. Complete feasibility assessment for bulk street lighting upgrade to LED (Category V)	1. 100%	1. 0%	Yet to commence. Subject to finalisation of Category V street lighting specifications by network distributor.
4.7.1.8 Continue to implement and monitor the Long Term Energy Strategy	Assets and Property Investment	1. Provide six monthly update reports to Council on the status of the Long Term Energy Strategy	1. 100%	1. 100%	On target. Six monthly update report tabled at November 2018 Ordinary Council Meeting. Next six monthly update report scheduled for the April 2019 Ordinary Council Meeting.

Community Strategic Plan: 4.8 Increase awareness of issues affecting our environment, including the preservation of flora and fauna

Delivery Program Objective: 4.8.1 Ensure all Council operations comply with environmental standards and regulations

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.8.1.1 Operate and maintain water treatment plants in accordance with adopted maintenance programs and scheme requirements	Water and Sewer	1. Monitor plants continuously with plant breakdowns attended to within 24 hours	1. 100%	1. 100%	On target. All Water Treatment Plants monitored continuously by Council's remote water monitoring system (SCADA-C)
4.8.1.2 Operate the water supply network to ensure public health and safety	Water and Sewer	1. Ensure any public health and safety issues in relation to water supply are responded to in line with service standards	1. 100%	1. 100%	On target. Drinking water treatment systems operated in accordance with Council's Drinking Water Quality Management System.
4.8.1.3 Maintain and operate storage dams in accordance with Australian National Committee On Large Dams (ANCOLD) guidelines	Water and Sewer	1. Ensure any issues in relation to the operation and maintenance of storage dams are handled in line with ANCOLD guidelines	1. 100%	1. 100%	On target. Storage dams operated in accordance with ANCOLD guidelines.
4.8.1.4 Operate and maintain sewerage treatment plants in accordance with environmental licences, adopted maintenance programs and scheme requirements	Water and Sewer	1. Monitor plants continuously with plant breakdowns attended to within 24 hours	1. 100%	1. 100%	On target. All Sewage Treatment Plants monitored continuously by Council's remote water monitoring system (Clear SCADA).
4.8.1.5 Operate the sewerage network to ensure service delivery meets public health and safety requirements	Water and Sewer	1. Ensure any public health and safety issues in relation to sewerage network are responded to in line with service standards	1. 100%	1. 100%	On target. Sewerage System monitored continuously by Council's remote water monitoring system (SCADA) with Duty Officer available at all times. There was one notifiable sewerage surcharge event during the reporting period.

Delivery Program Objective: 4.8.2 Increase community awareness and enable access to the natural environment

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.8.2.1 Deliver bushfire preparedness and planning programs to the community	Environmental Services	1. Deliver bushfire preparedness and planning programs	1. 100%	1. 100%	On target. Programs delivered as part of daily business including customer request management

Community Strategic Plan: 4.8 Increase awareness of issues affecting our environment, including the preservation of flora and fauna

Delivery Program Objective: 4.8.3 Promote Biodiversity Programs

Operational Plan Activity 2018 - 2019	Lead Responsibility	Success Measures	Target	YTD Actual	Comment on Progress
4.8.3.1 Finalise the Biodiversity Strategy	Environmental Services	1. Biodiversity Strategy presented to Council for adoption	1. 100%	1. 50%	Behind schedule. Finalisation of the Draft Strategy delayed pending revised/ updated mapping.

Glasshouse Financial Statements
for the period ending 30 December 2018

	Notes	Original Annual Budget $	Current Annual Budget $	Current Quarter Budget $	Current Quarter Actual $	Current Quarter Variance $	Current Quarter Variance %	Year to Date Budget $	Year to Date Actual $	Year to Date Variance $	Year to Date Variance %
Operating											
Operating Income											
Operating Contributions and Grants		0	57,528	0	0	0		0	0	0	
Venue Hire (including hirer promotors events)		1,179,880	1,179,880	294,855	285,453	(9,402)	97%	589,710	651,669	61,959	111%
Performing Arts - Show Income		350,000	350,000	87,465	38,420	(49,045)	44%	174,930	130,021	(44,909)	74%
Gallery - Income		25,400	25,400	6,345	4,718	(1,627)	74%	12,690	33,345	20,655	263%
VIC - Income		6,500	6,500	1,626	696	(930)	43%	3,252	1,236	(2,016)	38%
Bar/Café Sales		200,000	200,000	49,980	45,873	(4,107)	92%	99,960	103,515	3,555	104%
Retail Income		60,000	60,000	14,994	13,740	(1,254)	92%	29,988	16,857	(13,131)	56%
Rental Income received		0	0	0	0	0		0	0	0	
Sponsorships/Donations/Memberships		60,100	60,100	15,021	17,145	2,124	114%	30,042	21,307	(8,735)	71%
Operating Income Total		1,881,880	1,939,408	470,286	406,046	(64,240)	86%	940,572	957,950	17,378	102%
Operating Expenditure											
Building Operational Expenses		548,220	548,220	119,544	99,419	20,125	83%	291,828	238,927	52,901	82%
Building Maintenance		232,500	232,500	90,364	100,100	(9,736)	111%	137,728	134,469	3,259	98%
Administration Operational Expenses		82,300	82,300	19,474	12,585	6,889	65%	42,331	36,044	6,287	85%
Salaries and oncosts		1,675,793	1,675,793	428,910	467,458	(38,548)	109%	857,820	967,447	(109,627)	113%
Community Discount		65,000	65,000	16,245	4,066	12,179	25%	32,490	34,522	(2,032)	106%
Bar/Café Operations		135,000	135,000	33,738	18,785	14,953	56%	67,476	46,842	20,634	69%
Marketing and Promotion		83,500	83,500	20,868	13,452	7,416	64%	41,736	19,817	21,919	47%
Performing Arts - Show Expenditure		266,012	323,540	80,853	35,218	45,635	44%	161,706	173,777	(12,071)	107%
Gallery Expenditure		300,178	300,178	79,749	74,484	5,265	93%	153,198	162,714	(9,516)	106%
Retail Expenditure		4,000	4,000	999	413	586	41%	1,998	2,878	(880)	144%
Venue Hire Costs (including hirer promotors events)		114,200	114,200	28,539	22,796	5,743	80%	57,078	49,472	7,606	87%
Sponsorship/Donations/Memberships Expense		6,000	6,000	1,501	47	1,454	3%	1,501	3,368	(1,867)	224%
Council Overheads		466,607	466,607	116,607	116,655	(48)	100%	233,214	233,310	(96)	100%
Operating Expenditure Total		3,979,310	4,036,838	1,037,391	965,480	71,911	93%	2,080,104	2,103,586	(23,482)	101%
Operating Surplus (Deficit)		(2,097,430)	(2,097,430)	(567,105)	(559,434)	7,671	99%	(1,139,532)	(1,145,637)	(6,105)	101%
Interest and Depreciation											
Interest Repayments		562,835	562,835	297,758	309,232	(11,474)	104%	297,758	309,232	(11,474)	104%
Depreciation		1,033,000	1,033,000	516,500	481,057	35,443	93%	516,500	481,057	35,443	93%
Interest and Depreciation Total		1,595,835	1,595,835	814,258	790,289	23,969	97%	814,258	790,289	23,969	97%
Total Operating Surplus (Deficit)		(3,693,265)	(3,693,265)	(1,381,363)	(1,349,723)	31,640	98%	(1,953,790)	(1,935,926)	17,864	99%
Capital											
Capital Income											
Capital Contributions and Grants		0	0	0	0	0		0	0	0	
Depreciation		1,033,000	1,033,000	(516,500)	(481,057)	35,443	93%	(516,500)	(481,057)	35,443	93%
Capital Income Total		1,033,000	1,033,000	(516,500)	(481,057)	35,443	93%	(516,500)	(481,057)	35,443	93%
Capital Expenditure											
Acquisition of Assets		66,000	66,000	19,000	815	18,185	4%	33,000	5,021	27,979	15%
Transfers to Reserves		0	0	0	0	0		0	0	0	
Loan Principal Repayment		1,883,846	1,883,846	1,018,014	1,006,665	11,349	99%	1,018,014	1,006,665	11,349	99%
Capital Expenditure Total		1,949,846	1,949,846	1,037,014	1,007,481	29,533	97%	1,051,014	1,011,686	39,328	96%
Total Capital Surplus (Deficit)		(916,846)	(916,846)	(1,553,514)	(1,488,538)	64,976	96%	(1,567,514)	(1,492,743)	74,771	95%
Total Cash Position (before funding)		(4,610,111)	(4,610,111)	(2,934,877)	(2,838,260)	96,617	97%	(3,521,304)	(3,428,669)	92,635	97%
Funded By:-											
Reserves		66,000	66,000	19,000	815	18,185	4%	33,000	5,021	27,979	15%
Other Funds		0	0	0	0	0		0	0	0	
General Council Revenue		4,544,111	4,544,111	2,915,877	2,837,445	78,432	97%	3,488,304	3,423,648	64,656	98%
Total Cash Funding Sources		4,610,111	4,610,111	2,934,877	2,838,260	96,617	97%	3,521,304	3,428,669	92,635	97%

GLASSHOUSE STRATEGIC PLAN 2014 - 2017 - UPDATE ON PROGRESS ACHIEVED AGAINST RECOMMENDATIONS – FEBRUARY 2019

Key Outcomes:	Recommendations:	By When:	Progress Achieved as at 31 January 2019:
Ensuring Good Governance *Implement effective and efficient management structures, processes and systems, to ensure open and transparent decision-making based on the provision of accurate and timely data*	1.1 Develop a business plan to guide day-to-day activities consistent with delivering the key outcomes of the Strategic Plan within set timeframes	Complete by 30 September 2014	*Completed - Service Plan actions being implemented consistent with the Strategic Plan and business priorities.* * **Work is continuing in conjunction with Council's Cultural Steering Group to review and update the Glasshouse Strategic Plan (OP ref 1.5.3.2)**
	1.2 Review management and reporting systems to support effective decision-making	Immediate and Ongoing	*Operational / business as usual - Service Plan KPIs monitored by Senior Management. Utilisation and occupancy rates reported to Council in Glasshouse reports.*
	1.3 Advocate for an Economic Impact Assessment to identify the benefits of the Glasshouse to the local and regional economy	Complete by 30 June 2015	*Completed - AEC Group report submitted and presented at the August 2015 GSC meeting.*
	1.4 Investigate options for the future management and operational structure of the Glasshouse	Complete by 30 June 2017	*Operational / business as usual - Operational structure being reviewed as necessary to support implementation of the Glasshouse Strategic Plan and Service Plan.*
Developing Successful Partnerships *Work with key stakeholders in the community, government and business to build community engagement and maximise commercial outcomes*	2.1 Identify and develop key partnerships to maximise cultural, community and commercial outcomes	Immediate and Ongoing	*Operational / business as usual.* * **New / renewed cultural, community and commercial partnerships developed in conjunction with the 2019 Glasshouse Season** **2016 Membership = 1,284 members*** * **2017 Membership = 1,344 members*** **2018 Membership = 1,505 members* (*as at 30 November each year)** * **$70k grant funding awarded by Create NSW (Arts and Cultural Development Program) to support the 2019 Regional Gallery Program**
	2.2 Review the delivery of information services (including visitor information) within the Glasshouse in partnership with Council's Economic Development unit	1st Draft by 31 December 2014 Final complete by 30 June 2015	*Completed - Improvements to the VIC located at the Glasshouse implemented in December 2015 with positive feedback received from industry stakeholders.*
Enhancing Utilisation and Visitation *Implement targeted marketing and sales strategies to enhance utilisation, increase event visitation and maximise commercial outcomes*	3.1 Promote operational flexibility in the use of the Glasshouse footprint to optimise cultural, community and commercial outcomes	Complete by 31 December 2014	*Operational / business as usual - opportunities continuing to be investigated / implemented.* * **Work has been completed to convert the "Speakers Room" (a space previously used as an office and storage area) to a hireable small meeting room space. This will give the venue a higher level of flexibility, additional break out space for conference and meeting events and increased venue hire income**
	3.2 Develop Glasshouse Marketing and Sales Strategies, including redevelopment of the website www.glasshouse.org.au	Complete by 30 September 2014 Website complete by 30 June 2015	*Completed - Marketing and Sales Plan actions being implemented consistent with the Strategic Plan and business priorities.* *Completed - Redeveloped website implemented 1 December 2015 - with Membership Renewal Launch.* * **New partnership developed with Destination North Coast NSW to support attraction of new Business (Conference) Events to the Glasshouse** * **2019 Education Program launched in November to approx. 60 teachers (>4,000 tickets sold)**
Promoting Viability *Apply a commercial management focus to all cultural, community and commercial activities to improve long-term efficiency, effectiveness and viability*	4.1 Develop a rolling 5-year profit and loss forecast	Complete by 31 October 2014	*Completed - P&L incorporated into Business / Service Plan (see Recommendation 1.1).*
	4.2 Undertake a review of the Glasshouse incremental revenue streams and opportunities with a view to enhancing utilisation and visitation	Immediate and Ongoing	*Operational / business as usual - in conjunction with the implementation of the Business / Service Plan and Marketing and Sales Plan.* * **2017 Archibald Prize Regional Tour Exhibition 25 Aug – 7 Oct Total visitation to exhibition and public programs = 5,642**
	4.3 Implement the Service Delivery Matrix	Immediate and Ongoing	*Operational / business as usual - Matrix implemented, subject to ongoing review. Cost - benefit analysis and risk assessment undertaken as part of event booking process.*
	4.4 Continue to rationalise operating costs and overheads	Immediate and Ongoing	*Operational / business as usual - in conjunction with the implementation of the Business / Service Plan and Marketing and Sales Plan.* * **$128k grant funding awarded by Create NSW (Regional Cultural Fund Round Two) to replace the existing Studio seating**

DIGITAL TECHNOLOGY ROAD MAP 2018 - 2020

Technology performs a critical role in enabling the successful operations of our Council.

We've started to move in the right direction but we need to sustain our pace of change to transform our organisation, and deliver successful outcomes, while enabling our Council's strategic objectives.

What's the Opportunity

"A technology roadmap that helps us to transform our Council operation, at pace, to ensure we're ready to deliver on the services our changing organisation, and community needs, as we experience significant growth"

- New & improved ways of working to support our growth
- 'People First' approach to deliver enhanced customer experience
- Increase Digital Technology staff capabilities & skills
- Improved Collaboration & Business Insights
- Preparedness for digitisation & automation to drive efficiency

	Build the foundations 2018 – 2019	Deliver 2019 – 2020	Position for the future 2020 – Onwards
A new way of working Deliver automation, workflows and systems which integrate, release Productivity & enables efficiencies within the organisation.	Establish a new digital team structure to support our Council transformation and provide a way to sustain a move to new ways of working. Deliver on projects such as HRIS, CRM, Office365 and Mobility	Implement new ways of working including new systems & functionality which allow us to realise organisatonal efficiencies and improved customer service outcomes. Automate business process to release productivity and allow staff to add value back to core services.	Drive continuous improvement & bed in new ways of working through new systems and automation to deliver efficiencies.
Digitisation & Insights Utilise information management and data to increase visibility and insight for Council operations and service delivery	Deliver an open data program supported by an information management strategy to enable more effective, transparent and available access to Council data and systems. Commence back-scanning of historical paper records to build a foundation of digitisation, linked to improve search and access for Council staff.	Deliver a data warehouse to underpin Council's current and future business intelligence opportunities. Implement core digital customer transaction and process improvements, including digitising online forms, to further improve customer experience across our digital platforms. Deliver modern reporting & business intelligence platforms to improve decision making.	Commence support of embedded asset sensors in business intelligence platforms, assisting Council in realising ongoing efficiencies across its asset portfolios and Smart City futures.
Supporting Our Growth Deliver value across existing infrastructure investment with a focus on supporting access, productivity and mobility of staff in order to deliver effective customer services.	Finalise delivery of a modern, secure & high performance network across Council's business operations. Implement improved wireless connectivity in support of mobile computing efforts. Update Council UPS system to provide resilience and availability. Review & embed standard operating procedures, governance and process improvement across the Digital Technology team.	Migration effort to push Council applications into the Cloud, removing future expenditure on physical assets. Review systems integration platforms to standardise toolsets and maintain modern integration capability. Build an end user compute strategy, taking into account our Cloud migration and mobilty requirements into the future.	Drive continuous improvement in the organisation, enabled through technology & implement new technology platforms which support our Cloud and Future City agenda.

PORT MACQUARIE-HASTINGS COUNCIL

Port Macquarie-Hastings Council
PO Box 84
Port Macquarie
NSW Australia 2444
DX 7415
e council@pmhc.nsw.gov.au

ABN 11 236 901 601

PORT MACQUARIE HASTINGS COUNCIL

18 December 2018

The Hon. Melinda Pavey MP
Minister for Roads, Maritime and Freight
P O Box 531
SYDNEY NSW 2001

Melinda

Dear ~~Minister Pavey~~,

I am writing to you in relation to traffic congestion in the Port Macquarie-Hastings Local Government Area (LGA). At the 12 December 2018 Council meeting, Council resolved the following:

12.01 NOTICE OF MOTION - TRAFFIC CONGESTION CRISIS – OXLEY HIGHWAY, PORT MACQUARIE

RESOLVED: Turner/Intemann

That Council:

1) *Request the General Manager write to the Minister for Roads and the Member for Port Macquarie seeking an urgent response to the impending traffic congestion crisis on the Oxley Highway in Port Macquarie, notably at the intersection with the Pacific Highway, the intersection with Wrights Road, and the intersection with Lake Road, as described in the November 2018 Bitzios report.*
2) *Request the General Manager immediately devise and implement a communications strategy to explain to our community:*
   a) *What Council is doing to mitigate the Oxley Highway traffic congestion crisis at Lake Road, the Wrights Road roundabout, and at the Pacific Highway interchange; and*
   b) *The relationship and responsibilities between RMS and PMHC with respect to safety and functional aspects of intersections involving state "controlled" highways and Council "controlled" roads with specific reference to the intersections at Wrights Road and Lake Road, Port Macquarie and the Oxley Highway.*
3) *Request the General Manager report back to the February 2019 Council meeting with:*
   a) *Responses from the Minister for Roads and the Member for Port Macquarie.*
   b) *An update on the development and implementation of the communications strategy.*
4) *Send a copy of all correspondence to all local State and Federal election candidates for the 2019 elections.*

CARRIED: 8/0
FOR: Alley, Cusato, Griffiths, Hawkins, Intemann, Levido, Pinson and Turner
AGAINST: Nil

This letter is in relation to resolution number one as detailed above.

As noted in the above Council resolution, Council is concerned about the current and impending traffic congestion crisis on the Oxley Highway in Port Macquarie and specifically where the Oxley Highway intersects with the Pacific Highway, the intersection with Wrights Road and the intersection with Lake Road. In a recent draft traffic modelling report, referred to above as the November 2018 Bitzios report, the following information is found on Pages 4 & 5 of that report:

PORT MACQUARIE OFFICE
17 Burrawan Street, Port Macquarie NSW 2444
WAUCHOPE OFFICE
49 High Street, Wauchope NSW 2446
LAURIETON OFFICE
9 Laurie Street, Laurieton NSW 2443

3. BASE MODELLING RESULTS

3.1 BASE MODELLING SUMMARY

The Base modelling results in traffic impacts and queuing in a number of locations throughout the modelled network. The primary locations of these traffic impacts are the Pacific Highway northbound off-ramp as well as a number of intersections on the Oxley Highway closer to Port Macquarie. Figure 3.1 shows the queues on the northbound Pacific Highway off-ramp in 2018 AM and 2019 AM AADT Base models.

The 2018 model was calibrated to the queues extending just back to the deceleration lane (as shown). The 2019 queues show that with only a year of growth, the queue extends back onto the Pacific Highway to impact the through traffic lanes. In the 2029 AM AADT Base model, the queues on the Pacific Highway immediately extend back to the model extent, approximately 1km further south.

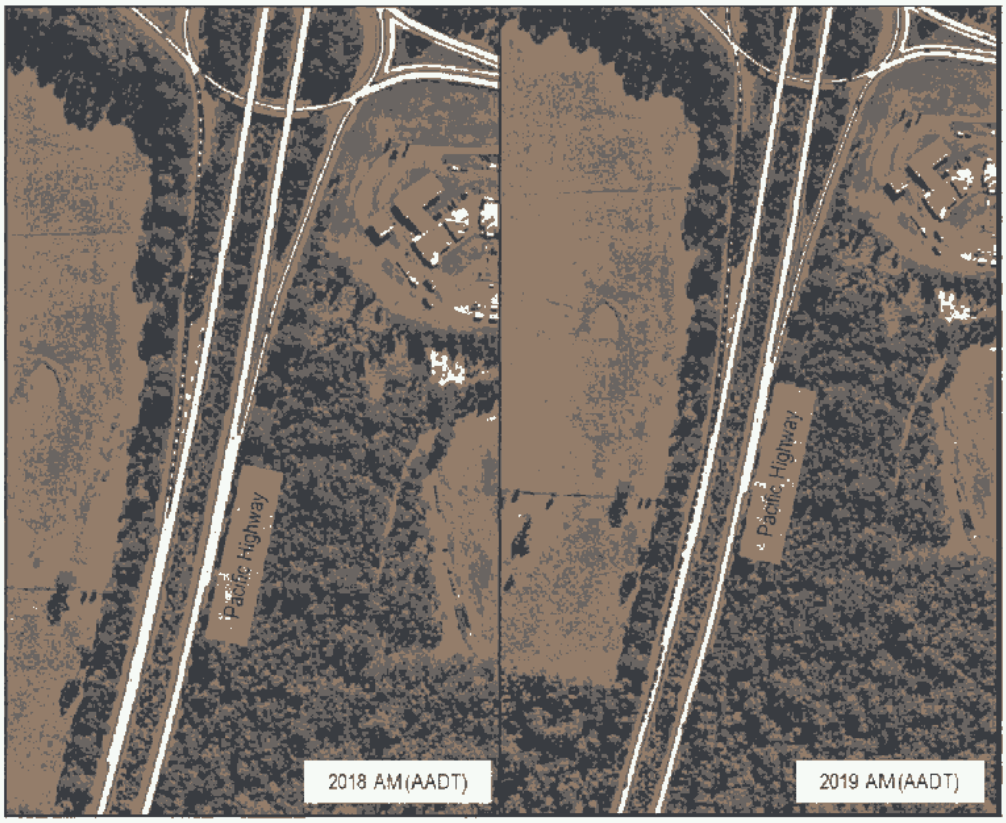


Figure 3.1: 2018 AM AADT and 2019 AM AADT Base Model Queue

The PM Base models also experience significant traffic impacts, however, mainly closer to Port Macquarie. Figure 3.2 shows the queuing on the Oxley Highway in the 2019 PM AADT Base model.

The queues on approach to the Oxley Highway / Lake Road roundabout effectively hold traffic upstream and prevent it from reaching the service centre study area. The impacts exacerbate in the 2029 models and further constrain traffic upstream within Port Macquarie.

Figure 3.2: 2019 PM AADT Base Model Queues

PORT MACQUARIE HASTINGS COUNCIL

As can be seen from the above information and the related modelling, traffic congestion on and around the Oxley Highway is already at capacity and is currently causing major congestion not only in Port Macquarie at the intersections of Wrights Road and Lake Road, but is causing major queuing into traffic lanes on the Pacific Highway as vehicles reach the Oxley Highway.

The Port Macquarie-Hastings LGA has been identified by the NSW government as a regional city in the North Coast Regional Plan. According to this plan, it is one of the regional cities that will see more than three quarters of the north coast regions population growth over the next 20 years, as well as supporting critical jobs growth and health and education services. In light of this, it is with absolute urgency that we ask the NSW government to detail for Council and the community, how the government plans to ease congestion in and around the Oxley Highway, noting the level of congestion already taking place.

For your information and as per the above-mentioned Council resolution, I have been tasked with devising and implementing a communications strategy around what Council is doing to mitigate the Oxley Highway congestion at the roads and intersections as mentioned earlier in this letter. Part of that strategy will also be around detailing for the community, the responsibilities between Council and the RMS in relation to the Oxley Highway and the previously mentioned roads, with respect to the safety and functional aspects of these intersections. Development of the required communications strategy is currently underway.

I am required to report back to the 20 February 2019 Council meeting on any responses received to this letter, so your earliest attention and response to this letter would be most appreciated.

Should you require any further information or if you would like to discuss any aspects of this letter further, please do not hesitate to contact me on (02) 6581 8020 or by email at craig.swift-mcnair@pmhc.nsw.gov.au.

Yours sincerely

Craig Swift-McNair
General Manager

Copy:
Member for Port Macquarie, Leslie Williams MP
Member for Cowper, The Hon. Luke Hartsuyker MP
Greens Candidate for Cowper, Dr Sally Townley
Labor Candidate for Port Macquarie, Peter Alley
Labor Candidate for Cowper, Andrew Woodward
Nationals Candidate for Cowper, Patrick Conaghan

PORT MACQUARIE HASTINGS COUNCIL

COMMUNICATIONS PLAN: OXLEY HIGHWAY TRAFFIC CONGESTION AND ROADS AUTHORITY EXPLANATION

Communication Objective

To ensure the community is better informed on:

1. The differing road responsibility between the State Government (Roads and Maritime Services) and Council; and
2. Council efforts to plan for future transport networks, including advocacy for RMS planning and support for State roads which are critical to our growing regional city, in particular, the Oxley Highway.

Target Audience

Influential and engaged community members.

Stakeholders

Local members and candidates, other levels of government, RMS staff, community

Key Dates and Locations

As below

Budget

N/A. Will only require staff time.

Key Messages

Council is actively planning to ensure our road network can cater for the growth in our region. This includes both roads within Council's direct control (local and regional roads) and advocacy on those which are managed by the NSW Government, Roads and Maritime Services (State roads).

Risk Management

Risk	Mitigation Strategy
Many in the community just want the issue fixed /don't care who is responsible	Focus communications on influential and engaged community members and groups who can act as advocates for good planning of and funding for our future road transport network

PORT MACQUARIE HASTINGS COUNCIL

Timing

1. December 2018	2. January 2019	3. February 2019	4. March 2019	5. April 2019
Council NOM and letter to the Minister for Roads	Drafting of communications strategy	Strategy implementation	Strategy implementation cont.	Strategy review and next steps determined.

Communication Tactics

Communication Objective	Tool / Channel	Message	Timing	Responsibility	Notes/Status
Explain the problem	Letter to Minister	Council is concerned about the current and impending traffic congestion on the Oxley Highway, Port Macquarie	December 2018	General Manager	Letter sent on 18 December 2018. Nil response received as at 6 February 2019.
RMS support road network planning	Regional Transport Infrastructure Steering Group + working level interactions (RMS staff and Council)	Council is committed to working with RMS to solve the local transport issues, noting the integrated nature of local and state roads.	Ongoing	Director infrastructure, Group Manager Transport and Stormwater Network	Monthly meetings and on-going working interactions
Explain in plain english who is the relevant roads authority and what Council is doing to mitigate the Oxley	Fact Sheet	Explain roads authority delineation, strategic planning for our future road network.	February 2019	Council subject matter expert and Comms team	Draft pending publication

PORT MACQUARIE HASTINGS COUNCIL

Highway traffic congestion					
Ensure appropriate context provided with Orbital Road project engagement and Comms – complement rather than confuse	Orbital Road Project FAQs and Fact sheets	Explain Regional Integrated Transport Planning and the network approach to managing traffic.	February & March 2019	Council subject matter expert, Comms & Engagement teams	
Ensure the facts are promoted and available for 'self service' or Council promotion/pointers	Council website Social media	Confused around who manages what and how we are trying to address traffic congestion? Here are the facts.	February 2019	Comms team	
Staff are understanding of the facts and can share with community members in conversation	'Staff Connect' newsletter article Website	Confused around who manages what and how we are trying to address traffic congestion? Here are the facts.	Late February 2019	Comms team	
Create community advocates	Mayor/Councillor/Senior Staff meetings and presentations	Help us plan and advocate for good future outcomes, provide fact sheets, information, encourage advocacy	February 2019 + Ongoing	Mayor/Councillor/Senior Staff	

Evaluation

Engagement levels will be assessed for each tactic. Higher level evaluation will include review of results from future community surveys.

2 Your Community Life

20/02/2019

What we are trying to achieve

A healthy, inclusive and vibrant community.

What the result will be

We will have:

- Community hubs that provide access to services and social connections
- A safe, caring and connected community
- A healthy and active community that is supported by recreational infrastructure
- A strong community that is able to identify and address social issues
- Community participation in events, programs, festivals and activities

How we will get there

2.1 Create a community that feels safe
2.2 Advocate for social inclusion and fairness
2.3 Provide quality programs, community facilities and public spaces, for example, community halls, parks and vibrant town centres
2.4 Empower the community through encouraging active involvement in projects, volunteering and events
2.5 Promote a creative and culturally rich community

PORT MACQUARIE HASTINGS COUNCIL

07 MAYOR'S SPORTING FUND - APPLICATIONS RECEIVED

CONSENSUS:

That Kayle Enfield be granted the amount of $350.00 to assist with the expenses he would have incurred travelling to and competing at the Australian All Schools National Surfing Championships held in South Australia from 1 – 8 December 2018 inclusive.

Aboriginal Awareness and Understanding Strategy 2013 – 2017
End of Term Report

OUR SHARED PLACE		
ACTION	**MEASURE**	**DATE COMPLETED/ COMMENTS**
Promotion of Aboriginal resources and programs in Port Macquarie-Hastings Council Libraries including location & signage	Signage included in all Libraries	Achieved December 2014 Signage is located above Aboriginal resource section in all libraries.
Aboriginal Flag is flown at all Council Administration buildings including Wauchope and Laurieton	New flags and posts provided at Wauchope and Laurieton Offices	In review of Local Government Policy, the Aboriginal Flag is only required to be flown at the main administration building of Council. The Aboriginal Flag is flown daily on Mon - Fri at Council headquarters.
Acknowledging Birpai names in Parks	Signs acknowledging Birpai names in parks installed.	Ongoing • Together as One Sculpture and Interpretative signage • Interpretative signage Tacking Point • Historical Cemetery Interpretative signage
Reducing the red tape in application processes to utilise public spaces for events with a focus on Aboriginal events and programs	Increase in Aboriginal events and programs that are held in public spaces.	Ongoing. Review of Events process included in Council's Event Plan.
Gateway Signage acknowledging Birpai Nation at all key entry points.	Included in new signage proposal.	Not completed due to changes in the RMS signage policy.
Aboriginal Arts Trail is developed to highlight Aboriginal public art across the Port Macquarie-Hastings local Government area.	Brochure is developed to highlight the Aboriginal Arts Trail.	Commenced 2015 with the Gurri Wakal Gagil – Together as One Aboriginal Public Art installation. Included as an action in the Cultural Plan 2018 - 2021

OUR CONNECTED STORIES		
ACTION	**MEASURE**	**DATE COMPLETED/ COMMENTS**
Map all interpretative signage.	A Master Plan of Aboriginal Sign locations.	Not achieved Action carried over to 2018 – 2021 Cultural Plan
Collate details of all available Aboriginal resources in Port Macquarie-Hastings Local Government Area.	Booklet designed that identifies available resources across the Port Macquarie-Hastings Area.	Not achieved. Intended as a co-operative project with the Bearlay Interagency, but did not gain traction. To be carried over to the Community Inclusion Plan.
Promotion of cultural awareness in Port Macquarie-Hastings Council through staff induction training.	Cultural Awareness is included into Port Macquarie-Hastings Council staff induction training.	Work commenced on proposal with Human Resources for staff cultural awareness training program. Discussions continuing.
Encourage people to attend Sea Acres and learn more about local stories.	Encourage people to attend Sea Acres and learn more about local stories.	Aboriginal cultural activities at Sea Acres included in Council's ongoing support and promotion activity supported by Community Place and Destination marketing. Ongoing
Port Macquarie-Hastings Council will support groups and events held at Birpai and Bunyah Local Aboriginal Land Councils	Port Macquarie-Hastings Council to support groups and events held at Birpai and Bunyah Local Aboriginal Land Council's.	Events at Land Councils included in Council's ongoing support and promotion activity supported by Community Place.
Port Macquarie-Hastings Council will work with Aboriginal Education Consultative Group (AECG) and service providers to support initiatives aimed at increasing Aboriginal Student access, retention and outcomes at all levels.	Increased number of Aboriginal students participating in education at all levels achieving outcomes equal with non-Aboriginal population.	Achieved December 2014. Council's Aboriginal Liaison Officer: • elected as Deputy President of the AECG in 2015 and 2016; • involved in the delivery of Hastings Aboriginal Education Consultative Group's Connecting to Country cultural awareness program for Department of Education staff; and • involved in Sista Speak mentoring program Hastings Secondary College for Aboriginal girls in years 7 - 12
Port Macquarie-Hastings Council will continue to participate and work with Bearlay Aboriginal Interagency to address Aboriginal community needs.	Aboriginal service providers regularly update and provide Port Macquarie-Hastings Council with information on specific issues arising in the community.	Achieved December 2014, Council represented at ongoing bi-monthly meetings each year. Council's Aboriginal Liaison Officer involved in the NAIDOC Planning Committee for the planning and delivery of the Hastings Community Fun Day each year.

Aboriginal Advisory to provide advice and guidance to Port Macquarie-Hastings Council.	The Aboriginal community has an equitable voice in Port Macquarie-Hastings Council. Port Macquarie-Hastings Council to nurture and enhance engagement with the Aboriginal community.	Under review in the formation of committees and community reference groups across Council.
Engage Local Aboriginal Lands Council's to conduct corporate cultural awareness training.	Port Macquarie-Hastings Council supports and promotes Local Aboriginal Land Council's cultural awareness training package.	Currently working on cultural awareness training proposal with Human Resources
Develop brochure for Aboriginal interpretive walks with additional signage where needed.	Develop an Aboriginal Interpretative walks brochure.	Not achieved. Included as an action in the Cultural 2018 – 2021.
Publicise Aboriginal activities that are supported by Port Macquarie-Hastings Council.	Activities supported by Port Macquarie-Hastings Council increased.	Achieved 2014, ongoing
Aboriginal community protocol brochure to be used by Council and given to service providers and corporate bodies to provide local content and relevant information about Birpai community.	Brochure is developed	Achieved. This was an initiative that was implemented by the Hastings Aboriginal Education Consultative Group in 2017. Council's Aboriginal Liaison Officer was involved in this process. Lunchtime talk to Council Staff – Aboriginal Community Protocols to be held February 2019.
Develop an Aboriginal Heritage Strategy.	Develop and implement an Aboriginal Heritage Strategy.	Not achieved. Included as an action in the Cultural 2018 – 2021.

TOGETHER AS ONE		
ACTION	**MEASURE**	**DATE COMPLETED/ COMMENTS**
Review the Port Macquarie-Hastings Council Community Grants to encourage and support Aboriginal community groups to apply for grants in the annual Community Grants program criteria.	Notify Aboriginal Land Councils and encourage Aboriginal community groups to apply for Community Grants. Increase in number of applications by local Aboriginal groups for community grants.	Ongoing - working with Council's Grants officer and Local Aboriginal community to increase grant submissions from local Aboriginal services and community groups. The following grants were provided during the period of this Strategy: • Birpai Local Aboriginal Land Council 2016-2017 General Community Grant. $2500 for the Aboriginal Creative Circle. • Werin Aboriginal Medical Clinic 2013-2014 Christmas & New Year's Eve Events $3000
Participate and support annual National Sorry Day and National Reconciliation Week activities	Increased awareness of the significance of National Sorry Day and National Reconciliation Week.	Achieved May 2014, ongoing each year. Participation and engagement rates from both Aboriginal and non-Aboriginal community increasing each year.
Participate and support annual NAIDOC week activities	Increased awareness of the significance of NAIDOC Week.	Achieved July 2014, ongoing each year. Participation and engagement rates from both Aboriginal and non-Aboriginal community increasing each year.
Continue to build strong relationships with relevant government agencies including health, education and housing to lobby for improved services.	Strong relationships are built to lobby for improved services.	Achieved, ongoing Council's Aboriginal Liaison Officer is a member of Port Macquarie Base Hospital Aboriginal Advisory Committee and the Bearlay Interagency Group.
Review the "Walking the Talk" protocol.	Revised protocol is implemented.	To be reviewed as part of Council's Engagement, Education and Communication Strategy.
Promotion of Local Government Aboriginal Network Conference 2015 and associated activities.	Increased awareness of and participation in the Local Aboriginal Network Conference in August 2015.	Achieved 14/08/15. Delivered a successful conference on time and on budget.
Develop a Port Macquarie-Hastings Council Aboriginal Employment Policy Plan to represent % of staff members to % of population.	Improve access and participation rates for Aboriginal people. Culturally richer workforce. Enhancement of Reconciliation process.	Not achieved. Included as an action of the Community Inclusion Plan 2019 – 2021. Council's Equal Employment Opportunity (EEO) Management Plan 2013 - 2017 outlines the specific

		actions Council will undertake to meet the objectives of the Equal Employment Opportunity (EEO) Policy, Council's responsibilities under the Local Government Act 1993, and associated EEO legislation. The target outlined in the EEO Management Plan 2013 - 2017 for Aboriginal and Torres Strait Islander staff is 3.3% as at December 2017 the actual percentage of Aboriginal and Torres Strait Islander staff employment at Council was 2.0%.

Key:

- Short term goals – by December 2014
- Medium term goals – by December 2015
- Long term goals – by December 2017 and beyond

GRANTS REGISTER (to 31 Jan 2019)

Date App. Submitted	Project Title	Grant Program	Organisation Offering the Grant	Grant amount applied for	Council's contribution	Amounted granted	Funding Type (Local, State, Federal)	Grant Successful?	Estimated preparation time (hours)
01-Jul-17	Local Land Services Weed Action Plan 2018-19	NSW Weeds Action Program 2015-2020	Department of Primary Industries	N/A	$0	$116,082	State	Yes	100
18-Oct-17	Shared path-Port Macquarie CBD to Wrights Road	RMS Active Transport	Roads & Maritime Services	$70,000	$0	$70,000	State	Yes	10
01-May-18	2018/2019 Bush Fire Risk Mitigation and Resilience Grant Program	Bush Fire Risk Mitigation and Resilience Grant Program	Rural Fire Service	$17,600	$0	$17,600	Federal/State	Yes	25
04-May-18	Hinterland Sports Field Lighting and Infrastructure	Stronger Country Communities Fund (Round 2)	NSW Department of Industry	$443,464	$0	$443,464	State	Yes	5
04-May-18	Hinterland Tennis Courts Upgrades	Stronger Country Communities Fund (Round 2)	NSW Department of Industry	$551,420	$0	$0	State	No	35
04-May-18	Camden Haven Sports Field Lighting & Infrastructure	Stronger Country Communities Fund (Round 2)	NSW Department of Industry	$446,750	$0	$446,750	State	Yes	5
04-May-18	Port Macquarie Sporting Field Upgrades	Stronger Country Communities Fund (Round 2)	NSW Department of Industry	$250,536	$0	$152,854	State	Yes*	14
04-May-18	Lake Cathie Master Plan Implementation	Stronger Country Communities Fund (Round 2)	NSW Department of Industry	$222,696	$0	$222,696	State	Yes	180
04-May-18	Telegraph Point Pedestrian Safety Upgrades	Stronger Country Communities Fund (Round 2)	NSW Department of Industry	$698,000	$0	$698,000	State	Yes	28
04-May-18	Kew Community Park	Stronger Country Communities Fund (Round 2)	NSW Department of Industry	$151,662	$0	$151,662	State	Yes	35
04-May-18	Town Beach Picnic Area	Stronger Country Communities Fund (Round 2)	NSW Department of Industry	$202,052	$0	$0	State	No	30
04-May-18	Port Macquarie-Hastings Community Halls Upgrade	Stronger Country Communities Fund (Round 2)	NSW Department of Industry	$99,875	$0	$0	State	No	5
04-May-18	Tacking Point Lighthouse Accessible Walkway	Stronger Country Communities Fund (Round 2)	NSW Department of Industry	$152,982	$0	$0	State	No	35
04-May-18	Wauchope Bicentenary Riverside Sculptural Trail	Stronger Country Communities Fund (Round 2)	NSW Department of Industry	$196,140	$0	$196,140	State	Yes	15
04-May-18	Coal Wharf Reserve Upgrades	Stronger Country Communities Fund (Round 2)	NSW Department of Industry	$50,470.00	$0	$50,470	State	Yes	15
04-May-18	Port Macquarie Tennis Club Lighting Upgrade	Stronger Country Communities Fund (Round 2)	NSW Department of Industry	$160,033	$0	$0	State	No	23
27-Jun-18	Westport Public School	RMS	Roads & Maritime Services	$3,336	$0	$3,336	State	Yes	30
01-Jul-18	Bus Shelter Replacement Program	Council Passenger Transport Infrastructure Grant Scheme	Transport for NSW	$126,500	$0	$126,500	State	Yes	35
01-Jul-18	Bold Street Pedestrian Crossing	Stronger Country Communities Fund (Round 1)	NSW Department of Industry	$347,000	$0	$347,000	State	Yes	100
01-Jul-18	Update technology and resources	Local Priority Grant 2018/19	NSW State Library	$45,029	$0	$45,029	State	Yes	72
04-Jul-18	Hastings-Macleay Koala Recovery Partnership (Mid North Coast Joint Organisation application)	OEH Saving Our Species ($450,000) + Koala Hospital ($150,000) + KSC ($60,000) over three years	Office of Environment & Heritage	N/A	$270,000	$660,000	State + Local + Other	Yes	70
23-Jul-18	New South Wales Bike Week	RMS	Roads & Maritime Services	$2,000	$0	$2,000	State	Yes	35
24-Jul-18	Youth Opportunities Program	FACS Youth Opportunities Program 2018/19	NSW Family and Children's Services	$39,500	$0	$0	State	No	14
14-Aug-18	Seniors Week Festival	NSW Seniors Festival	NSW Department of Premier and Cabinet	$3,000	$0	$0	State	No	5

20-Aug-18	Port Macquarie West Sewer Development Project	Growing Local Economies - Regional Growth Fund	NSW Department of Premier and Cabinet	$4,820,000	$0	TBA	State	TBA	16
31-Aug-18	Glasshouse Regional Gallery Program 2019	2019 Arts and Cultural Organisations Funding	Create NSW	$100,000	$0	$70,000	State	Yes	35
31-Aug-18	Stuart Park Regional Sporting Precinct Upgrade	Regional Sport Infrastructure Fund (Round 2)	NSW Office of Sport	$3,192,586	$800,000	$3,192,586	State	Yes	2
31-Aug-18	Fire hazard reduction program	Rural Fire Service Hazard Reduction Works (RFFF reimbursables)	NSW Rural Fire Service	$226,138	$0	$196,920	State	Yes	4
18-Sep-18	Library Van	Regional Culture Fund	Create NSW	$136,470	$0	$136,470	State	Yes	70
21-Sep-18	Glasshouse Studio Performance Space Seating Upgrade	2018 Medium Scale Cultural Fund - Infrastructure Round 2	Create NSW	$127,828	$19,179	$127,828	State	Yes	35
03-Oct-18	Road blackspot projects (x7)	Safer Roads Program	Roads & Maritime Services	$3,000,000	Varies	TBA	Federal/State	TBA	5
12-Oct-18	Port Macquarie Maritime Facility (Koonoonbung Fisherman's Wharf for Crown Lands)	Regional Communities Development Program	Department of Premier & Cabinet	$1,800,000	$0	$1,800,000	State	Yes	5
15-Oct-18	Bril Bril Road Upgrade and Sealing	Fixing Country Roads	Infrastructure NSW	$8,607,000	$200,000	$0	State	No	5
15-Nov-18	Young Leader's Program for Port Macquarie	Building Better Regions Fund	Dept of Industry Innovation & Science	$25,000	$25,000	TBA	Federal	TBA	5
15-Nov-18	Cultural Economy Plan for Port Macquarie-Hastings	Building Better Regions Fund	Dept of Industry Innovation & Science	$37,500	$37,500	TBA	Federal	TBA	5
15-Nov-18	Kew Town Centre Upgrade	Building Better Regions Fund	Dept of Industry Innovation & Science	$800,000	$800,000	TBA	Federal	TBA	5
04-Dec-18	Scoping Study for Port Macquarie Water Treatment Plant	Safe and Secure Water Program	Department of Industry – Water	$57,000	$228,000	TBA	State	TBA	5
14-Dec-18	Camden Haven Shared Path; Oxley Highway Shared Path (design); Wauchope CBD.	RMS Active Transport	Roads & Maritime Services	$1,808,000	$600,00	TBA	State	TBA	5
21-Dec-18	Play and Stay Town Beach playground renewal	Play and Stay NSW grant fund	Dept of Planning & Environment	$200,000	$415,000	TBA	State	TBA	5
21-Dec-18	Play and Stay Blair Street playground upgrade	Play and Stay NSW grant fund	Dept of Planning & Environment	$50,000	$85,000	TBA	State	TBA	5
13-Jan-19	ArtWalk - Creative Festival	Destination NSW	Destination NSW	$20,000	$26,000	TBA	State	TBA	5
Recurring Grant	Flood Mitigation Structures - Maintenance Grant	Floodplain Maintenance Program	Office Environment & Heritage	$9,700	$0	$9,700	State	Yes	5
				$29,297,267	**$2,905,679**	**$9,283,087**			**1143**

AGENDA **TOWN CENTRE MASTER PLAN SUB-COMMITTEE**
29/11/2018

Item: **06**

Subject: **TOWN CENTRE MASTER PLAN PRIORITY PROJECTS - DRAFT OPERATIONAL PLAN 2019/20**

Presented by: Development and Environment, Melissa Watkins

RECOMMENDATION

That the Town Centre Master Plan Sub-Committee identify priority projects for inclusion in the 2019/20 Operational Plan.

Discussion

The attachments to this report were provided in December 2017 to inform members of the range of identified projects relating to Port Macquarie Town Centre.

These reports are again provided to the Town Centre Master Plan Sub-Committee to inform members of the range of yet to be completed works that may be prioritised for delivery during the 2019/20 financial year.

Attachments

1. Town Centre Master Plan Strategic Council Project Planning
2. Town Centre Master Plan - Proposed Five Year Project Plan

PMHC - Town Centre Masterplan Sub-Committee
STRATEGIC COUNCIL PROJECT PLANNING

Updated
11.12.2017

PLAN REF. Dwg. No. SPP1	TCMP Review Implementation Matrix (2013) Reference	PROJECT	PROJECT STATUS	IMPLEMENTATION TIMELINES Financial year	ESTIMATED COST	TCMP Funded	OTHER Funding
COMPLETED							
	6.4, 6.5, 6.6, 8.5	**Glasshouse Forecourt Activation**	Complete	2015-2016			
	3.7	**William Street pedestrian Bridge**	Complete	2015	$ 1,200,000.00	$ 1,200,000.00	
		Clarence / Murray Street intersection	Complete	2016	$ 2,000,000.00	$ 2,000,000.00	
		Short Street Planting	Complete	2016	$ 25,000.00	$ 25,000.00	
4A	6.1	**Mid-block crossings Horton Street**	Northern mid-block crossing needs improvement.	2015	$ 20,500.00	$ 20,500.00	
	4.1, 4.2	**Gordon Street** - Horton Street to Lake Road	Complete	Aug-17			
	2.1, 2,2, 2.3, 2.4, 8.4	**Town Green East**	BBQ facilities and picnic settings not installed.	Oct-17	$ 1,050,000.00	$ 1,050,000.00	
	6.9	**Town Square**	Complete	Nov-17	$ 3,500,000.00	$ 3,500,000.00	
					$ 7,795,500.00	$ 7,795,500.00	

2017-2018						TCMP Funded	OTHER Funding
1B	3.2, 4.6, 3.9	**Kooloonbung Creek Walkway** Stage 1 Gordon to Hayward Streets.	Detail design documentation reviewed and changes being made by King and Campbell.	April-June 2018	$ 450,000.00	$ 300,000.00	$ 150,000.00
1D	3.3, 3.8	**Fishermen's Wharf Walkway** William Street to Fishermen's Wharf Boardwalk.	Concept Plan completed by Council in April 2016. Detail Design submitted by DPI Lands for boardwalk. Council to review boardwalk plans and request changes and additions.	Boardwalk April 2018	$ 2,800,000.00		$ 2,800,000.00
1D, 1F, 1G, 1H	3.3, 3.8	**Foreshore Walkway** including Pilots Boatshed	Detailed Design. Concept Design Completed.	June 2018	$ 100,000.00	$ 100,000.00	
2B	6.2, 7.1, 7.2	**Wayfinding Signage** Throughout Town Centre and connecting Coastal Walkway	Consultant preparing wayfinding signage plan for Port Macquarie Town Centre and the Coastal Walk. To be presented to a TCMP meeting in early 2018.	June 2018	$ 100,000.00		$ 100,000.00
5G		**Outdoor Dining Parklets**	EOI process endorsed in principal at the September meeting.	Early 2018	$ 30,000.00		$ 30,000.00
7B	6.1	**Screen Fencing/Hoarding** Around William Street 'Hole in the Ground'	Fencing agreed at October meeting. To be implemented.	Jan 2018	$ 18,000.00		$ 18,000.00
3B	6.8	**Horton Street Understorey Replanting**	Report presented to September meeting.Replanting strategy adopted including trial for treating beds choked with tree roots. Detailed planting design and trials yet to be undertaken to determine costs.	Jan-Feb 2018	$ -		
3C		**William Street Tree and Understorey replanting** Short to Hay Streets	Report presented to August meeting. Resolution was for Short to Hay Street to be adopted for priority implementation. Detailed design yet to be competed.	Detailed Design June 2018	$ -		
4A	6.1	**Safe pedestrian crossings** across Hayward and North Horton Streets	Per Pedestrian Access Study. Detailed design to be completed.	Detailed Design June 2018	$ -		
1A	1.1, 1.3, 4.5	**Pedestrian Underpass** Gordon Street Bridge	Boardwalk – footpath connection agreed in principal by the TCMP Sub-Committee. Next step is to develop concept design for approval.	Concept March 2018	$ -		
5D	6.12	**Clarence Street Verge** between Murray and Munster Streets	Footpath repairs to make safe. Will be done by developer. Long term streetscape following development.	Early 2018			Developer
7C	6.1	**Short Street Plaza site** following demolition	Undulating lawn and trees in bags in mounding with sign stating that this is a private development site. DA to be conditioned.	June 2018			Developer
TOTAL					**$ 3,498,000.00**	$ 400,000.00	$ 3,098,000.00

2018-2019						TCMP Funded	OTHER Funding
3A	6.7	**Clarence Street Tree and Understorey replanting.**	Concept approved for tree and understorey upgrade. Detailed design to be presented in the February 2018 meeting.	July 2018	$ 500,000.00	$ 500,000.00	
2A	6.2	**Banner Poles**	Banner pole strategy plans were endorsed for implementation at the July meeting. Tender documentation underway.	Nov 2018	$ 250,000.00	$ 250,000.00	
1E		**Foreshore Landscaping**	General embellishment	July 2018	$ 200,000.00	$ 200,000.00	
1A	1.1, 1.3, 4.5	**Pedestrian Underpass** Gordon Street Bridge	Boardwalk – footpath connection agreed in principal by the TCMP Sub-Committee. Next step is to develop concept design for approval.	Concept March 2018 Implementation June 2018	$ 80,000.00	$ 80,000.00	
3C		**William Street Tree and Understorey** Short to Hay	Detailed design 17/18	Aug-Sept 2018	$ 50,000.00	$ 50,000.00	
2C	6.3	**Paver Banding Replacement**	Refresh and Reboot. The existing brick banding is high maintenance and dated. Consider and present contemporary banding replacement options to withstand vehicular street sweeper.	Trial options 2018	$ -		

PLAN REF. Dwg. No. SPP1	TCMP Review Implementation Matrix (2013) Reference	PROJECT	PROJECT STATUS	IMPLEMENTATION TIMELINES Financial year	ESTIMATED COST	TCMP Funded	OTHER Funding
5B		**William and Short Streets Intersection** Pedestrian crossings	Pedestrians taking shortcuts away from designated crossings.	June 2019	$ 40,000.00		$ 40,000.00
4G		**Footpath Hay Street** Hayward to Gordon Streets	Roadway upgraded but pathway not included. North end frontage of ex-fire station development site.	June 2019	$ 30,000.00		$ 30,000.00
3E	4.3	**Planting to Roundabout** Gordon & Hollingworth St	Roundabout is bare. It is part of the entryway to the Town Centre.	July 2018	$ 10,000.00		$ 10,000.00
7A	6.1	**Automated Public Amenities** Short Street Plaza Car Park.	Concept plans completed. Grant application lodged 18 October 2017. On hold until grant outcomes are known.	Outcome of grant application expected December 2017	$ 260,000.00		$ 260,000.00
TOTAL						$ 1,080,000.00	$ 340,000.00

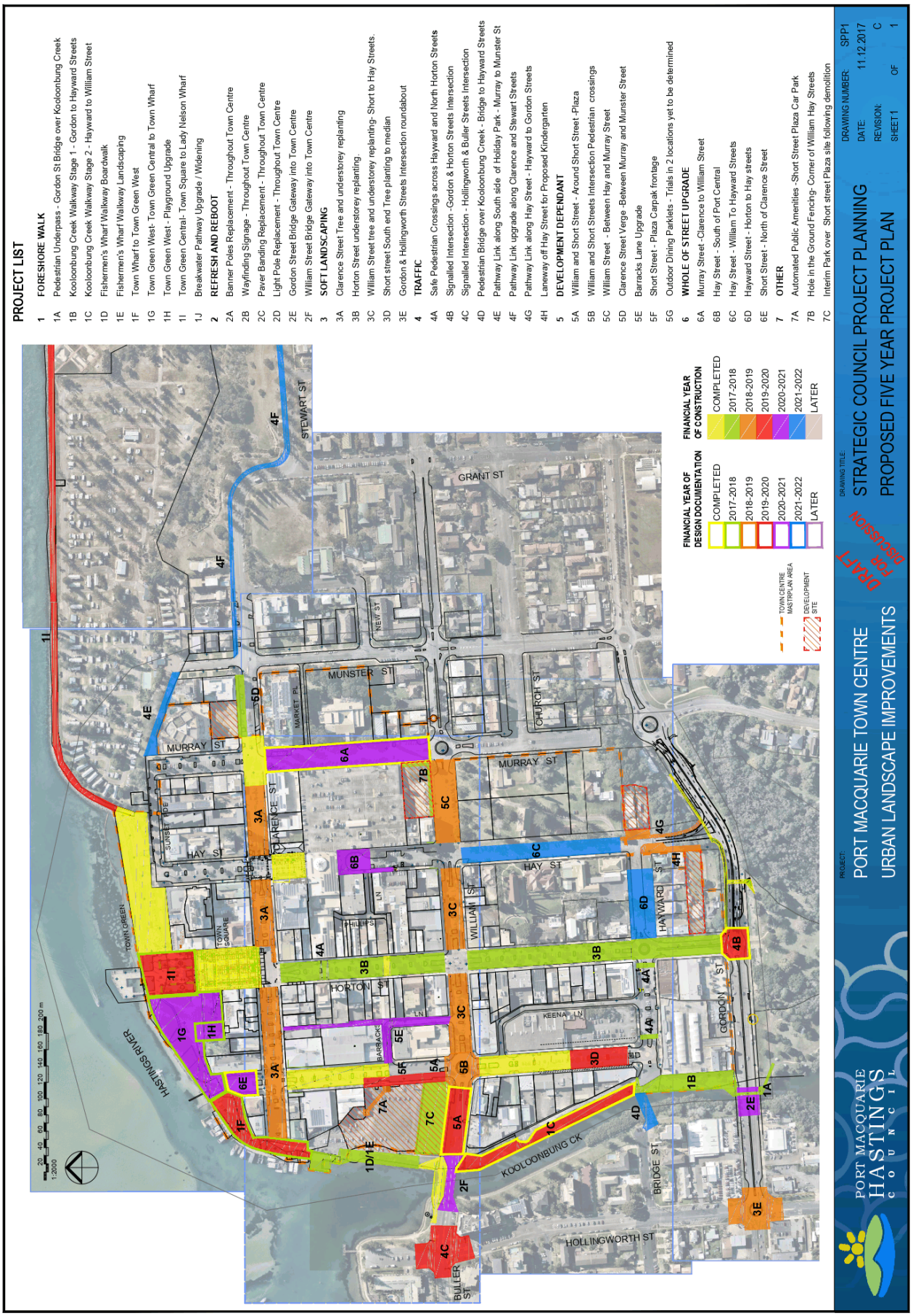
2019-2020						TCMP Funded	OTHER Funding
1C	3.1, 3.4	**Kooloonbung Creek Walkway Stage 2.** Hayward to William Street	Detail design documentation completed by King and Campbell. On hold until adjacent vacant sites are developed.	On hold	$ 500,000.00	$ 500,000.00	
5A	6.1, 6.11	**William & Short Streets** Plaza frontage	Detail design documentation completed by King and Campbell. On hold until adjacent vacant sites are developed.	On hold	$ 500,000.00	$ 250,000.00	$ 250,000.00
1I	2.3	**Town Green Central Town** Square to Lady Nelson Wharf.	Concept plan completed. Detailed design 17/18	June 2020	$ 1,210,000.00	$ 600,000.00	$ 610,000.00
1F	6.13	**Town Wharf** Between Fishermen's Wharf & Town Green	Concept plan completed. Detail design to be completed in 2018-2019.	Feb-May 2019	$ 1,500,000.00		$ 1,500,000.00
2C	6.3	**Paver Banding Replacement.**	Refresh and Reboot. The existing brick banding is high maintenance and dated. Consider and present contemporary banding replacement options to withstand vehicular street sweeper.	Trial options 2018 Implementation 19/20	$ 200,000.00	$ 200,000.00	
2D	6.3	**Light Pole Replacement** Throughout Town Centre	Pole and luminaire selection. Lighting Design to be done	June 2020	$ -		$ -
4B	4.3 ,7.6	**Signalled Intersection** Gordon & Horton St Intersection	Design underway 17/18	Detailed Design June 2018	$ 1,500,000.00		$ 1,500,000.00
4C		**Signalled Intersection** Buller & Hollingworth Streets	Design underway 17/18	June 2020	$ 1,500,000.00		$ 1,500,000.00
1J	5.1, 5.3, 7.10	**Breakwall Pathway Upgrade / Widening.**	Concept design developed. Construction by DPI Crown Lands	June 2020	$ -		$ -
5F	6.1, 6.11	**Short Street** Plaza Car park frontage.	On hold until adjacent vacant sites are developed.	On hold	$ 200,000.00	$ 100,000.00	$ 100,000.00
5C	6.13, 6.1	**William Street** Between Hay and Murray Streets	On hold until vacant 'Hole in The Ground' site is developed.	On hold	$ 500,000.00	$ 250,000.00	$ 250,000.00
3D		**Short Street** Southern End to Hayward Street. Tree planting to median.	Flooding issues may need to be resolved first although streetscape could be installed for short term improvement.	Dec 2019	$ 50,000.00	$ 50,000.00	
TOTAL					$ 7,660,000.00	$ 1,950,000.00	$ 5,710,000.00

2020-2021						TCMP	OTHER
1G	2.6, 2.7, 6.14	**Town Green West** Town Green Central to Cruise Terminal.	Detail design to be completed in 2018-2019. Probable earlier construction dependant on funding.		$ 1,230,000.00	$ 600,000.00	$ 630,000.00
1H		**Town Green West** Playground Upgrade	Detail design to be completed in 2018-2019.		$ 300,000.00		$ 300,000.00
6E	2.8	**Short Street North** North of Clarence Street	Detail Design completed. Pedestrian link to Town Green West.	To follow construction of Town Green West	$ 750,000.00	$ 750,000.00	
6A		**Murray Street** Clarence to William Street	Detail Design completed. Low priority, low use area. Courthouse and some retail.		$ 750,000.00	$ 350,000.00	$ 400,000.00
5E		**Barracks Lane Upgrade**	Drainage issues to be resolved. Concept plan for Streetscape to be integrated with drainage works. Including private lane connection.		$ -		
6B		**Hay Street Plaza** South of Port Central	A redesign has not yet been initiated by Council.		$ 200,000.00	$ 200,000.00	
2E	7.4	**Gordon Street Bridge** Gateway into Town Centre	This bridge seems like just a continuation of a roadway. The river crossing into town centre is inconspicuous. Including distinct bridge pavement, lighting and signage.		$ 100,000.00	$ 100,000.00	
2F	7.3	**William Street Vehicular Bridge** Gateway into Town Centre	This bridge has very little visual interest and appeal. Concept plan including distinct bridge pavement, lighting and signage.		$ 100,000.00	$ 100,000.00	
					$ 3,430,000.00	$ 2,100,000.00	$ 1,330,000.00

2021-2022						TCMP	OTHER
4D	1.2	**Pedestrian Bridge over Kooloonbung Creek** Form Bridge to Hayward Streets	Consider probable bridge when designing pathways along the Creek corridor. This is a large investment. A feasibility study should be completed first.	William Street bridge cost $1.2M)	$ 1,000,500.00	$ 1,500,000.00	
6C		**Hay Street Streetscape** William to	Full Streetscape design required,		$ 1,000,000.00	$ 500,000.00	$ 500,000.00

PLAN REF. Dwg. No. SPP1	TCMP Review Implementation Matrix (2013) Reference	PROJECT	PROJECT STATUS	IMPLEMENTATION TIMELINES Financial year	ESTIMATED COST	TCMP Funded	OTHER Funding
		Hayward	including retaining walls, pathways and unsuitable tree replacement. To be coordinated with proposed roadway resurfacing & kerbing.				
4E	1.1, 5.2, 7.8	**Pathway Link along Holiday Park South** Between Munster and Murray Streets	Consultation with holiday park operators and Crown Lands.		$ 300,000.00	$ 300,000.00	
4F	1.1, 1.4, 5.7, 5.8, 7.8	**Clarence and Stewart Streets Pathway Link Upgrade**	Consider widening and alignment. *Not part of Town Centre but an important approach corridor?*		$ 300,000.00	$ 150,000.00	$ 150,000.00
6D	1.1	**Hayward Street** Horton to Hay Street	Earmarked as requiring roadway upgrade. Largely residential, some commercial frontage near Horton Street. Low key pathway link and street tree planting.		$ 750,000.00		$ 750,000.00
					$ 3,350,500.00	$ 2,450,000.00	$ 1,400,000.00

LATER						TCMP	OTHER


PROJECT LIST
1 FORESHORE WALK
1A Pedestrian Underpass - Gordon St Bridge over Kooloonbung Creek
1B Kooloonbung Creek Walkway Stage 1 - Gordon to Hayward Streets
1C Kooloonbung Creek Walkway Stage 2 - Hayward to William Street
1D Fishermen's Wharf Walkway Boardwalk
1E Fishermen's Wharf Walkway Landscaping
1F Town Wharf to Town Green West
1G Town Green West- Town Green Central to Town Wharf
1H Town Green West - Playground Upgrade
1I Town Green Central- Town Square to Lady Nelson Wharf
1J Breakwater Pathway Upgrade / Widening
2 REFRESH AND REBOOT
2A Banner Poles Replacement - Throughout Town Centre
2B Wayfinding Signage - Throughout Town Centre
2C Paver Banding Replacement - Throughout Town Centre
2D Light Pole Replacement - Throughout Town Centre
2E Gordon Street Bridge Gateway into Town Centre
2F William Street Bridge Gateway into Town Centre
3 SOFT LANDSCAPING
3A Clarence Street Tree and understorey replanting
3B Horton Street understorey replanting.
3C William Street tree and understorey replanting- Short to Hay Streets.
3D Short street South end Tree planting to median
3E Gordon & Hollingworth Streets Intersection roundabout
4 TRAFFIC
4A Safe Pedestrian Crossings across Hayward and North Horton Streets
4B Signalled Intersection -Gordon & Horton Streets Intersection
4C Signalled Intersection - Hollingworth & Buller Streets Intersection
4D Pedestrian Bridge over Kooloonbung Creek - Bridge to Hayward Streets
4E Pathway Link along South side of Holiday Park - Murray to Munster St
4F Pathway Link upgrade along Clarence and Stewart Streets
4G Pathway Link along Hay Street - Hayward to Gordon Streets
4H Laneway off Hay Street for Proposed Kindergarten
5 DEVELOPMENT DEPENDANT
5A William and Short Street - Around Short Street -Plaza
5B William and Short Streets Intersection Pedestrian crossings
5C William Street - Between Hay and Murray Street
5D Clarence Street Verge -Between Murray and Munster Street
5E Barracks Lane Upgrade
5F Short Street - Plaza Carpark frontage
5G Outdoor Dining Parklets - Trials in 2 locations yet to be determined
6 WHOLE OF STREET UPGRADE
6A Murray Street -Clarence to William Street
6B Hay Street - South of Port Central
6C Hay Street - William To Hayward Streets
6D Hayward Street - Horton to Hay streets
6E Short Street - North of Clarence Street
7 OTHER
7A Automated Public Amenities -Short Street Plaza Car Park
7B Hole in the Ground Fencing- Corner of William Hay Streets
7C Interim Park over Short street Plaza site following demolition
FINANCIAL YEAR OF DESIGN DOCUMENTATION
COMPLETED
2017-2018
2018-2019
2019-2020
2020-2021
2021-2022
LATER
FINANCIAL YEAR OF CONSTRUCTION
COMPLETED
2017-2018
2018-2019
2019-2020
2020-2021
2021-2022
LATER
TOWN CENTRE MASTRPLAN AREA
DEVELOPMENT SITE
DRAFT FOR DISCUSSION
PROJECT:
PORT MACQUARIE TOWN CENTRE
URBAN LANDSCAPE IMPROVEMENTS
DRAWING TITLE:
STRATEGIC COUNCIL PROJECT PLANNING
PROPOSED FIVE YEAR PROJECT PLAN
DRAWING NUMBER: SPP1
DATE: 11.12.2017
REVISION: C
SHEET 1 OF 1
PORT MACQUARIE HASTINGS COUNCIL
HASTINGS RIVER
TOWN GREEN
TOWN SQUARE
MURRAY ST
HAY ST
CLARENCE ST
MUNSTER ST
GRANT ST
STEWART ST
MARKET PL
NEW ST
CHURCH ST
WILLIAM ST
HAYWARD ST
HORTON ST
PHILLIPS LN
BARRACKS LN
KEENA LN
GORDON ST
BRIDGE ST
KOOLOONBUNG CK
HOLLINGWORTH ST
BULLER ST
1:2000
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4 Your Natural and Built Environment

20/02/2019

What we are trying to achieve

A connected, sustainable, accessible community and environment that is protected now and into the future.

What the result will be

We will have:

- Effective management and maintenance of essential water, waste and sewer infrastructure
- A community that is prepared for natural events and climate change
- Sustainable and environmentally sensitive development outcomes that consider the impact on the natural environment
- Accessible transport network for our communities
- Infrastructure provision and maintenance that meets community expectations and needs
- Well planned communities that are linked to encourage and manage growth
- Accessible and protected waterways, foreshores, beaches and bushlands
- An environment that is protected and conserved for future generations
- Renewable energy options that are understood and accessible by the community

How we will get there

4.1 Provide (appropriate) infrastructure and services including water cycle management, waste management, and sewer management
4.2 Aim to minimise the impact of natural events and climate change, for example, floods, bushfires and coastal erosion
4.3 Facilitate development that is compatible with the natural and built environment
4.4 Plan for integrated transport systems that help people get around and link our communities
4.5 Plan for integrated and connected communities across the Port Macquarie-Hastings area
4.6 Restore and protect natural areas
4.7 Provide leadership in the development of renewable energy opportunities
4.8 Increase awareness of issues affecting our environment, including the preservation of flora and fauna

PORT MACQUARIE HASTINGS COUNCIL

Port Macquarie-Hastings Council
PO Box 84
Port Macquarie
NSW Australia 2444
DX 7415
e council@pmhc.nsw.gov.au
ABN 11 236 901 601

PORT MACQUARIE HASTINGS COUNCIL

28 November 2018

Therapeutic Goods Administration
PO Box 100
WODEN ACT 2606

Email: info@tga.gov.au

To Whom It May Concern,

Port Macquarie-Hastings Council (PMHC) is a NSW water authority that fluoridates its reticulated drinking water supply, as directed by the NSW Health.

There continues to be a level of community objection to the fluoridation of our reticulated drinking water supply and in preparation for a report to be tabled at the February 2019 Council meeting, I am interested to understand what the legal basis of the Therapeutic Goods Administration (TGA's) position is (as stated on your web site) that fluoridated drinking water "is not therapeutic goods within the definition of that term in the Therapeutic Goods Act 1989."

Firstly, could you please clarify whether or not your position refers to 'fluoridated reticulated drinking water', which is what PMHC supplies?

If your position statement does refer to fluoridated reticulated water, in the interests of clarity, could you respond by identifying the reason or reasons for the TGA declaring fluoridated reticulated drinking water not to be 'therapeutic goods' according to Section 3(1) paragraphs (c) - (h) in the definition of that term found in the Therapeutic Goods Act 1989.

Your prompt response to the above question would be appreciated and if you would like to discuss this further, I can be contacted at craig.swift-mcnair@pmhc.nsw.gov.au or on 02 6581 8020.

I look forward to receiving your response.

Yours Sincerely

Craig Swift-McNair
General Manager

PORT MACQUARIE OFFICE
17 Burrawan Street, Port Macquarie NSW 2444
WAUCHOPE OFFICE
49 High Street, Wauchope NSW 2446
LAURIETON OFFICE
9 Laurie Street, Laurieton NSW 2443

Australian Government

Department of Health
Therapeutic Goods Administration

Craig Swift-McNair
General Manager
Port Macquarie-Hastings Council
PO Box 84
Port Macquarie
NSW 2444

By email: council@pmhc.nsw.gov.au

Our Reference: D18-11358877

Dear Mr Swift-McNair

Position of the Therapeutic Goods Administration on fluoridation of reticulated drinking water supply

I refer to your correspondence dated 28 November 2018 in relation to the legal basis upon which the Therapeutic Goods Administration (**TGA**) considers fluoridated drinking water not to be therapeutic goods within the meaning of the *Therapeutic Goods Act 1989*.

Specifically, you have enquired whether the TGA's position as stated on our website refers to fluoridated reticulated drinking water. I understand that you have requested this information for the preparation of a report to be tabled at a meeting of the Port Macquarie-Hastings Council in February 2019.

I confirm that the TGA's position as stated on our website refers to fluoridated reticulated drinking water. I also confirm that the TGA considers fluoridated reticulated drinking water not to be therapeutic goods within the meaning of the Act. The TGA will consider making this position clear in an instrument under section 7AA of the Act.

Yours sincerely

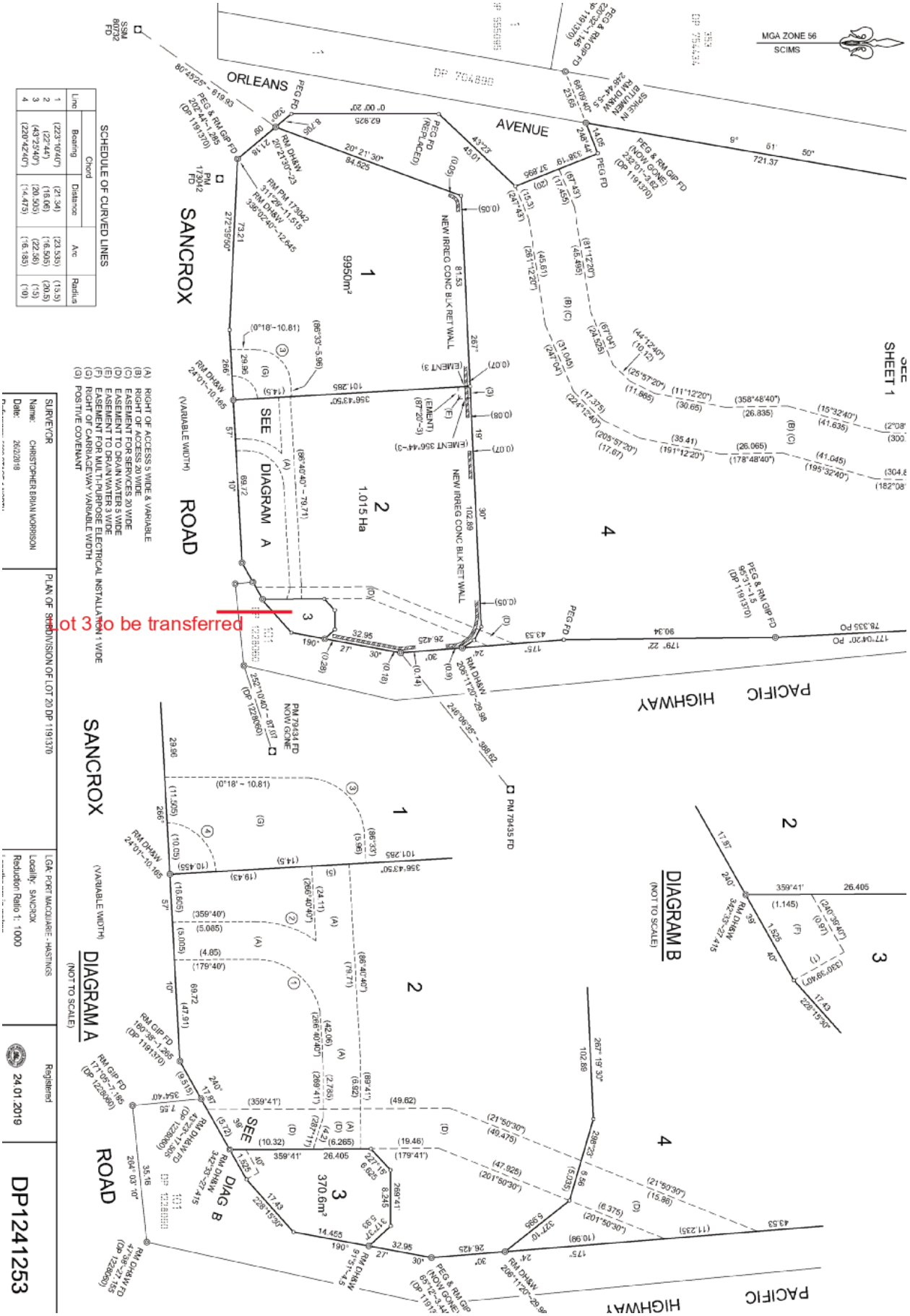
Dr Tony Gill
Principal Medical Adviser
Medicines Regulation Division
Department of Health

21 December 2018

Copy to Dr Kerry Chant PSM, Chief Health Officer and Deputy Secretary, Population and Public Health, NSW Ministry of Health

PO Box 100 Woden ACT 2606 ABN 40 939 406 804
Phone: 02 6232 8444 Fax: 02 6203 1605 Email: info@tga.gov.au
https://www.tga.gov.au

TGA Health Safety Regulation


MGA ZONE 56
SCIMS
ORLEANS AVENUE
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SCHEDULE OF CURVED LINES
(A) RIGHT OF ACCESS 5 WIDE & VARIABLE
(B) RIGHT OF ACCESS 20 WIDE
(C) EASEMENT FOR SERVICES 20 WIDE
(D) EASEMENT TO DRAIN WATER 5 WIDE
(E) EASEMENT TO DRAIN WATER 3 WIDE
(F) EASEMENT FOR MULTI-PURPOSE ELECTRICAL INSTALLATION 1 WIDE
(G) RIGHT OF CARRIAGEWAY VARIABLE WIDTH
(G) POSITIVE COVENANT
SURVEYOR
Name: CHRISTOPHER BRIAN MORRISON
Date: 26/2/2019
PLAN OF SUBDIVISION OF LOT 20 DP 1191370
LGA: PORT MACQUARIE - HASTINGS
Locality: SANCROX
Reduction Ratio 1: 1000
Registered
24.01.2019
DP1241253

Planning and Providing Our Infrastructure

Item: 13.04

Subject: ROAD NETWORK PLANNING

Presented by: Infrastructure & Asset Management, Jeffery Sharp

Alignment with Delivery Program

5.1.1 Plan, investigate, design and construct road and transport assets which include pedestrian, cyclist and vehicular needs.

RECOMMENDATION

That Council:

1. **Endorse the investigation and planning for new road links and upgrades within the Local Government Area including:**
   - **(a) new North-South and East-West links**
   - **(b) additional links to Port Macquarie Regional Airport**
   - **(c) new link between Central Road and Acacia Avenue**
   - **(d) options for additional access to the southern section of the Lake Road Industrial area through to Kingfisher Drive/Wrights Road area.**
   - **(e) Upgrade of Lake Road to two lanes in each direction between the Oxley Highway and Ocean Drive.**
2. **Consider the proposed link road investigations in the preparation of the Urban Growth Management Strategy (UGMS) review and prior to commencing any investigations for the future rezoning of land that may be affected by future link roads.**
3. **Actively seek external funding for the preconstruction activities required for the upgrade of Lake Road and consider funding the preconstruction activities in the 2016 - 2017 budget.**

Executive Summary

A significant function of Council is to plan for the future needs of the region. Of particular concern is the need for long term planning of new roads or major road upgrades and the assurance that corridor locations are planned, protected and acquired where necessary.

Council has a strong focus on economic development in the area and providing infrastructure that will sustain business growth. This includes the operations of the Regional Airport and the potential to leverage this valuable asset following recent runway upgrades and new planning for an Airport Business park.

There are some significant issues relating to the existing road network and its ability to meet capacity demands of the current population and transport needs and this translates as an inability to cope with future growth without hindering economic growth or sustainability.

INFRASTRUCTURE

PORT MACQUARIE HASTINGS

Planning and Providing Our Infrastructure

The most significant of these is the constrained east-west road links which push all traffic through either Lake Road or the Oxley Highway.

Currently traffic generated in the eastern areas of Port Macquarie gains access to Ocean Drive at eight main intersections with Ocean Drive, being Gordon Street, Lake Road (east), Koala Street, Greenmeadows Drive (both north & south intersections), Dahlsford Dr/Crestwood Dr, Pacific Dr/Jonas Absalom Dr and Matthew Flinders Dr/Emerald Dr.

There is, as noted above, then only two roads to take all westward bound traffic, being the Oxley Highway and Lake Road (west).

Other major issues include better access to the airport and Hastings River Drive from the south, an alternate access for the industrial area south of Lake Road and potential connection of Acacia Avenue and Central Road.

These issues have all been discussed at length through the Roads & Infrastructure Portfolio meetings, with Councillors taking a significant lead in moving forward with the planning for our road network.

Discussion

One of the key strategic functions of Council is to adequately manage and plan for necessary changes in the road network. These changes are driven by a need to accommodate population growth as well as changes in land use and travel patterns. Constructing new roads or upgrading existing roads ensures that the efficiency and capacity of the network is maintained. This requires the identification and planning of new road corridors as well as increasing the corridors of existing roads.

The road network is heavily constrained for east-west movements, with all traffic travelling through the Lake Road / Oxley Highway Roundabout and funnelling through the Oxley Highway between Lake Road and the Pacific Highway. The only alternatives are Houston Mitchell Drive, some 14km to the south or Hastings River Drive which caters more for northern traffic movements and diverts traffic through the town. Hastings River Drive will lose its direct connection to the Pacific Highway once the current highway upgrades are completed. Currently all north-south traffic is funnelled through the Port Macquarie township, with significant volumes travelling over Clifton Drive which is a narrow local road. Furthermore the Airport is heavily constrained by the flooding and condition of Boundary Street and alternate access is required if growth in airport usage and potential business development is sought.

In light of the current situation, ongoing residential growth, increases in major traffic generators such as the base hospital and higher education facilties, changes in land use, and a desire to have a prosperous and sustainable economy, it is clear that there is an imperative to plan for new road corridors and existing network upgrades.

An increase in traffic crashes and negative driver behaviour can be readily related to increased congestion and delayed travel times, and can be tracked through regular data collection and analysis. However, the impact of traffic congestion on business productivity, sustainability and growth is often overlooked.

To better assess this issue, an Infrastructure Gap Analysis was commissioned by the Economic Development Steering Group (EDSG) and completed by PSA Consulting.

Planning and Providing Our Infrastructure

The report prepared by the consultant along with EDSG commentary was considered at the 19 November 2014 Ordinary Meeting of Council, where Council resolved as follows:

RESOLVED: Sargeant/Roberts

That Council:

1. Note the Port Macquarie-Hastings Infrastructure Gap Analysis report.
2. Note the views of Council's Economic Development Steering Group with regard to the key priorities and future actions stemming from this analysis.

CARRIED: 8/0
FOR: Besseling, Cusato, Griffiths, Hawkins, Intemann, Levido, Roberts and Sargeant
AGAINST: Nil

The EDSG, in considering the Infrastructure Gap Analysis Report, determined the following view point as contained in the Council report:

> *"To ensure long-term economic growth opportunities in the future, Council needs to identify and plan for infrastructure that will facilitate this growth. Without this infrastructure in place, our region's economic growth and prosperity may be stymied."*

The EDSG also identified five critical projects to assist in ensuring long term economic growth opportunities:

- Lake Road duplication [*between the Oxley Highway and Ocean Drive*]
- Hastings River Drive Duplication (between Park and Aston Street)
- A southern access road to the airport
- Boundary St Upgrade
- A southern ring road that would link Ocean Drive to John Oxley Drive

Staff have commenced design work on the duplication of Lake Road between the Oxley Highway and Toorak Court which will provide dual lanes through from Acacia Avenue to the Highway. Concepts for the upgrade of Lake Road to dual lanes have previously been developed; however, funding should be sought for the remaining design work including intersection upgrades and environmental approvals. A funding allocation for preconstruction activities for Lake Road between the Oxley Highway and Ocean Drive should be considered in the development of the 2016/17 Operational Plan.

The duplication of Hastings River Drive between Park and Aston Streets forms part of the current 2014/15 Operational Plan and Draft 2015/16 Operational Plan.

Currently, Council has allocated $150,000 to investigations for the North South Link road. However, to ensure the appropriate network is planned for, it is proposed that, as part of this project, corridors are also investigated for an east-west link (southern ring road) and alternate accesses for the Regional Airport.

This proposal will see three of the five priority projects identified by the EDSG investigated; being the southern access to the airport, Boundary Street upgrade and a southern ring road. A corridor plan incorporating these projects will allow Hastings

Planning and Providing Our Infrastructure

River Drive to be clearly connected to the Oxley Highway and John Oxley Drive, forming an orbital road around the Port Macquarie Township to provide better access to the broader network.

In addition to the above projects, the Roads and Infrastructure Portfolio has also identified the potential of a link between Acacia Avenue and Central Road. This link may provide some traffic relief to Lake Road and provide a better link in the long term. It may also assist traffic movements following the introduction of a central median in Lake Road in vicinity of the Acacia Avenue intersection.

The proposed investigations will provide valuable data for inclusion in the Area Wide Traffic Study that Council is undertaking. This will allow better analysis of these and other potential corridors and upgrades and their short, medium and long term effects on the road network.

By failing to plan for, and construct over time, the necessary new roads and upgrades, we will be left with an under capacity inefficient road network that will negatively impact upon the long term growth and economy of the area.

Options

Council has the option of accepting or amending the recommendations presented within this report, or rejecting the recommendations and determining an alternate resolution.

Community Engagement & Internal Consultation

Community engagement will not form part of these preliminary corridor investigations. Any form of community engagement will not be possible until there is clearer understanding of what may be feasible and more detailed investigation is then undertaken on identified routes.

Internal consultation has occurred with:

- Roads Portfolio
- Mayor & Councillors
- General Manager
- Director Infrastructure and Asset Management
- Group Manager Transport & Stormwater Network
- Group Manager Strategic land use Planning
- Transport & Traffic Engineer

Planning & Policy Implications

There are no planning or policy implications from undertaking the recommended investigations. However there may be implications resulting from the proposed investigations.

Financial & Economic Implications

Currently there is a $150,000 budget allocation in the 2014-15 Operation Plan for preconstruction activities for a North South Link Road, which can accommodate the additional corridor review and investigations for an East West Link and alternate access to the Regional Airport.

INFRASTRUCTURE

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There is also current funding for an Area Wide Traffic Study and model which will also be utilised in time to assess any proposed new linkages and road upgrades.

Currently there is no allocation to fund further design work on Lake Road. This can be considered by Council in future budgets as well as seeking external funding grants for the design works.

There is also a significant opportunity cost to the community as a whole if these investigations are not completed and the road network is not properly managed to ensure safe and efficient capacity is maintained.

Attachments

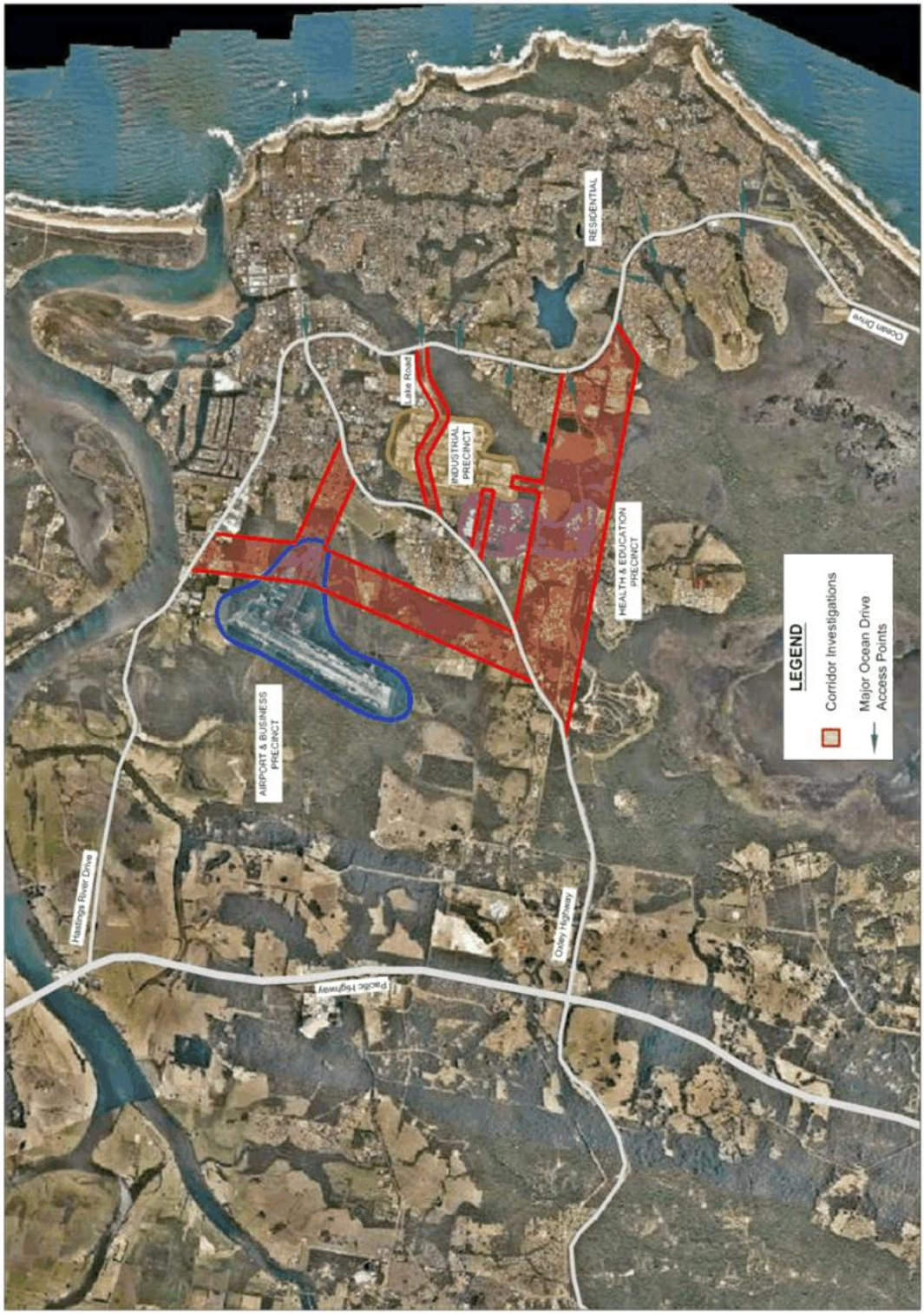
1View. Road Corridors for Investigation

INFRASTRUCTURE

PORT MACQUARIE HASTINGS

ATTACHMENT

ORDINARY COUNCIL
20/05/2015



13.04 ROAD NETWORK PLANNING

Mr Ross Cargill, representing Men at Work, addressed Council in support of the recommendation.

RESOLVED: Intemann/Sargeant

That Council:

1. Endorse the investigation and planning for new road links and upgrades within the Local Government Area including:
   (a) new North-South and East-West links
   (b) additional links to Port Macquarie Regional Airport
   (c) new link between Central Road and Acacia Avenue
   (d) options for additional access to the southern section of the Lake Road Industrial area through to Kingfisher Drive/Wrights Road area
   (e) upgrade of Lake Road to two lanes in each direction between the Oxley Highway and Ocean Drive.
2. Consider the proposed link road investigations in the preparation of the Urban Growth Management Strategy (UGMS) review and prior to commencing any investigations for the future rezoning of land that may be affected by future link roads.
3. Actively seek external funding for the preconstruction and construction activities required for the upgrade of Lake Road.
4 Consider funding the preconstruction activities in 2016 - 2017 budget if other funding is not forthcoming.

CARRIED: 8/0
FOR: Besseling, Cusato, Griffiths, Intemann, Levido, Roberts, Sargeant and Turner
AGAINST: Nil

09.01 STATUS OF OUTSTANDING REPORTS TO COUNCIL

RESOLVED: Levido/Intemann

That the information in the May 2015 Status of Outstanding Reports to Council be noted.

CARRIED: 8/0
FOR: Besseling, Cusato, Griffiths, Intemann, Levido, Roberts, Sargeant and Turner
AGAINST: Nil

09.02 DELEGATED AUTHORITIES - CERTIFICATE OF IDENTIFICATION ISSUED UNDER THE SWIMMING POOLS ACT 1992

RESOLVED: Sargeant/Cusato

That the seal of Council be affixed to the certificates of identification issued under the Swimming Pools Act 1992 for:

Port Macquarie-Hastings Council and Roads and Maritime Services

Port Macquarie - Hastings Local Government Area

Traffic Study

VOLUME 1 – Main Report

June 2018

WATER | ENERGY & RESOURCES | ENVIRONMENT | PROPERTY & BUILDINGS | TRANSPORTATION

This report: has been prepared by GHD for Port Macquarie-Hastings Council and Roads and Maritime Services and *may only be used and relied on by Port Macquarie-Hastings Council and Roads and Maritime Services for the purpose agreed between GHD and the Port Macquarie-Hastings Council and Roads and Maritime Services as set out in section 1.2 of this report.*

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The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

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Executive Summary

This report details the outcomes of the Port Macquarie-Hastings Local Government Area Traffic Study, completed by GHD for Port Macquarie-Hastings Council and Roads and Maritime Services. Objectives of the Traffic Study include:

- Evaluate road network performance for future years and identify a road hierarchy for future planning;
- Test a range of infrastructure improvements and develop an implementation strategy / timeframe for identified road network improvements; and
- Evaluate current road network performance including light and heavy vehicles, pedestrians, cyclists and on-road public transport.

The study has involved collection and analysis of various traffic data, reviewing population and land use forecasts, development of a traffic model for part of the study area, and considering the implications of future changes on the long-term operation of the road network.

Future Growth

The population of the Port Macquarie-Hastings Local Government Area is forecast to increase by some 20,000 people over the next 20 years, at a rate of 1.4% per annum. Some parts of the study area will not grow significantly from existing levels, while other areas are expected to experience substantial growth.

Residential development in the study area is focussed around the north-eastern locations surrounding the Port Macquarie CBD. Over half of all current dwellings are situated in this area.

Growth to 2036 will include over 10,000 additional dwellings, with one third located in the Thrumster and Innes Peninsula growth areas. Over 20% will be located in the Ocean Drive corridor between Lake Cathie and Kew. The remainder will be distributed across the study area, comprising infill development and new subdivisions. In terms of retail and office floor space, the Port Macquarie CBD is the dominant location, containing over 60% of the total retail and office floorspace in the study area, with forecast growth of over 50% by 2036. New commercial and retail centres would be developed at Thrumster and Lake Innes, supporting residential growth in these locations.

The largest areas of zoned industrial land are at Bago Road (Wauchope), Lake Road, Sancrox and Herons Creek, with over 380 hectares in these four locations combined. The major new release of industrial land will be at the Airport Precinct, increasing from 24 to 52 hectares.

Road Safety

Over the 5-year period 2012-2016, there was an average of over 300 crashes per year reported within the study area, including an average of 5 fatal crashes and 172 injury crashes per year. Half of the crashes, including 80% of the fatal crashes, occurred on 2-way undivided roads. Other common crash locations include T-junctions (17%), divided roads (13%), cross intersections (9%) and roundabouts (9%).

Traffic Conditions

Analysis of existing and predicted future traffic conditions in the study area has been based on a range of sources and techniques. For part of the study area, a mesoscopic traffic model has been developed, using the Aimsun modelling software package. A traffic model is a computer based mathematical model of real world traffic, enabling the analysis of an existing road network or theoretical network to estimate the performance of the network (e.g travel times, flow

volumes etc). The base model was developed, and then calibrated and validated, using various traffic data collected for this study. Future traffic volumes were generated using population and land use forecasts for the model area, provided by Council. The model covers the AM (7-10am) and PM (2-6pm) weekday peak periods. Future models have been developed for 2021, 2026 and 2036.

The road network within the study area covers a diverse range of road types, traffic activity and adjacent land use types. The primary arterial routes in the study area include the Pacific Highway, Oxley Highway, Hastings River Drive and Ocean Drive.

The study area road network generally operates well under existing conditions, and is expected to continue operating well in most situations as traffic demand grows over time. There are, however, some locations where capacity is constrained and future growth, particularly associated with expansion of the urban area, will result in poor performance during peak periods. There are also locations where upgrades may be justified on road safety grounds.

As traffic grows, the conflict between the needs of through traffic on major corridors, and local traffic seeking to access these corridors from adjacent areas, will increase.

Future Improvements

Four general approaches to road network planning have been identified, as potential responses to the analysis of existing conditions and the expected future needs of the study area:

- New road links, including for network connectivity, or bypass routes
- Corridor upgrades (including intersection modifications and road widening), for traffic efficiency and/or road user safety
- Localised works such as intersection upgrades, traffic calming, access restrictions / turn bans or other minor works
- Non-infrastructure approaches, such as demand management and land use planning initiatives

New road link projects such as the Outer Orbital Road, connecting Ocean Drive, Oxley Highway and Hastings River Drive, would remove through traffic from the inner Port Macquarie area, and allow easier access for local traffic.

Intersection upgrades along major corridors, such as from roundabout control to traffic signal control, improves the reliability for local access and through traffic, but potentially at the expense of increased travel times for through traffic (due to the operation of signals). In the long-term, however, such upgrades are expected to be necessary if the needs of both local traffic and through traffic are to be met.

In established urban areas, intersection upgrades, including from give-way control to roundabout control, will facilitate safer accessibility for local traffic, as well as acting to reduce traffic speeds in these locations.

There is a place, too, for non-infrastructure approaches, which seek to manage demand for private car travel across the study area, and to manage expectations of how the network could or should perform in the future. These non-infrastructure approaches to transport should be pursued alongside infrastructure improvements, in order to maximise the sustainability of the road network in the study area.

High priority recommendations include:

Timeframe	Treatment	Comment
Short term (approximately 2021)	Boundary Street / Hastings River Drive Upgrade (upgrade signals)	Upgrade of this intersection required to support development of the Airport Precinct light industrial area.
	Ocean Drive / Gordon Street / Hastings River Drive / Oxley Highway Intersection upgrade (consider turn bans and signal phasing changes)	Key intersection in the inner area, where 3 major corridors converge. Delays forecast in the future base case, but may be avoided if Outer Orbital Road is built. Airport Industrial Precinct a significant contributor to demand at this location, and staged or reduced development of this precinct could delay need for upgrades.
	Pacific Highway / Oxley Highway interchange upgrade (consider roundabout metering and/or additional approach and circulating lanes)	Continued traffic growth will increase pressure on this interchange, which may need upgrade to accommodate turning traffic and maintain safety. Current roundabout configuration prioritises NB right turn from Pacific Highway over Oxley Highway eastbound through movement, creating delays for the latter. Metering of the NB off-ramp approach, and/or the WB Oxley Highway approach, could be considered to create additional gaps for Oxley Highway eastbound traffic in peak periods.
	Gordon Street / Horton Street intersection upgrade (signalisation)	Busy roundabout on edge of CBD has high turning volumes. Signalisation would increase capacity, and improve safety for pedestrians.
	Pembrooke Road upgrade at railway bridge	Upgrade would resolve safety issue, and may improve access for higher vehicles (depending on solution).
Medium term (approximately 2026)	Outer Orbital Road (south) – Oxley Highway to Ocean Drive	Has a significant impact on travel patterns, and provides relief to Lake Road. Southern section a higher priority than the northern section (Oxley Highway to Hastings River Drive).
	John Oxley Drive corridor upgrade – The Ruins Way to Wrights Road	Upgrades required to accommodate traffic accessing from adjacent residential areas, where significant growth is forecast.
	Pacific Highway / Houston Mitchell Drive interchange upgrade (grade separation)	Required as increasing volumes on the highway make turns out of Houston Mitchell Drive harder. Grade separation likely to be the most effective treatment and give the best road safety outcome
	Buller Street / Hollingworth Street intersection upgrade (signals)	Buller Street / William Street is one of the two east-west connections to the CBD, resulting in consistent traffic which makes turns from Hollingworth Street difficult. Upgrade to signals would improve accessibility and safety.
	Kennedy Drive / Koala Street intersection upgrade (roundabout)	Key junction in centre of large urban area. Limited sight distances for some approaches. Upgrade to roundabout would improve safety and efficiency for turning traffic, and reduce speeds on Kennedy Drive
	Pacific Drive / Bangalay Drive intersection upgrade (roundabout)	Limited sight distances for some approaches. Upgrade to roundabout would improve safety and efficiency for turning traffic, and reduce speeds on Pacific Drive

Timeframe	Treatment	Comment
	John Oxley Drive / Thrumster Street intersection upgrade (roundabout)	Upgrade to roundabout would improve safety and efficiency for turning traffic (major development area) and reduce speeds on John Oxley Drive.
	Ocean Drive / Kew Road intersection upgrade (roundabout)	Major intersection and access point to Laurieton. Current priority disadvantages through traffic on Ocean Drive. Upgrade to roundabout would improve safety and efficiency for turning traffic and reduce speeds.
	Ocean Drive / Sirius Drive intersection upgrade (signalisation)	Main access to Lakewood town centre and growth area. Signals would provide for high turning traffic and pedestrian access across Ocean Drive.
Longer term (approximately 2036 or beyond)	Outer Orbital Road (north) – Oxley Highway to Hastings River Drive	Has a significant impact on travel patterns, and provides relief to Clifton Drive, and services the Airport Light Industrial precinct.
	Lake Road corridor upgrade – Oxley Highway to Ocean Drive	Upgrade would have limited benefit for through traffic, but improves access to and from adjacent areas. Not a long-term solution to Lake Road congestion, and needs to be considered in conjunction with the Outer Orbital Road.
	Hastings River Drive corridor upgrade – Boundary Street to Findlay Avenue	Ease of access onto Hastings River Drive is improved where intersections are upgraded. However due to changes in delays at these locations, traffic may divert to remaining roundabout intersections.
	Ocean Drive (north) corridor upgrade - Matthew Flinders Drive to Lake Road	Upgrade to signals at key intersections improves ease of access onto Ocean Drive, but impacts on travel times for through traffic. Some local traffic switches to remaining roundabout intersections to take advantage of right of way rules.
	William Street / Munster Street intersection upgrade (signals)	CDB periphery location. Upgrade to signals would improve safety and efficiency for turning traffic.
	William Street / Short Street intersection upgrade (signals)	Signalisation to improve capacity for CBD traffic, and also improve pedestrian safety and access
	Oxley Highway / Cameron Street intersection upgrade (signalisation)	Busy intersection in the Wauchope CBD, with high volumes of turning traffic. Traffic signals would improve traffic capacity, and provision for pedestrians.
	Ocean Drive / Abel Tasman Drive intersection upgrade (signals)	Signals would improve safety and efficiency for turning traffic, and access to adjacent subdivision.
	Ocean Drive / Lake Cathie Town Centre Access intersection upgrade (signals)	Required to service adjacent development

Timeframe	Treatment	Comment
Ongoing, with future acceleration	Land use densification	Major growth in population in the study area will occur in low-density residential subdivisions, which are difficult to service by public transport, and are not easily accessible by pedestrians and cyclists. Redirecting some growth into established urban areas is likely to reduce demand for private car trips, particularly where such growth is in locations close to jobs, schools and other services.

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Appendices

Appendix A Base Case Volume Plots

Appendix B Base Case Lane Density Plots

Appendix C Base Case Speed Plots

Appendix D Base Case Volume Profile Graphs

Appendix E Scenario Volume Comparison Plots

Appendix F Base Model Trip Generation and Attraction

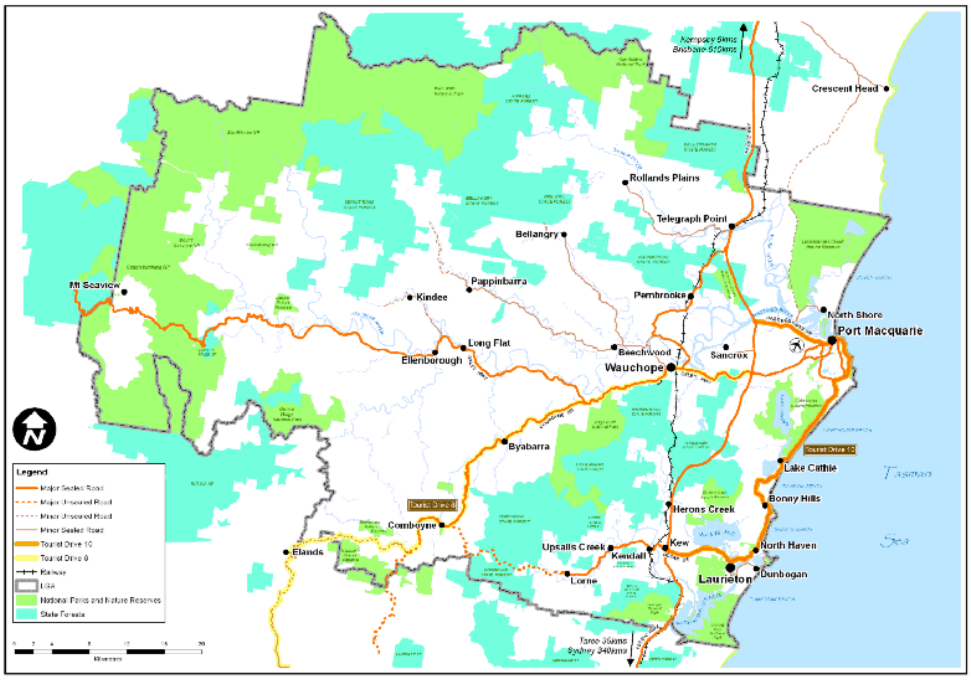
Appendix G Model – Land Use Alignment

Appendix H Model Zone Growth Rates

Appendix I Traffic Data Summary

1. Introduction

GHD Pty Ltd (GHD) was engaged by Port Macquarie-Hastings Council in conjunction with Roads and Maritime Services ('the Clients') to undertake a traffic study for the Port Macquarie-Hastings local government area. The study area comprises the entire local government area, as shown in Figure 1.1.



Source: Port Macquarie – Hastings Council

Figure 1.1 Port Macquarie-Hastings Local Government Area

1.1 Background

Port Macquarie-Hastings is a coastal area located on the mid north coast of New South Wales. It is home to approximately 80,000 people and includes the main centres of Port Macquarie, Camden Haven and Wauchope. The coastal city of Port Macquarie in the north east of the LGA is the largest township, which serves as a major tourist and regional centre. Camden Haven, to the south east of the LGA, is the second most populated area which includes the towns and suburbs of Dunbogan, Kendall, Kew, Laurieton, North Haven and West Haven. Wauchope is the third main township, serving as the inland regional centre.

The Pacific Highway and Oxley Highway provide access to the study area. The Pacific Highway is primarily a north-south road in the region and serves as a vital connection between Sydney to the south and Southern Queensland to the north.

1.2 Purpose of this Study

The purpose of this traffic study was to develop a road and traffic management strategy for the Port Macquarie-Hastings road network for the next 20 years by:

- Identifying existing and future constraints and issues with the transport network;
- Forecasting future travel demands; and
- Prioritising a range of infrastructure improvements to accommodate any current or forecast issues.

1.3 Project Objectives

Objectives of the Traffic Study include:

- Evaluate road network performance for future years and identify a road hierarchy for future planning;
- Test a range of infrastructure improvements and develop an implementation strategy / timeframe for identified road network improvements; and
- Evaluate current road network performance including light and heavy vehicles, pedestrians, cyclists and on-road public transport.

1.4 Scope

The following defines the Scope of Works for the traffic study:

- Undertake the traffic study on two geographical levels:
  - Main urban areas of Port Macquarie, Wauchope, Lake Cathie, Bonny Hills, Camden Haven and Kendall and key roads linking these areas; where a traffic model will be developed; and
  - A Desktop assessment of the remainder of the LGA, including major rural roads linking to Comboyne, Beechwood, Lorne, Pappinbarra, Rollands Plains etc.
- Undertake a traffic study that assists in creating and maintaining an integrated transport system that eases access between population centres and services;
- Undertake a traffic study that assists in ensuring that transport options are safe, functional and meet access needs across the LGA;
- Evaluate current road network performance based on existing transport demand and travel patterns, including a summary of existing constraints and issues;
- Evaluate the efficiency, performance and safety of the current transport system in relation to on-road public transport, walking and cycling;
- Forecast future travel demands, up to the year 2036, taking into consideration planned future developments, land release areas and committed major road projects;
- Evaluate road network performance for future years and identify a road hierarchy for future planning;
- Test a range of infrastructure improvements to accommodate existing and forecast future travel demands and develop an implementation strategy for identified road network improvements;
- Develop a traffic model that can be easily updated by Council and/or RMS in the future;
- Provide data that can be used as a key input into the revision of Council's Urban Growth Management Strategy and other relevant council strategies;

- Provide data that can be used as a key input into regional planning documents such as the NSW Long Term Transport Master Plan, the Mid North Coast Regional Strategy and other relevant State strategies;
- Provide data that can be used to develop or update new development contribution plans and voluntary planning agreements; and
- Consider within the study, interfaces with adjoining LGA's including Kempsey, Walcha and Greater Taree via the Pacific and Oxley Highways.

1.5 Glossary

The following terms are used throughout this report.

Term	Meaning
AADT	Annual Average Daily Traffic. The total volume of traffic using a section of road in a calendar year, divided by the number of days in that year.
Aimsun	Traffic modelling software used for the Port Macquarie-Hastings Traffic Model
AM Peak Hour	The busiest hour in the AM Peak period, nominally 8-9am on a weekday
AM Peak Period	7am-10am, as modelled
Base Case	Conditions without any changes to the existing road network
Level of Service (LOS)	A qualitative description of traffic conditions, which makes reference to quantifiable measures of performance. Scale is from A (free flow conditions) to F (congested conditions).
Model Area	The area covered by the Port Macquarie-Hastings Traffic Model
PM Peak Hour	The busiest hour in the PM Peak Period, nominally 3-4pm on a weekday
PM Peak Period	2pm-6pm, as modelled
Study Area	The Port Macquarie-Hastings Local Government Area
Travel Speed	The average speed achieved by vehicles on a particular road link
Travel Time	The time taken (on average) for a vehicle to travel between two locations on the network
VHT	Vehicle Hours Travelled
VKT	Vehicle Kilometres Travelled
Vehicles per hour	The number of vehicles using a road in a 60 minute period. Volumes are in one direction only, unless noted otherwise.

1.6 Methodology

The methodology adopted for this study is summarised in Figure 1.2. A key element of the study has been the development of a traffic model of much of the study area, which has considered existing traffic and land use patterns, and forecasts of future changes in population and land use, and the implications for traffic movement around the study area.

For other parts of the study area, particularly in rural areas, the model was not an appropriate assessment tool, and a separate evaluation has been undertaken.

The model and non-model assessment have been used to identify and assess a range of options, which has informed a Network Improvement Strategy for the study area.

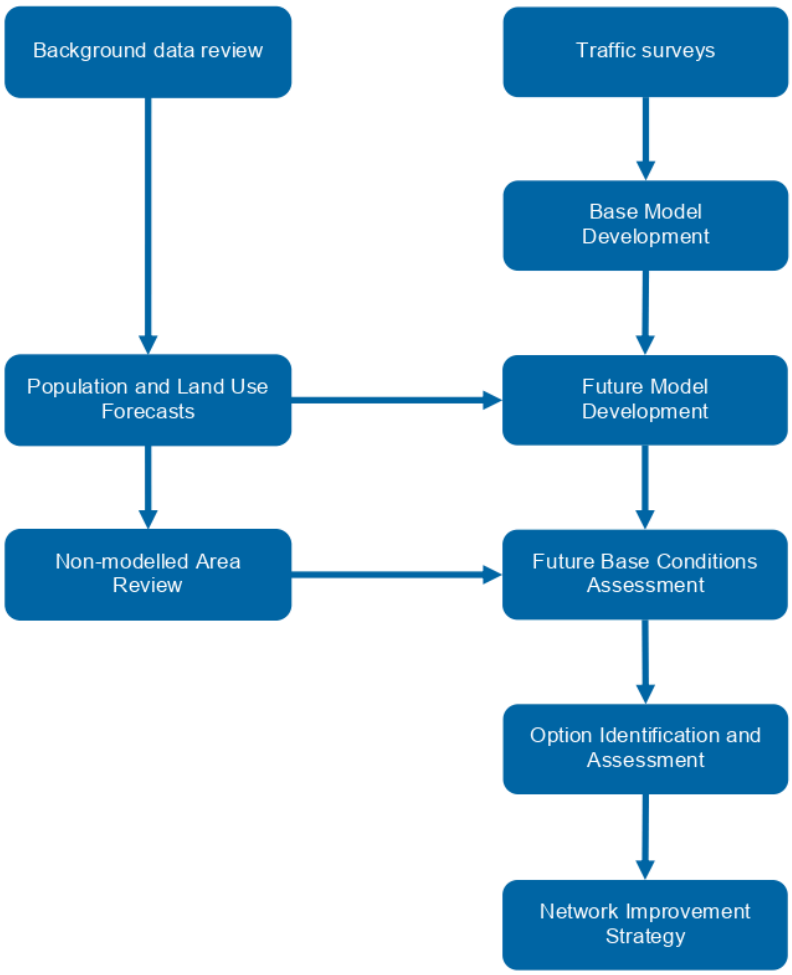


Figure 1.2 Study Methodology

1.7 Structure of this Report

The structure of this report is as follows:

- Section 1 provides an introduction to the study, including the study area and methodology
- Section 2 summarises key strategic and local planning documents from State Government and Council, as relevant to this study
- Section 3 describes the existing road network in the study area
- Section 4 introduces the traffic modelling that has been used to inform parts of the study
- Section 5 details the process used to generate the future models, reflecting expected changes in population and land use
- Section 6 reviews anticipated conditions in the study area with no changes to the road network
- Potential road network planning approaches to the anticipated future conditions are introduced in Section 7
- Section 8 details the results of traffic modelling for a range of scenarios that were identified for testing
- Section 9 evaluates the potential effects of the various actions on the safety and efficiency of the road network
- Section 10 documents a Road Network Improvement Strategy for the study area, including prioritisation of actions
- Section 11 summarises the study and provides a conclusion.

2. Background Review

The following section provides an overview of preceding reports and transport planning documents relevant to this traffic study. More detail on population and land use forecasts is provided in Section 5.1.

2.1 State Government Documents

2.1.1 NSW Long Term Transport Master Plan (TfNSW, 2012)

The Transport Master Plan is a transport strategy developed by Transport for New South Wales in consultation with the NSW community and transport industry. The Plan covers all of NSW and sets the framework for the NSW Government to deliver the transport system required to fill the growing needs of customers.

The purpose of the Plan is twofold:

- "…identifies the challenges that the transport system in NSW needs to address to support the States' economic and social performance over the next 20 years. It guides decision makers to prioritise actions which address the most pressing challenges."; and
- "… it identifies a planned and coordinated set of actions (reforms, service improvements and investments) to address those challenges. It provides a map of future service and infrastructure developments which future decisions will be required to support, and against which proposed investments can be evaluated."

While the report has a Sydney Metro focus, it does cover improvements to regional connectivity including:

- Completion of the Pacific Highway upgrade
- Bridges for the Bush; replacement and upgrades to an initial 17 key bridges in regional NSW.
- Completion of the Hunter Expressway (completed in 2013).

2.1.2 North Coast Regional Plan 2036 (Planning and Environment, 2017)

The North Coast Regional Plan 2036 will guide the NSW Government's land use planning priorities and decisions to 2036, providing an overarching framework to guide subsequent more detailed land use plans, development proposals and infrastructure funding decisions. The plans sets four regionally focussed goals:

- The most stunning environment in NSW
- A thriving, interconnected economy
- Vibrant and engaged communities
- Great housing choice and lifestyle options

For the Port Macquarie-Hastings local government area, specific inclusions in the plan that are relevant to this Traffic Study include:

- Regional Priorities
  - Manage and support growth in Port Macquarie
  - Grow community connectivity between centres and with Kempsey Shire

  - Deliver housing and job opportunities in Port Macquarie, Wauchope, Lake Cathie, Bonny Hills and Camden Haven
  - Maximise opportunities associated with growth in the Hunter region and the increased connectivity provided by the Pacific Highway upgrade and digital technology
- Economy and employment
  - Develop health, education and aviation precincts at Port Macquarie, and new employment land at Sancrox and Wauchope, which will drive opportunities for new investment in a range of sectors
- Housing
  - Deliver housing at Port Macquarie, Thrumster, Wauchope, Lake Cathie/Bonny Hills and Camden Haven
  - Enhance the variety of housing options by increasing the number of homes in and around the Port Macquarie city centre

2.1.3 Mid North Coast Regional Transport Plan (TfNSW, 2013)

The Mid North Coast Regional Transport Plan is one of ten Regional Transport Plans released by the NSW Government. The Regional Plans support the NSW Long Term Transport Master Plan.

Goals

- Improving accessibility to transport for everyone
- Appreciating the importance of intra and inter regional connectivity
- Recognising the importance of air travel
- Making sure that the transport solutions for the regions support growth and development, whilst protecting the viability and amenity of centres and towns
- Recognising the growing freight task and its impact
- Addressing cross-border connectivity issues.

Actions

- Travel to/from Mid North Coast
  - Invest in the road network
  - Improve NSW TrainLink services
  - Support ongoing access to Sydney Airport
  - Protect corridor for high speed rail.
- Travel within Mid North Coast
  - Improve road safety
  - Improve boating facilities and waterway access
  - Improve regional bus services
  - Integrate NSW TrainLink coach services with regional bus services
  - Improve public transport customer information
  - Improve public transport interchanges
  - Investigate flexible or demand responsive transport
  - Ensure adequate community transport services are provided

  - Improve the integration of community transport services into the passenger transport system
  - Develop a sustainable model for community transport service provision
  - Develop an annual servicing plan for major events
  - Improve tourism related transport services.
- Port Macquarie
  - Improve public transport services
  - Improve opportunities for walking and cycling

Projects

- Short term
  - Duplication of the Pacific Highway through the region.
  - Completion of upgrades to sections of the Oxley Highway between Port Macquarie and Wauchope.
  - Investigation of opportunities to improve accessibility through improved bus operations in major centres
  - Improved public transport connections between regional centres
- Medium to longer term
  - Continued investment in the road network to address localised congestion.
  - Work with community groups, regional transport coordinators, local councils and local bus operators to enhance the public transport system to meet the needs of the region's residents and businesses.

2.1.4 Draft Oxley Highway Corridor Strategy, 2016

The Draft Oxley Highway Corridor Strategy is a 20 year road plan aimed at supporting the regions road transport system. The strategy looks to provide a safe, reliable, sustainable and comfortable route from Port Macquarie in the east to Nevertire in the Central west of NSW.

The strategy supports the objectives of the NSW Long Term Transport Master Plan, Regional Transport Master Plans and other state and national plans.

The plan investigates transport demands and roles, current corridor performance, future changes and challenges across the 514 km length of the highway. Key finding of the strategy include road safety, level of service, freight productivity and asset performance. To address the challenges presented from the finding, a series of short term (0-5 years), medium term (5-10 year) and long terms actions are identified in the strategy. Those particularly relevant to this study include:

- Short Term
  - Improve alignment and overtaking opportunities between the Pacific Highway and Wauchope
  - Investigate opportunities to improve capacity and standard of key intersections
  - Pedestrian facility improvements identified in the Wauchope Main Street Plan
  - Investigate and develop improvements for pedestrians in Port Macquarie
  - Investigate options for improving cyclist connectivity between Wauchope and Port Macquarie

  - Develop identified recommendations of the Port Macquarie traffic study to support residential growth and retain the functionality of the highway
  - Continue to implement road safety initiatives to address identified and emerging crash types and locations
  - Continue to integrate transport and land use planning to improve the performance for the corridor through effective access management
- Medium Term
  - Investigate options to increase capacity between Wauchope and Port Macquarie, including corridor identification and reservation
  - Investigate network solution to reduce impact of local traffic and through traffic growth
- Long Term
  - Continue to implement road safety initiatives to address identified and emerging crash types and locations

2.2 Council Documents

2.2.1 Port Macquarie-Hastings Local Environment Plan 2011

The Port Macquarie-Hastings Local Environment Plan (LEP) is the principal statutory planning document governing Councils' planning decisions under the requirements of the Environmental Planning and Assessment Act 1979.

The LEP covers the Port Macquarie-Hastings LGA and allows Council to manage land use and development through land-use zoning and development standards.

The LEP also outlines the provisions to be covered within Councils' Development Control Plan.

2.2.2 Port Macquarie-Hastings Development Control Plan 2013

The Port Macquarie-Hastings Council Development Control Plan (DCP) is the key supporting document to the LEP. The DCP provides design considerations, standards and area based provisions surrounding development within the Port Macquarie-Hastings LGA. Currently there are two DCP's covering the LGA: the primary DCP is the 2013 Plan, covering general provisions, however the area-based DCP provisions are covered within both the 2013 (Part 4) and 2011 (Part 5) DCP's.

2.2.3 Port Macquarie-Hastings Urban Growth Management Strategy 2011-2031, 2011

The Port Macquarie-Hastings Urban Growth Management Strategy 2001-2031 is a planning framework for residential, rural residential, retail, industrial and tourism development in the LGA covering the 20 year horizon to 2031. The strategy supports the NSW Mid North Coast Regional Strategy (NSW Department of Planning, 2009).

The strategy is a consolidation and update of existing land use strategies, based on 2006 Census data and including consideration of the principles and issues contained in the regional Strategy.

The aim of the strategy is to facilitate urban growth to accommodate the projected increase in population, in locations that are least constrained and most suited to urban development, and in a form that best serves the long term interests of the Port Macquarie-Hastings community.

The plan covers six areas, including:

- Demography;

- Natural Environment, Natural Resources and Constraints;
- Settlement Pattern;
- Economic Development and Employment;
- Housing; and
- Infrastructure.

It is expected that a revised Urban Growth Management Strategy will be adopted by Council in late 2018. The updated document builds on the previous strategy, and identifies key short term actions to be completed by Council and others.

2.2.4 Port Macquarie-Hastings Infrastructure Gap Analysis (PSA Consulting (Australia), 2014)

The Port Macquarie-Hastings Infrastructure Gap Analysis report covers a capacity assessment of Port Macquarie-Hastings transport and telecommunications infrastructure, identifies gaps in the infrastructure, challenges to expansion and economic growth, interdependencies between infrastructure gaps, funding opportunities and prioritises action to address key infrastructure gaps.

Based on stakeholder input and strategic analysis of anticipated needs, the report recommended the consideration of the following transport infrastructure gaps:

- Southern access to Airport (Oxley Drive to Boundary Street)
- Southern Ring Road (Oxley Highway to Ocean Drive)
- Lake Road duplication
- Alternative access to Wrights Road health precinct
- Alternative access to Sancrox (other than Pacific Highway)
- High frequency public transport between CBD and Charles Sturt University campus
- Pacific Highway duplication (north of Oxley Highway)
- Hastings River Drive duplication
- Alternative access to Lake Road industrial precinct
- Alternative access to Charles Sturt University precinct
- Houston Mitchell Drive upgrade
- On and off-road cycleway / trail between CBD and Charles Sturt University campus
- Oxley Highway overtaking lanes / safety improvements between Pacific Highway and Wauchope
- Wauchope town bypass
- Oxley Highway North Coast Railway Crossing Improvement

Several of these projects have since proceeded to planning and/or construction.

2.2.5 Port Macquarie-Hastings Economic Development Strategy, 2017

The Port Macquarie-Hastings Development Strategy looks at the five year economic horizon of the LGA. The strategy represents a commitment by business, industry and council who are united in their desire to create the right environment for growth, and drive the economic success of the region by supporting existing, new and emerging industry.

There are five overarching strategy outcomes covered in the report:

- Embracing business and a stronger economy; "A council that recognises the importance of a strong economy and fosters a culture that is supportive of business and that ensures the economic development of the region is a central consideration of all its activities.
- Providing the foundations: "A Council that leads and takes responsibility for contributing to the liveability of the region through improved planning, infrastructure and services."
- Creating vibrant and desirable places; " a region where townships, villages and business precincts across the Local Government Area are vibrant commercial, tourism, recreational and/or community hubs"
- Embracing opportunity; "A region that embraces opportunities and attracts investment to create additional jobs and increase the wealth of the region and its residents."
- Partnering for success: "A council which works alongside key stakeholders in business, government and the community with a focus on maximising economic return and efficient and effective business environment."

3. Existing Road Network Conditions

The Pacific and Oxley Highways provide arterial road access to the Port Macquarie-Hastings area. The Pacific Highway is the primary north-south road in the region and serves as a vital connection between Sydney to the south and Southern Queensland to the north.

Within the Port Macquarie area Hastings River Drive, Oxley Highway, Lake Road and Ocean Drive are arterial roads that connect the city to the north, south and west and serve the City Centre.

3.1 Road Hierarchy

Roads within NSW are categorised in the following two ways:

- By Classification (ownership); and
- By the function that they perform.

It is noted that a road's administrative classification may not necessarily be consistent with its function.

3.1.1 Road Classification

Roads are Classified (as defined by the *Roads Act 1993*) based on their importance to the movement of people and goods within NSW (as a primary means of communication).

The classification of a road allows Roads and Maritime Services (Roads and Maritime) to exercise authority of all or part of the road. Classified roads include Main Roads, State Highways, Tourist Roads, Secondary Roads, Tollways, Freeways and Transitways.

For management purposes, Roads and Maritime has three administrative classes of roads. These are:

- **State Roads –** Major arterial links through NSW and within major urban areas. They are the principle traffic carrying roads and fully controlled by Roads and Maritime with maintenance fully funded by Roads and Maritime. State Roads include all Tollways, Freeways and Transitways; and all or part of a Main Road, Tourist Road or State Highway.

  Within the study area, the State Roads are the Pacific Highway and Oxley Highway.

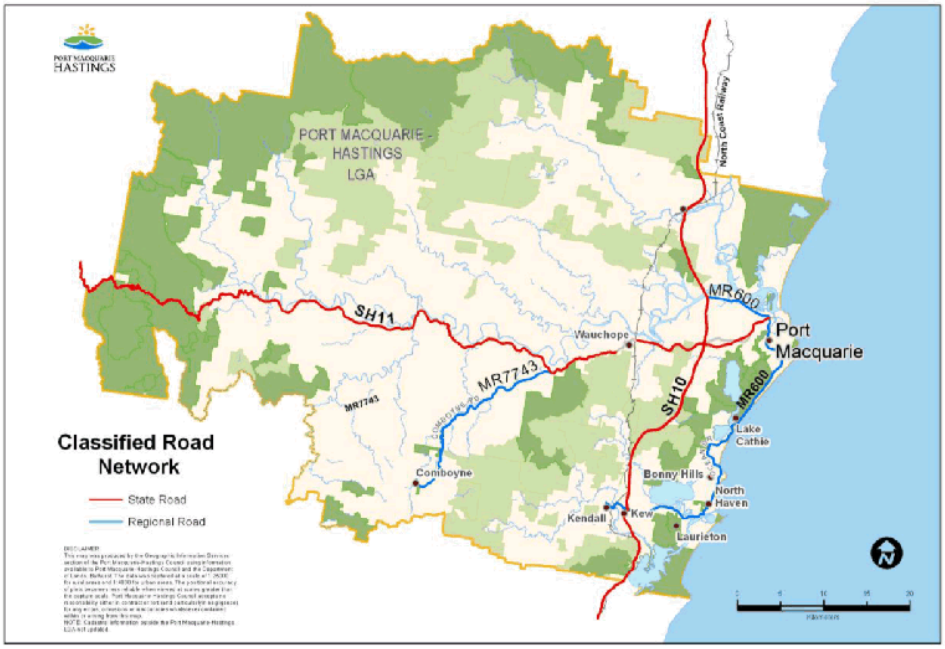
- **Regional Roads** – Roads of secondary importance between State Roads and Local Roads which, with State Roads, provide the main connections to and between smaller towns and perform a sub arterial function in major urban areas. Regional roads are the responsibility of councils for maintenance funding, though Roads and Maritime funds some maintenance based on traffic and infrastructure. Traffic management on Regional Roads is controlled under the delegations to local government from Roads and Maritime. Regional Roads may be all or part of a Main Road, Secondary Road, Tourist Road or State Highway; or other roads as determined by Roads and Maritime.

  Within the study area, Regional Roads include Ocean Drive, Hastings River Drive, Gordon Street, Comboyne Road, Kendall Road, River Street, Graham Street and Nancy Bird Walton Drive.

- **Local Roads** – The remainder of the council controlled roads. Local Roads are the responsibility of councils for maintenance funding. Roads and Maritime may fund some maintenance and improvements based on specific programs (e.g. urban bus routes, road

safety programs). Traffic management on Local Roads is controlled under the delegations to local government from Roads and Maritime.

The classified road network in the study area is shown in Figure 3.1.



Source: Port Macquarie – Hastings Council

Figure 3.1 Classified Road Network

3.1.2 Functional Hierarchy

Functional road classification involves the relative balance of the mobility and access functions. Roads and Maritime define four levels in a typical functional road hierarchy, ranking from high mobility and low accessibility, to high accessibility and low mobility. These road classes are:

- **Arterial Roads** – generally controlled by Roads and Maritime, typically no limit in flow and designed to carry vehicles long distance between regional centres.
- **Sub-Arterial Roads** – can be managed by either Roads and Maritime or local council. Typically, their operating capacity ranges between 10,000 and 20,000 vehicles per day, and their aim is to carry through traffic between specific areas in a sub region, or provide connectivity from arterial road routes (regional links).
- **Collector Roads** – provide connectivity between local roads and the-arterial road network and typically carry between 2,000 and 10,000 vehicles per day.
- **Local Roads** – provide direct access to properties and the collector road system and typically carry between 500 and 4,000 vehicles per day.

An allocation of existing roads to the functional road hierarchy is provided in Table 3.1.

Table 3.1 Existing Functional Road Hierarchy

Road	Existing Function
Pacific Highway	Arterial
Oxley Highway	Arterial
Hastings River Drive	Arterial
Ocean Drive	Arterial
Lake Road (Oxley Highway to Ocean Drive)	Sub-arterial
Lake Road (Ocean Drive to Gordon Street)	Collector
Boundary Street	Collector
Clifton Drive	Collector
John Oxley Drive	Collector
Major Innes Road	Collector
Bay Street	Collector
Findlay Street	Collector
Park Street	Collector
Gordon Street	Collector
Buller Street / William Street	Collector
Lord Street / Kennedy Drive	Collector
Koala Street	Collector
Pacific Drive	Collector
Houston Mitchell Drive	Sub-arterial
Kew Road / Bold Street	Collector
Camden Head Road	Collector
Kendall Road / River Street / Graham Street / Lorne Road	Sub-arterial
Nancy Bird Walton Drive	Sub-arterial
Comboyne Road	Sub-arterial
Bago Road / Cameron Street	Sub-arterial
Stoney Creek Road (south)	Sub-arterial
Pembrooke Road	Sub-arterial
Beechwood Road	Collector
Blackbutt Drive	Collector

All other roads are "Local Roads" in function.

3.2 Road Network

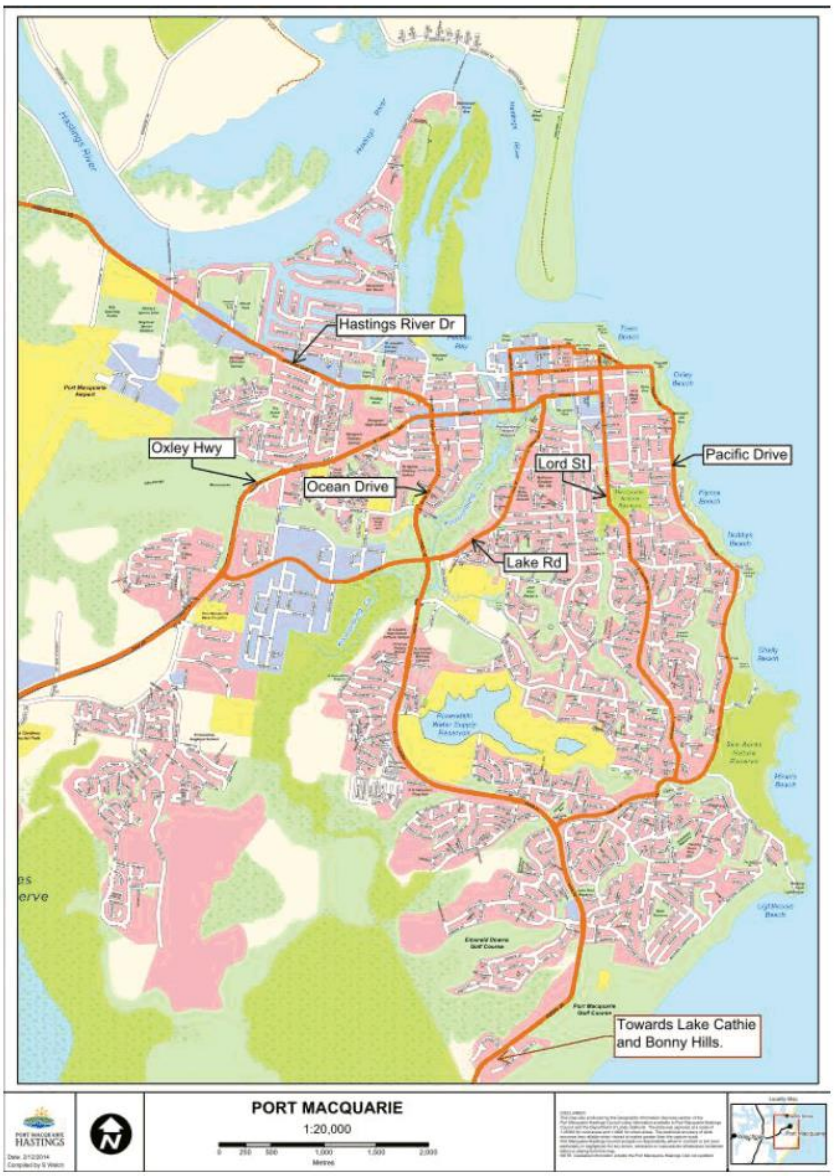
The road network within the study area covers a diverse range of road types, traffic activity and adjacent land use types. The primary arterial routes in the study area include the Pacific Highway, providing for north-south traffic, and the Oxley Highway, providing an east-west connection. Hastings River Drive provides a secondary east-west connection between the Pacific Highway and the Port Macquarie CBD. Ocean Drive connects the CBD with coastal areas to the south, connecting back to the Pacific Highway at Kew. The study area can effectively be divided into discrete but related areas using these arterial routes as a reference point.

Port Macquarie Area

The Port Macquarie area is located in the north-eastern portion of the study area. The Port Macquarie city centre is located at the eastern end of the Oxley Highway (refer Figure 3.2). The Oxley Highway (up to 26,000 vehicles per day), Hastings River Drive (up to 15,000 vehicles per day) and Ocean Drive (up to 18,000 vehicles per day) radiate outwards from the city centre providing access to the surrounding suburbs, as well as connections to other regions. Lake

Road (up to 18,000 vehicles per day) also provides a critical east-west link, being the southern-most connection between Ocean Drive and the Oxley Highway / Pacific Highway within the Port Macquarie urban area.

Within Port Macquarie the major land use is residential, interspersed with bushland and public open space. A large industrial area is centred around Lake Road, with smaller light industrial and bulky-goods retail along Hastings River Drive. There is also a large industrial area at Sancrox on the Pacific Highway, mid-way between Port Macquarie and Wauchope.



Source: Port Macquarie – Hastings Council

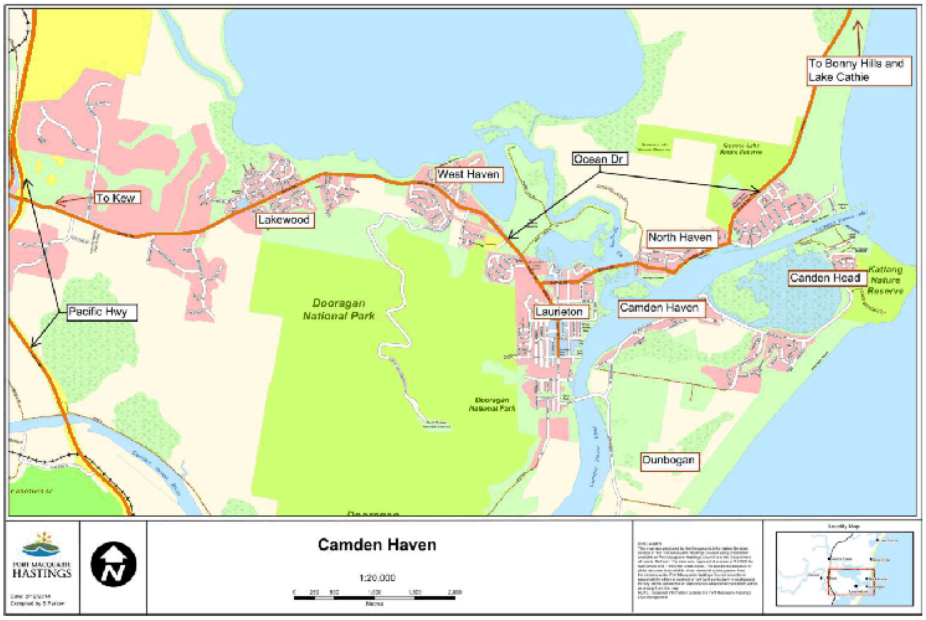
Figure 3.2 Port Macquarie Road Network

Ocean Drive Corridor

Ocean Drive connects Port Macquarie with the Pacific Highway, travelling via the coastal towns of Lake Cathie, Bonny Hills, North Haven, Laurieton, West Haven, Lakewood and Kew (refer Figure 3.3). Dunbogan, Camden Head and Kew are each located off the main Ocean Drive spine. Daily traffic volumes vary along the route, with up to 11,000 vehicles per day west of Laurieton, 8,000 vehicles per day between Bonny Hills and Lake Cathie, and 7,000 vehicles per day south of the Port Macquarie urban area.

Houston Mitchell Drive (approximately 3,000 vehicles per day) provides a connection to the Pacific Highway between Lake Cathie and Bonny Hills, but otherwise this area is predominantly reliant on Ocean Drive for road network connectivity.

Land use in this area is primarily low-density residential with associated services.



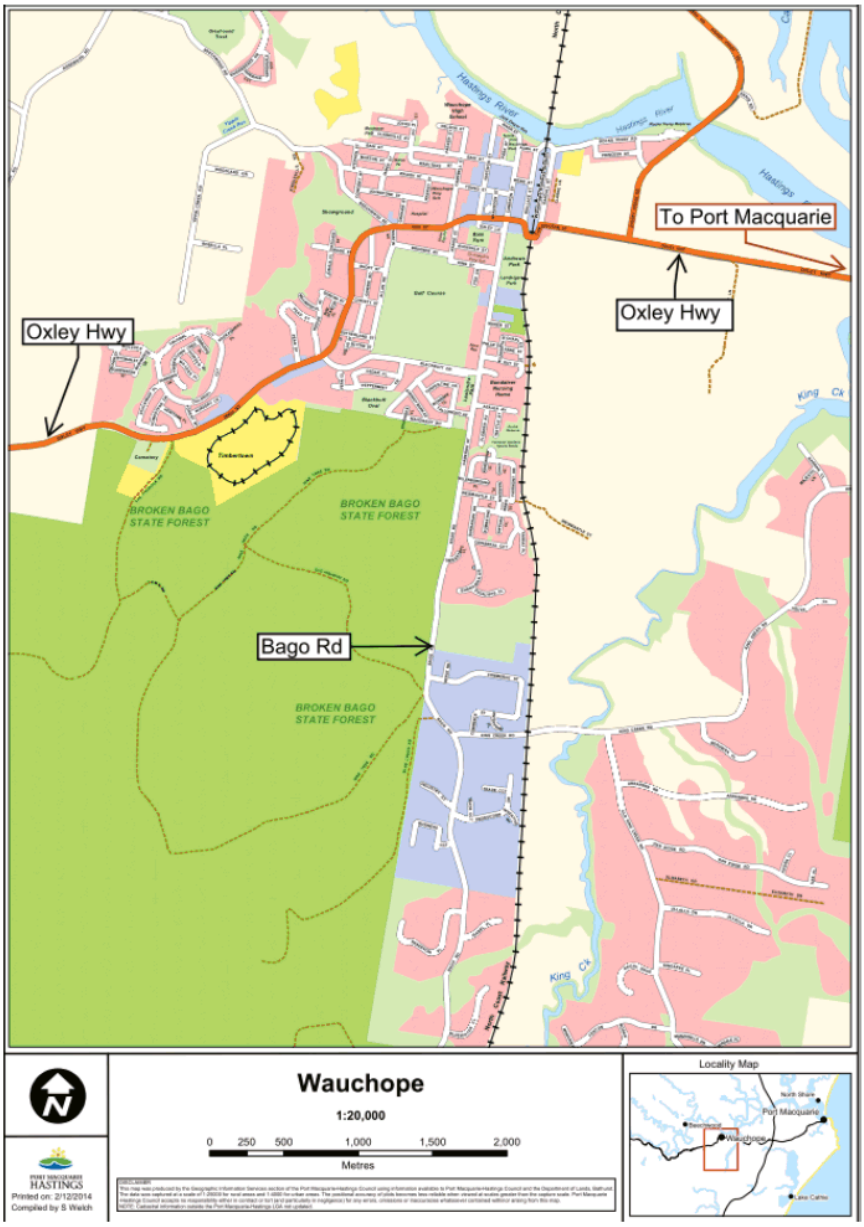
Source: Port Macquarie – Hastings Council

Figure 3.3 Camden Haven Road Network

Wauchope Area

The town of Wauchope is located on the Oxley Highway to the west of the Pacific Highway (refer Figure 3.4). From Wauchope the Oxley Highway continues westwards towards Tamworth. However the major traffic activity is east of Wauchope, with traffic connecting to the Port Macquarie area. The volume on the Oxley Highway east of Wauchope is approximately 12,000 vehicles per day, while west of Wauchope the volume is some 3,000 vehicles per day.

Connection to the Pacific Highway is via the Oxley Highway, however for trips north and south more direct travel options are provided by Pembrooke Road (up to 2,000 vehicles per day) and Bago Road (approximately 3,000 vehicles per day) respectively. Due to the relative standards of the Oxley Highway and Pacific Highway compared to the alternative routes, the travel time differences are not significant.



Source: Port Macquarie – Hastings Council

Figure 3.4 Wauchope Road Network

3.2.1 Observations and commentary

Outside of the Port Macquarie inner area, traffic generally flows freely, with only small delays at key local junctions. Other general delays are experienced on single-lane sections of road where a slow-moving vehicle might create a build-up of traffic. During the morning and afternoon peak traffic periods, in particular, the Pacific Highway / Oxley Highway interchange and Lake Road industrial areas are known to become busy, with traffic from the north, south and west converging due to major business locations and facilities such as the Port Macquarie Base Hospital and University campus serving Port Macquarie.

Specifically, the Oxley Highway is one of the busiest road corridors heading into Port Macquarie from Wauchope, with limited access between the large Wrights Road roundabout and its intersection with Lake Road. Eastbound traffic is able to flow freely until the impacts of the Lake Road roundabout are felt. North-east of Lake Road, roundabouts on Oxley Highway break up traffic flow and reduce speeds.

The northern sections of Ocean Drive can become heavily congested during peak periods. Capacity improvement works to widen Ocean Drive to a four lane facility are currently in design phase.

Lake Road is also congested with through traffic mixing with local traffic (including heavy vehicles) accessing the industrial area. The small-diameter roundabout at Jindalee Road is a particular constraint, although works have recently occurred (commenced after the traffic surveys) to improve this and other parts of Lake Road.

Hastings River Drive is a busy corridor, with through traffic mixing with local access traffic. Adjacent retail, commercial and light industrial land uses and associated parking create friction with traffic movement.

Pacific Drive and Kennedy Drive provide a north-south connection between established residential areas and the Port Macquarie city centre. As these roads cater for relatively small proportions of through traffic, volumes are moderated and traffic flow is generally smooth.

3.3 Public Transport

3.3.1 Bus

Bus services in the study area are operated by Busways, and connect within and between Port Macquarie, Wauchope, Camden Haven and Kempsey. Bus route maps are shown in Figure 3.5, Figure 3.6 and Figure 3.7.

Key terminus locations include the Port Macquarie CBD, Settlement City and Port Macquarie Base Hospital.

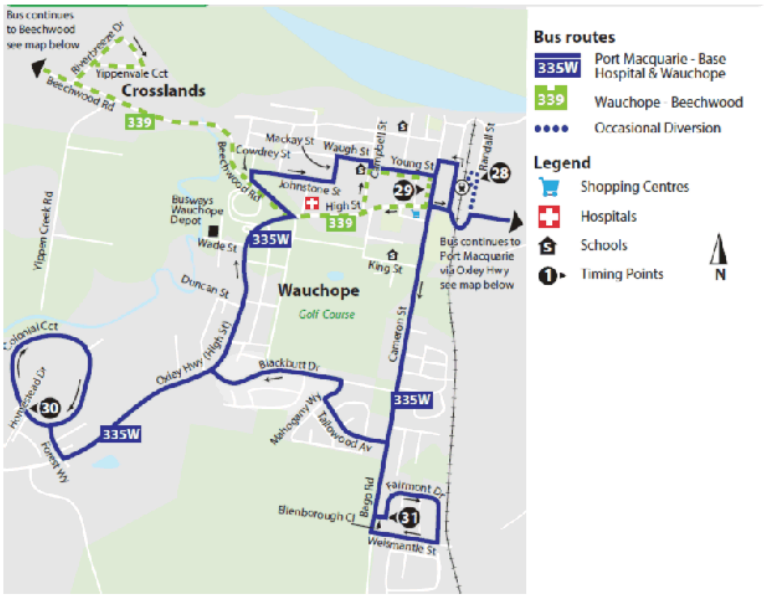
Network coverage outside the Port Macquarie and Wauchope areas is generally limited to the Oxley Highway, Hastings River Drive and Ocean Drive corridors.

There are limited services outside Port Macquarie on weekends and in the evening.

Long distance coach services operate through the study area between Sydney and Brisbane via the Pacific Motorway, with scheduled stops at Port Macquarie only.

Source: Busways

Figure 3.5 Bus Routes – Port Macquarie Area



Source: Busways

Figure 3.6 Bus Routes – Wauchope Area

Source: Busways

Figure 3.7 Bus Routes – Ocean Drive area

3.3.2 Rail

NSW TrainLink operates daily return train services between Sydney and each of Brisbane, Grafton and Casino. Each service stops at Kendall and Wauchope (total 3 services per day in each direction). NSW TrainLink also operates a coach connection between Wauchope and Port Macquarie, once per day in each direction.

3.4 Pedestrians and Cyclists

Facilities for pedestrians are focussed on the Port Macquarie CBD, and other local commercial / retail centres in the study area. Many residential streets do not have footpaths, even in well-established residential areas. Where a path is provided it is often on one side of the road only, and may not be continuous or connect to other facilities.

Land use in the study area is relatively dispersed, making walking a less attractive mode of travel than it might otherwise be. Within the inner Port Macquarie area the major arterial roadways, particularly Oxley Highway, Ocean Drive and Hastings River Drive, present significant barriers to pedestrian movement, due to a combination of traffic volume, speed, road width and car-dominated land uses. Opportunities for pedestrians to cross these roads are limited, with many intersections controlled by roundabouts rather than traffic signals.

There are few specific cycling facilities in the study area, limited to on-road bike lanes on parts of Hastings River Drive and Ocean Drive.

3.5 Road Safety

The crash history for the Port Macquarie – Hastings local government area was provided by Council for the 5-year period 2012-2016. As shown in Table 3.2, there were 1,508 crashes over this time, including 24 fatal crashes, and 859 crashes resulting in injury. There was an average of 302 crashes each year across the LGA. It is noted that the number of Injury and Property Damage crashes reduced significantly in 2015 and 2016, relative to previous years. This is predominantly as a result of changes to the way that non-injury crashes are reported[1]. Therefore care needs to be taken comparing 2012-2014 data to 2015-2016 data.

Table 3.2 Crash History 2010-2014

Year	Fatal	Injury	Property damage	Total
2012	5	190	175	370
2013	3	207	182	392
2014	5	166	145	316
2015	4	150	70	224
2016	7	146	53	206
Total	**24**	**859**	**625**	**1508**
Annual Average	**4.8**	**171.8**	**125**	**301.6**

[1] As of 15 October 2014 NSW Police do not attend or investigate crashes in which a vehicle is towed away but no one is injured or killed. These crashes are now required to be self-reported by involved parties to Police via the Police Assistance Line (PAL). If medical attention for an injury is sought more than 24 hours after a crash, this may also be reported via PAL as an injury crash.
The introduction of self-reporting for crashes has impacted trends in the crash data from October 2014. Crash records collected directly from involved parties contain less descriptive data making the determination of attributes such as road user movements and contributing factors less reliable or unavailable for these crashes. The introduction of self-reporting of crashes has also resulted in a decrease in the number of crashes recorded by NSW Police.
Care should therefore be taken when making comparisons with data from previous years.

Half of the crashes, including 80% of the fatal crashes, occurred on 2-way undivided roads. Other common crash locations include T-junctions (17%), divided roads (13%), cross intersections (9%) and roundabouts (9%).

More detail is discussed in Section 6.1.3.

3.6 Data Collection

A range of traffic data was collected, to supplement data already available from other sources including Council and RMS. The data collection strategy for the development of the model comprised the following surveys:

- Peak-period turn movement counts at 59 intersections;
- Nine Origin-Destination survey points;
- Six classified tube counts; and
- Peak period travel time surveys on three routes.

These surveys were completed in the week commencing 9 February 2016[2]. The primary purpose of the traffic surveys was to inform the development of the base traffic model (refer Section 4.2) and to be used as the basis of the model calibration and validation (see Section 4.5).

3.6.1 Intersection Count Data

The Intersection surveys encompassed 59 intersections within the model area. A list of the sites, with the recorded volume at each intersection, is provided in Appendix I, along with a map showing the distribution across the model area.

3.6.2 Classified Tube Counts

Classified tube count data was collected using pneumatic tube counters at the following six locations:

1. Bago Road, north of Milligans Road
2. Pembrooke Road, south of Reids Road
3. Lake Road, south of Hill Street
4. Park Street, north of Bay Street
5. Ocean Drive, north of Ernest Street
6. Ocean Drive, north of Jordan Street

All surveys were collected for the seven-day period 8 February to 14 February 2016.

Results are summarised in Appendix I.

[2] Roadworks at the eastern section of Hastings River Drive were underway at the same of the surveys, with changed traffic conditions in place affecting Hastings River Drive, Oxley Highway, Park Street and other connecting streets. The impact of this was taken into consideration when calibrating the model, and preparing future base models (see Section 4).

3.6.3 Origin Destination Surveys

Nine Origin-Destination stations were set up within the model area to capture the travel between population centres, both in terms of the number of vehicles and their travel time. The locations of the surveys are shown in Appendix I:

1. Pacific Hwy / Hastings River
2. Pacific Hwy (between Sancrox Road and Oxley Hwy)
3. Oxley Hwy (east of Stoney Creek Rd)
4. Oxley Hwy (south of Lake Rd)
5. Ocean Drive (north of Koala St)
6. Ocean Drive (between Matthew Flinders Drive and Lake Cathie)
7. Ocean Drive (south of Houston Mitchell Drive)
8. Ocean Drive (2km north of Edith St)
9. Pacific Hwy (north of Camden Haven

3.6.4 Travel Time Surveys

Travel Time Surveys were undertaken on three routes within the model area to capture the effects of congestion on travel flow and to assist in the validation of the model:

1. Ocean Drive – between Matthew Flinders Drive and Bay Street;
2. Oxley Highway, Lake Road and Gordon Street – between Pacific Highway and the Lake Road / Gordon Street intersection; and
3. Ocean Drive – between Pacific Highway and Houston Mitchell Drive.

These floating car surveys were undertaken for the morning and evening peak periods, and between one and four sample observations were undertaken for each direction along these routes in each peak.

Travel times were also extracted from the Origin-Destination Surveys to supplement the data obtained from the floating car surveys.

The travel time data is summarised in Appendix I.

4. Traffic Modelling

A traffic model is a computer based mathematical model of real world traffic, enabling the analysis of an existing road network or theoretical network to estimate the performance of the network (e.g travel times, flow volumes etc). Traffic modelling can be undertaken at various geographic levels, using different software packages as summarised in Figure 4.1.

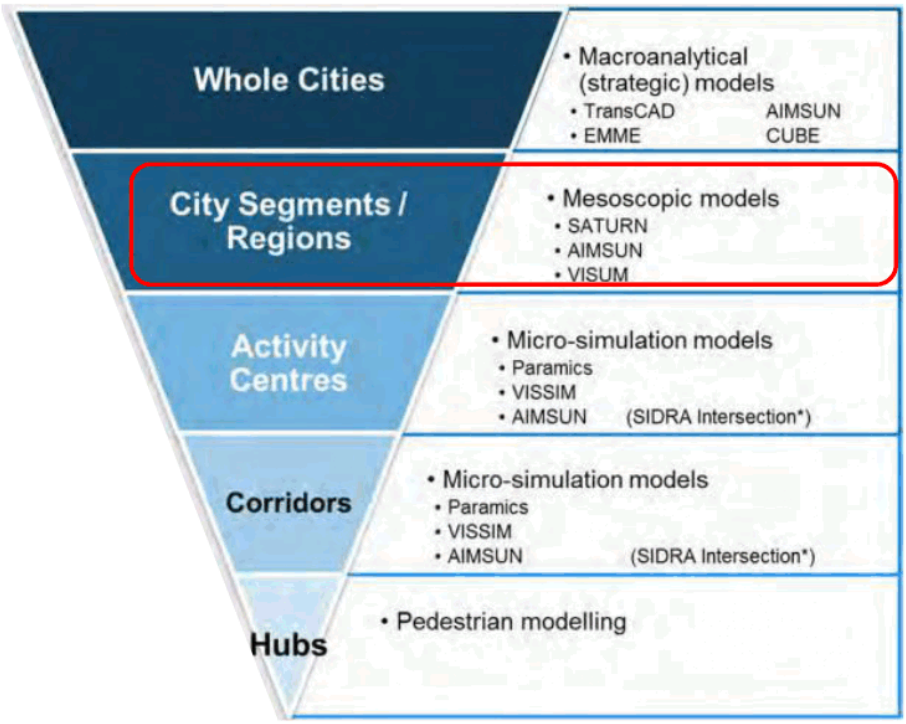


Figure 4.1 Modelling Levels and Commonly Used Software

Traffic modelling for this study was undertaken using Aimsun Version 8.1.5 (R46394), used as a mesoscopic modelling tool consistent with the objectives of the project.

This approach to the modelling allows for expansion of the model to include more detail in some areas, with some additional data collection as necessary, should this be required in the future.

The Port Macquarie-Hastings Aimsun base model was completed in June 2016. A model calibration and validation report was produced and submitted to Council and RMS.

4.1 Model Coverage

The Port Macquarie-Hastings mesoscopic traffic model covers the following areas:

- Port Macquarie
- Wauchope
- Telegraph point
- Kew
- Laurieton

- North Haven
- Bonny Hills
- Lake Cathie

The base model includes 195 zones where traffic is added to the road network. These are located throughout the model area, and represent aggregations of property accesses, side streets not included in the model, and car parking areas. A plot of the model study area is shown in Figure 4.2. The model encompasses the entire city centre of Port Macquarie bounded by Wauchope in the west, Laurieton in the south, and Telegraph Point in the north.

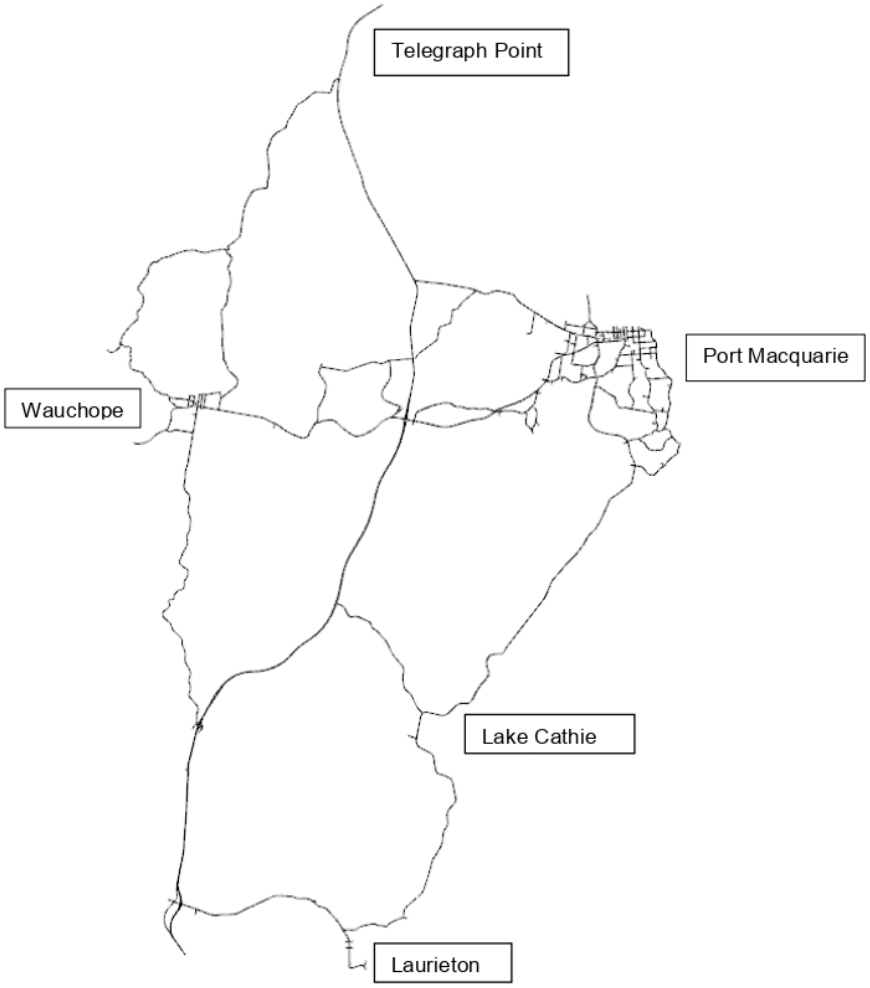


Figure 4.2 Modelled Road Network

The modelled area is a subset of the study area. Outside of the modelled area, traffic capacity is not expected to be a significant issue, with safety and local efficiency more critical. Traffic modelling is not an appropriate tool for assessing these issues, and so the model has been supplemented by a desktop assessment of other issues. Refer to Section 6.7 for this assessment.

4.2 Model Development

Aimsun allows for a coded network to be analysed utilising both static and dynamic methods, performing traditional static macroscopic modelling using volume delay functions as well as more detailed dynamic mesoscopic and microscopic simulation modelling within the same model.

Dynamic traffic models are useful in modelling congested or capacity constrained conditions where traffic demand exceeds available capacity and traffic diverts to seek less congested routes. These conditions result in queuing that builds up and dissipates over time and dynamic routing of traffic that is responsive to this build-up of delays.

The Port Macquarie-Hastings mesoscopic traffic model was developed based on up-to-date aerial photography, GIS data and traffic signal layouts and cycle times provided by Port Macquarie-Hastings Council and Roads and Maritime Services, as well as data gathered from the traffic surveys (see Section 3.6).

All key roads and intersections within the study area were included in the model. In some locations local streets that do not significantly impact the performance of the overall network were amalgamated to simplify the network of the model.

During the collection of the traffic surveys several road segments were operating under changed conditions due to road works. It was agreed with Port Macquarie-Hastings Council and Roads and Maritime Services that the original base model would be calibrated and validated including the effect of these roadworks. The base model was then updated to reflect the traffic conditions experienced upon completion of these roadworks.

The modelling process is summarised in Figure 4.3, showing the relationship between input data. Model development and the calibration and validation process. A gravity model was used to synthesise traffic count and survey data into origin/destination pairs that can then be assigned within the Aimsun Model.

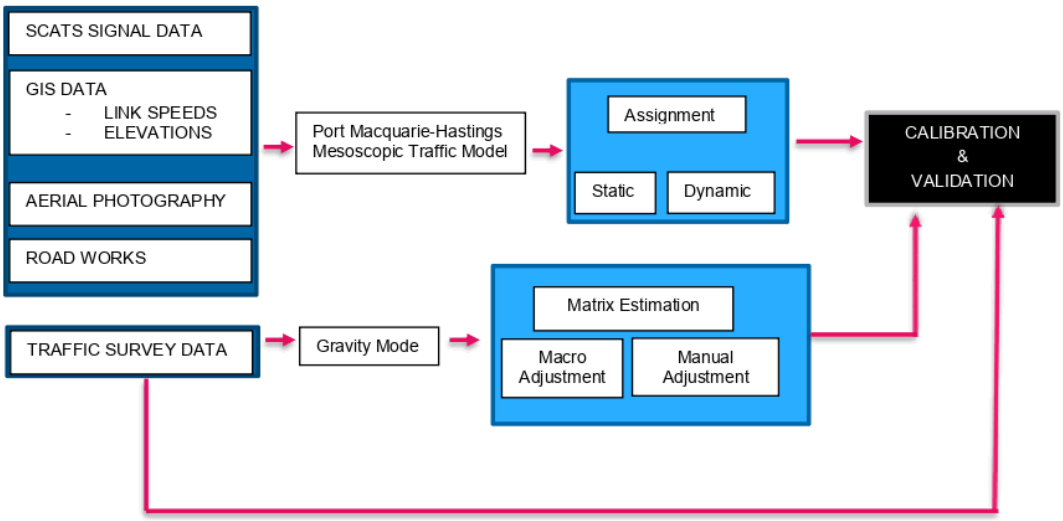


Figure 4.3 Mesoscopic Modelling Architecture

The relationship between trip generation and attraction in the 2016 AM and PM peak periods is illustrated for each zone in maps contained in Appendix F.

4.3 Temporal Coverage

Separate models have been developed for the AM and PM weekday peak periods. Each model includes a 1-hour "warm-up" period and an analysis period (2 hours in the AM model, 3 hours for the PM model) immediately following, as outlined in Table 4.1.

Table 4.1 Model Time Periods

	AM Peak	PM Peak
Warm-up period	7:00 – 8:00 am	2:00 – 3:00 pm
Analysis period	8:00 – 10:00 am	3:00 – 6:00 pm

The purpose of a warm-up period is to feed traffic into the network so that the model is not empty at the start of the analysis period, allowing realistic conditions to be evaluated through the entire analysis period. The rate that vehicles are fed into the network during the warm up period, as well as during the analysis period, is informed by the profile of traffic activity observed at various locations, and so particularly at the end of the warm-up period the model is generally representative of realistic conditions.

Whilst not included in the model analysis period, any significant congestion issues during the warm-up period are likely to be apparent through the results of the model analysis period. The warm-up period can also be analysed separately, although it is not necessarily calibrated to the same extent as the analysis period.

A specific cool-down period has not been included. The general reduction in volumes that occurs towards the end of each peak period is sufficient to act as a cool-down period, allowing any congestion to dissipate before the end of the analysis period.

4.4 Road Network Coding

The Port Macquarie-Hastings mesoscopic traffic model was developed based on up-to-date aerial photography, GIS data and traffic signal layouts and cycle times provided by Port Macquarie-Hastings Council and Roads and Maritime Services, as well as data gathered from site observations. The following features have been coded in the model network:

- Zone and connector system;
- Speed limits, banned traffic movements; and
- Intersection and lane configuration.

In addition, the following traffic management features were coded in the network to reflect the ongoing road works associated with Hastings River Drive and variable speed limits at School Zones:

- Turn Bans to replicate the closure of Hastings River Drive between Aston Street and Park Street with the allowance for local traffic;
- Lane configurations replicating the construction works at the Oxley Highway/Pacific Highway interchange; and
- Reduction of speed limits to 40km/hr in school zones during the scheduled times.

All key roads and intersections within the study area have been included in the model. Several local streets that do not significantly impact the performance of the overall network were amalgamated to simplify the network of the model.

While not explicitly coded into the model, delay caused by parking manoeuvres was included through the inclusion of centroids at midblock locations on some roads. Give way control was applied to vehicles entering/leaving these centroids. This ensured that some vehicle interaction occurred on the links, causing minor delays similar to those which would be caused by parking manoeuvres.

4.5 Calibration and Validation of the Model

4.5.1 Calibration Process

Calibration of the Port Macquarie-Hastings mesoscopic traffic model was undertaken according to the methodology set out in the adopted Roads and Maritime Services *Traffic Modelling Guidelines, 2013*. Calibration was undertaken for the morning and evening peak periods based on a comparison against surveyed turning movements.

Model calibration was undertaken on the basis of comparison of modelled and observed traffic volumes. Two methodologies were adopted to confirm the calibration of the model:

1. The GEH Statistic as described in the Roads and Maritime Services *Traffic Modelling Guidelines*, *2013*; and
2. Absolute and percentage differences as described in the UK Department for Transport, *TAG Unit M3.1 Highway Assignment Modelling Guidelines*.

Based on the calibration and validation guidelines presented in the Roads and Maritime Services *Traffic Modelling Guidelines*, *2013*, a calibrated model should conform to the following requirements:

- Flow comparisons with GEH greater than 10 explained;
- At least 85 percent of flow comparisons with GEH less than 5; and
- Coefficient of Determination (R^2) between 0.9 and 1.0.

It is noted that this criterion is based on Highway Assignment modelling which is usually on a smaller scale than a mesoscopic model of a large network, such as the Port Macquarie-Hastings mesoscopic traffic model. This can lead to the criterion being too strict for models that encompass larger areas.

A small number of locations showed poor correlation between observed and modelled volumes particularly when considering the GEH statistic. The majority of these points are generally minor turn movements, movements with low traffic volumes and locations on the periphery of the model area. These locations are generally in locations where the zoning system used is too coarse to be able to match the observed counts or in locations with low traffic volumes where the GEH statistic requires a more strict correlation to observed volumes.

This is the case in the south eastern side of Port Macquarie along Pacific Drive, where the zone structure is relatively coarse reflecting the lower importance of this area of the model and areas around Hastings River Drive, where construction works influenced route choice.

Overall, the Port Macquarie-Hastings mesoscopic traffic model has been calibrated to a level that is appropriate to the purpose for which the model will be used and has been approved for use by Port Macquarie-Hastings Council and RMS.

4.5.2 Validation Process

In order to determine the suitability of the Port Macquarie-Hastings mesoscopic traffic model in forecasting future traffic conditions, it is necessary to validate the model against a set of data that is independent to that used in the calibration process.

Validation of the mesoscopic simulation model has been undertaken based on two independent data sources:

- Floating car travel time surveys; and
- Travel times between Origin Destination Pairs.

Generally, model validation is undertaken exclusively using Travel Time Surveys. However, for this model it was decided to supplement the travel time surveys with travel times between Origin-Destination Pairs, due to the large size of the model in comparison to the relatively low number of congestion points experienced in the travel time surveys. The use of the travel times between Origin-Destination Pairs assists in validating travel times between major population centres.

The travel times detailed in Section 3.6.4 were used to validate the operation of the model. Validation to travel times demonstrates that the model accurately reflects the volume to delay response that occurs on the road network.

The following are the key findings from the validation of the Port Macquarie-Hastings mesoscopic traffic model:

- Analysis of floating car travel time surveys in the shows that the model is well-validated, given the limitations of mesoscopic simulation
- Analysis of travel times between Origin Destination Pairs shows that the percentage of pairs where modelled travel times are within 'cut off range' is above 80%.

Validation showed a satisfactory correlation between modelled and observed data sets. The model was peer reviewed by a third party, and some modifications made based on that review. Subsequent to the peer review, the base model was approved for use by Port Macquarie-Hastings Council and RMS.

5. Future Model Development

Growth in traffic was estimated with reference to forecast changes in population and land use, supplied by Council.

5.1 Population and Land Use

The estimated 2017 population of the Port Macquarie – Hastings Local Government Area is 80,261 people. The current forecast is that the population will increase to some 102,300 people by 2036[3], a growth rate of some 1.4% per annum.

The estimation of future traffic activity used for this study considers both population growth (generally a generator of trips) and changes in industrial, commercial and retail floor space, which may represent attractions for generated trips.

Changes in population and land use will not be uniform across the study area, and therefore forecasts have been disaggregated to allow a refined analysis of spatial issues.

Future growth has been determined for four segments: residential, retail, office and industrial. Data has been obtained from a variety of sources, provided by Council.

5.1.1 Residential

The key factor affecting traffic activity associated with residential land use is the number of residential dwellings. Current forecasts are for a 29% increase in the number of dwellings across the whole LGA from 2016 to 2036, as shown in Table 5.1. In some locations the growth will be small, while in others substantial new development is forecast.

Major growth is forecast in Thrumster and Lake Innes (locations defined in Figure 5.1), both in terms of the number of additional dwellings, and the change compared to existing. Lake Cathie and Bonny Hills, too, are forecast to grow by over 1,500 dwellings.

Rates of growth in established residential areas surrounding the Port Macquarie city centre are less than in fringe areas.

[3] http://forecast.id.com.au/port-macquarie-hastings?_sm_au_=iHVjZsLDbV07DPDH

Table 5.1 Growth in Residential Dwellings 2016-2036

	2016		2036		Change between 2016 and 2036	
Area	Number	%	Number	%	Number	%
Camden Haven East	3,408	9.4	3,648	7.8	+240	+7.0
Camden Haven West	1,326	3.6	1,924	4.1	+598	+45.1
Flynns Beach	1,263	3.5	1,362	2.9	+99	+7.8
Hastings River Canals	1,480	4.1	1,523	3.3	+43	+2.9
Inner Westport	1,472	4.1	1,947	4.2	+475	+32.3
Innes Peninsula	1,513	4.2	2,787	6.0	+1,274	+84.2
Lake Cathie - Bonny Hills	2,864	7.9	4,424	9.5	+1,560	+54.5
Lighthouse Beach - Greenmeadows	4,857	13.4	5,412	11.6	+555	+11.4
Lord Street	1,194	3.3	1,639	3.5	+445	+37.3
Port Macquarie Rural Fringe	1,383	3.8	2,104	4.5	+721	+52.1
Rural	2,916	8.0	3,235	6.9	+319	+10.9
Shelly Beach - Bellevue Hill	4,903	13.5	5,221	11.2	+318	+6.5
Thrumster	283	0.8	2,823	6.0	+2,540	+897.5
Town Beach - CBD	914	2.5	1,234	2.6	+320	+35.0
Wauchope	3,038	8.4	3,758	8.0	+720	+23.7
Westport	3,528	9.7	3,773	8.1	+245	+6.9
Total	**36,343**	**100.0**	**46,815**	**100.0**	**+10,472**	**+28.8**

Source: .id, 2014

(Source: UGMS 2011-2031, 2010)

Figure 5.1 Residential Growth Area Locations

5.1.2 Retail

In 2015 Council commissioned an update to the Retail Strategy that was set out in the 2011 Urban Growth Management Strategy. This process recommended a maximum total retail floor area in the order of 200,000 square metres by 2036, with distribution across the LGA as per Table 5.2 and Table 5.3.

Table 5.2 Maximum Retail Floor Areas 2036

Centres	Recommended Appropriate Size (sqm GLA)*
Greater PMQ CBD	120,000
Wauchope	12,000
Laurieton	12,000
Lakewood	5,000
Lake Innes	10,000
Lake Cathie	5,000
Lighthouse Plaza	5,000
Bonny Hills	5,000 (Future Centre)
Thrumster	10,000 (Future Expansion)
Smaller Centres	2,000sqm per centre (North Haven, Kew, Kendall, Lighthouse Beach, Flynns Beach, Waniora Parkway, Clifton)

*Excludes non-retail shop front space such as real estate agents, medical, travel agents, etc

Source: Hill PDA, supplied by Port Macquarie – Hastings Council

Table 5.3 Retail Floor Area (m^2 Gross Leasable Area) Forecast 2016-2036

	2015			Forecast			
Centre	Supermarkets and Grocery Stores	Other Retail	Total Retail	2016	2021	2026	2036
Greater CBD							
Port Central	2,450	12,350	14,800	15,192	17,153	19,113	23,035
Balance of Port Macquarie Town Centre	4,200	27,750	31,950	32,797	37,029	41,262	49,728
Settlement City	4,250	13,850	18,100	18,580	20,977	23,375	28,171
Warlters Street & Foreshore Precincts	0	4,200	4,200	4,311	4,868	5,424	6,537
Gordon Street	1,600	5,700	7,300	7,493	8,461	9,428	11,362
Munster Village	500	250	750	770	869	969	1,167
TOTAL CBD	***13,000***	***64,100***	***77,100***	***79,143***	***89,357***	***99,571***	***120,000***
Wauchope	1,600	7,650	9,250	9,381	10,036	10,690	12,000
Laurieton	2,400	5,450	7,850	8,048	9,036	10,024	12,000
Lakewood	3,250	600	3,850	3,905	4,179	4,452	5,000
Lake Innes	3,000	900	3,900	4,190	5,643	7,095	10,000
Lake Cathie	2,800	950	3,750	3,810	4,107	4,405	5,000
Lighthouse Plaza	3,000	1,000	4,000	4,048	4,286	4,524	5,000
North Haven	200	1,900	2,100	2,095	2,071	2,048	2,000
Kew	200	100	300	381	786	1,190	2,000
Kendall	200	700	900	952	1,214	1,476	2,000
Lighthouse Beach	100	650	750	810	1,107	1,405	2,000
Flynn's Beach	100	800	900	952	1,214	1,476	2,000
Waniora Parkway	300	700	1,000	1,048	1,286	1,524	2,000
Bonny Hills	0	450	450	667	1,750	2,833	5,000
Clifton	200	1,000	1,200	1,238	1,429	1,619	2,000
Thrumster	0	0	0	476	2,857	5,238	10,000
TOTAL LGA	**30,350**	**86,950**	**117,300**	**121,144**	**140,358**	**159,570**	**198,000**

Table 5.4 Non-retail (Office) Floor Area (m^2 Gross Leasable Area) Forecast 2016-2036

	2015		Forecast			
Centre	Non-Retail Shop Front	Total Shop Front Space	2016	2021	2026	2036
Greater CBD						
Port Central	300	15,100	3,154	3,561	3,968	4,782
Balance of Port Macquarie Town Centre	12,900	44,850	6,808	7,687	8,565	10,323
Settlement City	1,200	19,300	3,857	4,355	4,852	5,848
Warlters Street & Foreshore Precincts	400	4,600	895	1,010	1,126	1,357
Gordon Street	1,400	8,700	1,556	1,756	1,957	2,359
Munster Village	0	750	160	180	201	242
TOTAL CBD	***16,200***	***93,300***	***16,429***	***18,549***	***20,670***	***24,910***
Wauchope	3,000	12,250	1,947	2,083	2,219	2,491
Laurieton	2,800	10,650	1,671	1,876	2,081	2,491
Lakewood	450	4,300	811	868	924	1,038
Lake Innes	500	4,400	870	1,171	1,473	2,076
Lake Cathie	500	4,250	791	853	914	1,038
Lighthouse Plaza	0	4,000	840	890	939	1,038
North Haven	100	2,200	435	430	425	415
Kew	200	500	79	163	247	415
Kendall	200	1,100	198	252	306	415
Lighthouse Beach	150	900	168	230	292	415
Flynn's Beach	0	900	198	252	306	415
Waniora Parkway	0	1,000	218	267	316	415
Bonny Hills	250	700	138	363	588	1,038
Clifton	0	1,200	257	297	336	415
Thrumster	0	0	99	593	1,087	2,076
TOTAL LGA	**24,350**	**141,650**	**25,148**	**29,137**	**33,125**	**41,102**

5.1.3 Office

Information provided by Council indicates that the 117,300 square metres of retail floor space (as detailed in Table 5.3) represents 83% of the total shop-front space in the LGA, with the remaining 17% (approximately 24,350 square metres) used for office and other commercial uses. Non-retail shopfront area therefore represents some 21% of the amount of retail floor space, and it has been assumed that office space will grow at the same rate and distribution as retail space. The assumed quantity of non-retail (office) space is detailed in Table 5.4.

5.1.4 Industrial

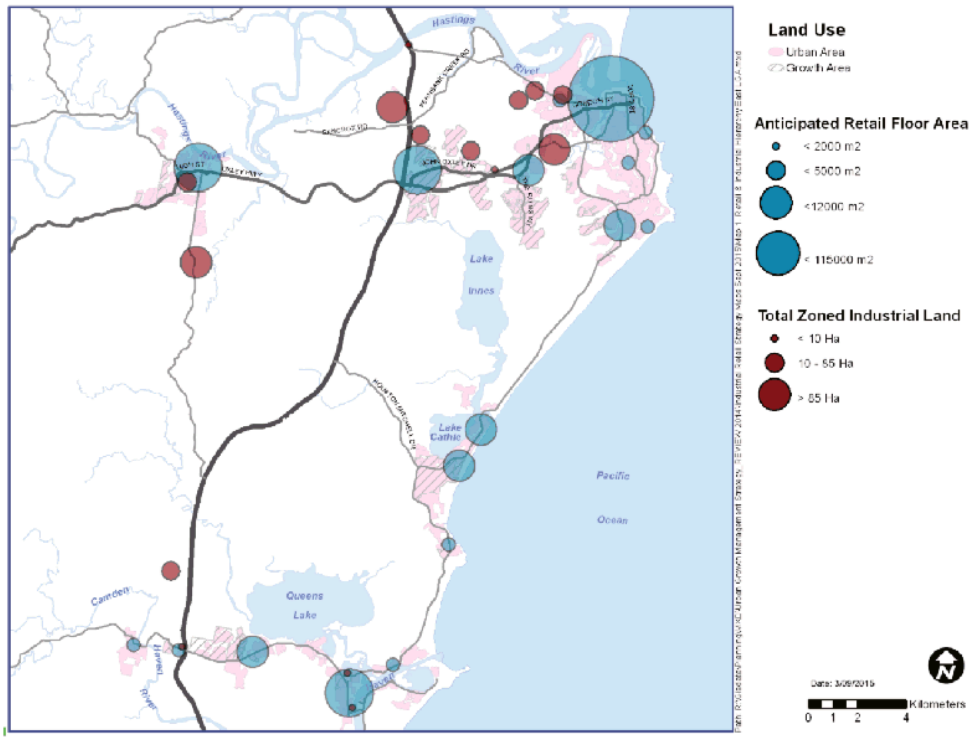
Council has advised that a review of the 2011 Urban Growth Management Strategy by Hill PDA in 2015/16 has found that there is 530 hectares of land zoned for industrial use in the LGA, with approximately 46% occupied / developed. It is broadly estimated that the current supply of zoned industrial land will be sufficient to meet demand to 2036. However some additional land has been identified to meet specific local requirements. These include at the airport, in the John Oxley Drive corridor, and in the Lake Cathie / Bonny Hills corridor. Indicative locations are shown in Figure 5.2.

For the purposes of this assessment it has been assumed that currently vacant industrial land, as well as additional proposed rezonings, will be progressively developed to 2036.

Table 5.5 outlines the assumed changes in industrial land.

Table 5.5 Forecast Change in Industrial Land (hectares)

Precinct	2016 Total Zoned Land	Additional Zoned Land (proposed)	2016 (46% Developed)	2021	2026	2031	2036
Area 13 Employment Precinct	32.4	8	17	23	29	35	40
Lindfield Park Road	7.3		4	5	6	6	7
Lake Road	101		54	66	78	89	101
Bellbowrie	11.1		6	7	9	10	11
Hastings River Drive	18.8		10	12	14	17	19
Birdon Marine	6.4		3	4	5	6	6
Airport	24.3	28	13	23	33	42	52
Wauchope CBD	14.3		8	9	11	13	14
Bago Road	117.2		63	77	90	104	117
Herons Creek	80.7		43	53	62	71	81
Laurieton	5.4		3	4	4	5	5
Sancrox	85.4		46	56	66	76	85
Camden Haven		4	0	1	2	3	4
Lake Cathie - Bonny Hills		10	0	3	5	8	10
Fernbank Creek Road	23.3		13	15	18	21	23
Kew	3		2	2	2	3	3
Total	**530.6**	**50**	**285**	**359**	**433**	**507**	**581**



Source: Port Macquarie – Hastings Council

Figure 5.2 Indicative Industrial and Retail Centre Locations

5.1.5 Summary

Trip Generation

Residential development in the study area is focussed around the north-eastern locations surrounding the Port Macquarie CBD. Over half of all current dwellings are situated in this area.

Growth to 2036 will include over 10,000 additional dwellings, with one third located in the Thrumster and Innes Peninsula growth areas. Over 20% will be located in the Ocean Drive corridor between Lake Cathie and Kew. The remainder will be distributed across the study area, comprising infill development and new subdivisions.

Trip Attraction

In terms of retail and office floor space, the Port Macquarie CBD is the dominant location, containing over 60% of the total retail and office floorspace in the study area. The Port Macquarie CBD is forecast to grow by over 50% to 2036.

Existing centres in Wauchope and Laurieton will continue to be secondary centres, each with up to 12,000 square metres floor area by 2036. These will be supplemented by new centres at Thrumster and Lake Innes, each 10,000 square metres, to support the residential growth in these locations.

The largest areas of zoned industrial land are at Bago Road (Wauchope), Lake Road, Sancrox and Herons Creek, with over 380 hectares in these four locations combined. The major new release of industrial land will be at the Airport Precinct, increasing from 24 to 52 hectares.

5.2 Growth Factors

The estimation of future demand considered the relative growth in various land use types, within discrete geographic sub-areas (as detailed in Section 5.1). Reflecting the format of the source data, the geographic sub-areas for each of the demand segments (residential, retail, office and industrial) are slightly different. The allocation of each centroid to subareas for each demand segment is detailed in Appendix G.

Each centroid in the Aimsun model has been allocated to one of these geographic sub-areas in each of the four demand segments. For each of the centroids the proportion of traffic associated with each of the four demand segments within the area represented by that centroid was assumed to be generally equivalent to the proportion of the area for each segment. For example, if the area represented by a centroid was 60% residential and 40% industrial, then the calculated residential growth factor was applied to 60% of traffic, with the industrial growth factor applied to the other 40%.

Demand Segment growth factors were estimated using the forecasts detailed in Section 5.1 for each geographic subarea. The same growth factor was applied to all similar demand segments within each subarea, in the absence of more detailed localised forecasts of future growth. Combining each land use type gives a growth factor to be applied to total traffic activity between an origin and destination pair for the future year compared to the 2016 base scenario. This process is illustrated in Figure 5.3.

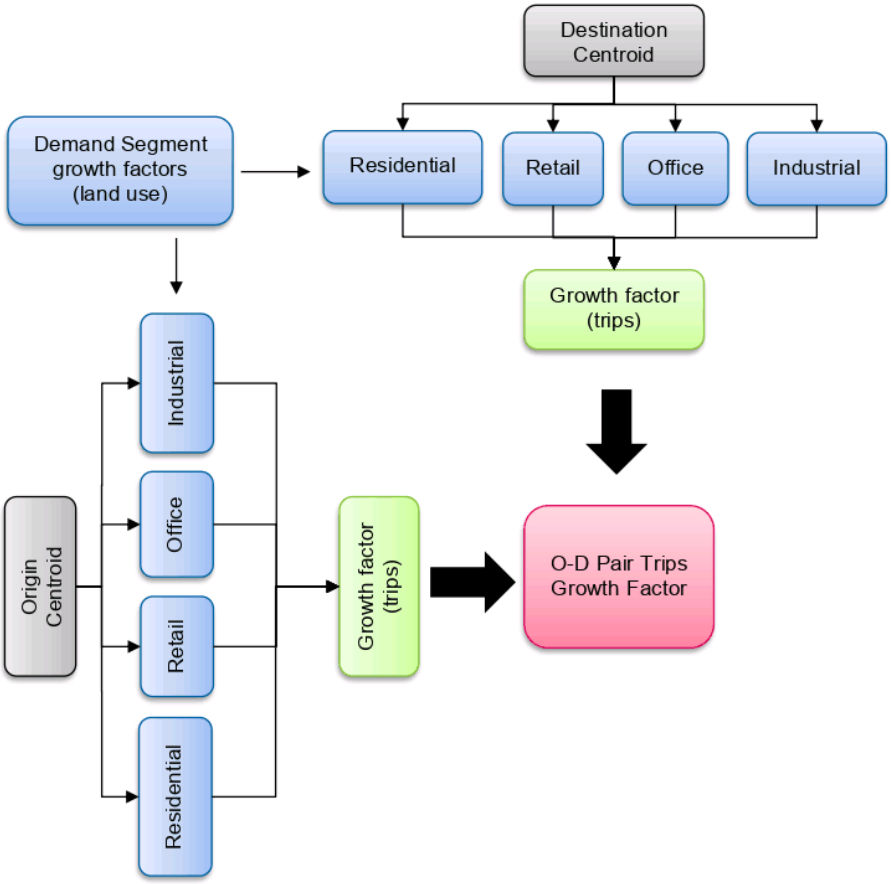


Figure 5.3 Growth Factor Estimation Process

For greenfield developments, where it would not be appropriate to simply apply a growth factor to the existing traffic activity, growth has been estimated from the size of the development and the expected traffic generation, calculated based on adjacent, developed areas, or areas of equivalent development. The calculated traffic associated with the greenfield development was then applied to a new centroid at the location that traffic would enter the road network.

To disaggregate the growth between centroid pairs a Gravity Model using the Detroit Model methodology was used to allocate vehicle trips throughout the network. The Detroit Model methodology utilises the relative growth of each centroid of a centroid pair and the overall growth in the network and proportionally distributes the growth accordingly. This is done through an iterative process whereby the volumes between all centroid pairs are adjusted progressively until they match with the estimated centroid totals (typically within +/- 5%).

The growth factors applied to all individual zones are detailed in Appendix H. Maps of zone-by-zone growth in trip generation and attraction, between 2016 and 2036, are also included in Appendix H.

5.3 "Do Minimum" Road Network

The base future models assume that the only changes to the existing road network will be projects that have been committed to by State or local government. Within the model area, these committed works are summarised in Table 5.6.

Table 5.6 Committed Road Network Changes

Location	Description of works	Included in model		
		2021	2026	2036
Hastings River Drive	Newport Island Road intersection upgrade (roundabout)	✓	✓	✓
Pacific Highway	Highway Upgrades between Sancrox and Telegraph Point (RMS Project)	✓	✓	✓
Thrumster	Link under Oxley Highway (Carlie Jane Drive)	✓	✓	✓
Lake Road	Jindalee Road intersection upgrade (upgrade roundabout)	✓	✓	✓
Lake Road	Blackbutt Road intersection upgrade (roundabout) and Acacia Avenue turn ban (no right turns)	✓	✓	✓
Park Street	Warlters Street Intersection Upgrade (signals)	✓	✓	✓
Pacific Highway	Sancrox Interchange upgrade (grade separation and service roads)	✓	✓	✓
Hill Street	Granite Street intersection upgrade (roundabout)	✓	✓	✓

Note that since the commencement of this project, and the data collection to inform the traffic model development, several of these projects have been completed, with the remainder either currently under construction or scheduled for construction shortly.

6. Base Conditions Review

The existing road network has been reviewed with regard to a number of factors, including:

- Traffic volumes
- Travel speeds / delays
- Changes in future demand associated with population and land use changes
- Road safety

These are discussed in the following sections, considering the overall network and specific corridors and sub-areas.

6.1 Network Overview

6.1.1 Network Performance

For the modelled part of the study area, network statistics can be drawn that provide an indication of how the network performs as a whole. The extent of the modelled road network is shown in Figure 4.2.

Vehicle Kilometres Travelled (VKT) is the sum of the distance travelled by every trip modelled, across the network. VKT varies as the number of vehicles changes, but also as vehicles choose different routes through the network.

Vehicle Hours Travelled (VHT) is the sum of the travel time for every trip modelled, across the network (only those portions of each trip that occur within the modelled area are included). VHT varies according to the number of vehicles in the network, and the speeds at which they are able to travel.

VKT and VHT can also be used to calculate an average travel speed across the network (average speed = VKT / VHT). In the context of the study area it is noted that long lengths of relatively high speed and high volume roads, such as the Pacific Highway, act to skew the average speed across the network to be relatively high, compared with the posted speed limit in most of the urban areas in the model.

Table 6.1 shows that in the morning peak period, on the current network with only committed modifications, VKT is expected to increase by 45% over 2016 conditions by 2036. This is primarily a result of an increase in traffic on the network associated with population growth and other development. Over the same period, VHT would increase by 57%. The relatively larger growth in travel time (VHT) compared to the growth in travel distance (VKT) indicates a reduction of average speed of 4km/hr. Similar results are forecast in the PM peak period (Table 6.2), with a 3km/hr reduction in average speed forecast.

These results indicate that, without intervention, travel speeds will decline as more traffic is added to the network.

Table 6.1 Base Case Network Statistics, AM Peak Period

	VKT	Change from 2016	VHT	Change from 2016	Avg. Speed (km/hr)	Change from 2016
2016	434,056		7,188		60	
2021	494,307	+14%	8,098	+13%	61	+1 km/hr
2026	552,611	+27%	9,381	+30%	59	-1 km/hr
2036	628,053	+45%	11,312	+57%	56	-4 km/hr

Table 6.2 Base Case Network Statistics, PM Peak Period

	VKT	Change from 2016	VHT	Change from 2016	Avg. Speed (km/hr)	Change from 2016
2016	604,638		9,890		61	
2021	702,822	+16%	11,740	+19%	60	-1 km/hr
2026	790,493	+31%	13,310	+35%	59	-2 km/hr
2036	897,018	+48%	15,374	+55%	58	-3 km/hr

6.1.2 Traffic Volumes

Figure 6.1 and Figure 6.2 show the distribution of traffic volumes across the modelled area in the 2016 AM and PM peak hours respectively (volumes outside the modelled area are generally in the lower range of volumes). It can be seen that the highest volumes occur on the key arterials accessing central Port Macquarie, including Oxley Highway, Ocean Drive and Lake Road.

Lane density, as shown in Figure 6.3 and Figure 6.4 for the 2036 AM and PM peak hours respectively, is another measure of traffic activity that takes into account the additional capacity where multiple traffic lanes are provided on a road. Using this measure, the busiest road segments are expected to occur around the Oxley Highway / Pacific Highway interchange, Oxley Highway through Thrumster, Lake Road, Ocean Drive and parts of the Oxley Highway through Wauchope.

It is noted that this measure of density is not necessarily an indicator of road performance, and so the modelled speeds on the network, as a proportion of the posted speed limit, have also been considered. Where traffic is able to travel close to the posted speed limit, the value will be close to 100%. Where traffic is moving slowly, the value will be closer to 0%.

The Austroads Guide to Traffic Management nominates Level of Service bands for various ratios of travel speed to free flow speed for urban arterial roads with interrupted flow (e.g. frequent intersection control etc). Whilst a lot of the modelled network does not have these characteristics, the results none-the-less give an indication of Level of Service. The Level of Service bands are detailed in Table 6.3. Ideally, roads should operate at Level of Service C or better.

Table 6.3 Travel Speed Level of Service Criteria

Level of Service	Travel speed as a percentage of free flow speed	Colour Legend (Figure 6.5 and Figure 6.6)
A	> 85%	
B	67-85%	
C	50-67%	
D	40-50%	
E	30-40%	
F	≤30%	

Source: Austroads Guide to Traffic Management Part 3

Figure 6.5 identifies potential issues on Oxley Highway approaching Wrights Road and in the vicinity of the Hastings River Drive / Ocean Drive intersection. Ocean Drive itself is also slow in sections, particularly around Lake Road. In many of the locations where slower speeds are modelled in 2036, slower speeds are also modelled in 2016 conditions. However by 2036 the extent of the slower conditions is often across a longer length of road, rather than concentrated in particular segments.

Similar patterns are observed in the PM peak (see Figure 6.6), although the issues of slower speeds are not as acute.

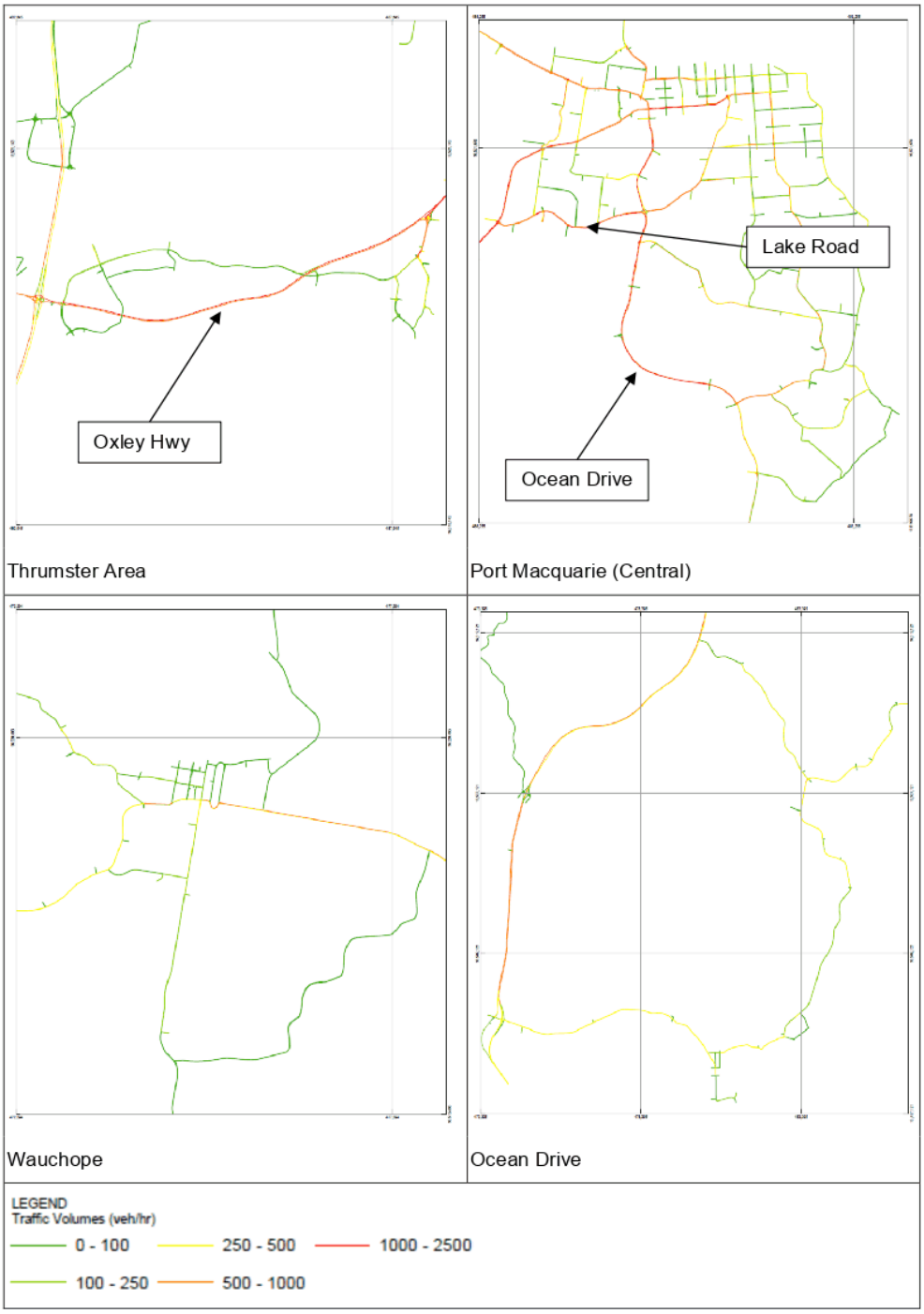


Figure 6.1 2016 AM Peak Hour Modelled Volumes

Larger versions of these figures are contained in Appendix A.

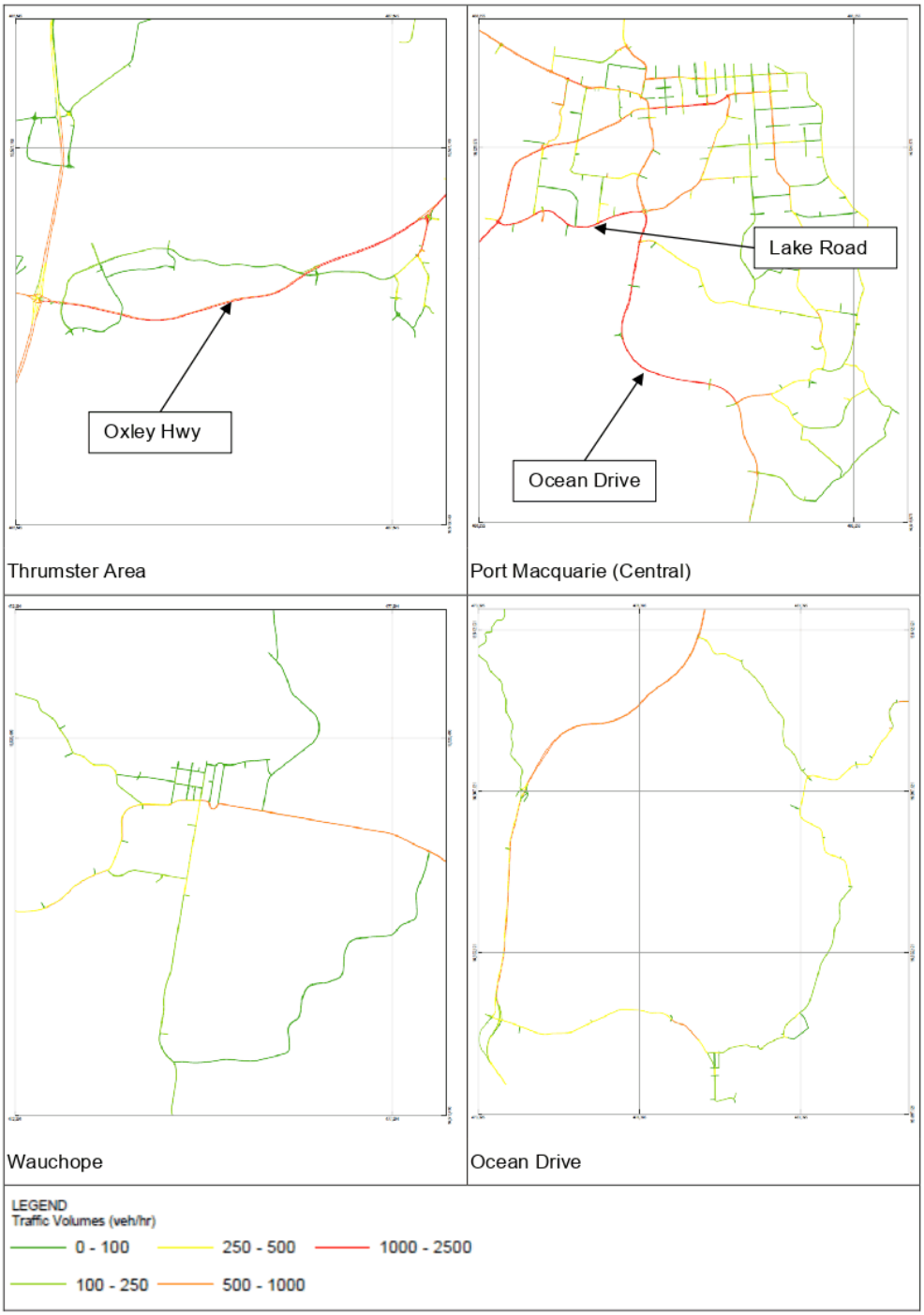


Figure 6.2 2016 PM Peak Hour Modelled Volumes

Larger versions of these figures are contained in Appendix A.

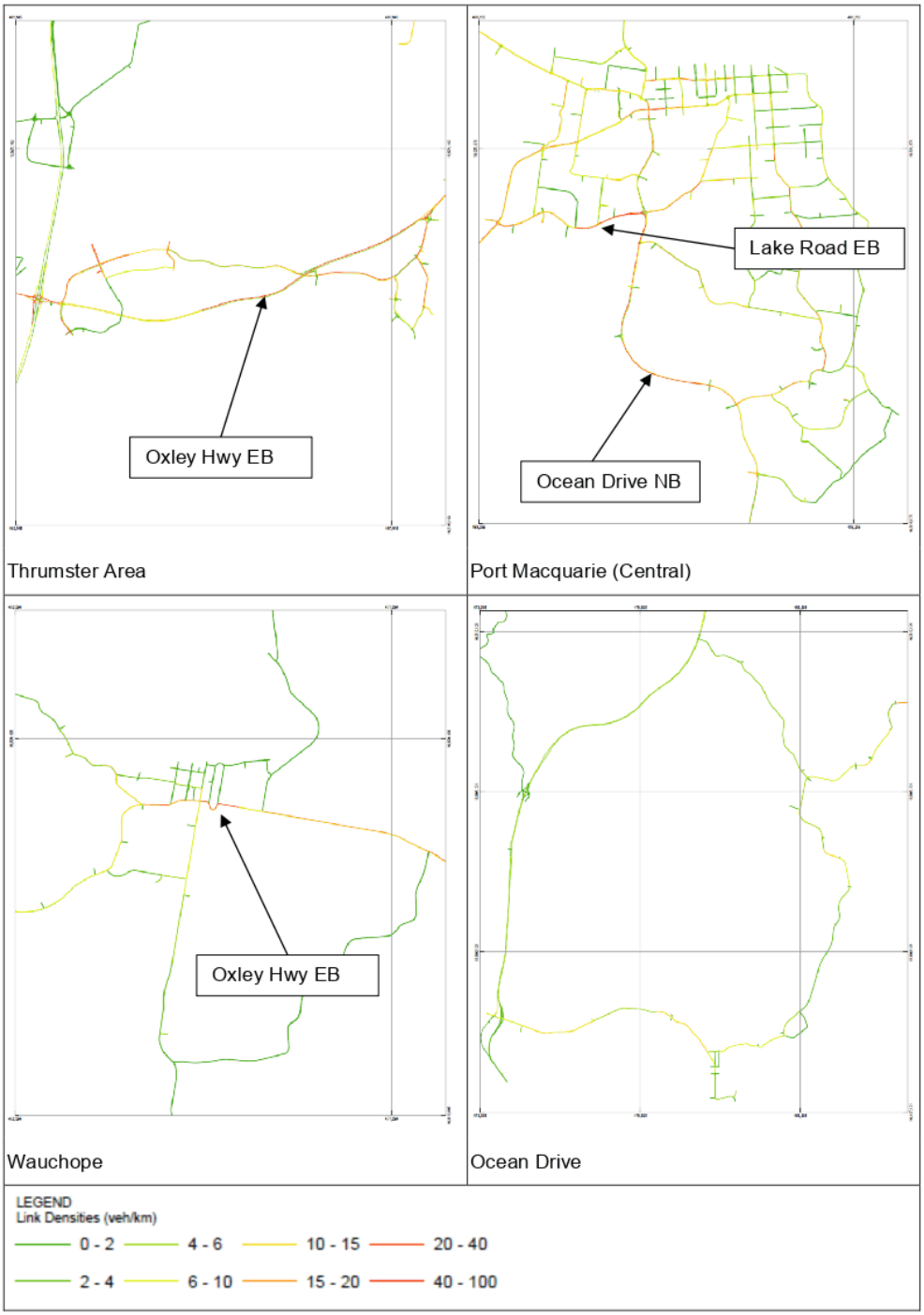


Figure 6.3 2036 AM Peak Hour Lane Density

Larger versions of these figures are contained in Appendix B.

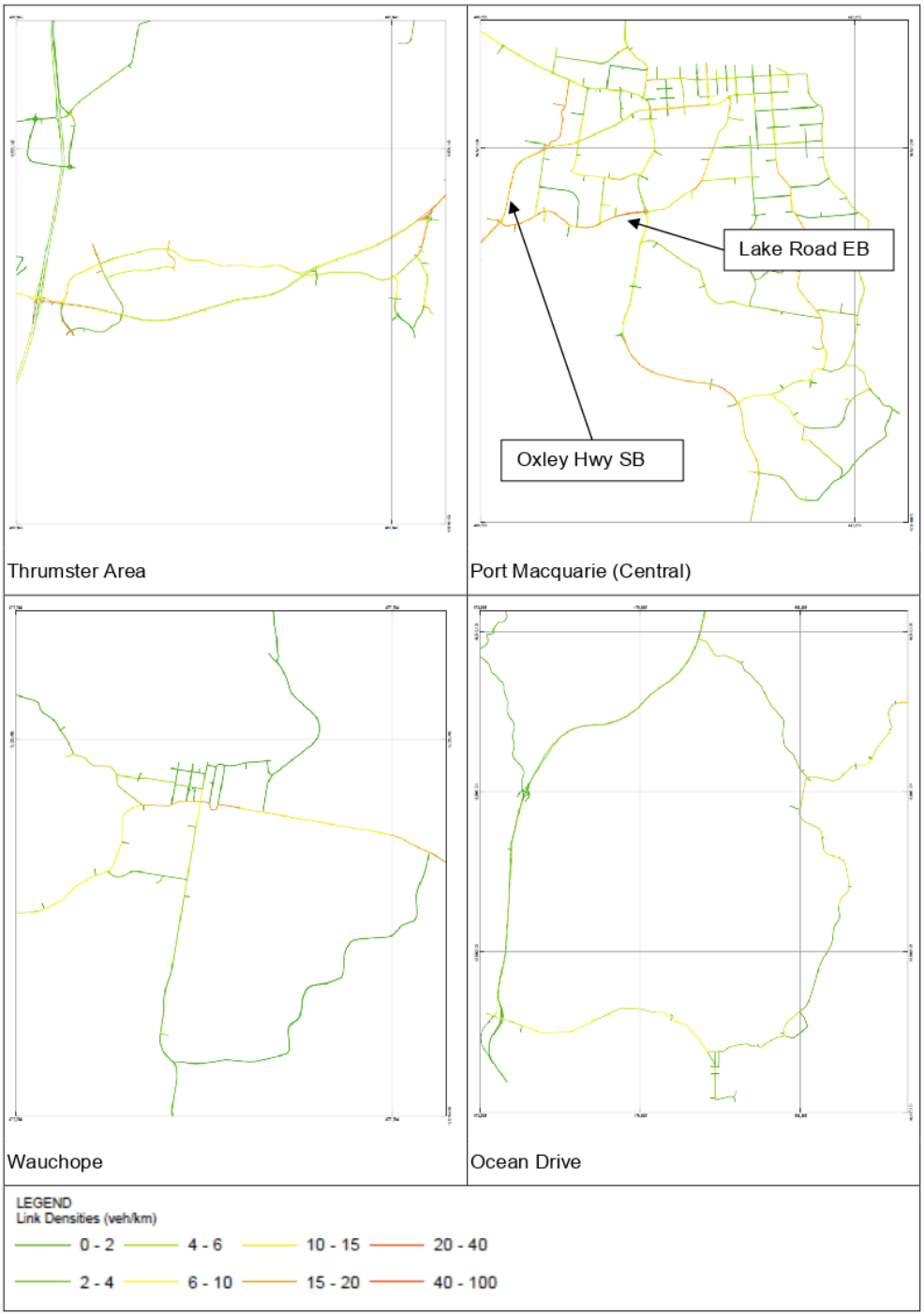


Figure 6.4 2036 PM Peak Hour Lane Density

Larger versions of these figures are contained in Appendix B.

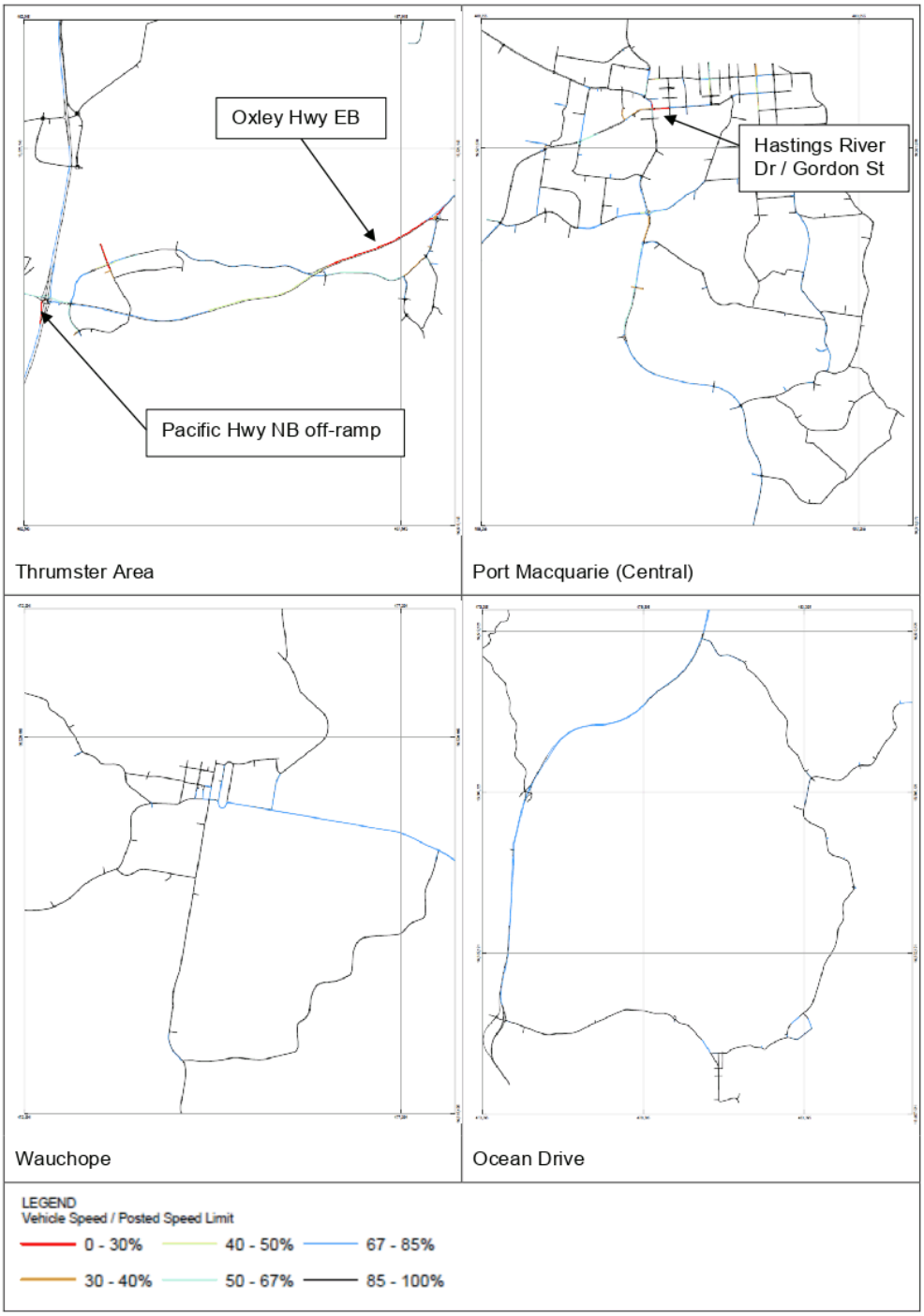


Figure 6.5 2036 AM Peak Speeds Relative to Speed Limit

Larger versions of these figures are contained in Appendix C. Level of Service criteria are outlined in Table 6.3.

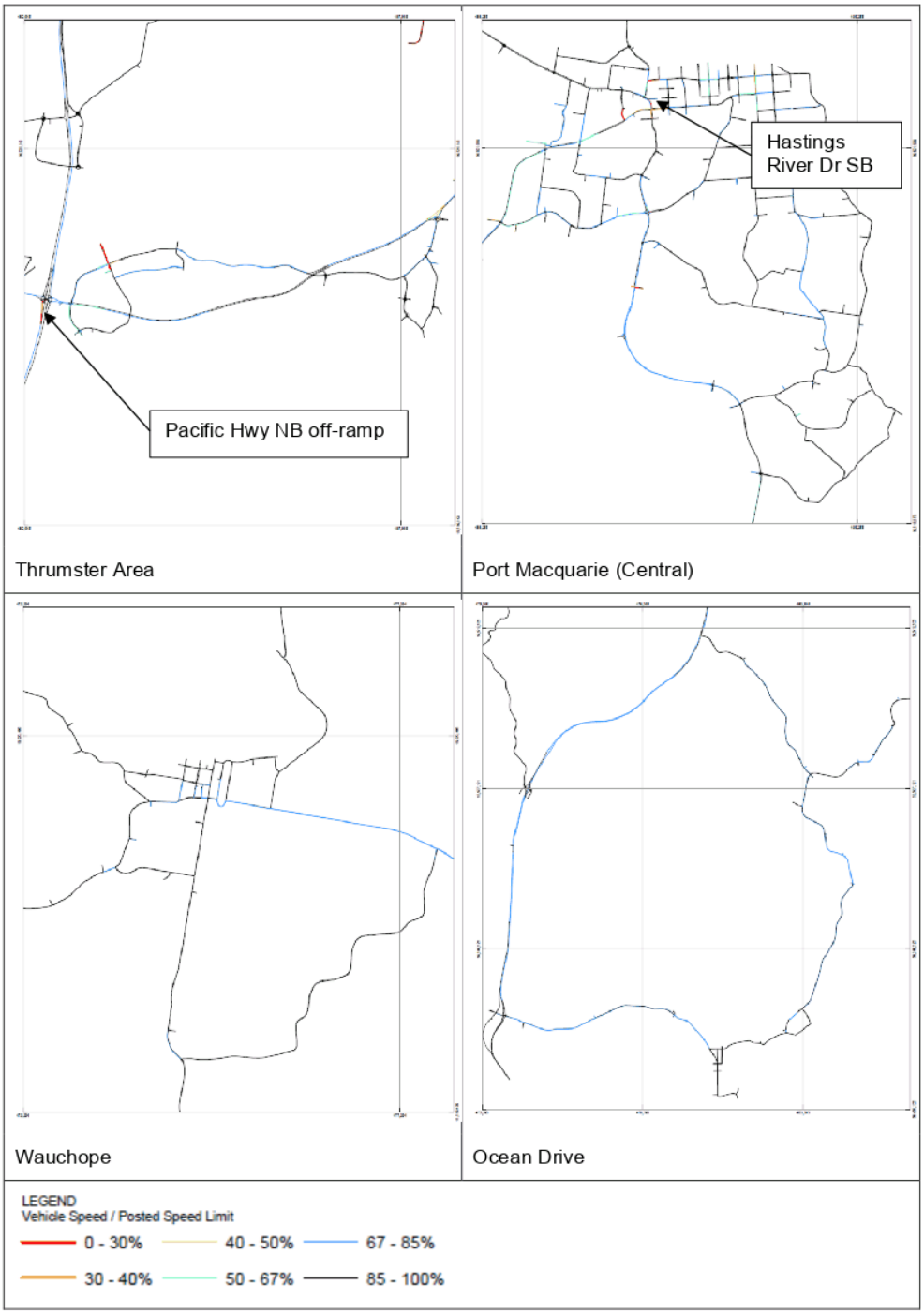


Figure 6.6 2036 PM Peak Speeds Relative to Speed Limit

Larger versions of these figures are contained in Appendix C. Level of Service criteria are outlined in Table 6.3.

6.1.3 Road Safety

The reported crash history for the Port Macquarie – Hastings local government area was provided by Council for the 5-year period 2012-2016 (see Section 3.5). The location of crashes are shown in the following figures, along with a representation of crash density (crashes per 500m radius). The highest density of crashes is in the Port Macquarie CBD (see Figure 6.7), with other significant concentrations on Hastings River Drive and Lake Road (Figure 6.7), and Wauchope, the intersection of the Pacific Highway with Hastings River Drive, the Pacific Highway / Oxley Highway interchange, and the Oxley Highway / Sancrox Road intersection (Figure 6.8).

Approximately 15% of all crashes occurred on each of the Pacific and Oxley Highways, with almost half of all fatal crashes occurring on the Pacific Highway.

Approximately half of all crashes in the study area occurred in the inner Port Macquarie urban area. Dominant crash types include vehicles leaving the road, rear-end and lane-change crashes, and crashes at intersections. Pedestrian crashes make up a small proportion of overall crashes, but the fatal crash recorded in the inner area involved a pedestrian.

There was a particular concentration of crashes around Lake Road, including 12 rear-end type crashes.

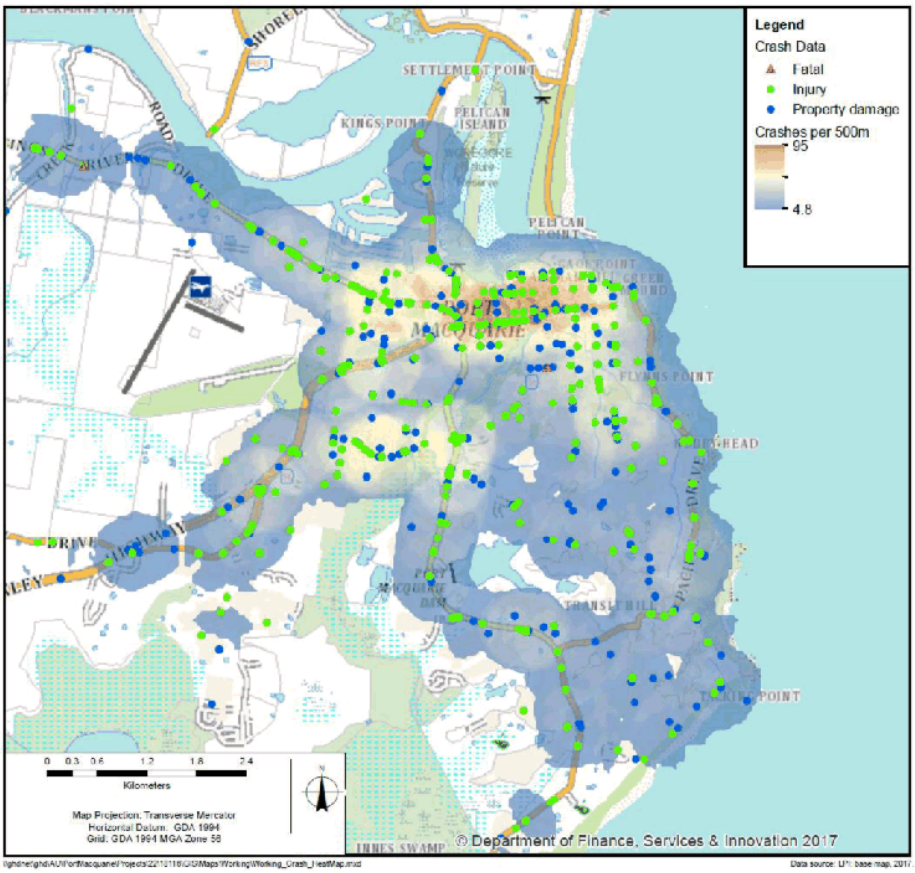


Figure 6.7 Crash location and density 2012-2016, Port Macquarie Urban

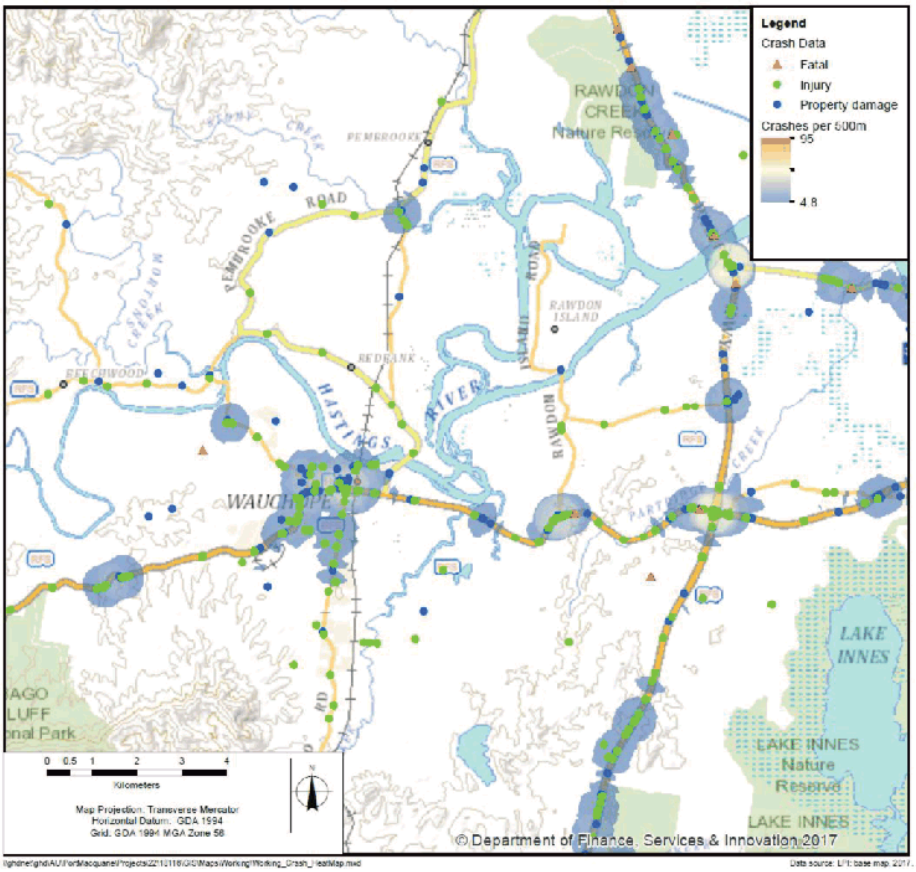


Figure 6.8 Crash location and density, 2012-2016, Wauchope area

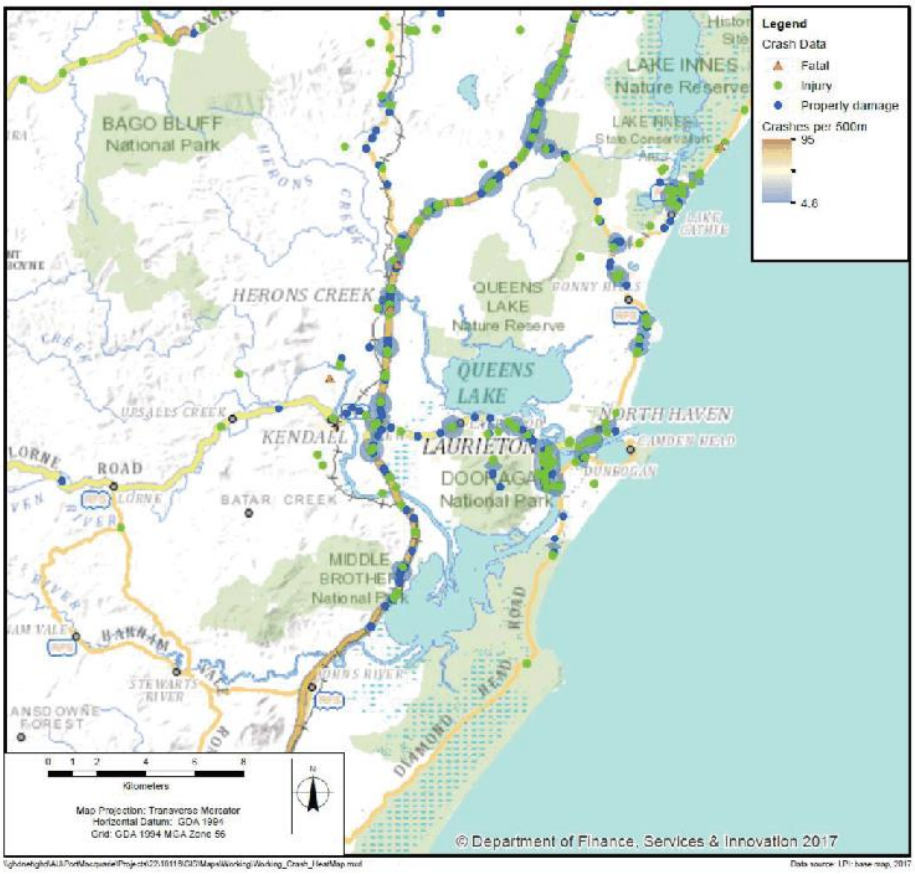


Figure 6.9 Crash location and density, 2012-2016, Camden Haven area

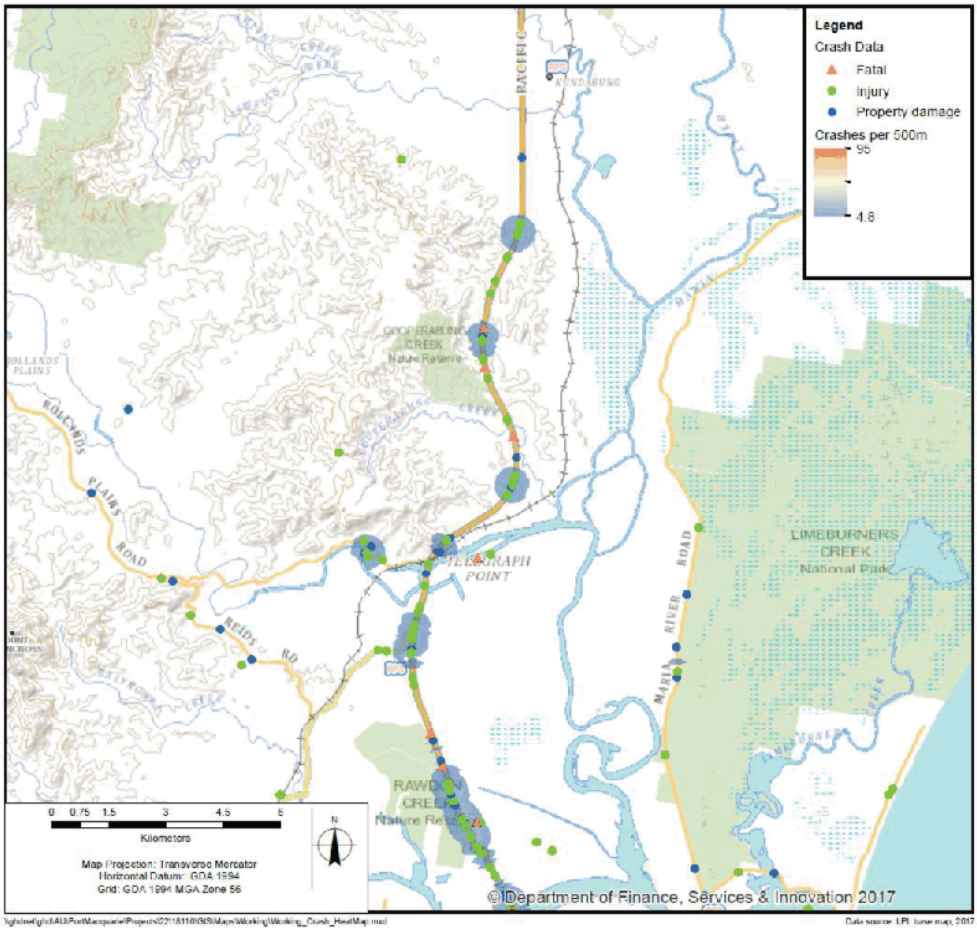


Figure 6.10 Crash location and density, 2012-2016, Telegraph Point area

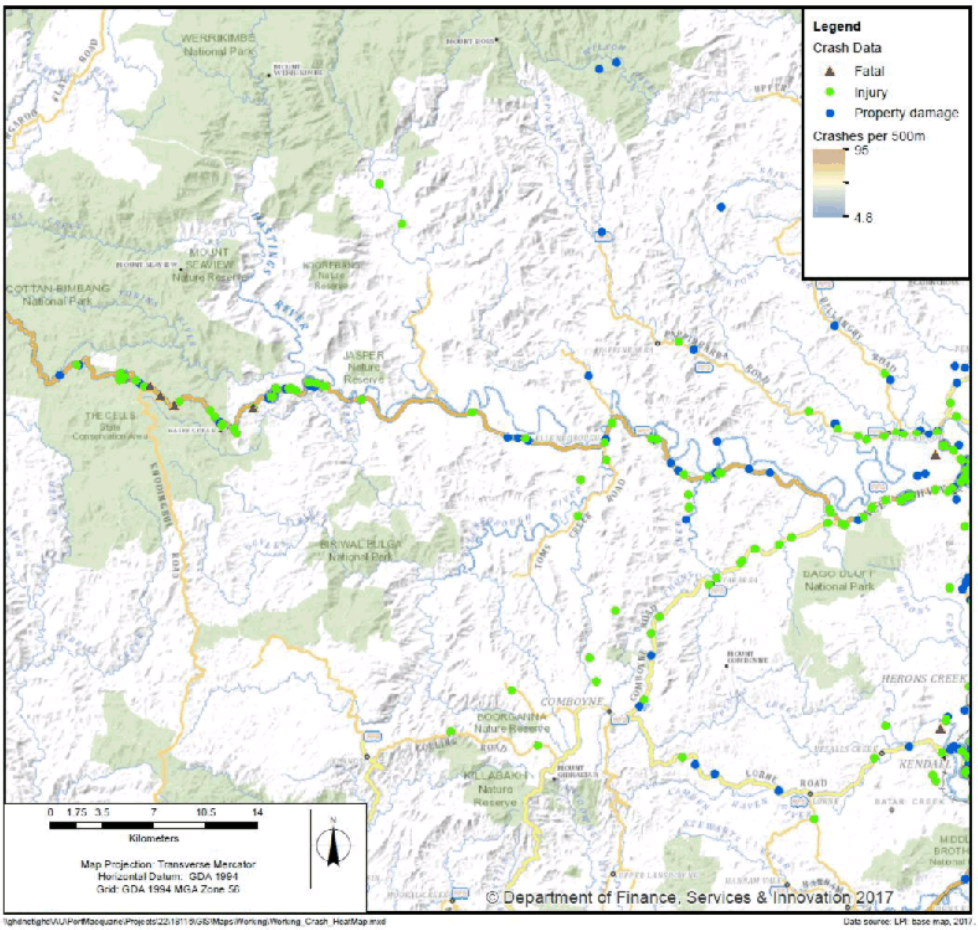


Figure 6.11 Crash location and density, 2012-2016, Oxley Highway west

6.2 Oxley Highway Corridor

The Oxley Highway is the major east-west corridor connecting the Port Macquarie CBD with the Pacific Highway and Wauchope. The area west of Wauchope is considered in Section 6.7.

6.2.1 Traffic Volumes

Traffic volumes on Oxley Highway vary considerably along its length. The busiest section of Oxley Highway is south of Lake Road, with volumes of 2,300 vehicles per hour in the 2016 morning peak hour. Volumes at the eastern end of the Oxley Highway, closest to the CBD, reduce significantly suggesting that most traffic in this corridor is not destined for the CBD itself but rather are diverting to other locations in the inner area particularly via Lake Road and Clifton Drive.

Many of the future growth areas planned for the study area are in the Oxley Highway Corridor, including Thrumster, Innes Peninsula and rural areas around Wauchope. This will result in significant growth in traffic volumes on Oxley Highway, including a 55% increase in eastbound traffic during the AM peak period south of Lake Road by 2036, compared to 2016 volumes.

Volume Profile

The figures in Appendix D show the modelled profile of traffic activity at various locations along the Oxley Highway. It is clear that traffic volumes at various locations peak at different times. The substantially higher volumes immediately south of Lake Road are also obvious, compared to other locations.

In the morning peak, high volumes are sustained generally up until 9 am. In the afternoon, the profile of traffic activity is generally flatter, although still with peaks in some locations leading up to 4 pm, around 4:30 pm and around 5:15 pm.

6.2.2 Travel Speeds

A key measure of the performance of the network is the speed at which vehicles are able to travel, relative to the posted speed limit. Whilst slower speeds are to be expected at intersections, comparing future forecast speeds with current speeds can give an indication of where conditions are expected to worsen. The following figures show average travel speed for the peak hour, as a proportion of the posted speed limit, for each link along the Oxley Highway, for the 2016 and future years base case scenarios.

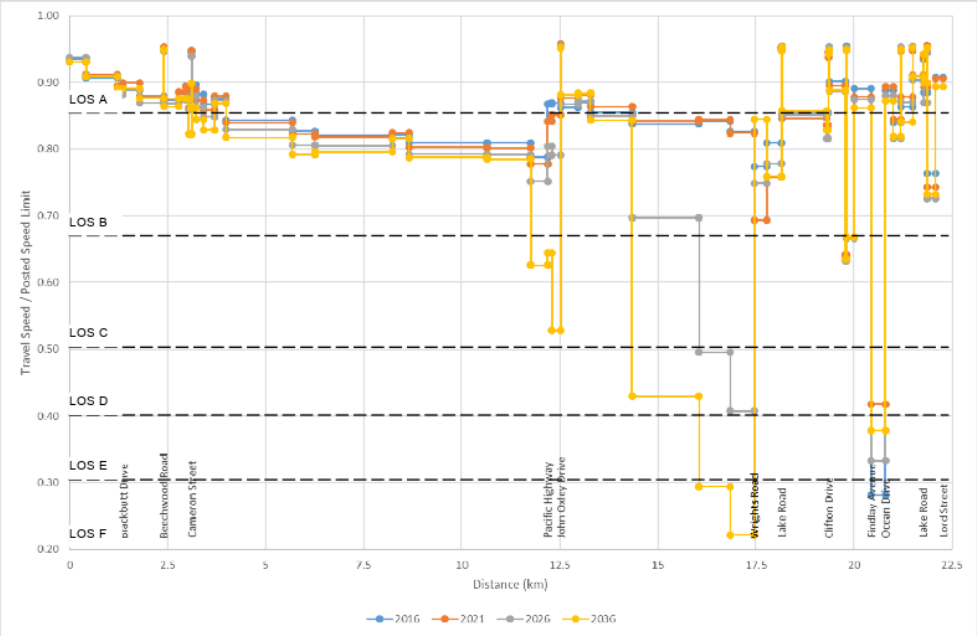


Figure 6.12 Oxley Highway AM Peak Hour Eastbound Speeds Relative to Speed Limit

During the morning peak, eastbound conditions are forecast to significantly deteriorate on approach to Wrights Road after 2021, and around the Pacific Highway / Oxley Highway interchange and John Oxley Drive (west) after 2026. Westbound traffic is slowest approaching Ocean Drive, although conditions are not expected to be much worse than currently experienced.

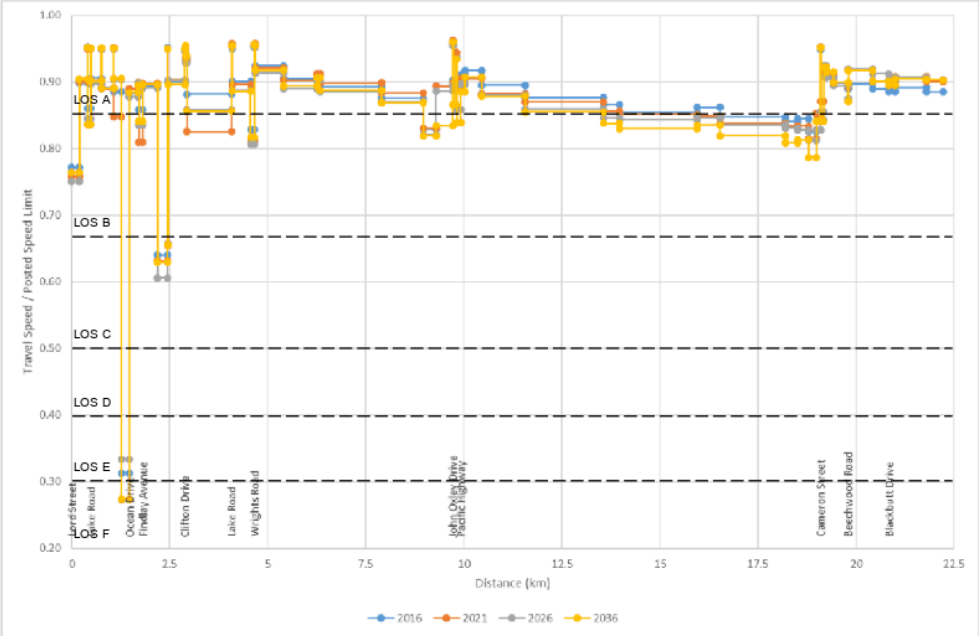


Figure 6.13 Oxley Highway AM Peak Hour Westbound Speeds Relative to Speed Limit

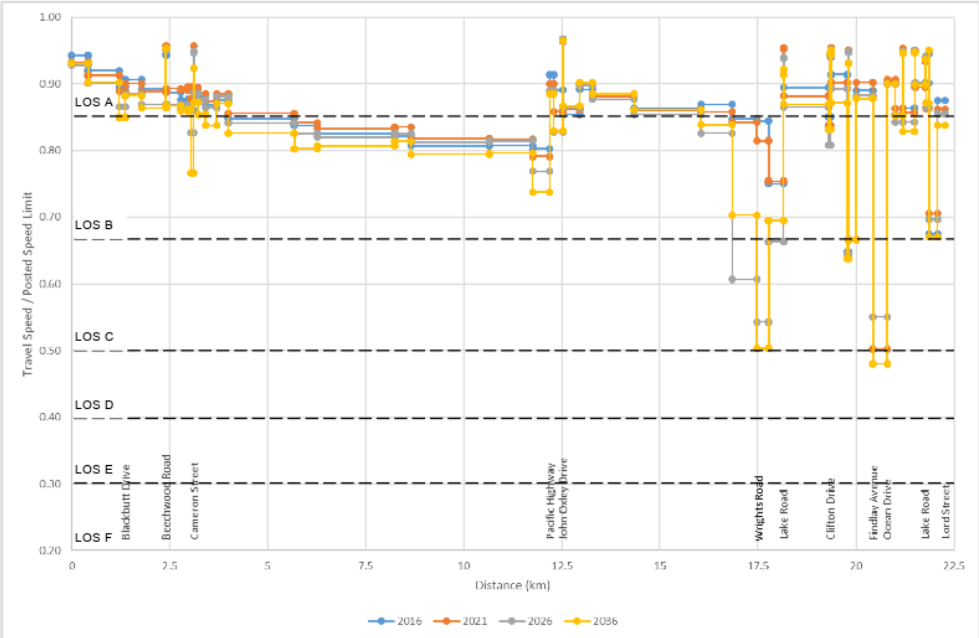


Figure 6.14 Oxley Highway PM Peak Hour Eastbound Speeds Relative to Speed Limit

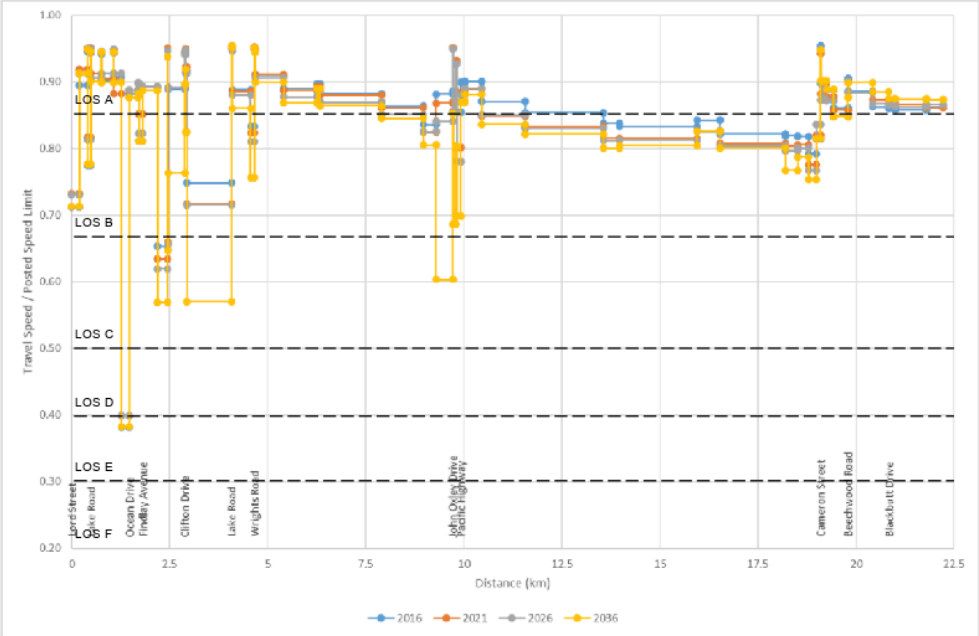


Figure 6.15 Oxley Highway PM Peak Hour Westbound Speeds Relative to Speed Limit

During the PM peak hour, eastbound traffic speeds are forecast to worsen on approach to Lake Road after 2021, with a small reduction in speed at the Pacific Highway interchange. For westbound traffic forecast speeds are substantially reduced compared to existing between Clifton Drive and Lake Road, and approaching the Pacific Highway interchange.

6.2.3 Road Safety

The crash history for the Oxley Highway indicates concentrations of incidents at key junctions, including at the Pacific Highway, Rawdon Island Road, Widderson Street, Wrights Road, John Oxley Drive, Lake Road, Clifton Drive and Ocean Drive / Hastings River Drive. There were two fatal crashes recorded on this section of the Oxley Highway, both involving pedestrians: one near Rawdon Island Road and the other near the Pacific Highway.

The concentration of crashes at junctions is not an unexpected finding, given the volume of activity at some of these locations, and the complexity of junction arrangements in some cases.

6.3 Wauchope Area

Peak volumes on the Oxley Highway east of Wauchope are currently some 700 vehicles per hour, eastbound during the morning peak, with 400-500 vehicles per hour through the town centre. Volumes drop off west of the Wauchope urban area. Blackbutt Drive has relatively low volumes, indicating few vehicles using this route as a bypass of the town centre. However the higher volumes on Cameron Street are the result of the large catchment area to the south of Wauchope which accesses the Oxley Highway via Bago Road.

Future development in the Wauchope area will be focussed on expanded rural living areas in the Beechwood area, and around King Creek. The major development within the area is the Yippin Creek development (which includes the proposed 'Oxley Club' housing estate) which is

estimated to add an extra 1,050 new dwellings within the area. Afternoon peak hour volumes on the Oxley Highway east of Wauchope are forecast to almost double by 2036.

Existing and predicted traffic speeds on roads in the Wauchope area are generally close to the posted speed limit, with the westbound approach to the railway the main exception in both peaks. This indicates that peak period capacity is not a significant issue through Wauchope.

The modelling indicates that along High Street (Oxley Highway) within the Wauchope town centre there was some lowering of travel performance, due to the high number of vehicles turning into and out of side streets and parking areas.

6.3.1 Road Safety

Crashes in the Wauchope area are concentrated on the higher trafficked roads of Oxley Highway, Beechwood Road, and Cameron Street / Bago Road. There were no fatalities, but approximately 60% of crashes resulted in an injury. Almost half of all crashes in the area occurred where a vehicle ran off the road.

6.4 Ocean Drive Corridor

6.4.1 Overview

Volumes on Ocean Drive vary by location, with the busiest sections closer to Port Macquarie (in the north) and the Pacific Highway (in the south), and the quietest sections around North Haven. Volumes peak in the section south of Lake Road (2200 vehicles travelling northbound in the morning peak hour), with many vehicles using Lake Road to access the Oxley Highway corridor. In the lower volume areas of Ocean Drive, directional flows are more balanced, whereas closer to Port Macquarie the peak direction is more apparent.

Major development areas along Ocean Drive will include at Bonny Hills and Lakewood. New development in these areas will access directly onto Ocean Drive, and in most cases traffic generated in these areas will have to travel through existing areas like Laurieton and Lake Cathie, and into Port Macquarie which will add to existing traffic.

This will result in significant growth in traffic volumes on parts of Ocean Drive, up to a 30-35% increase in peak period volumes south of Gordon Street and east of the Pacific Highway by 2036, compared to 2016 volumes.

Volume Profile

The figures in Appendix D show the modelled profile of traffic activity at various locations along Ocean Drive. Figure 6.16 shows that northbound traffic in the morning has a relatively flat peak period, for those locations closest to Port Macquarie, with volumes dropping sharply after 9 am as people arrive at work and school. The morning peak for most southbound locations is at around 8:30 am.

During the afternoon, there is a sharp peak for northbound traffic approaching Lake Road up to 3:30 pm, with traffic volumes dropping after that time. Northbound peaks are less obvious at other locations. For southbound traffic the profile is generally less “peaky”. Higher volumes generally occur later in the afternoon than for northbound traffic.

Travel Speeds

The following figures show average travel speed for the peak hour, as a proportion of the posted speed limit, for each link along Ocean Drive, for the 2016 and future years base case scenarios.

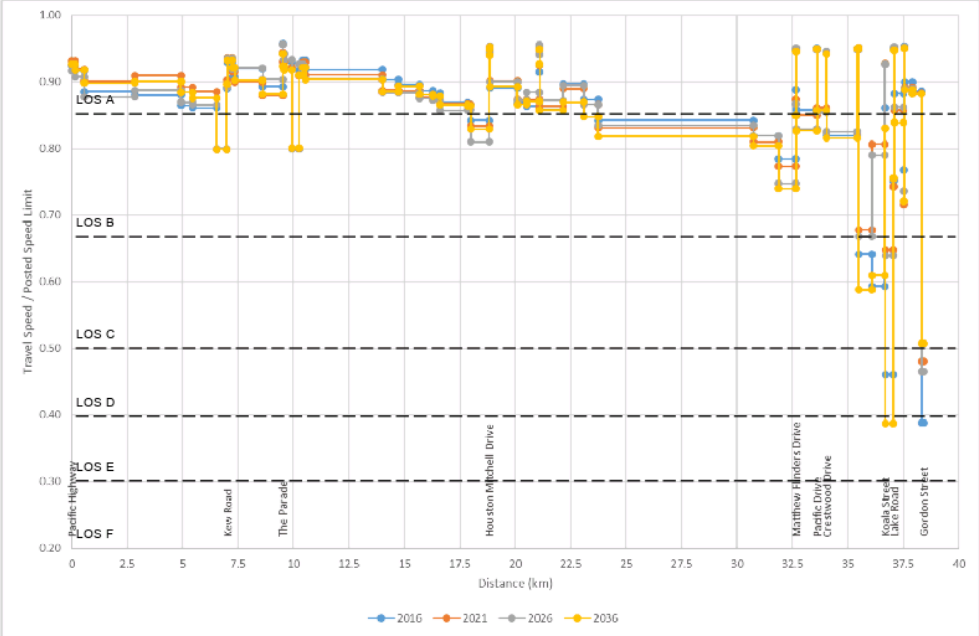


Figure 6.16 Ocean Drive AM Peak Hour Northbound Speeds Relative to Speed Limit

It can be seen that there are few locations where future performance is significantly worse than the current performance. The slowest sections are, naturally, where intersection controls require drivers to slow and/or stop, such as between Crestwood Drive and Gordon Street.

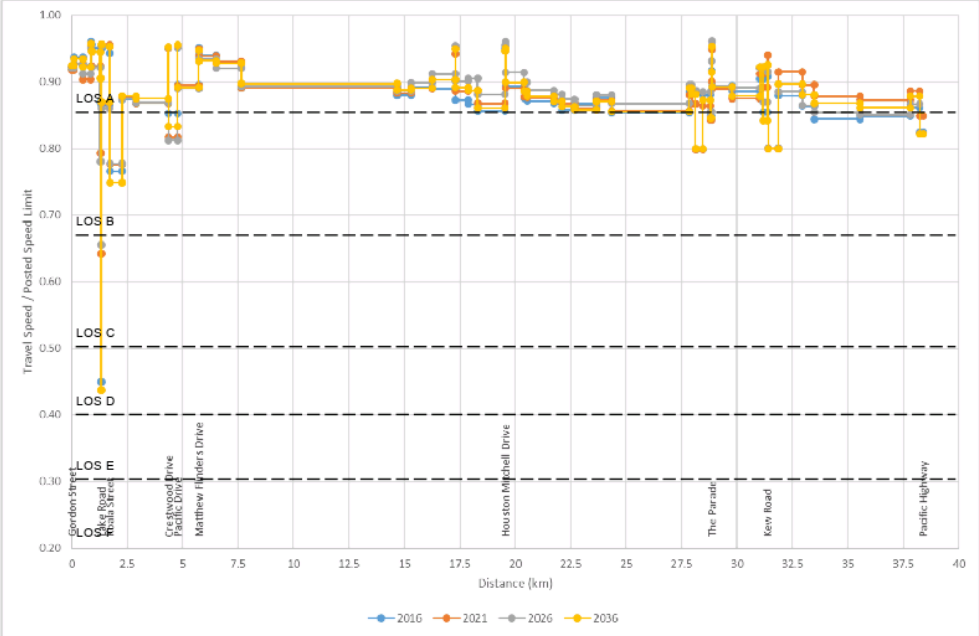


Figure 6.17 Ocean Drive AM Peak Hour Southbound Speeds Relative to Speed Limit

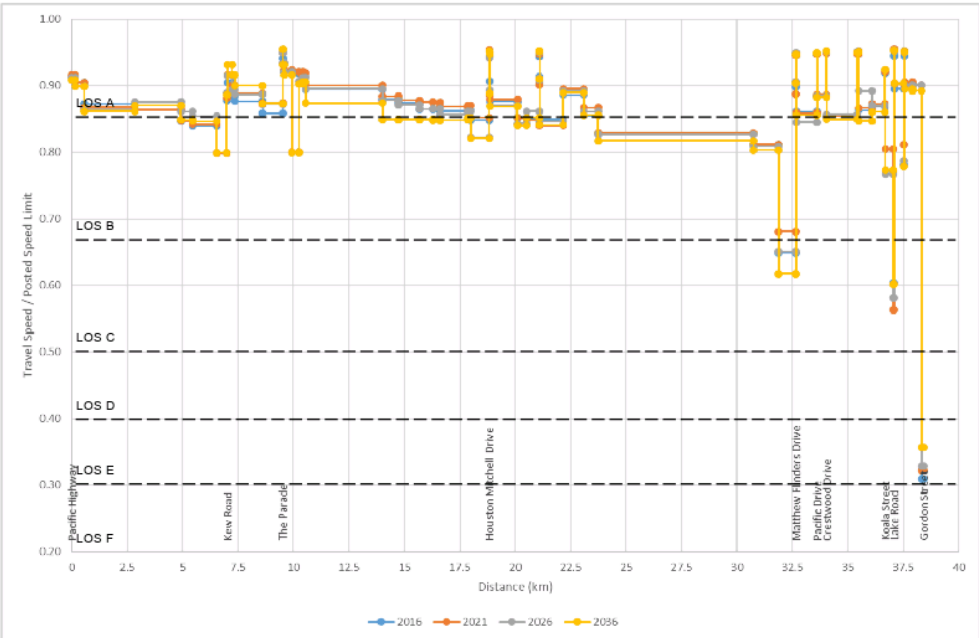


Figure 6.18 Ocean Drive PM Peak Hour Northbound Speeds Relative to Speed Limit

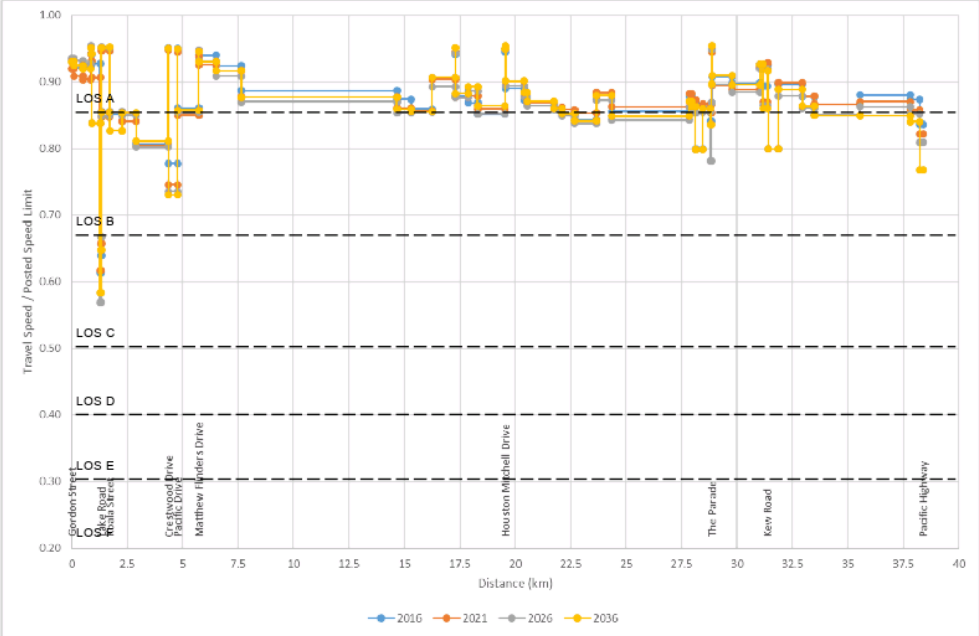


Figure 6.19 Ocean Drive PM Peak Hour Southbound Speeds Relative to Speed Limit

Road Safety

The crash history for Ocean Drive indicates few significant concentrations of crashes, apart from at the Lake Road intersection, Koala Street Intersection and in Laurieton. There was one fatal crash recorded on Ocean Drive between Port Macquarie and Lake Cathie, which involved a vehicle leaving the road.

Common crash types include vehicles leaving the road, and rear-end crashes in urban areas.

6.4.2 Ocean Drive North (North Haven to Port Macquarie)

The northern section of Ocean Drive, between Bonny Hills and Port Macquarie, passes through large areas of undeveloped land, particularly between the villages of Bonny Hills and Lake Cathie. As Ocean Drive enters the Port Macquarie urban area, the context of the road changes. There are still few direct property accesses, but traffic flow is interrupted by roundabouts and traffic signals which provide access to adjacent developed areas.

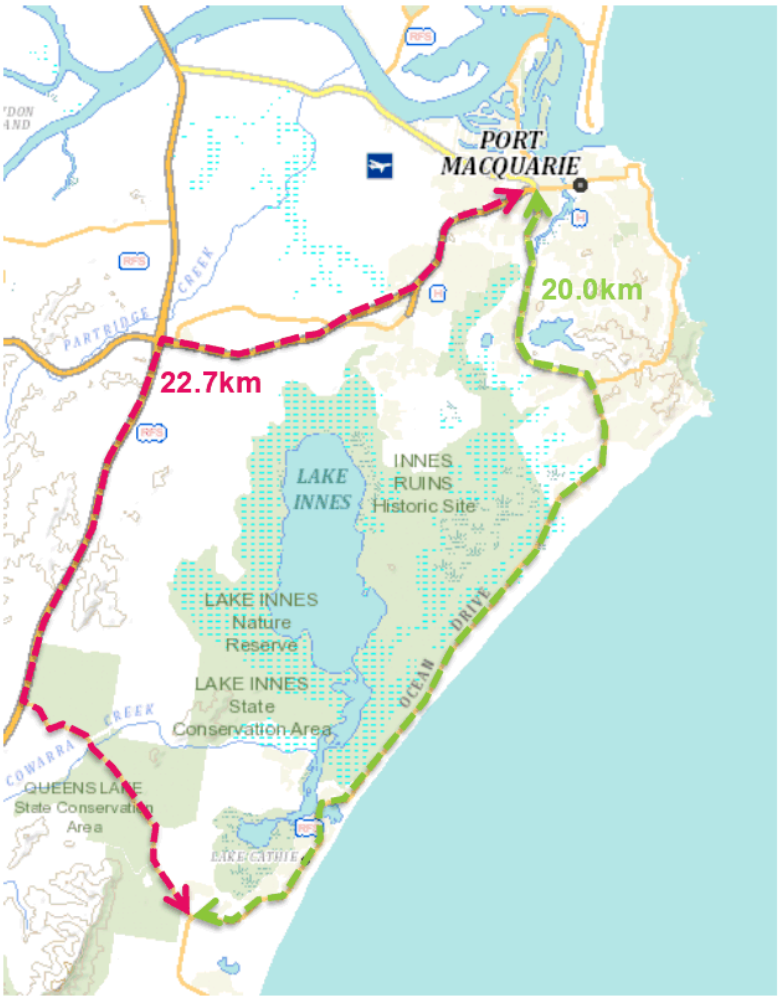
Alternative Routes

It is noted that for trips between Port Macquarie and areas such as Bonny Hills and Lake Cathie, there are two routes available, one being Houston Mitchell Drive / Pacific Highway / Oxley Highway, and the other Ocean Drive.

From the intersection of Ocean Drive and Houston Mitchell Drive, Ocean Drive provides a shorter distance of travel compared to the alternative route (see Figure 6.20). However for northbound trips, Table 6.4 shows that the Pacific Highway / Oxley Highway route currently provides a faster journey to Port Macquarie, due to the higher speeds possible on this route. This is particularly the case for trips to western parts of Port Macquarie. However over time, as additional traffic is added to the Oxley Highway in particular, and delays increase for turning

from Houston Mitchell Drive onto Pacific Highway (see further discussion in 6.6.1), Ocean Drive would become the faster route. This is expected to occur beyond 2026.

For southbound trips, as shown in Table 6.5, Ocean Drive currently provides the faster trip, and would continue to do so into the future.



Base image source: https://maps.six.nsw.gov.au/

Figure 6.20 Ocean Drive Alternative Routes

Table 6.4 Modelled Travel Time Comparison – Bonny Hills to Port Macquarie Northbound

	AM Peak		PM Peak	
	Via Pacific Hwy / Oxley Hwy 22.7 km	Via Ocean Dr 20.0 km	Via Pacific Hwy / Oxley Hwy 22.7 km	Via Ocean Dr 20.0 km
2016	**19:36**	21:37	**18:00**	20:30
2021	**18:45**	20:24	**18:07**	20:25
2026	23:49	**20:24**	**19:29**	20:30
2036	32:06	**21:37**	22:29	**20:39**

Ocean Drive / Houston Mitchell Drive to Ocean Drive / Oxley Highway / Gordon Street / Hastings River Drive

*Fastest route highlighted in **bold**.*

Table 6.5 Modelled Travel Time Comparison – Bonny Hills to Port Macquarie Southbound

	AM Peak		PM Peak	
	Via Pacific Hwy / Oxley Hwy	Via Ocean Dr	Via Pacific Hwy / Oxley Hwy	Via Ocean Dr
2016	19:18	**19:03**	17:29	**16:48**
2021	19:27	**18:54**	17:51	**16:57**
2026	19:45	**18:51**	19:16	**17:00**
2036	19:42	**18:50**	22:16	**17:11**

Ocean Drive / Houston Mitchell Drive to Ocean Drive / Oxley Highway / Gordon Street / Hastings River Drive

*Fastest route highlighted in **bold**.*

6.4.3 Ocean Drive South (Kendall to North Haven)

The southern section of Ocean Drive runs in a generally east-west direction between the Pacific Highway at Kew, and North Haven. It services the established villages of Laurieton, Lakewood , West Haven and North Haven, and the emerging growth area at Camden Haven.

The mesoscopic model covers the area east of Kendall, although Kendall itself is not modelled in detail and is discussed separately below.

Kew – North Haven

The crash history for Ocean Drive South indicates a relatively even spread of crashes along this section. There were no fatalities, but approximately 56% of crashes resulted in an injury. Approximately one third of all crashes in the area occurred where a vehicle ran off the road.

Kendall – Kew

Within Kendall, the North Coast Rail Line crosses River Street at a level crossing. There is no recent crash history at the level crossing, although the movement of trains does result in obstructions to traffic flow from the main residential and commercial areas of Kendall towards the east. As well as passenger train movements (refer to Section 3.3.2) freight train movements also regularly obstruct the road for extended periods.

The main access from the residential and commercial areas of Kendall onto Graham Street and River Street is via Comboyne Street, which brings traffic down from the elevated areas to the lower level of the roads adjacent to the river. Comboyne Street meets Graham Street / River Street at an acute angle, which combined with the grade of Comboyne Street results in restricted sight lines to the left (west). The crash history indicates only a single crash at this intersection, involving a single vehicle leaving the road opposite the intersection.

A review of intersection capacity, using a SIDRA Intersection peak hour model of the junction and counts undertaken in February 2016, also indicates good operation (Level of Service A) from this perspective. Nonetheless the configuration of this intersection is not ideal.

Between Kendall and Kew, a distance of 2.5 kilometres, the road has a daily volume of 4,000 vehicles. It crosses the Camden Haven River a short distance east of Kendall. The bridge is a two lane concrete bridge with a footpath on its western side. The road has a small radius curve on the western approach to the bridge.

The posted speed limit is generally 60 km/hr outside of town limits. The lower speed limit recognises the relatively frequent property accesses. Some sections of the road have a poor running surface and sub-standard shoulders. Overtaking opportunities are limited by centreline markings for a substantial proportion of the road.

The crash history for 2012-2016 indicates six crashes on Graham Street, River Street and Kendall Road. Four crashes involved a single vehicle leaving the roadway, outside the built-up area.

6.5 Hastings River Drive Corridor

Peak traffic volumes on Hastings River Drive occur in the section between Clifton Drive and Findlay Avenue, with volumes close to 1000 vehicles per hour in each direction during the morning peak period. In the eastern part of the corridor, active land uses result in a relatively even balance of traffic flow, whereas further west the peak direction is more pronounced.

Light industrial development is proposed for the Port Macquarie Airport precinct, with traffic meeting Hastings River Drive at Boundary Street. Significant growth is also expected in the Settlement City area, to the north of Hastings River Drive.

6.5.1 Travel Speeds

The following figures show average travel speed for the peak hour, as a proportion of the posted speed limit, for each link along Hastings River Drive, for the 2016 and future years base case scenarios.

Eastbound traffic is slowed on approach to the traffic signals at Boundary Street, and it is here that the greatest variation between future years is observed in the AM peak hour (eastbound). Apart from this, traffic speeds are expected to be relatively similar to existing conditions into the future.

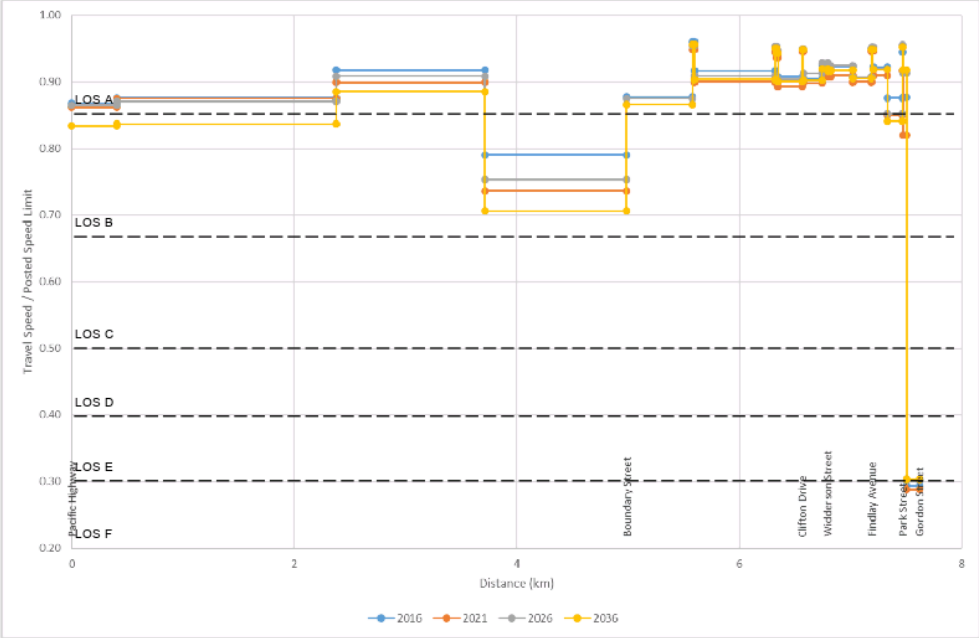


Figure 6.21 Hasting River Drive AM Peak Hour Eastbound Speeds Relative to Speed Limit

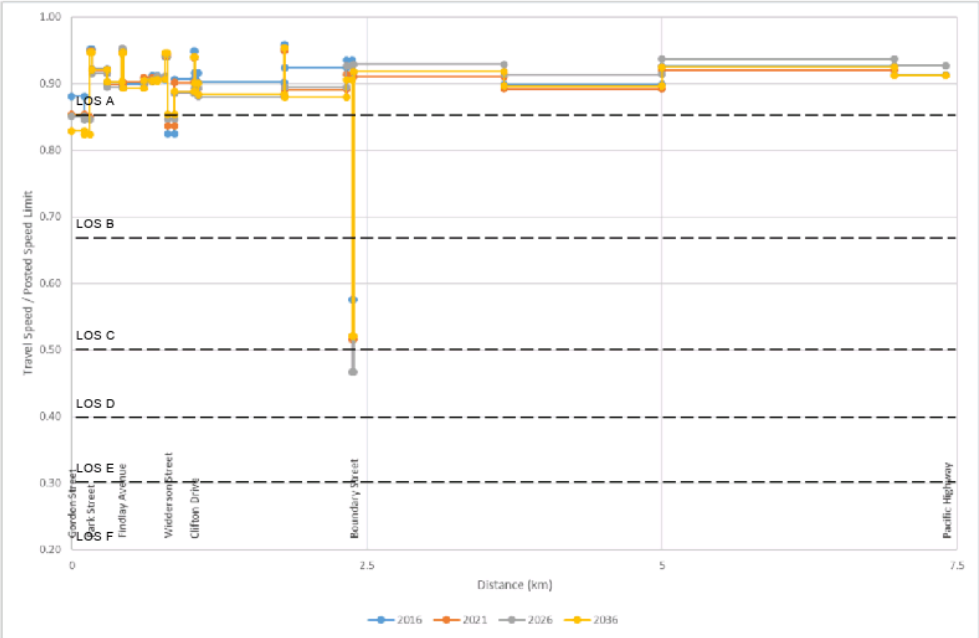


Figure 6.22 Hasting River Drive AM Peak Hour Westbound Speeds Relative to Speed Limit

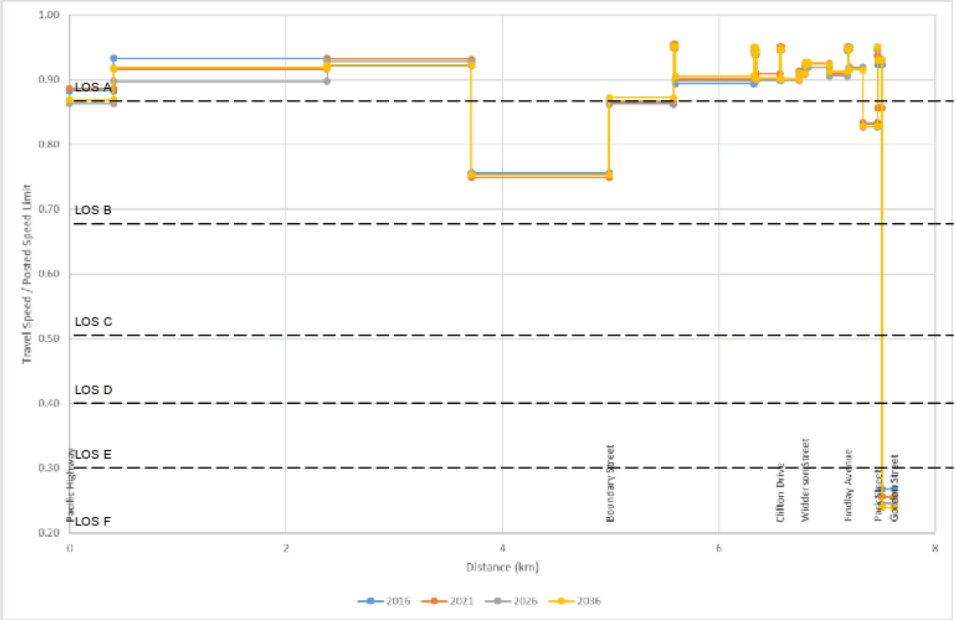


Figure 6.23 Hasting River Drive PM Peak Hour Eastbound Speeds Relative to Speed Limit

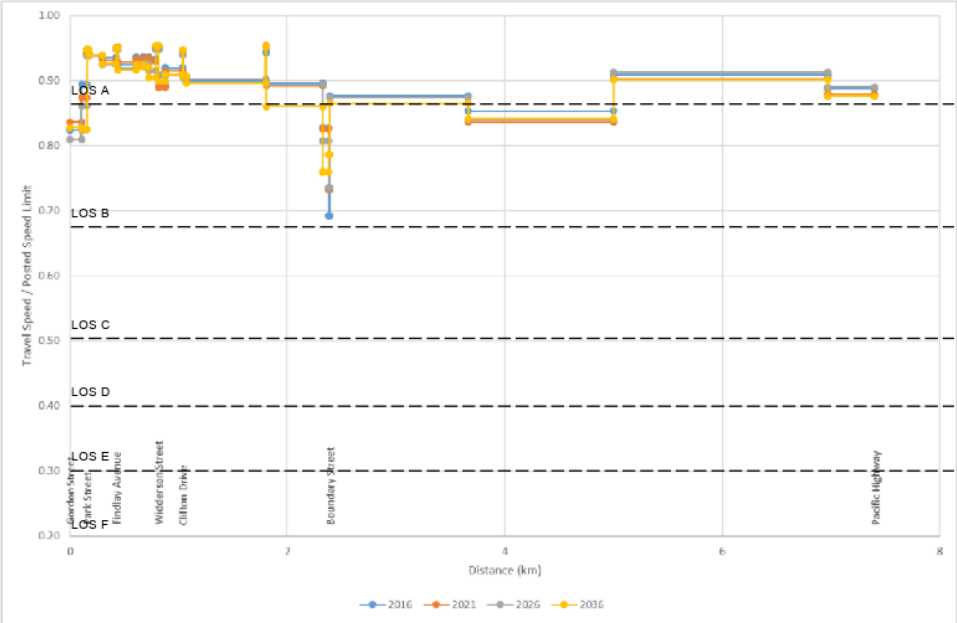


Figure 6.24 Hasting River Drive PM Peak Hour Westbound Speeds Relative to Speed Limit

6.5.2 Road Safety

Aside from a concentration of crashes at the Pacific Highway / Hastings River Drive intersection, the crash history for Hastings River Drive indicates a relatively even spread, particularly towards the eastern end of the road where adjacent development is fairly consistent. Common types of crashes include, not unexpectedly, rear-end type crashes, and off road crashes. There was one fatality in 2015 from a head-on crash. A similar fatal crash occurred in 2017 (not included in the crash history analysed for this project). These occurred between the Port Macquarie urban extents and the Pacific Highway, where Hastings River Drive is characterised by narrow travel lanes and narrow shoulders, with an 80 km/hr speed limit and relatively high traffic volumes.

6.6 Pacific Highway Corridor

6.6.1 Houston Mitchell Drive Intersection

The intersection of the Pacific Highway with Houston Mitchell Drive is currently a channelised seagull intersection. The crash history for this intersection shows five crashes over five years. However, there is no clear trend in the crash data to suggest a particular safety issue.

Notwithstanding, the combination of high speeds on the Pacific Highway and turning traffic using at at-grade intersection is not ideal, and is considered a constraint on traffic using Houston Mitchell Drive for travel between Bonny Hills and Port Macquarie, as an alternative to Ocean Drive.

The surveys taken at this intersection in 2016 indicate that approximately 250 vehicles per hour turn right out of Houston Mitchell Drive onto the Pacific Highway during the morning peak hour. Figure 6.25 shows the future forecast turn movements at this intersection. All movements are expected to grow at similar rates, except the right turn from Houston Mitchel Drive onto Pacific Highway. After 2026 volumes for this movement reduce, due to the difficulty in undertaking this manoeuvre at a high volume at-grade intersection. With increases in through traffic on Pacific Highway of up to 650 vehicles an hour over existing volumes, the occurrence of suitable spaced gaps in the traffic stream for right turns out of Houston Mitchell Drive is diminished and as such vehicles divert onto Ocean Drive to travel north.

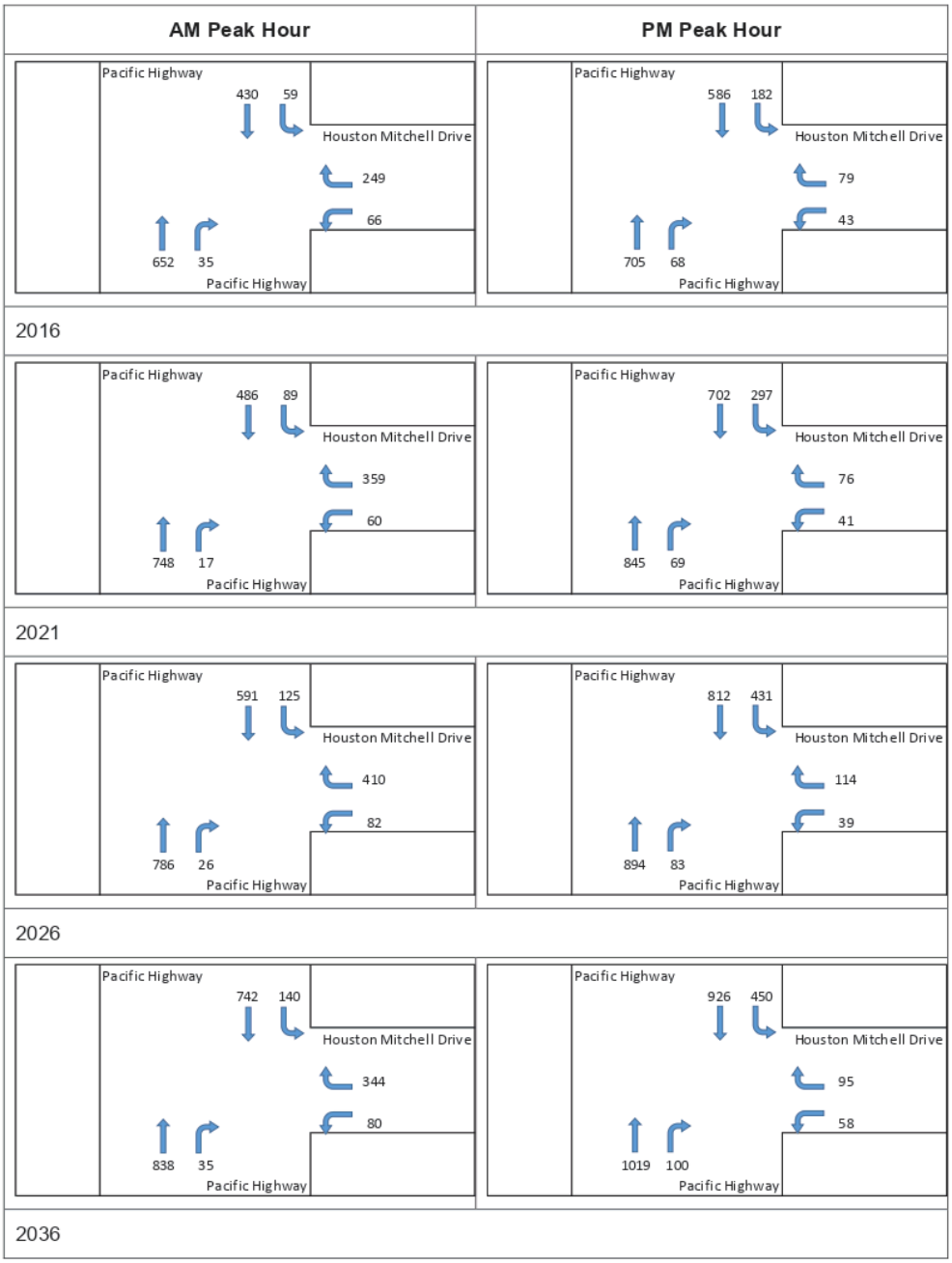


Figure 6.25 Pacific Highway / Houston Mitchell Drive Intersection Volumes

6.7 Non-modelled Areas

The mesoscopic traffic model does not cover the entire study area (the Port Macquarie – Hastings local government area), and so a separate assessment has been undertaken of the road network beyond the extents of the traffic model. The following roads have been considered in this assessment:

- Oxley Highway (west of Wauchope)
- Comboyne Road (Oxley Highway to Comboyne)
- Lorne Road / Graham Street / River Street / Kendall Road (Kew to Comboyne)
- Pappinbarra Road (Beechwood to Pappinbarra)
- Pembrooke Road (Beechwood to Pacific Highway)
- Stoney Creek Road (Oxley Highway to Pembrooke Road)
- Rolland Plains Road (Pacific Highway to Rolland Plains)

6.7.1 Oxley Highway

The Oxley Highway (State Highway 11) links Port Macquarie with the Newell Highway at Coonabarabran, via Wauchope, Walcha, Tamworth and Gunnedah. AADT volumes immediately west of Wauchope are in the order of 2,000-3,000 vehicles per day, dropping significantly at locations further towards the western end of the Port Macquarie – Hastings local government area.

The road is fully sealed, with unsealed shoulders. The highway passes through variously wooded and open terrain, with an undulating and winding alignment resulting in limited overtaking opportunities. Between Wauchope and Comboyne Road, an 80 km/hr speed limit applies. The speed limit west of Comboyne Road is 100 km/hr.

The crash history for 2012-2016 indicates 95 crashes on the Oxley Highway between Wauchope and the LGA boundary, including four fatal crashes and 59 resulting in injury. Two thirds of all crashes involved a vehicle leaving the road, with another 23% involving two vehicles colliding head-on. Almost half of all crashes involved a motorcycle.

6.7.2 Comboyne Road

Comboyne Road (Regional Road 7743) forms part of Tourist Drive 8 connecting Port Macquarie, Wauchope, Byabarra, Comboyne and Wingham and Taree.

Council's records indicate that Comboyne Road has an AADT of between 700 and 800 north of Byabarra and 440 south of Byabarra. The distance between Oxley Highway and Comboyne is approximately 26 kilometres.

The road is sealed between Wauchope and Comboyne and the pavement width is approximately seven metres. The road has edge and centreline markings and there are overtaking opportunities on the section between Wauchope and Byabarra. South of Byabarra the road climbs steeply to the Comboyne plateau and follows several kilometres of winding alignment. Overtaking opportunities are rare and the cross section is severely constrained by high steep cutting on the east and steep embankments on the west. Chain wire fence along the western verge is poorly maintained and may not effectively restrain errant vehicles.

In 2013 a land slip caused by heavy rains caused the closure of Comboyne Road on the steep section south of Byabarra. Alternative access arrangements were made during the closure including the use of Lorne Road.

There are several timber bridges along the route that allow two-way traffic. Council has recently replaced two of these bridges, and another is due to be replaced in late 2018.

The crash history for 2012-2016 indicates 13 crashes on Comboyne Road, mostly resulting in injury. All crashes except one involved a single vehicle leaving the roadway.

6.7.3 Lorne Road

Lorne Road connects Comboyne to Kendall, a distance of 31 kilometres. The road continues through Kendall as Graham Street and River Street, and is known as Kendall Road between Kendall and Kew.

West of Kendall

Council records indicate that Lorne Road has an AADT of 650-1000 between Lorne and Kendall, and 100-300 west of Lorne.

West of Lorne the road is unsealed for approximately 16 kilometres and has a formation width that varies between approximately 5 and 5.5 metres where it passes through heavily wooded terrain. The road follows a curving horizontal and vertical alignment. Safe travel speeds are limited to approximately 50 km/hr at many locations due to limited sight distance and surface conditions. Sections of the road have large diameter trees within or very close to the road formation.

Lorne Road generally parallels the Camden Haven River, crossing it several times. The road is of a reasonable standard between Lorne and Kendall.

The crash history for 2012-2016 indicates six crashes on Lorne Road. All but one of these crashes involved a single vehicle leaving the roadway.

6.7.4 Pappinbarra Road

Pappinbarra Road connects Beechwood to Pappinbarra, a distance of 20 kilometres. At its eastern end it carries up to 900 vehicles per day, but quickly drops to 500 vehicles per day west of Pipeclay Road, and fewer than 100 vehicles per day further west.

The road passes through the village of Hollisdale and generally follows the Pappinbarra River, crossing it via a high level concrete bridge. The road is sealed from Beechwood and appears to be constructed and maintained to an acceptable standard for its relatively low traffic volume.

However, the crash record for Pappinbarra Road, with eight crashes over five years, is disproportionate to the traffic volume. There were six crashes involving a single vehicle leaving the roadway, and one crash involving a head-on collision.

A section of Pappinbarra Road, between Koree Island Road and Pipeclay Road, was upgraded in 2017 to address a blackspot location.

6.7.5 Pembrooke Road

Pembrooke Road connects Beechwood to the Pacific Highway south of Telegraph Creek. Council records show that it had an AADT of 1020 in 2015 south of Redbank Road and an AADT of 1,060 in 2015 west of the Pacific Highway.

The intersection of Pembrooke Road and Redbank Road provides priority to Pembrooke Road traffic. Similarly, traffic travelling between Pembrooke and Beechwood has priority over traffic from Wauchope. The connection to Wauchope via Beechwood Road relies on the bridge over the Hastings River, with tight curves and steep grades on the eastern approach.

Further north, Pembrooke Road traffic has a 3.0 metre vertical clearance under the North Coast railway bridge, restricting some high vehicles (although there is a localised detour with 4.7 metre

clearance). Very close to this is a single-lane low-level wooden bridge over Stoney Creek that restricts capacity and presents a safety hazard due to the approach alignments. Three crashes were recorded in this vicinity in the period 2012-2016.

Overall the crash history for Pembrooke Road 2012-2016 shows 11 crashes, mostly the result of a vehicle leaving the carriageway.

6.7.6 Stoney Creek Road

Stoney Creek Road connects Pembrooke Road to the Oxley Highway, east of Wauchope. It provides an alternative to Pembrooke Road for trips between Wauchope and the Pacific Highway at Telegraph Point. Whilst shorter in distance, Stoney Creek Road is of a lower standard and as such travel time is slightly longer than via Pembrooke Road. Travel via the Oxley and Pacific Highways is marginally longer both in terms of travel time and distance.

Stoney Creek Road intersects with Pembrooke Road at the railway bridge discussed in Section 6.7.5.

North of Redbank Road Stoney Creek Road is relatively narrow, with no line marking or shoulders. It is unsealed for approximately 1 kilometre at its northern end near Pembrooke Road. The section between Redbank Road and the Oxley Highway is a higher standard, with a centre line, unsealed shoulders and roadside barriers where required.

North of Oxley Highway, the AADT in 2016 was 1700. Between Redbank Road and Pembrooke Road the AADT is between 470 and 700 vehicles.

There were seven crashes recorded on Stoney Creek Road during the period 2012-2016, with four on the section south of Redbank Road, and three between Redbank Road and Pembrooke Road. Four crashes involved a single vehicle leaving the roadway, and one involved a head-on collision.

6.7.7 Rollands Plains Road

Rollands Plains Road connects Telegraph Point to Rollands Plains, a distance of 17 kilometres. The road continues a further 8 kilometres to the village of Upper Rollands Plains. Council's records indicate that Rollands Plains Road had an AADT of 740 in 2015 near Telegraph Point, and an AADT of 210 in 2015 further west.

The road is sealed from Telegraph Point to Upper Rollands Plains. It generally follows the Wilson River and crosses it via a low level single lane causeway about five kilometres from Telegraph Point.

There were six crashes recorded on Rollands Plains Road 2012-2016, mostly involving a single vehicle leaving the roadway.

7. Road Network Planning Approaches

In planning for the future needs of the road network, a number of potential responses are available, including construction of new road links, upgrades to existing corridors (including intersection modifications and road widening), localised works to address specific issues, or non-infrastructure approaches including demand management. In this latter issue, there is a strong relationship between traffic demand and land use planning. Consideration of the future urban form of the study area, while beyond the scope of this study, will have a critical effect on travel patterns.

7.1 New Road Links

7.1.1 Network Connectivity

There are some parts of the study area with limited connectivity to other parts, generally a result of geographical constraints. One of the most significant of these is Lake Innes, which restricts east-west road access between Ocean Drive and the Pacific Highway. This results in reliance on Lake Road for movement between the south-eastern residential areas of Port Macquarie, and the Oxley Highway and Pacific Highway corridors.

Similarly, due to constraints such as the Port Macquarie airport there are limited road connections between the Oxley Highway and Hastings River Drive, which results in reliance on local streets such as Clifton Drive.

An "Outer Orbital" road has been suggested as one means of alleviating pressure on Lake Road and Clifton Drive, and improve connectivity between Hastings River Drive, the Oxley Highway and Ocean Drive. By providing an additional link in parallel with Lake Road and Clifton Drive, reliance on these corridors is reduced, and there is greater overall capacity in the network.

7.1.2 Bypass Routes

A bypass route allows through traffic to divert away from a town centre or other built up area, thereby reducing conflict between through traffic and local traffic, and potentially improving safety and amenity on the bypassed section of road. Bypasses can be effective where there are high volumes of through traffic which are impacting on local areas. Bypasses of Bonny Hills and Wauchope have been suggested as potential ways to resolve localised traffic issues in these areas.

7.2 Corridor Upgrades

Instead of increasing capacity by providing a new corridor, upgrades to existing corridors may also improve traffic flow and efficiency. In urban areas, intersections generally form the major constraint on traffic capacity, and therefore improvements to intersections along a corridor also have the potential to improve traffic flow. Where the focus is on traffic throughput, intersection upgrades generally need to occur along the whole corridor, so that there is not a "bottleneck" left.

Corridor upgrades can also assist in providing access from adjacent areas to the arterial road network. For example, given the future growth in areas like Thrumster and Lake Innes, access to John Oxley Drive and Oxley Highway will become more difficult without changes to key intersections to make access safer and more efficient, as well as providing for through traffic along these corridors.

On corridors where major intersections are currently controlled by roundabouts, the give-way protocols can result in small volumes of turning traffic delaying through traffic, or through traffic making access from side roads difficult. In such situations, conversion of roundabouts to traffic signals can result in improved overall access, by giving each movement regular "guaranteed" time.

Corridors that can be considered for upgrade include Hastings River Drive, Ocean Drive (north), John Oxley Drive and Lake Road.

In rural areas, corridor upgrades may consist of road widening, shoulder sealing, provision of overtaking lanes or other treatments. The Oxley Highway (west of Wauchope), Comboyne Road, Lorne Road and Pappinbarra Road are corridors where upgrades may be considered for safety and efficiency.

7.3 Localised Works

Throughout the study area are issues generally related to localised safety or access that are not readily apparent from the results of the traffic modelling, but may nonetheless be beneficial for the future operation of the network.

Such minor works can include localised intersection upgrades (e.g. give way to roundabout), traffic calming treatments, access restrictions / turn bans or other minor works.

Council, in its management of the local road network, has identified a number of locations where minor works could be considered.

7.4 Non-Infrastructure Approaches

The base conditions review indicates that, theoretically at least, much of the road network in the study area is operating well, with no major issues foreseen for the future. Peak conditions occur for relatively short periods, after which there is generally spare capacity in the network.

However the study area is highly car dependent, a result of community preferences, historic trends and the dispersed geographic spread of many land uses. So despite a relatively high-capacity road network in many locations, the community has expectations with regard to travel time and delays that cannot continue to be met into the future without significant investment in infrastructure, or a change in those expectations.

Therefore, there is opportunity to manage demand, rather than necessarily catering for that peak level of demand through providing new infrastructure.

There is also an opportunity for demand management initiatives to change the function that the road network is required to perform, so that the efficiency of the existing network is maximised. For example, if growth in peak period travel were moderated, this may be an opportunity to delay the need for infrastructure treatments such as those identified above. Shifting some peak period travel slightly earlier or later can increase the volume of traffic accommodated by the network, without increasing the peak volume, which is one of the primary determinants of network performance.

Encouraging greater densification of the urban area will allow a greater number of people the opportunity to use active transport for shorter trips, reducing the pressure on the road network from traffic.

8. Scenario Modelling

In identifying scenarios of future network improvements to be modelled, it is noted that the effects of some treatments will not be apparent in the outputs of the mesoscopic traffic model. Specifically, the model is not sensitive enough to show any significant change in operation as a result of some types of treatment.

Therefore the range of scenarios has been focussed on modelling substantial changes to the road network. Table 8.1 indicates which scenarios were modelled for which future years.

Table 8.1 Scenario Testing Matrix

Scenario ID	Description	2016	2021	2026	2036
Base	Do Minimum (Base)	✓	✓	✓	✓
Base A	Do Minimum, with upgrade of Boundary Street / Hastings River Drive intersection		✓	✓	✓
1	Outer Orbital Road inc John Oxley Drive upgrade and Jindalee Road link			✓	✓
2	Outer Orbital Road inc John Oxley Drive upgrade but no Jindalee Road link			✓	✓
3	Lake Road corridor upgrade		✓	✓	✓
4	Hastings River Drive corridor upgrade		✓	✓	✓
5	Ocean Drive corridor upgrade		✓	✓	✓
6	John Oxley Drive corridor upgrade		✓	✓	✓
7	Wauchope bypass			✓	✓
8	Bonny Hills bypass			✓	✓

The "Base A" scenario includes an upgrade to the intersection of Hastings River Drive with Boundary Street, in order to accommodate expected traffic generation from proposed industrial land use changes in this area. Although this upgrade is a not a project that Council has committed to at this stage, it was considered appropriate to include this upgrade in all future scenarios to permit a reasonable comparison, particularly for scenarios where capacity in this area may be improved.

8.1 Scenario 1 – Outer Orbital Road with Jindalee Road Link

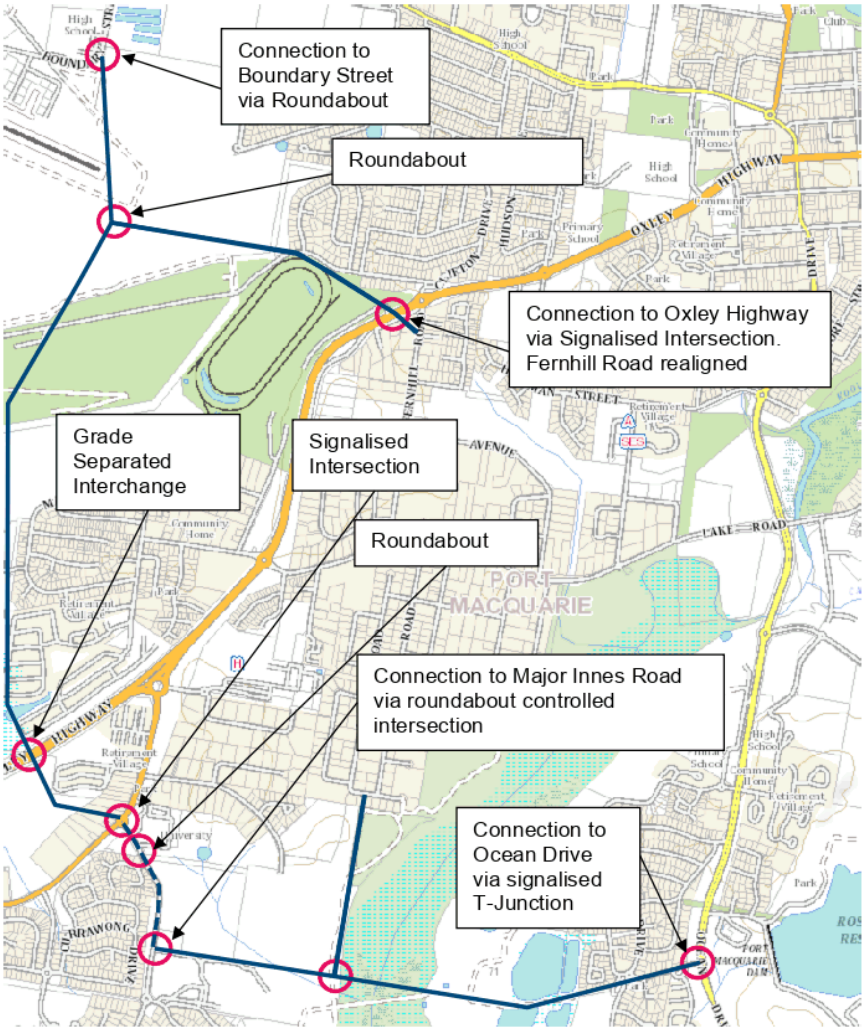
The concept for the Outer Orbital Road was advised by Council. The Outer Orbital Road would link Hastings River Drive and Oxley Highway, connecting to Major Innes Road and Ocean Drive at Greenmeadows Drive. Connections from the new road to Clifton Drive and Jindalee Road are included in the modelled scenario, however a second scenario was modelled without the Jindalee Road link. The modelled alignment is shown in Figure 8.1.

Although the Outer Orbital Road is most likely a longer-term prospect, it was modelled first to allow the implications of this scenario on key routes in the study area, particularly Oxley Highway and Lake Road, to be understood prior to assessing other potential treatments for these locations.

8.1.1 Intended Function

The Outer Orbital Road (with Jindalee Road Link) would provide a number of benefits to the road network, including:

- Additional east-west capacity between Oxley Highway and Ocean Drive, relieving pressure on Lake Road
- Additional north-south capacity between Oxley Highway and Hastings River Drive, relieving Clifton Drive
- Relieving parts of the Oxley Highway, Ocean Drive and Hastings River Drive.



Base image source: https://maps.six.nsw.gov.au/

Figure 8.1 Scenario 1 Outer Orbital Road Modelled Alignment (Indicative)

8.1.2 Design Assumptions

The proposed Outer Orbital Road is assumed to include a dual carriageway with an 80 km/hr speed limit for the majority of the route (except on Major Innes Road).

The Outer Orbital Road would intersect with several other roadways along its alignment. These include:

- Ocean Drive – T-Junction signalised intersection.
- Outer Orbital Road to Lake Road industrial area – T-Junction Give way controlled intersection, with the Outer Orbital Road having priority.
- Major Innes Road – Roundabout controlled intersection.
- Ellis Parade – Roundabout controlled intersection.
- John Oxley Drive – Signalised intersection.
- Oxley Highway – Grade separated interchange with give-way controlled terminals
- Outer Orbital Road to Fernhill Road – Roundabout controlled intersection.
- Boundary Street – Roundabout controlled intersection.
- Oxley Highway at Clifton Drive and Fernhill Road – Signalised intersection with Fernhill Road re-aligned and the existing roundabout removed. Clifton Drive closed at southern end.
- Kingfisher Road – Signalised intersection.
- New development on the western side of John Oxley Drive between Wrights Road and Kingfisher Road – Signalised intersection.

The adopted intersection arrangements for the signalised intersections are shown in Figure 8.2 to Figure 8.4. The traffic signal phasing arrangements for the intersection with Ocean Drive provided actuated phasing with a 120 second maximum cycle time. A leading right turn was provided on Ocean Drive, but without allowing right turns to filter. As shown in Figure 8.2 the left turn slip lanes were maintained and two right turning lanes were provided from the Outer Orbital Road onto Ocean Drive.

The intersection arrangements for the intersections along the John Oxley Drive corridor were informed by concept designs supplied by Council as shown in Figure 8.3. The phasing arrangement for the intersection of John Oxley Drive and Major Innes Road/Outer Orbital Road provided actuated phasing with double diamond overlap phasing and a 120 second maximum cycle time. The intersections of Kingfisher Road and the new development on the western side of John Oxley Drive provided actuated phasing with a 70 second maximum cycle time. A lower cycle time was chosen due to the low volumes entering and exiting the side streets. A leading right turn was provided on John Oxley Drive, but without allowing right turns to filter.

The upgrade of the Clifton Drive intersection to signals was as per the recommendations of the Port Macquarie Airport Precinct Traffic Study (GHD, April 2016). This involves closing Clifton Drive at the Oxley Highway, with no connection to the Outer Orbital Road. A realignment of Fernhill Road, approaching the Oxley Highway, is also required. The phasing arrangement for the intersection provided actuated phasing with double diamond overlap phasing and a 120 second maximum cycle time.

Figure 8.2 Scenario 1 Ocean Drive / Greenmeadows Drive Modelled Upgrade

Figure 8.3 Scenario 1 John Oxley Drive Modelled Upgrades

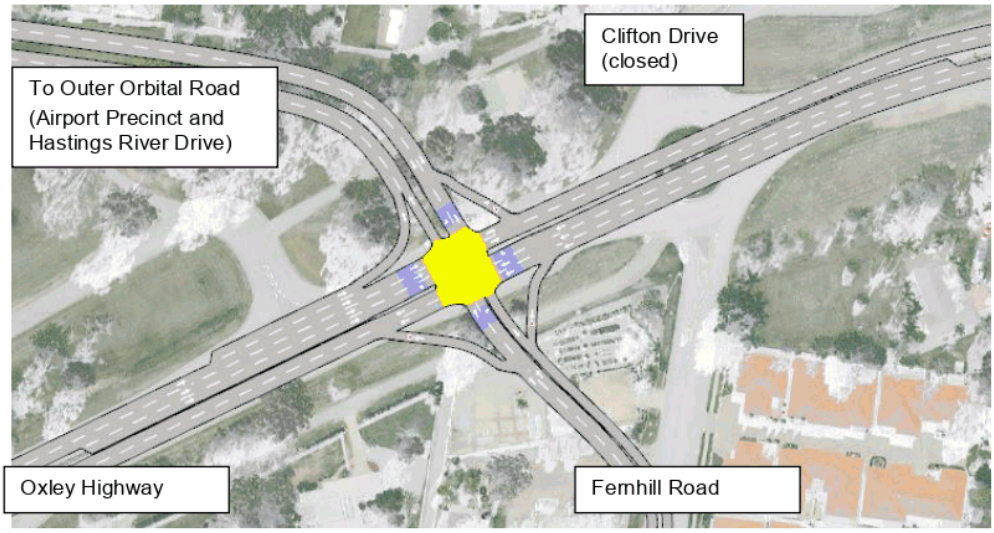


Figure 8.4 Scenario 1 Fernhill Road Modelled Upgrade

8.1.3 Model Results

The analysis indicates that the Outer Orbital Road would attract traffic to/from several key locations within the study area. Traffic utilising the Outer Orbital Road the most are from the areas adjacent to the various interchanges, including Hastings River Drive area to the north, Major Innes Road area and the south east area of Port Macquarie near Pacific Drive/Ocean Drive. Traffic travelling to/from locations outside these areas would have to divert too far to make utilising the Outer Orbital Road beneficial.

The peak period volumes on the Outer Orbital Road vary by location, with highest volumes on the southern section. Two-way volumes in the order of 1800 vehicles per hour are predicted in 2036 during the morning peak period, including an increase of over 40% in traffic on Major Innes Road compared to the base case. In the afternoon peak hour, two-way volumes on Major Innes Road are predicted to more than double compared to the base case in 2036. Two-way volumes on the connection to the Oxley Highway at Clifton Drive are in the order of 800-900 vehicles per hour in 2036.

On the southern section, peak hour volumes are relatively evenly balanced, whereas north of Oxley Highway the peak flow is more pronounced, being heavily influenced by the proposed light industrial development at the Airport Precinct.

One of the key benefits of the implementation of the Outer Orbital Road would be a reduction in traffic on several key roads that currently experience significant delays and travel times. Figure 8.5 shows the changes in traffic volumes with the Outer Orbital Road in operation. The results indicate a significant reduction in traffic on Ocean Drive and Lake Road as vehicles utilise the Outer Orbital Road to access areas to/from the west of Port Macquarie. There is also an increase in traffic on the Oxley Highway as traffic diverts away from Hastings River Drive to access the Airport Precinct via the Outer Orbital Road and the Clifton Drive link.

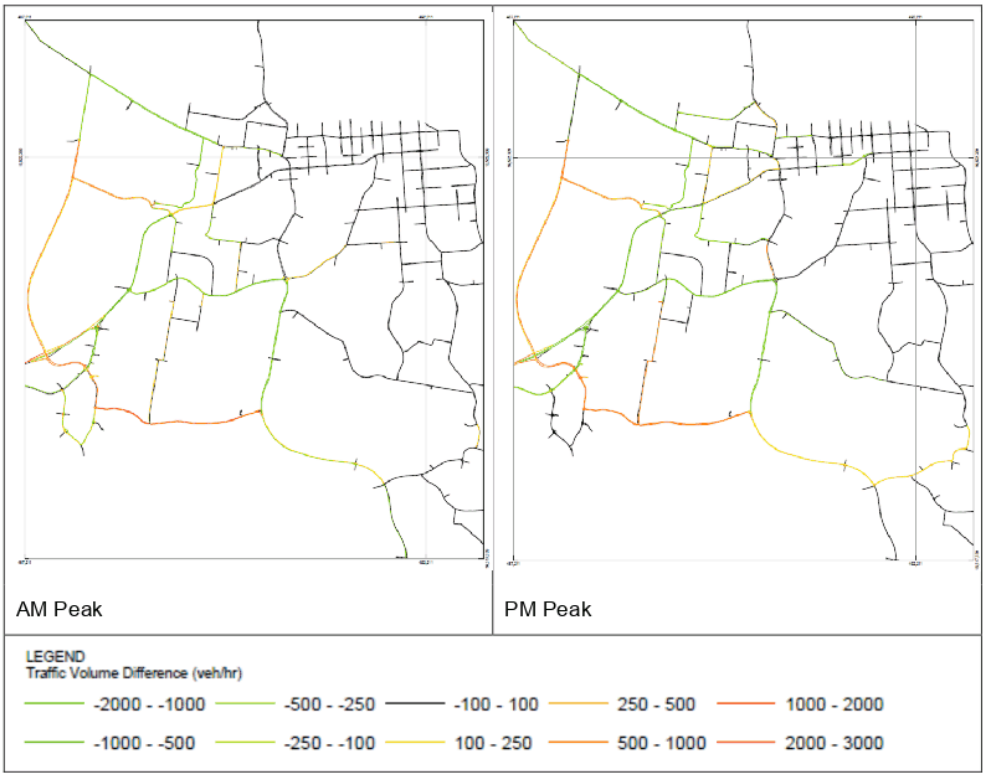


Figure 8.5 Scenario 1 Difference from Base Case - 2036

Larger versions of these figures are contained in Appendix E.

The relative performance of key roads with the Outer Orbital Road operational were analysed and the results are shown Table 8.2 and Table 8.3. The results show that in general the rerouting of traffic away from these roads and onto the Outer Orbital Road has a limited impact on the average travel times on those links, indicating that intersection operation continues to be the main determinant of travel times, rather than the necessarily the volume of traffic on these roads. The main exception is for westbound trips along Lake Road in the PM peak, where average travel times improve by two minutes.

Table 8.2 Scenario 1 Travel Time Comparison AM Peak Period

	Hastings River Drive Oxley Highway to Boundary Street	Lake Road Ocean Drive to Oxley Highway	Ocean Drive Pacific Drive to Lake Road
2026			
EB / NB	3:54 (+0:07)	3:28 (+0:34)	4:06 (+0:10)
WB / SB	3:02 (-0:03)	2:37 (-0:06)	3:53 (+0:21)
2036			
EB / NB	3:49 (0:00)	2:56 (-0:07)	4:22 (+0:16)
WB / SB	3:03 (-0:03)	2:39 (-0:07)	3:55 (+0:22)

Table 8.3 Scenario 1 Travel Time Comparison PM Peak Period

	Hastings River Drive Oxley Highway to Boundary Street	Lake Road Ocean Drive to Oxley Highway	Ocean Drive Pacific Drive to Lake Road
2026			
EB / NB	3:51 (-0:10)	2:39 (-0:04)	3:45 (+0:16)
WB / SB	3:01 (-0:04)	2:41 (-0:08)	3:53 (+0:17)
2036			
EB / NB	3:48 (-0:03)	2:40 (-0:06)	3:47 (+0:15)
WB / SB	3:02 (-0:03)	2:42 (-2:00)	3:55 (+0:14)

Whilst the performance of individual roads (as measured by travel times) may not necessarily improve with the construction of the Outer Orbital Road, the Outer Orbital Road itself would improve travel times across Port Macquarie, reducing the distance for travel to/from some areas. Table 8.4 and Table 8.5 show that utilising the Outer Orbital Road would improve travel times for most trips, including by more than 11 minutes for trips between Thrumster and the airport in the morning peak.

Table 8.4 Scenario 1 Key Link Travel Time Comparison AM Peak Period

	Oxley Highway / John Oxley Drive to Ocean Drive / Pacific Drive		Oxley Highway / John Oxley Drive to Airport		Airport to Gordon Street / Lord Street		Airport to Ocean Drive / Pacific Drive	
	Existing	With Outer Orbital Road	Existing	With Outer Orbital Road	Existing	With Outer Orbital Road	Existing	With Outer Orbital Road
2026								
EB / NB	14:49	9:30 (-5:19)	13:32	6:19 (-7:13)	7:41	6:22 (-1:19)	11:07	11:01 (-0:06)
WB / SB	11:17	9:06 (-2:11)	10:51	6:03 (-4:48)	7:07	6:21 (-0:46)	10:45	8:59 (-1:46)
2036								
EB / NB	19:17	9:47 (-9:30)	17:53	6:31 (-11:22)	7:46	6:15 (-1:31)	11:09	10:24 (-0:45)
WB / SB	11:32	9:22 (-2:10)	11:07	6:03 (-5:04)	7:00	6:19 (-0:41)	10:55	9:16 (-1:39)

Table 8.5 Scenario 1 Key Link Travel Time Comparison PM Peak Period

	Oxley Highway / John Oxley Drive to Ocean Drive / Pacific Drive		Oxley Highway / John Oxley Drive to Airport		Airport to Gordon Street / Lord Street		Airport to Ocean Drive / Pacific Drive	
	Existing	With Outer Orbital Road	Existing	With Outer Orbital Road	Existing	With Outer Orbital Road	Existing	With Outer Orbital Road
2026								
EB / NB	12:25	9:17 (-3:08)	10:46	6:07 (-4:39)	9:40	5:57 (-3:43)	13:35	9:59 (-3:36)
WB / SB	11:21	8:29 (-2:52)	13:31	6:10 (-7:21)	6:56	6:05 (-0:51)	10:27	8:33 (-1:54)
2036								
EB / NB	13:06	10:12 (-2:54)	11:36	7:04 (-4:32)	9:09	6:01 (-3:08)	13:18	10:07 (-3:11)
WB / SB	12:17	9:05 (-3:12)	13:43	6:47 (-6:56)	6:57	6:08 (-0:49)	10:29	8:33 (-1:56)

In terms of the impact of the Outer Orbital Road on the wider network, Table 8.6 shows that compared to the base case, the orbital would reduce travel time across the network (VHT) by as much as 10% in the 2036 AM peak period, with 3-4% reductions at other peak periods. Average speeds on the network would also increase by 2-5 km/hr. This is a reflection of the congested conditions in the base case (with future land use development and subsequent growth in traffic activity) that would be relieved by the Outer Orbital Road.

Table 8.6 Scenario 1 Network Statistics

Scenario		AM Peak Period		PM Peak Period	
		2026	2036	2026	2036
Base A	VKT	551,491	628,920	789,515	896,255
	VHT	9,372	11,328	13,199	15,063
	Avg. Speed (km/hr)	59	56	60	59
With Outer Orbital Road	VKT	549,262	618,568	784,525	889,670
	VHT	8,985	10,169	12,708	14,571
	Avg. Speed (km/hr)	61	61	62	61
Difference	*VKT*	*-0%*	*-2%*	*-1%*	*-1%*
	VHT	*-4%*	*-10%*	*-4%*	*-3%*
	Avg. Speed (km/hr)	*+2*	*+5*	*+2*	*+2*

8.1.4 Evaluation

The Outer Orbital Road would provide an important cross-area link, relieving existing connections including Lake Road, Clifton Drive and parts of the Oxley Highway, Hastings River Drive and Ocean Drive.

The major benefit, reflected in the relative traffic volumes forecast along the Outer Orbital Road, would be in the southern section, improving the connectivity between Ocean Drive and Oxley

Highway. On this basis, staged construction could also be considered, subject to further investigation.

8.2 Scenario 2 – Outer Orbital Road (no Jindalee Road Link)

The Outer Orbital Road was also analysed without the link connecting the Outer Orbital Road to Jindalee Road and the Lake Road industrial area.

8.2.1 Intended Function

The Jindalee Road Link may not be feasible to construct, and this scenario describes the operation of the network without the connection to the Lake Road industrial area.

8.2.2 Design Assumptions

This scenario is identical to Scenario 1, with the exception of the Jindalee Road Link.

8.2.3 Model Results

Figure 8.6 compares volumes with and without the Jindalee Road Link (Scenario 2 vs Scenario 1). The results indicate that vehicles previously accessing the Jindalee Road Link from the Outer Orbital would divert onto alternate routes including Ocean Drive, Lake Road and Oxley Highway, although the volume of traffic affected is relatively small. The results indicate that traffic utilising the Jindalee Road Link is generally local traffic accessing the industrial area, and that minimal rat-running is expected on the link.

The variations in the traffic volumes on Ocean Drive and Lake Road between the two scenarios do not impact adversely on the overall performance of the road network. The highest use of the Jindalee Road Link is in the afternoon peak, with some 330 vehicles per hour leaving the industrial area. This volume can readily be accommodated on other routes if the Jindalee Road Link is not provided. Table 8.7 and Table 8.8 show that travel times on these corridors remain similar both with and without the Jindalee Road Link.

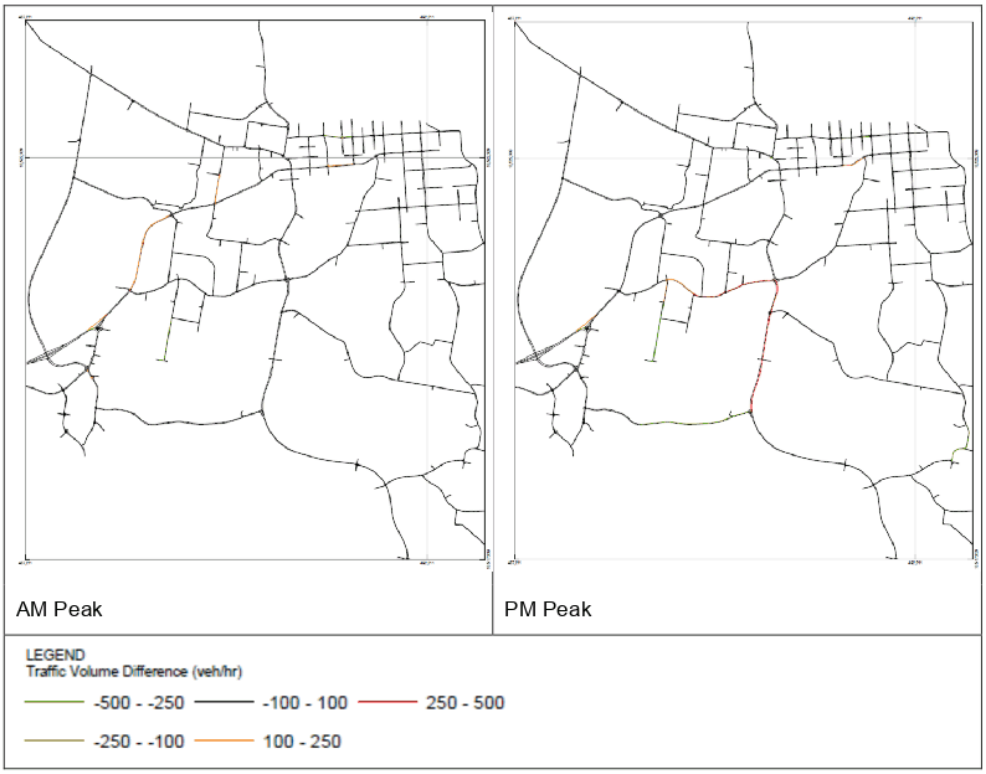


Figure 8.6 Scenario 2 Difference from Scenario 1 - 2036

Larger versions of these figures are contained in Appendix E.

Table 8.7 Scenario 2 Travel Time Comparison AM Peak Period

	Lake Road Ocean Drive to Oxley Highway With Jindalee Road Link	Lake Road Ocean Drive to Oxley Highway Without Jindalee Road Link	Ocean Drive Pacific Drive to Lake Road With Jindalee Road Link	Ocean Drive Pacific Drive to Lake Road Without Jindalee Road Link
2026				
EB / NB	3:28	02:49 (-0:39)	4:06	4:05 (-0:01)
WB / SB	2:37	02:38 (+0:01)	3:53	3:52 (-0:01)
2036				
EB / NB	2:56	02:51 (-0:05)	4:22	4:29 (+0:07)
WB / SB	2:39	2:39 (+0:00)	3:55	3:52 (-0:03)

Table 8.8 Scenario 2 Travel Time Comparison PM peak Period

	Lake Road Ocean Drive to Oxley Highway With Jindalee Road Link	Lake Road Ocean Drive to Oxley Highway Without Jindalee Road Link	Ocean Drive Pacific Drive to Lake Road With Jindalee Road Link	Ocean Drive Pacific Drive to Lake Road Without Jindalee Road Link
2026				
EB / NB	2:39	02:42 (+0:03)	3:45	3:43 (-0:02)
WB / SB	2:41	02:41 (+0:00)	3:53	3:51 (-0:02)
2036				
EB / NB	2:40	02:46 (+0:06)	3:47	3:48 (+0:01)
WB / SB	2:42	02:42 (+0:00)	3:55	3:45 (-0:10)

8.2.4 Evaluation

The Jindalee Road Link would provide improved accessibility into the Lake Road industrial area, but modelling suggests relatively low usage. Therefore its absence, as in Scenario 2, does not have a significant impact on the operation of the network.

8.3 Scenario 3 – Lake Road Corridor Upgrade

Lake Road is a critical link within Port Macquarie's road network. Lake Road connects from Port Macquarie CBD to Oxley Highway, providing both direct and indirect access to industrial and residential areas. With the Lake Road corridor already one of the busiest in the study area, consideration is needed as to how it will cope with any increases in traffic. The upgrade of the Lake Road Corridor is one option proposed to accommodate the current and expected future traffic demand.

This scenario has been assessed separate to the Outer Orbital Road scenarios (Scenarios 1 and 2), as a potential alternative option that addresses some of the issues experienced on Lake Road.

8.3.1 Intended Function

The intention of the Lake Road upgrade would be to increase capacity for through traffic on Lake Road, whilst maintaining accessibility for traffic accessing the adjacent land uses including the industrial area.

8.3.2 Design Assumptions

The upgrade of the Lake Road corridor has assumed duplication of Lake Road between Fernhill Road and Ocean Drive, with two lanes in each direction. Two lanes were also assumed westbound between Fernhill Road and Oxley Highway. The intersections of Hill Street and Fernhill Road with Lake Road were converted to roundabouts (see Figure 8.7 and Figure 8.9), with a short right turn lane provided for turns into Barton Crescent (see Figure 8.9).

The upgrade of the Lake Road corridor also included an upgrade of the Jindalee Road intersection to signals as shown in Figure 8.7. Due to limited space availability in this location, no slip lanes were considered, and only minimal infrastructure was provided for right turning traffic from Lake Road. The phasing arrangement assumed a diamond overlap on Lake Road.

However, due to concerns with the available space for a diamond overlap for the side roads, Jindalee Road and the Bunnings Access were assumed to be split phasing.

The current speed limit on the corridor remained unchanged. The recently completed upgrade of the Lake Road / Blackbutt Road intersection was also included in both the Base Case and Scenario 3.

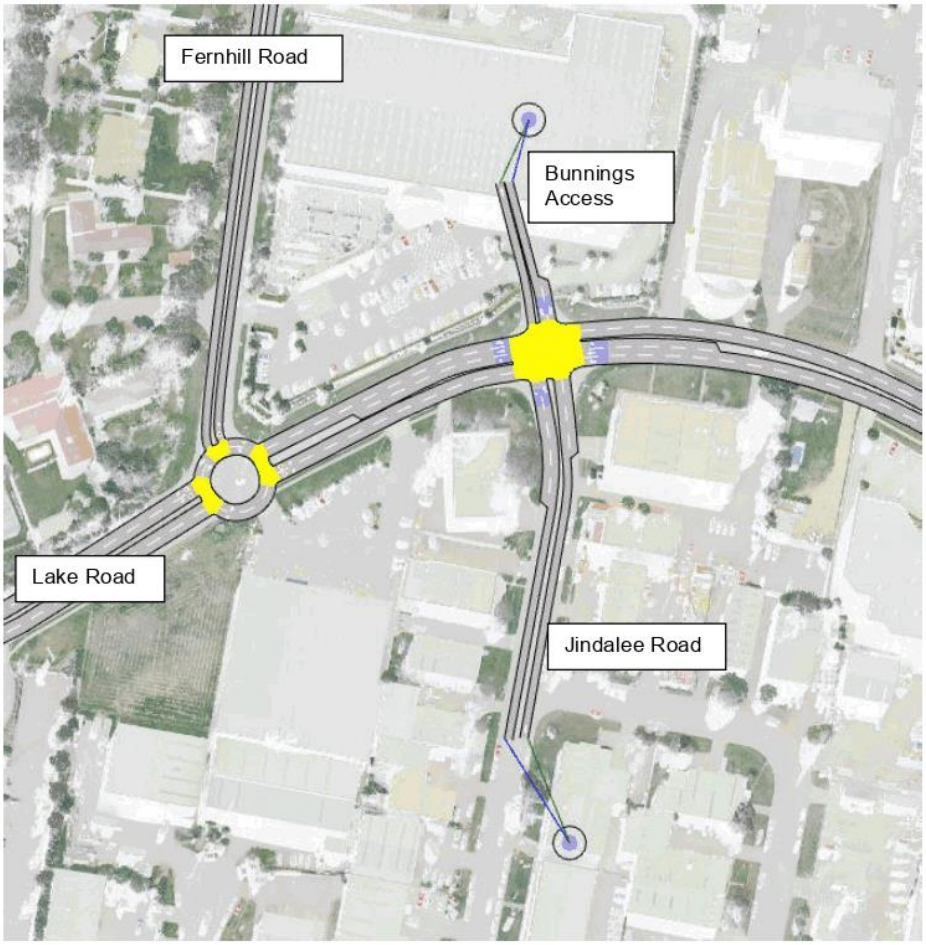


Figure 8.7 Scenario 3 Lake Road intersections with Fernhill Road and Jindalee Road Modelled Upgrades

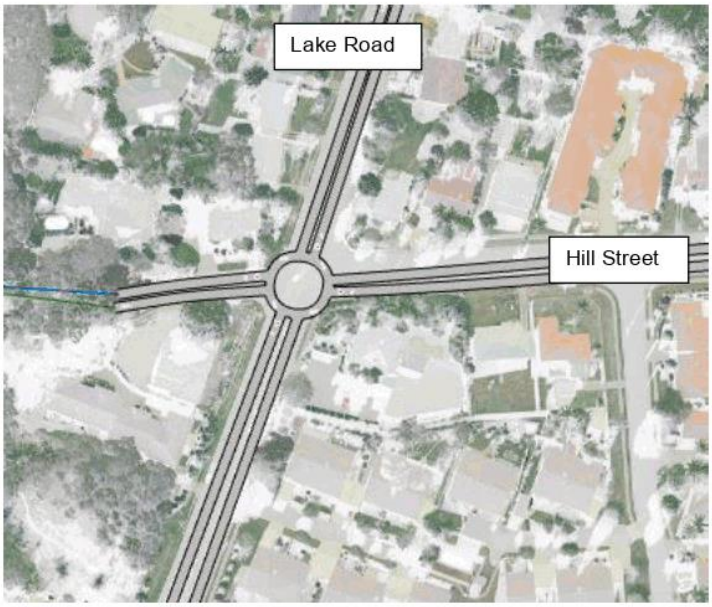


Figure 8.8 Scenario 3 Lake Road / Hill Street Modelled Upgrade

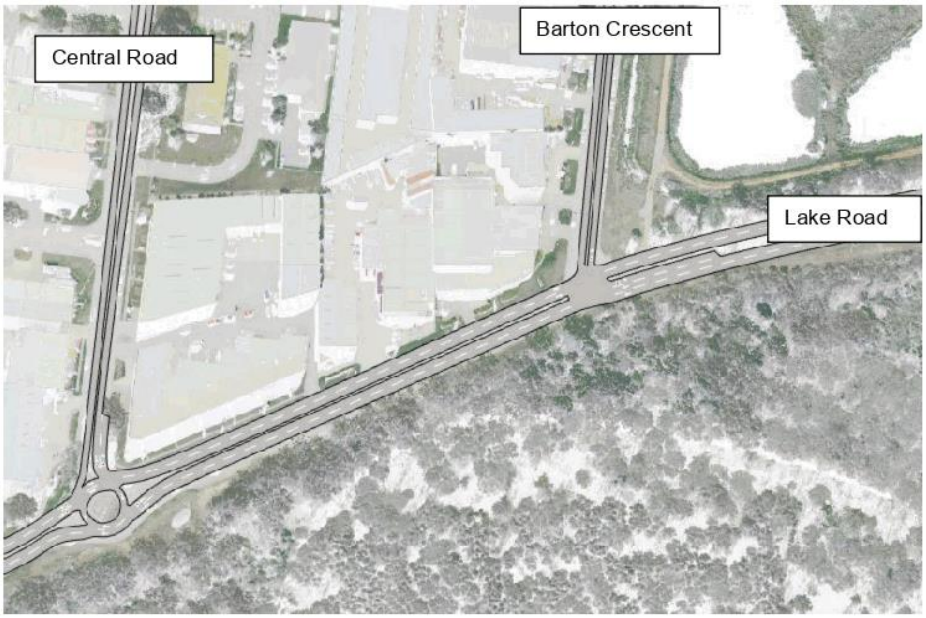


Figure 8.9 Scenario 3 Lake Road / Barton Crescent Modelled Upgrade

8.3.3 Model Results

With the proposed upgrades of Lake Road, the results shown in Table 8.9 and Table 8.10 show a deterioration in performance on the corridor, with average travel times increasing by up to 150 seconds. Figure 8.10 and Figure 8.11 indicate that the deterioration in performance is focussed

at the intersection of Lake Road and Jindalee Road, with the rest of the corridor operating at similar speeds with and without the upgrade (as indicated by the parallel lines between the 'With' and 'Without' upgrade scenarios). The deterioration is the result of a combination of issues, including:

- Increases in traffic on Jindalee Road due to future growth.
- Traffic signals at Jindalee Road restricting the through movement on Lake Road to provide increased accessibility for the side roads.

Due to the reduced performance of Lake Road, Figure 8.12 show that some through traffic would divert away from Lake Road, with higher volumes using Oxley Highway, Widderson Street, Hindman Street and Ocean Drive.

The modelled treatments improve accessibility and road safety associated with access to and from adjacent land uses. For instance, conversion of the Lake Road / Jindalee Road intersection to traffic signals would improve reliability of access to and from Jindalee Road, reduce conflict between vehicles, and improve pedestrian accessibility and safety. At the Lake Road intersections with Barton Crescent, separating queued right turn traffic from adjacent through traffic will reduce delays associated with these right turn manoeuvres needing to wait for suitable gaps in the Lake Road traffic stream, which are less likely to occur as traffic volumes increase.

Table 8.9 Scenario 3 Travel Time Comparison AM Peak Period

	Lake Road without upgrade Ocean Drive to Oxley Highway	Lake Road with upgrade Ocean Drive to Oxley Highway
2021		
EB / NB	6:33	7:24 (+0:51)
WB / SB	6:13	8:04 (+1:51)
2026		
EB / NB	6:40	7:23 (+0:43)
WB / SB	6:24	8:57 (+2:33)
2036		
EB / NB	6:19	7:12 (+0:53)
WB / SB	6:19	8:13 (+1:54)

Table 8.10 Scenario 3 Travel Time Comparison PM Peak Period

	Lake Road without upgrade Ocean Drive to Oxley Highway	Lake Road with upgrade Ocean Drive to Oxley Highway
2021		
EB / NB	6:14	7:08 (+0:54)
WB / SB	6:09	7:03 (+0:54)
2026		
EB / NB	6:14	7:05 (+0:51)
WB / SB	6:14	7:23 (+1:09)
2036		
EB / NB	6:19	7:14 (+0:55)
WB / SB	7:03	7:40 (+0:37)

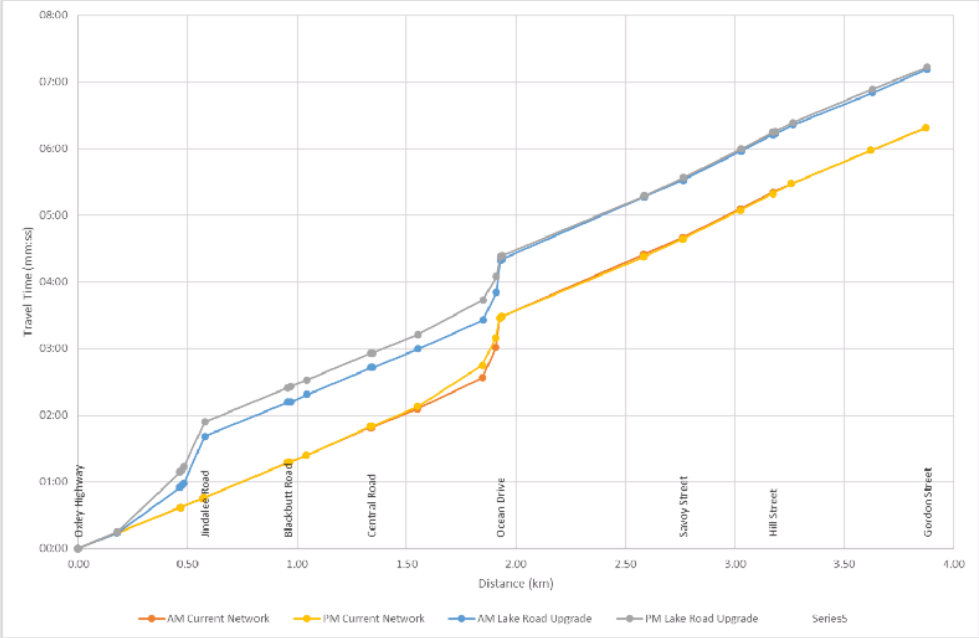


Figure 8.10 Scenario 3 Lake Road Average Travel Times Eastbound 2036

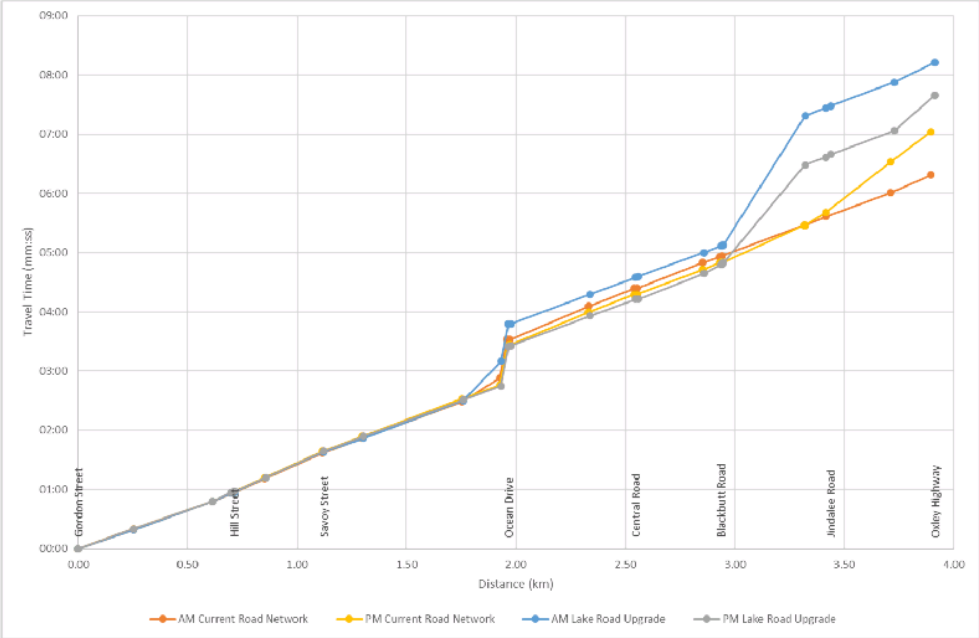


Figure 8.11 Scenario 3 Lake Road Average Travel Times Westbound 2036

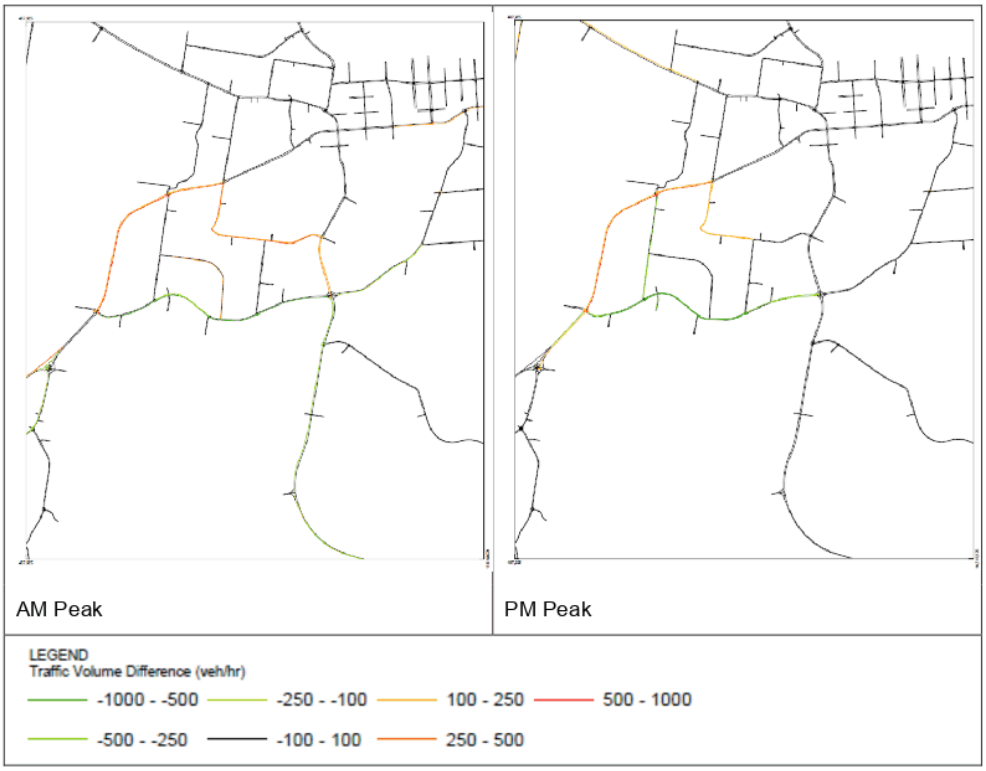


Figure 8.12 Scenario 3 Difference from Base Case - 2036

Larger versions of these figures are contained in Appendix E.

8.3.4 Evaluation

The results of the modelling indicate a conflict between the provision for through traffic on Lake Road, and the need to provide access to and from adjacent land uses. Some adjustments to the Lake Road / Jindalee Road intersection configuration may reduce some of this conflict, but fundamentally this issue would continue.

Opportunities to refine this scenario may include:

- Increase the available footprint for the Jindalee Road and Lake Road intersection, through land acquisition and civil works, to allow for an increased number of through and turn lanes as well as left turn slip lanes.
- Remove direct access for Bunnings onto Lake Road to change the intersection configuration to a T-Junction, which would allow for more green time to be provided to other approaches to the intersection.
- Limit further development of the Jindalee Road industrial area.
- Increase capacity of other intersections (e.g. Blackbutt Road) to provide alternative access out of the industrial area.

- Construct the Outer Orbital Road (or part thereof) with the Jindalee Road link (Scenario 1).
  - The Outer Orbital Road (specifically the section between Ocean Drive and Oxley Highway) would remove much of the through traffic demand from Lake Road, freeing up capacity for local traffic accessing the industrial area and other adjacent land uses. If the Outer Orbital Road was constructed in the short term, some of the Scenario 3 upgrades may not be required. However, it is likely that at least some of these works will be appropriate regardless of the status of the Outer Orbital Road, for both capacity and road safety reasons.

8.4 Scenario 4 – Hastings River Drive Corridor Upgrade

The Hastings River Drive corridor provides a major link between the Port Macquarie CBD and the Pacific Highway, although the new alignment of the Pacific Highway will result in Hastings River Drive being less directly accessible than previously, reducing the importance of this function. The corridor provides access to the airport, schools, businesses and residential areas.

8.4.1 Intended Function

The upgrade of Hastings River Drive is aimed at improving access on and off Hastings River Drive at key side roads. Current priority arrangements at give-way controlled intersections, and some roundabouts, make turns onto Hastings River Drive difficult when the opposing volume (e.g. through traffic on Hastings River Drive) is high. This is particularly the case for right turns out of side streets, which rely on there being a simultaneous gap in traffic in both directions along Hastings River Drive.

8.4.2 Design Assumptions

The Hastings River Drive corridor upgrade assumes dual lanes between the Oxley Highway and Boundary Street. There was no change assumed to the speed limit.

Several intersections along Hastings River Drive would be upgraded. These include:

- Widderson Street – T-Junction signalised intersection.
- Aston Street – T-Junction signalised intersection.
- Newport Island Road – Roundabout intersection.
- Boundary Street – Increased number of lanes on Boundary Street approaching and leaving the intersection with Hastings River Drive (as per the "Base A" assumptions (refer Section 5.3).

The intersection arrangements for the signalised intersections are shown in Figure 8.13 to Figure 8.15. The traffic signal phasing arrangements for the intersections of Aston Street and Widderson Street provided actuated phasing with a 120 second maximum cycle time. A leading right turn was provided on Hastings River Drive, but without allowing right turns to filter. No change was made to the existing phasing arrangements at Boundary Street. As shown in Figure 8.13 minimal turning infrastructure was provided for turning into and out of Aston Street, due to the low volumes of these movements. For the Widderson Street traffic signals, shown in Figure 8.14, the left turn slip lane from Hastings River Drive was maintained, but due to the high volume of left turning vehicles a second left turn lane from Widderson Street onto Hastings River Drive was provided. The upgrade of Boundary Street was as per the concept identified in the Port Macquarie Airport Precinct Traffic Study (GHD, April 2016).

Figure 8.13 Scenario 4 Aston Street Modelled Upgrade

Figure 8.14 Scenario 4 Widderson Street Modelled UUpgrade

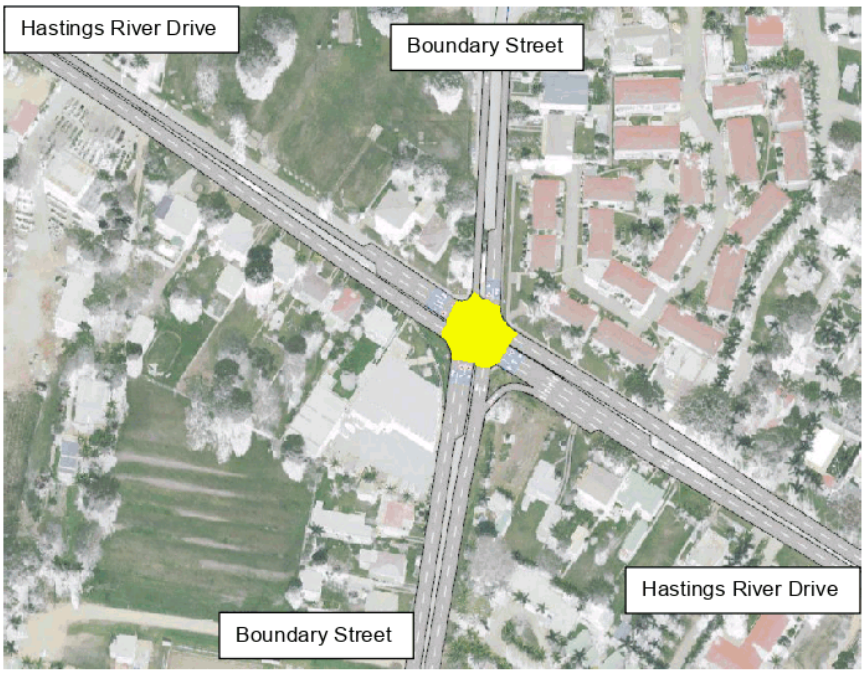


Figure 8.15 Scenario 4 Boundary Street Modelled Upgrade

8.4.3 Model Results

As detailed in Section 8.4.2 several intersections along the Hastings River Drive corridor were upgraded from give-way control to signals or roundabout control. As shown in Table 8.11 and Table 8.12, increasing the number of traffic signals along Hastings River Drive has increased average travel times along the corridor by up to 15 seconds. As shown in Figure 8.16 and Figure 8.17, this minor increase in travel time is a result of the new traffic signals regularly stopping through traffic on Hastings River Drive, particularly at the intersection of Widderson Street. With the existing arrangement these intersections were give-way controlled with Hastings River Drive having priority, thus through traffic was not required to stop.

The signalisation of Widderson Street also results in a change in route choice, as shown in Figure 8.18. During the AM peak there is a reduction in traffic volumes in the order of 200 veh/hr, and an associated increase in traffic on Clifton Drive, where the existing roundabout control was maintained.

Additionally, the upgrading of Boundary Street intersection has enabled a greater release of traffic onto Hastings River Drive, particularly in the PM peak. With the proposed Airport developments (which are included in all future scenarios) demand at this intersection exceeds its current capacity. Upgrades of this intersection increase capacity and allow up to an extra 150 veh/hr to exit Boundary Street onto Hastings River Drive.

Table 8.11 Scenario 4 Travel Time Comparison AM Peak Period

	Hastings River Drive without upgrade Oxley Highway to Boundary Street	Hastings River Drive with upgrade Oxley Highway to Boundary Street
2021		
EB / NB	3:02	3:16 (+0:14)
WB / SB	3:52	4:04 (+0:12)
2026		
EB / NB	3:03	3:17 (+0:14)
WB / SB	3:47	4:03 (+0:16)
2036		
EB / NB	3:04	3:16 (+0:12)
WB / SB	3:48	3:58 (+0:10)

Table 8.12 Scenario 4 Travel Time Comparison PM Peak Period

	Hastings River Drive without upgrade Oxley Highway to Boundary Street	Hastings River Drive with upgrade Oxley Highway to Boundary Street
2021		
EB / NB	3:01	3:11 (+0:10)
WB / SB	3:52	4:01 (+0:09)
2026		
EB / NB	3:01	3:12 (+0:11)
WB / SB	3:51	4:07 (+0:16)
2036		
EB / NB	3:03	3:12 (+0:09)
WB / SB	3:53	4:03 (+0:10)

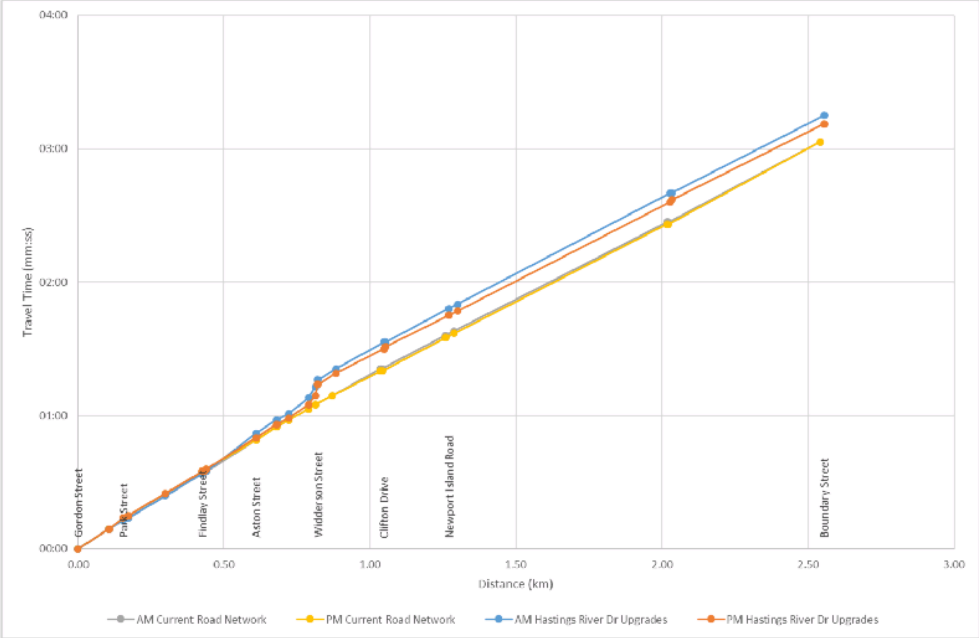


Figure 8.16 Scenario 4 Hastings River Drive Travel Times Westbound 2036

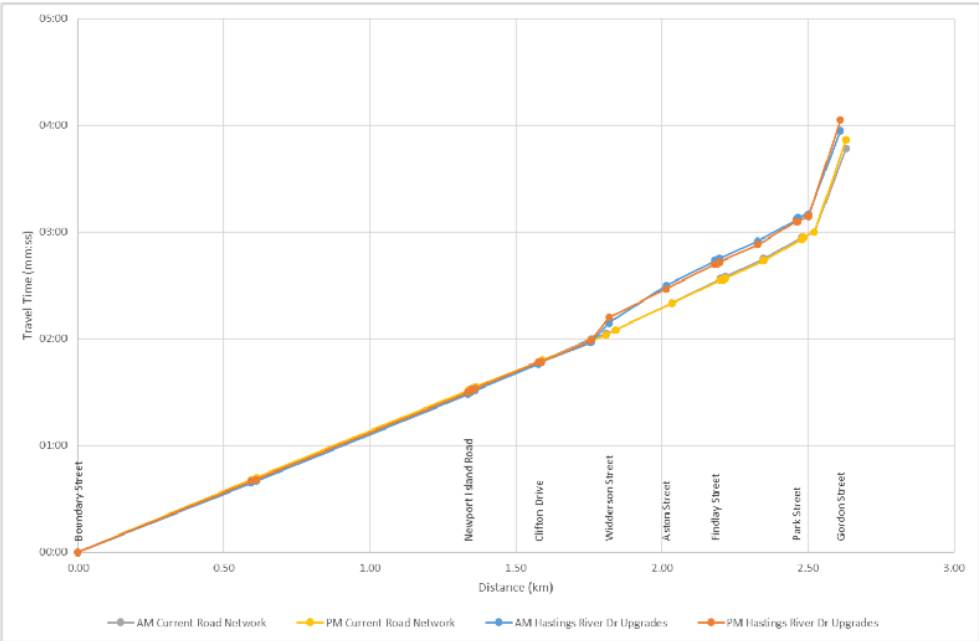


Figure 8.17 Scenario 4 Hastings River Drive Travel Times Eastbound 2036

Figure 8.18 Scenario 4 Difference from Base Case - 2036

Larger versions of these figures are contained in Appendix E.

8.4.4 Evaluation

Upgrade of key intersections along the Hastings River Drive corridor results in improved access to and from side roads, although at the expense of a minor impact on travel times for through traffic. The retention of a roundabout at Clifton Drive results in an increase in traffic on this road, switching from Widderson Street to avoid being delayed at the new traffic signals.

Signalisation of the Clifton Drive intersection could also be considered as a measure to avoid this impact.

8.5 Scenario 5 – Ocean Drive (North) Corridor Upgrade

Ocean Drive is a major corridor linking the areas south of Port Macquarie, such as Bonny Hills and Lake Cathie to Port Macquarie. With several large residential developments currently on, and proposed for, the corridor between Bonny Hills and Lake Road, how these developments connect to the corridor and how the corridor performs into the future needs to be considered. The upgrade of the Ocean Drive (North) Corridor is one option proposed to accommodate the current and expected future traffic demand. Council has undertaken extensive design investigations and community consultation on the proposed upgrade including traffic modelling which has informed the detailed design of intersection treatments.

8.5.1 Intended Function

Signalisation of intersections along Ocean Drive is intended to maintain capacity and safety for through traffic, while also providing for access to and from side roads. Due to relatively low southbound volumes in the morning peak, right turns onto Ocean Drive via the roundabouts at Pacific Drive and Dahlsford Drive have priority over northbound through traffic, which interrupts this peak direction flow.

8.5.2 Design Assumptions

The upgrade of Ocean Drive is assumed to include two lanes in each direction between Matthew Flinders Drive and Greenmeadows Drive (north), with no change to the speed limit. The upgrade of the Ocean Drive corridor also included the upgrade of several intersections:

- Matthew Flinders Drive – Signalised intersection.
- Pacific Drive – Signalised intersection.
- Crestwood Drive – Signalised intersection.

The adopted intersection arrangements for the signalised intersections are shown in Figure 8.19 to Figure 8.21. Dual right turn lanes have been assumed on Dahlsford Drive, Pacific Drive and Matthew Flinders Drive, to accommodate the large volumes of traffic utilising these movements. Similarly, the right turn from Ocean Drive into Emerald Drive, as shown in Figure 8.19, required two right turn lanes to accommodate the high right turn volume. The phasing arrangement for the intersections provided actuated phasing with double diamond overlap phasing and a 120 second maximum cycle time.

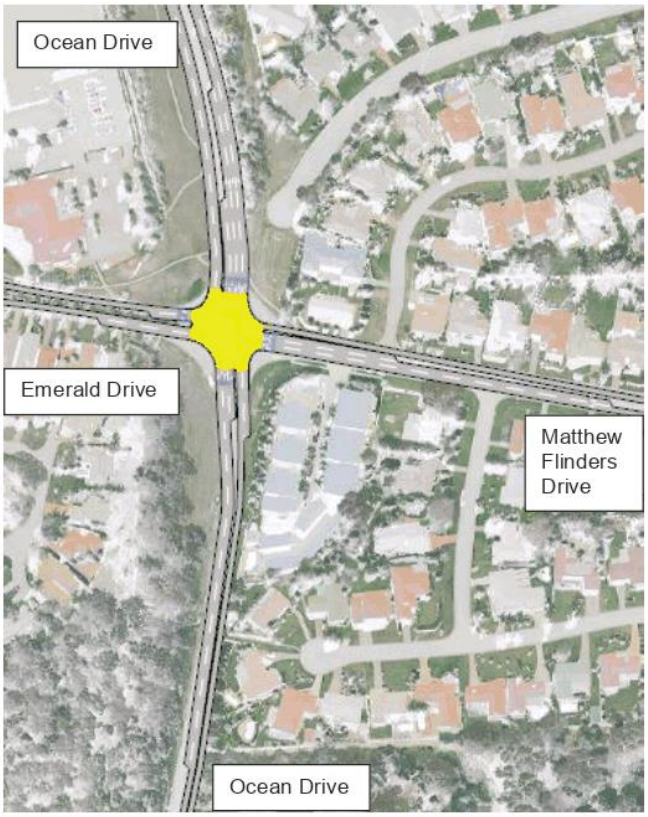


Figure 8.19 Scenario 5 Matthew Flinders Drive Modelled Upgrade

Figure 8.20 Scenario 5 Pacific Drive Modelled Upgrade

Figure 8.21 Scenario 5 Crestwood Drive Modelled Upgrade

8.5.3 Model Results

During the AM peak a large volume of traffic from areas east of Ocean Drive accesses Ocean Drive to travel north towards the CBD, Lake Road and Hastings River Drive. As the current intersection arrangements at these intersections are roundabouts, with relatively low southbound volumes, these right turn movements are largely unopposed. With these intersections signalised, these right turning vehicles are required to stop. The additional delay makes travel via alternative routes, including Koala Street and Lord Street, more attractive and the model shows traffic diverting away from Ocean Drive onto these routes, as illustrated in Figure 8.22.

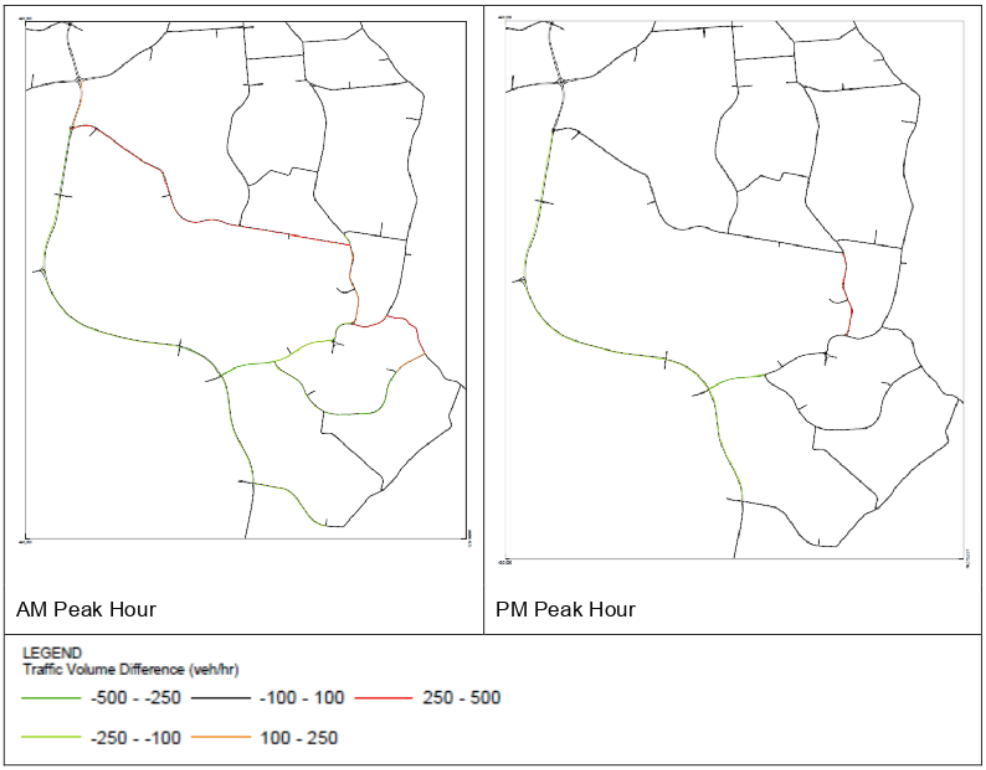


Figure 8.22 Scenario 5 Difference from Base Case - 2036

Larger versions of these figures are contained in Appendix E.

Table 8.13 Scenario 5 Travel Time Comparison AM Peak Period

	Ocean Drive without upgrade Matthew Flinders Drive to Gordon Street	Ocean Drive with upgrade Matthew Flinders Drive to Gordon Street
2021		
EB / NB	8:08	9:15 (+1:07)
WB / SB	7:52	8:15 (+0:23)
2026		
EB / NB	8:06	9:30 (+1:24)
WB / SB	7:13	8:20 (+1:07)
2036		
EB / NB	8:35	9:50 (+1:15)
WB / SB	7:13	8:13 (+1:00)

Table 8.14 Scenario 5 Travel Time Comparison PM Peak Period

	Ocean Drive without upgrade Matthew Flinders Drive to Gordon Street	Ocean Drive with upgrade Matthew Flinders Drive to Gordon Street
2021		
EB / NB	7:59	9:01 (+1:02)
WB / SB	7:25	9:07 (+1:42)
2026		
EB / NB	8:01	9:06 (+1:05)
WB / SB	7:29	9:26 (+1:57)
2036		
EB / NB	8:06	9:07 (+1:01)
WB / SB	7:18	9:33 (+2:15)

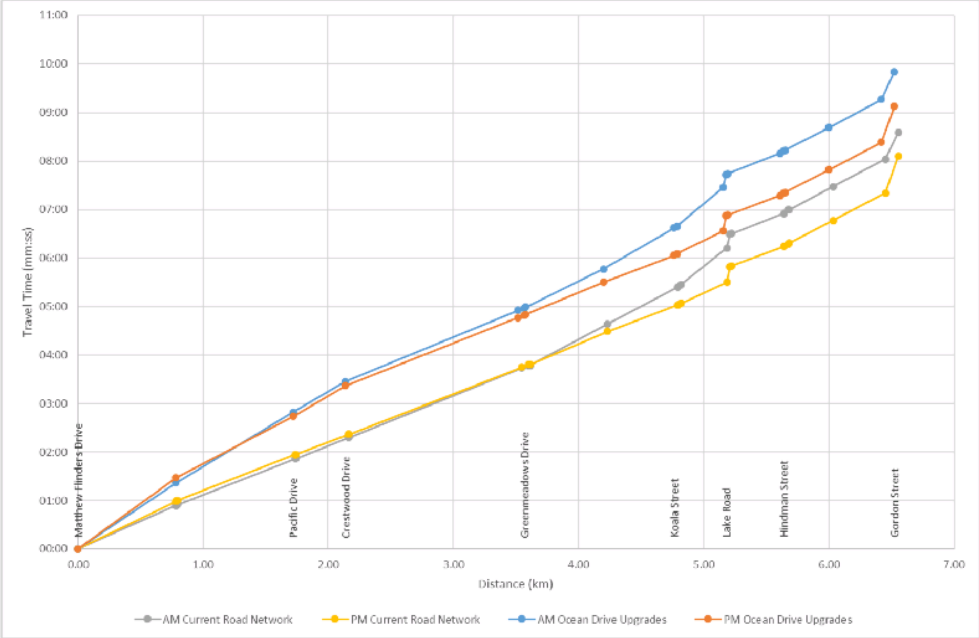


Figure 8.23 Scenario 5 Ocean Drive Travel Times Northbound 2036

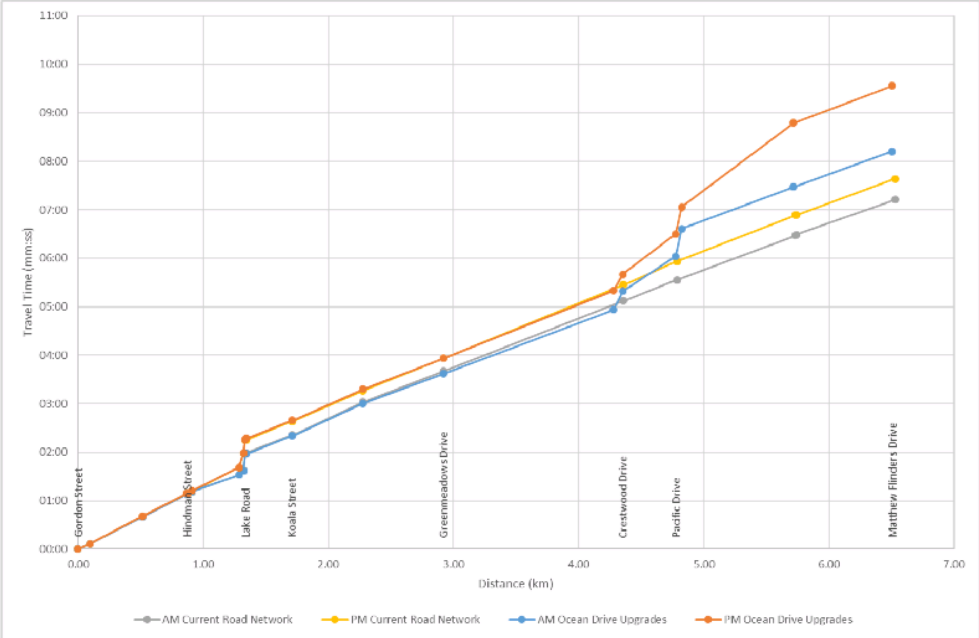


Figure 8.24 Scenario 5 Ocean Drive Travel Times Southbound 2036

Figure 8.23 and Figure 8.24 show that, between intersections, travel speeds along Ocean Drive are similar with and without the upgrade, indicated by the parallel lines. However for

northbound traffic the major change in travel time is between Matthew Flinders Drive and Crestwood Drive. For southbound traffic the major changes are on approach to Pacific Drive and Matthew Flinders Drive, particularly in the PM peak. Both these increases in travel time are due to the traffic signals intermittently stopping through traffic.

8.5.4 Evaluation

Section 8.5.3 indicates that the upgrade of the corridor would not result in improvements in travel time on the Ocean Drive corridor, with the corridor performing better with the current configuration.

The results indicate that the signalisation of the Ocean Drive / Pacific Drive intersection would result in some traffic, which previously turned right from Pacific Drive onto Ocean Drive, to switch to Koala Street where the existing roundabout would be retained and reduced delays would be experienced turning right onto Ocean Drive. This issue could be resolved by signalising the Koala Street intersection at the same time as the Pacific Drive intersection.

For the Crestwood Drive / Dahlsford Drive and Matthew Flinders Drive / Jonas Absalom Drive intersections, the availability of alternative routes is less of an issue, and the model does not suggest significant diversions would occur.

It is therefore possible to stage the upgrades, provided the Pacific Drive and Koala Street intersections are upgraded at the same time.

8.6 Scenario 6 – John Oxley Drive Corridor Upgrade

The John Oxley Drive corridor will be subject to significant development in the short to medium term. Several key developments are likely to influence travel behaviour and performance of the corridor. The proposed upgrade of the corridor is planned to increase capacity and accommodate the estimated future travel demand.

8.6.1 Intended Function

The John Oxley Drive corridor upgrade is intended to provide for increased traffic associated with growth in the residential areas of Thrumster and Lake Innes.

8.6.2 Design Assumptions

The assumed design of the John Oxley Drive corridor upgrade was informed by the proposed upgrades of the John Oxley Drive Corridor included in the Outer Orbital Road design, as shown in Section 8.1.2. The John Oxley Drive corridor upgrades considered dual lanes in each direction on John Oxley Drive from Wrights Road to west of The Ruins Way as well as on Major Innes Road from John Oxley Drive to east of Ellis Parade (south). The existing speed limit remains unchanged.

Several intersection configurations were revised as part of the corridor upgrade, including:

- Ellis Parade – Roundabout controlled intersection.
- The Ruins Way – Roundabout controlled intersection.
- John Oxley Drive / Major Innes Road – Signalised intersection.
- Kingfisher Road – Signalised intersection.
- New development on the western side of John Oxley Drive between Wrights Road and Kingfisher Road – Signalised intersection.

The adopted intersection arrangements for the signalised intersections are shown in Figure 8.25. The intersection arrangements for the intersections along the John Oxley Drive corridor

were informed by designs supplied by Council, with one change being necessary. Due to the expected development occurring off Ellis Parade the expected demand for right turning traffic from Major Innes Road onto John Oxley Drive is relatively high. In the PM peak the intersection could not cope with this demand without the inclusion of an additional lane for right turning traffic on this approach.

The phasing arrangement for the intersection of John Oxley Drive and Major Innes Road/Outer Orbital Road provided actuated phasing with double diamond overlap phasing and a 120 second maximum cycle time. The intersections of Kingfisher Road and the new development on the western side of John Oxley Drive provided actuated phasing with a 70 second maximum cycle time. A lower cycle time was chosen due to the low volumes entering and exiting the side streets. A leading right turn was provided on John Oxley Drive, but without allowing right turns to filter.

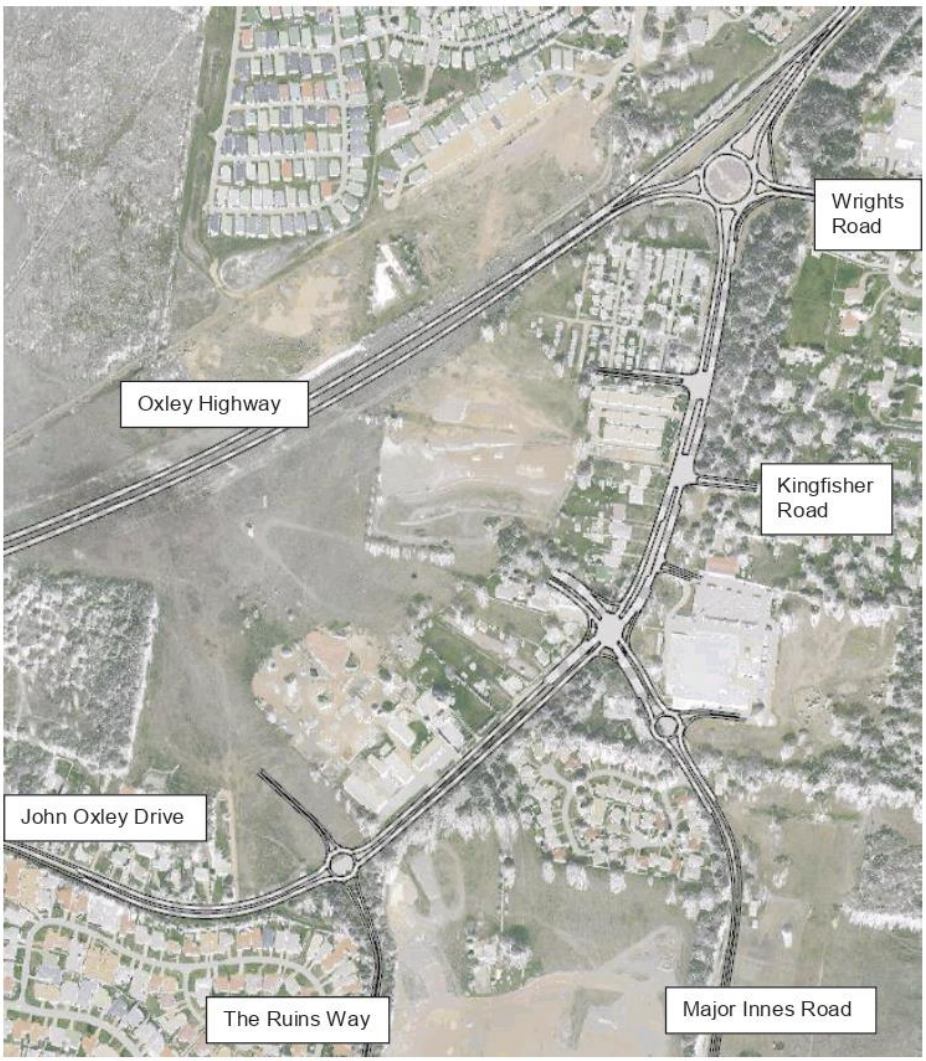


Figure 8.25 Scenario 6 John Oxley Drive Corridor Upgrades

8.6.3 Model Results

The results shown in Figure 8.26 show several changes in route choice on the John Oxley Drive corridor and adjacent areas. The two main motivators for this change in route choice are:

1. The three new traffic signals that require through traffic to stop intermittently, when previous they were unimpeded.
2. The roundabout at Ellis Parade allowing better access to/from the new developments proposed off Ellis Parade.

The three new signalised intersections reduce the attractiveness of utilising the Wrights Road roundabout to access the Oxley Highway southbound carriageway for vehicles from The Ruins Way and Major Innes Road. The model shows that these vehicles are diverting to the Philip Charley Drive roundabout to access the Oxley Highway to travel south. This is evident in the increases in traffic on John Oxley Drive (west of The Ruins Way) and the equivalent decrease in traffic on Oxley Highway.

The upgrade of the intersection of Ellis Parade and Major Innes Road to a roundabout allows greater connectivity for the new developments on Ellis Parade. This is evidenced by a large increase in northbound traffic on Major Innes Road. This increase in traffic stems from the Ellis Parade developments and increased congestion levels on Major Innes Road between John Oxley Drive and Ellis Parade. The increase in congestion warranted provision of an extra right turn lane at the intersection of Major Innes Road and John Oxley Drive to cater for traffic exiting Ellis Parade and travelling north on John Oxley Drive. This also reduces the attractiveness of this segment of Major Innes Road which, coupled with the upgrade of the John Oxley Drive intersection with The Ruins Way to a roundabout controlled intersection, creates a diversion to The Ruins Way for vehicles originating south of Ellis Parade. With the reduction in attractiveness of Major Innes Road and the improved accessibility created by the roundabout on The Ruins Way vehicles south of Ellis Parade to travel both either direction on the Oxley Highway. This is evident in the increases in traffic northbound on The Ruins Way and eastbound on John Oxley Drive west of Major Innes Road.

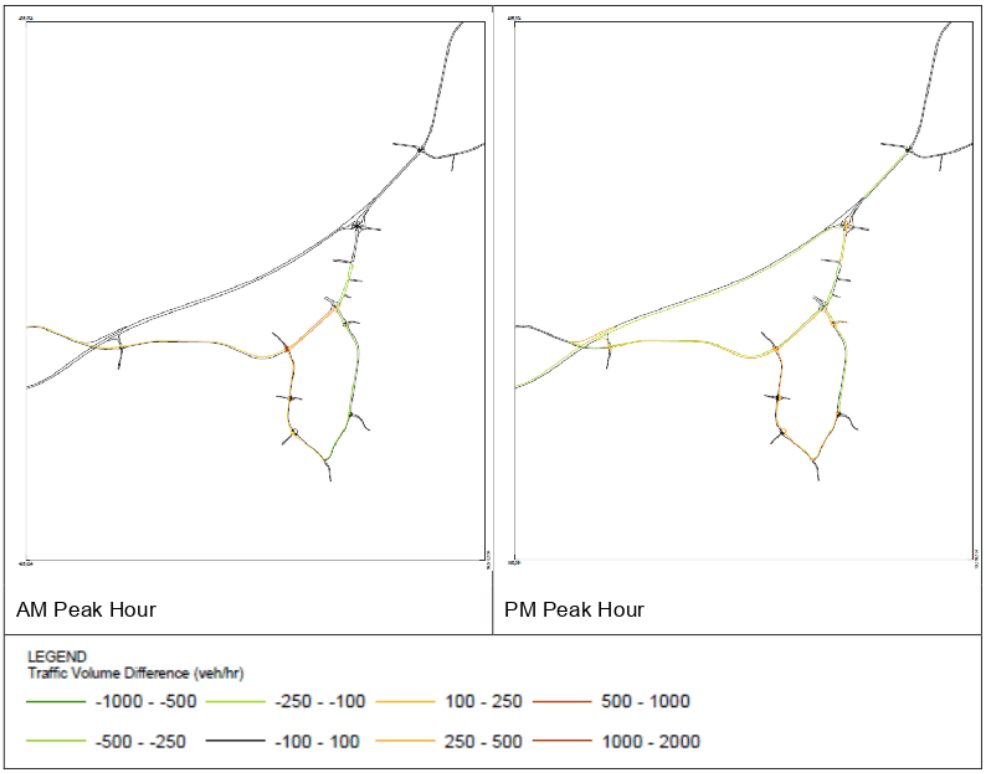


Figure 8.26 Scenario 6 Difference from Base Case - 2036

Larger versions of these figures are contained in Appendix E.

8.6.4 Evaluation

The proposed upgrades along John Oxley Drive have the desired effect of improving capacity for residential, educational, medical and commercial growth in the area, and improving accessibility as traffic volumes grow. However a result of the intersection upgrades is some modification in route choice, compared to the existing situation.

From Major Innes Road, access to the Oxley Highway (southbound) in the base case is fastest via the Wrights Road roundabout. The inclusion of two new signalised intersections between Major Innes Road and Wrights Road increases travel times along John Oxley Drive and makes the trip via the western part of John Oxley Drive more attractive, despite a lower speed limit.

8.7 Scenario 7 – Wauchope Inner Bypass

8.7.1 Intended Function

The intended function of the Wauchope Inner Bypass is to relieve pressure on High Street (Oxley Highway) by providing an alternative route for vehicles travelling between the Oxley Highway (west) and the Oxley Highway east of Wauchope.

8.7.2 Design Assumptions

The concept for the Wauchope Inner Bypass was advised by Council. The Bypass would connect High Street at the approximate location of the rail crossing to Cameron Street near Oxley Lane, as shown in Figure 8.27. The intersections of the Wauchope Inner Bypass with High Street and Cameron Street would be give-way controlled T-junctions with the Bypass having priority. This configuration has been chosen to encourage the use of Cameron Street and Blackbutt Drive, as an alternative to High Street, for vehicles travelling through Wauchope, as shown in Figure 8.28.

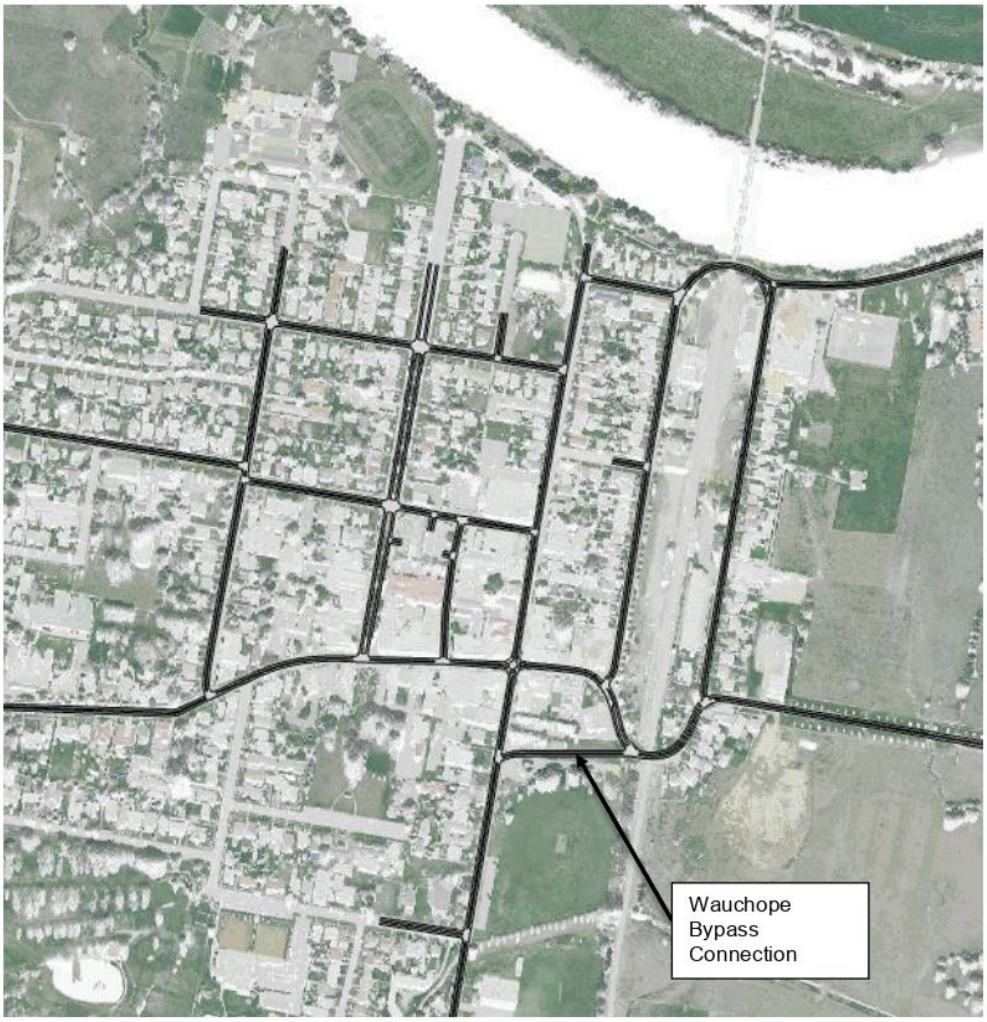


Figure 8.27 Scenario 7 Wauchope Inner Bypass Connection (Indicative)

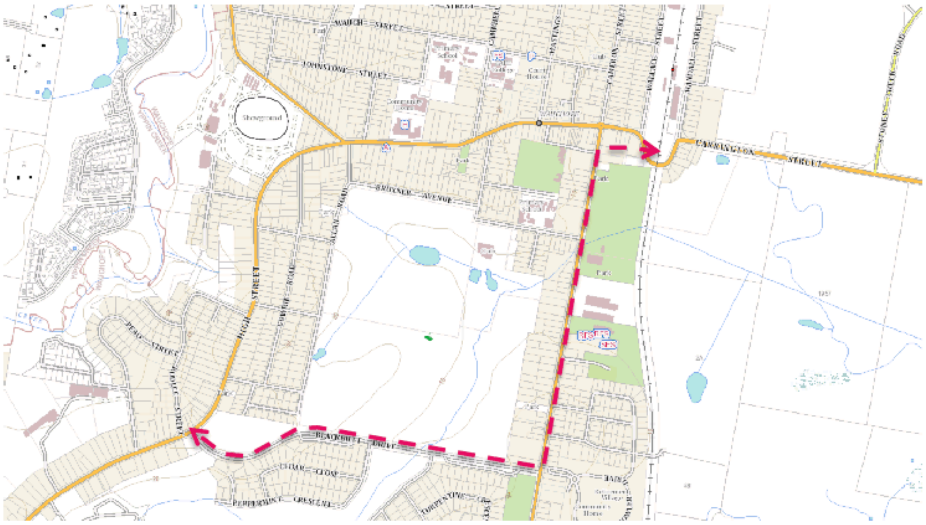


Figure 8.28 Scenario 7 Wauchope Inner Bypass Route

The design of the Bypass assumed a single carriageway road with a 50 km/hr speed limit, utilising the existing alignments of Cameron Street and Blackbutt Drive. The connections of the Bypass with High Street and Cameron Street were modelled as give way controlled, T-junctions with the Bypass having priority. Additionally the intersections of Cameron Street and Blackbutt Drive as well as Blackbutt Drive and High Street were upgraded to roundabout controlled intersections.

8.7.3 Model Results

The analysis of the Wauchope Inner Bypass indicated that the extent of use of the Bypass is highly dependent on the route hierarchy (attractiveness variables) set in the modelling software for the Bypass route (including Cameron Street and Blackbutt Drive). In the base model the road hierarchy was set such that Oxley Highway (High Street) was a more significant road (and therefore a more attractive road) than Cameron Street or Blackbutt Drive.

With the road hierarchy remaining the same with the inclusion of the Wauchope Inner Bypass, no change in the route choice of vehicles was observed. Vehicles travelling through Wauchope still utilised High Street, Cameron Street and Blackbutt Drive to the same extent as the base case.

The model was re-run with the road hierarchy changed so that Cameron Street and Blackbutt Drive were set to the same hierarchical level (and as such the same attractiveness level) as High Street. The model indicates that the Bypass is likely to attract up to 530 veh/hr in the peak. The majority of these movements are eastbound vehicles, with westbound travel on High Street and Blackbutt Drive remaining relatively unchanged (see Figure 8.29). The improved importance of Blackbutt Drive resulted in vehicles travelling from Beechwood Road to south of Cameron Street utilising Blackbutt Drive to access Cameron Street, rather than accessing Cameron Street directly from High Street.

The modelling indicates that the Bypass route (including Cameron Street and Blackbutt Drive) would not carry a large volume of traffic due to the length of the diversion. Travelling through Wauchope via High Street is 200m shorter than utilising Cameron Street and Blackbutt Drive. As shown in Table 8.15 and Table 8.16 the model indicates that travel through Wauchope via

the Bypass is 20 seconds slower than via High Street, indicating that High Street would still be an attractive route.

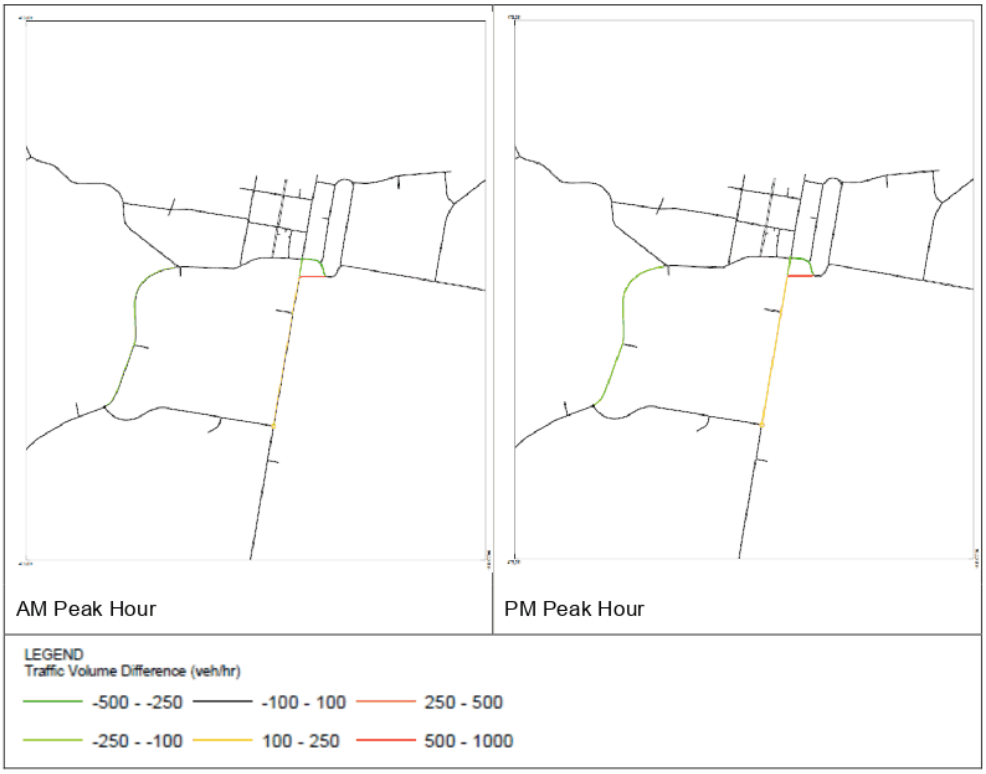


Figure 8.29 Scenario 7 Difference from Base Case – 2036

Larger versions of these figures are contained in Appendix E.

Table 8.15 Scenario 7 Travel Time Comparison AM Peak Period

	High Street without Bypass Stoney Creek Road to Pead Street	High Street with Bypass Stoney Creek Road to Pead Street	Link Road Stoney Creek Road to Pead Street
2021			
EB / NB	3:18	**3:16**	3:42
WB / SB	3:23	**3:21**	3:48
2026			
EB / NB	3:22	**3:19**	3:45
WB / SB	3:26	**3:24**	3:51
2036			
EB / NB	3:22	**3:20**	3:44
WB / SB	3:27	**3:26**	3:51

*Fastest route highlighted in **bold**.*

Table 8.16 Scenario 7 Travel Time Comparison PM Peak Period

	High Street without Bypass Stoney Creek Road to Pead Street	High Street with Bypass Stoney Creek Road to Pead Street	Link Road Stoney Creek Road to Pead Street
2021			
EB / NB	3:17	**3:14**	3:42
WB / SB	3:28	**3:25**	3:53
2026			
EB / NB	3:18	**3:16**	3:41
WB / SB	3:28	**3:26**	3:53
2036			
EB / NB	3:20	**3:19**	3:44
WB / SB	3:29	**3:28**	3:54

*Fastest route highlighted in **bold**.*

8.7.4 Evaluation

The overall distance of the bypass route via Cameron Street and Blackbutt Drive, relative to the route via High Street (Oxley Highway) is such that the traffic model suggests that for through traffic the High Street route through the town centre may continue to be more attractive. Whilst the potential for delays within the town centre associated with parking, pedestrian crossings and intersection delays may mean that the model is underestimating expected demand for the Bypass, any travel time benefit from the Bypass route is expected to be relatively small.

The main benefit of the bypass link between Oxley Highway and Cameron Street is for traffic destined for Cameron Street or Bago Road, rather than continuing towards Oxley Highway west.

8.8 Scenario 8 – Bonny Hills Bypass

8.8.1 Intended Function

The Bonny Hills Bypass would allow through traffic on Ocean Drive to avoid travelling through the urbanised area of Bonny Hills, improving travel times, capacity for local traffic, safety and amenity.

8.8.2 Design Assumptions

The concept for the Bypass of Bonny Hills was advised by Council. The Bypass would run parallel and to the west of Ocean Drive. At the southern terminal the Bypass would connect to Ocean Drive south of Seaview Street and at the northern terminal between Bonny View Drive and Seawind Chase. The modelled alignment is shown in Figure 8.30.

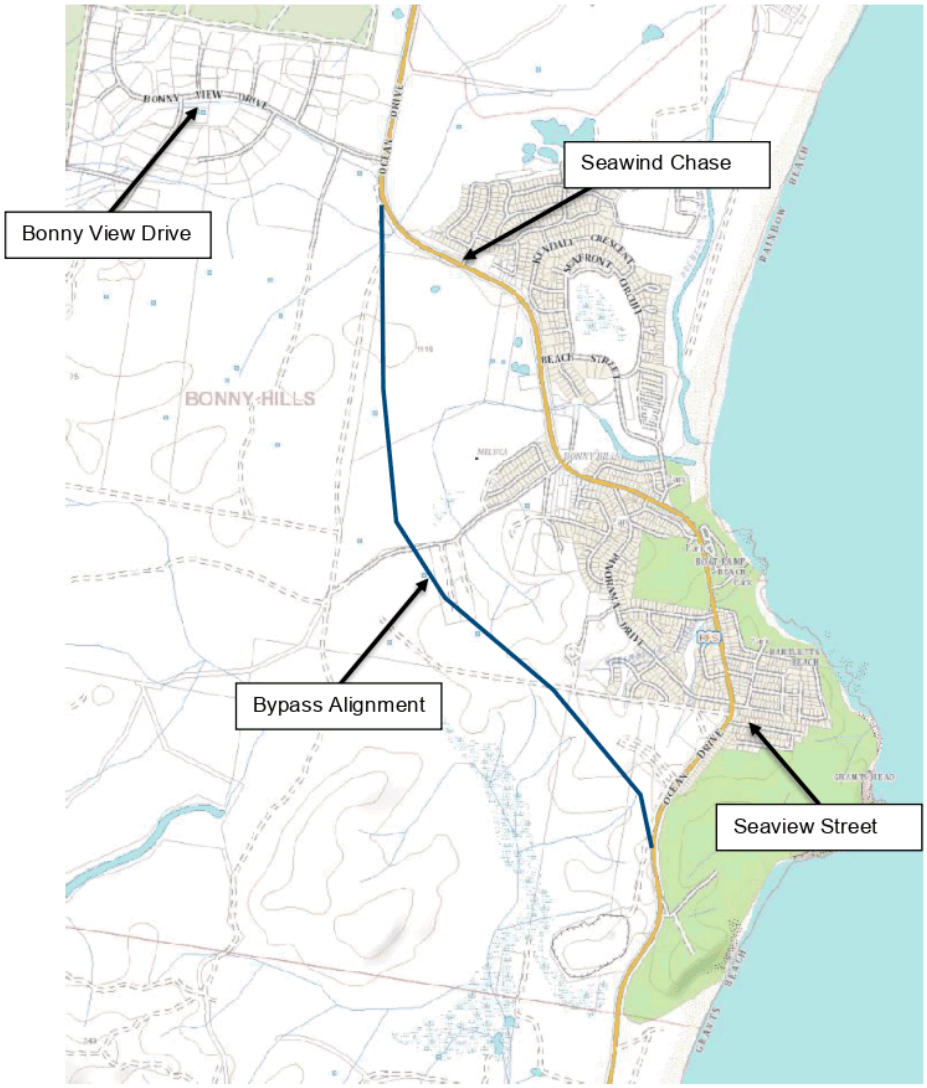


Figure 8.30 Scenario 8 Bonny Hills Bypass Modelled Alignment (Indicative)

The design of the Bypass assumed a single carriageway with one lane in each direction and an 80 km/hr speed limit. The connections of the Bypass with Ocean Drive were modelled as give way controlled T-junctions with the Bypass having priority.

8.8.3 Model Results

The analysis indicated that the bypass would provide travel time improvements for traffic travelling past the Bonny Hills area of up to 50 seconds when compared to the scenario without the Bypass, as shown in Table 8.17 and Table 8.18. The use of the Bypass would also reduce travel times on Ocean Drive by up to 20 seconds, due to the volume of traffic diverting away from Ocean Drive.

Table 8.17 Scenario 8 Travel Time Comparison AM Peak Period

	Bonny Hills Bypass	Ocean Drive With Bypass	Ocean Drive Without Bypass
2021			
EB / NB	2:50	4:16	4:36
WB / SB	2:51	4:16	4:40
2026			
EB / NB	2:52	4:13	4:38
WB / SB	2:52	4:12	4:40
2036			
EB / NB	2:52	4:15	4:38
WB / SB	2:52	4:14	4:41

Table 8.18 Scenario 8 Travel Time Comparison PM Peak Period

	Bonny Hills Bypass	Ocean Drive With Bypass	Ocean Drive Without Bypass
2021			
EB / NB	2:54	4:18	4:42
WB / SB	2:54	4:16	4:42
2026			
EB / NB	2:54	4:14	4:40
WB / SB	2:54	4:15	4:44
2036			
EB / NB	2:56	4:18	4:43
WB / SB	2:54	4:16	4:42

Forecast peak hour volumes on the bypass in 2036 are 620 vehicles (2-way) in the AM peak hour, and 760 vehicles (2-way) in the PM peak. This represents 75% and 85% of the base case volumes respectively. As shown in Figure 8.31 traffic using the bypass switches directly from Ocean Drive.

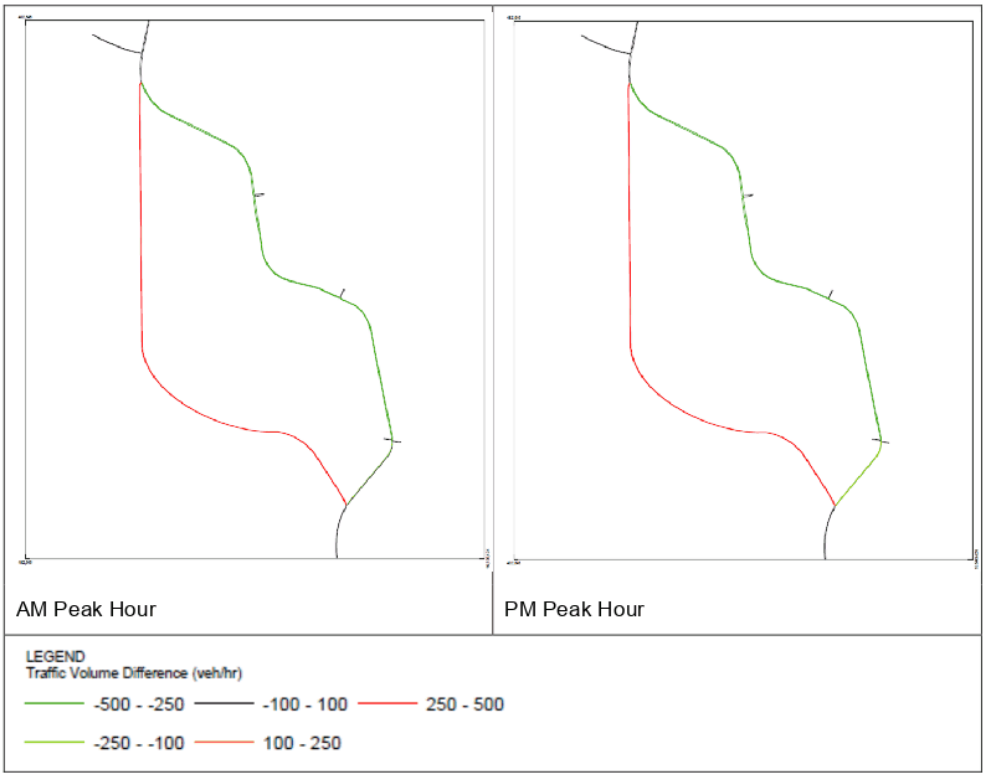


Figure 8.31 Scenario 8 Difference from Base Case - 2036

Larger versions of these figures are contained in Appendix E.

8.8.4 Evaluation

The Bonny Hills Bypass provides for a faster trip compared to the existing route via Ocean Drive, with savings of up to 50 seconds. On this basis the Bypass provides a benefit to existing road users, as well as removing through traffic from Ocean Drive adjacent to the Bonny Hills residential areas.

However conditions on Ocean Drive in the base case do not indicate significant congestion or delays, which may impact on the feasibility of this option.

9. Evaluation of Responses

A range of potential responses to the existing and forecast future road network in the study area have been identified, drawing on the review of base conditions in Section 6, the scenarios descried in Section 8, and projects identified by Council and RMS. They are discussed here in no particular order of priority, with relative priorities discussed in Section 10.

9.1 New Road Links

The following new road links have been considered, to create new connections in the network, or to bypass existing activity centres.

ID	Treatment / Option	Comment
1	Outer Orbital Road	Has a significant impact on travel patterns, and provides relief to Lake Road and Clifton Drive. Staged introduction may be appropriate, with southern section the higher priority.
2	Outer Orbital Road Jindalee Road Link	Improves access to Lake Road industrial area, and reduces pressure on Lake Road. Modelling suggests the link would mainly be used by a small volume of local traffic.
3	Wauchope Inner Bypass	Performance of Oxley Highway corridor expected to remain good into the future, and bypass will not provide significant benefit.
4	Bonny Hills Bypass	Bypass gives relatively small travel time savings for through traffic, but existing Ocean Drive corridor expected to perform well into the future.

9.2 Corridor Upgrades

Corridor upgrades have been identified for a number of roads in the study area, involving intersection upgrades (particularly in urban areas) or other improvements in rural locations.

ID	Treatment / Option	Comment
5	John Oxley Drive corridor upgrade – The Ruins Way to Wrights Road	Upgrades required to accommodate traffic accessing from adjacent residential areas, where significant growth is forecast.
6	Lake Road corridor upgrade – Oxley Highway to Ocean Drive	Upgrade would have limited benefit for through traffic, but improves access to and from adjacent areas. Not a long-term solution to Lake Road congestion, and needs to be considered in conjunction with the Outer Orbital Road.
7	Hastings River Drive corridor upgrade – Boundary Street to Findlay Avenue	Ease of access onto Hastings River Drive is improved where intersections are upgraded. However due to changes in delays at these locations, traffic may divert to remaining roundabout intersections.
8	Ocean Drive (north) corridor upgrade - Matthew Flinders Drive to Lake Road	Upgrade to signals at key intersections improves ease of access onto Ocean Drive, but impacts on travel times for through traffic. Some local traffic switches to remaining roundabout intersections to take advantage of right of way rules.

ID	Treatment / Option	Comment
9	Port Macquarie CBD traffic management review	As a major centre of activity, and the location of the greatest concentration of crashes (albeit mostly minor severity) it is appropriate to periodically review traffic management in the CBD area, with a focus on safety, accessibility and pedestrian movement.
10	Oxley Highway (west of Wauchope) overtaking lanes	Overtaking lanes will reduce impact of slower moving vehicles on traffic flow.
11	Comboyne Road targeted shoulder widening	Improving shoulder clearances in constrained locations expected to have road safety benefits.
12	Lorne Road sealing	Current travel times between Comboyne and Port Macquarie are 10 minutes faster via Comboyne Road than via Lorne Road. Sealing would need to allow an average speed between Comboyne and Kew of 70km/hr (currently 50 km/hr) to make this route faster and significantly affect traffic patterns. Sealing may have safety benefits.
13	Pappinbarra Road upgrade	Completed in 2017

9.3 Localised Works

Potential localised works are focussed on specific intersections or locations where an improvement is necessary. Council, in its day-to-day management of the local road network, and anticipating future needs, has identified a number of localised works, primarily intersection upgrades, for consideration. Other items have been identified through the base case assessment of this project.

ID	Treatment / Option	Comment
14	Boundary Street / Hastings River Drive Upgrade (upgrade signals)	Upgrade of this intersection required to support development of the Airport Precinct light industrial area.
15	Hastings River Drive / Hibbard Drive (east) intersection upgrade (signalisation)	Upgrade to signals would improve safety and efficiency for turning traffic.
16	Bay Street / Newport Island Road intersection upgrade (channelisation)	Upgrade would improve safety and efficiency for turning traffic. Roundabout could also be considered to reduce speeds on Newport Island Rd
17	Bay Street / Bellbowrie Street intersection upgrade (channelisation)	Upgrade would improve safety and efficiency for turning traffic. Roundabout could also be considered to reduce speeds on Bay St
18	Bay Street / Warlters Street / Aston Street intersection upgrade (roundabout)	New intersection would reduce through traffic from Settlement City area
19	Buller Street / Hollingworth Street intersection upgrade (signals)	Buller Street / William Street is one of the two east-west connections to the CBD, resulting in consistent traffic which makes turns from Hollingworth Street difficult. Upgrade to signals would improve accessibility and safety.
20	William Street / Short Street intersection upgrade (signals)	Signalisation to improve capacity for CBD traffic, and also improve pedestrian safety and access
21	William Street / Munster Street intersection upgrade (signals)	CDB periphery location. Upgrade to signals would improve safety and efficiency for turning traffic.

ID	Treatment / Option	Comment
22	Ocean Drive / Gordon Street / Hastings River Drive / Oxley Highway Intersection upgrade (consider turn bans and signal phasing changes)	Key intersection in the inner area, where 3 major corridors converge. Delays forecast in the future base case, but may be avoided if Outer Orbital Road is built. Airport Industrial Precinct a significant contributor to demand at this location, and staged or reduced development of this precinct could delay need for upgrades.
23	Gordon Street / Horton Street intersection upgrade (signalisation)	Busy roundabout on edge of CBD has high turning volumes. Signalisation would increase capacity, and improve safety for pedestrians.
24	Gordon Street / Grant Street intersection upgrade (upgrade signals)	Upgrade completed
25	Central Road / Hindman Street intersection upgrade (roundabout)	Upgrade to roundabout would improve safety and efficiency for turning traffic, and reduce speeds on Hindman Street
26	Hill Street / Pacific Drive intersection upgrade (channelisation)	Upgrade would improve safety and efficiency for turning traffic, and reduce conflicts with through traffic on Pacific Drive
27	Kennedy Drive / Koala Street intersection upgrade (roundabout)	Key junction in centre of large urban area. Limited sight distances for some approaches. Upgrade to roundabout would improve safety and efficiency for turning traffic, and reduce speeds on Kennedy Drive
28	Koala Street / Granite Street intersection upgrade (roundabout)	Limited sight distances for some approaches. Upgrade to roundabout would improve safety and efficiency for turning traffic, and reduce speeds on Koala Street
29	Pacific Drive / Bangalay Drive intersection upgrade (roundabout)	Limited sight distances for some approaches. Upgrade to roundabout would improve safety and efficiency for turning traffic, and reduce speeds on Pacific Drive
30	Pacific Drive / Lighthouse Road intersection upgrade (roundabout)	Upgrade to roundabout would improve safety and efficiency for turning traffic, and reduce speeds on Pacific Drive
31	Oxley Highway / Cameron Street intersection upgrade (signalisation)	Busy intersection in the Wauchope CBD, with high volumes of turning traffic. Traffic signals would improve traffic capacity, and provision for pedestrians.
32	Pembrooke Road upgrade at railway bridge	Upgrade would resolve safety issue, and may improve access for higher vehicles (depending on solution).
33	Pacific Highway / Oxley Highway interchange upgrade (consider roundabout metering and/or additional approach and circulating lanes)	Continued traffic growth will increase pressure on this interchange, which may need upgrade to accommodate turning traffic and maintain safety. Current roundabout configuration prioritises NB right turn from Pacific Highway over Oxley Highway eastbound through movement, creating delays for the latter. Metering of the NB off-ramp approach, and/or the WB Oxley Highway approach, could be considered to create additional gaps for Oxley Highway eastbound traffic in peak periods.
34	John Oxley Drive / Thrumster Street intersection upgrade (roundabout)	Upgrade to roundabout would improve safety and efficiency for turning traffic (major development area) and reduce speeds on John Oxley Drive.

ID	Treatment / Option	Comment
35	Ocean Drive / Evans Street (south) intersection upgrade (roundabout)	Upgrade to roundabout would improve safety and efficiency for turning traffic and reduce speeds on Ocean Drive.
36	Ocean Drive / Lake Cathie Town Centre Access intersection upgrade (signals)	Required to service adjacent development
37	Ocean Drive / Abel Tasman Drive intersection upgrade (signals)	Signals would improve safety and efficiency for turning traffic, and access to adjacent subdivision.
38	Ocean Drive / New Road intersection upgrade (roundabout)	Required to service adjacent development in Lake Cathie
39	Ocean Drive / McGilvray Road intersection upgrade (roundabout)	Upgrade to roundabout would improve safety and efficiency for turning traffic and reduce speeds on Ocean Drive.
40	Ocean Drive / Edith Street intersection upgrade (roundabout)	Upgrade to roundabout would improve safety and efficiency for turning traffic and reduce speeds on Ocean Drive.
41	Ocean Drive / Bold Street intersection upgrade (roundabout)	Upgrade to roundabout would improve safety and efficiency for turning traffic and reduce speeds on Ocean Drive.
42	Ocean Drive / Kew Road intersection upgrade (roundabout)	Major intersection and access point to Laurieton. Current priority disadvantages through traffic on Ocean Drive. Upgrade to roundabout would improve safety and efficiency for turning traffic and reduce speeds.
43	Ocean Drive / Sirius Drive intersection upgrade (signalisation)	Main access to Lakewood town centre and growth area. Signals would provide for high turning traffic and pedestrian access across Ocean Drive.
44	Graham Street / River Street / Comboyne Street intersection upgrade (roundabout)	Theoretical capacity is OK, and no significant crash history, but unusual geometry could be reviewed (e.g. upgrade to roundabout) to improve safety and legibility.
45	Pacific Highway / Houston Mitchell Drive interchange upgrade (grade separation)	Required as increasing volumes on the highway make turns out of Houston Mitchell Drive harder. Grade separation likely to be the most effective treatment and give the best road safety outcome

9.4 Non-infrastructure approaches

ID	Treatment / Option	Comment
46	Peak spreading / peak shifting	Some peak spreading will happen organically, in response to conditions where road capacity is reached at peak periods. Pro-active encouragement of a shift in the timing of some trips would require a specific behaviour change program, and may have limited feasibility given the influence on travel behaviour of fixed start-finish time activities such as schools. There is limited access to alternatives to private car use, such as public transport, and distances of many trips do not make walking or cycling viable.
47	Land use densification	Major growth in population in the study area will occur in low-density residential subdivisions, which are difficult to service by public transport, and are not easily accessible by pedestrians and cyclists. Redirecting some growth into established urban areas is likely to reduce demand for private car trips, particularly where such growth is in locations close to jobs, schools and other services.

10. Road Network Improvement Strategy

It is clear that some of the potential responses outlined in Sections 8 and 9 will have a bigger impact than others, or address a more pressing need. Table 10.1 and Table 10.2 outline a relative priority level for each of the evaluated responses, for 2021, 2026 and 2036. Where a priority level changes over time, it is an indication that should the response not be implemented initially, the need for action is expected to increase.

These priority levels are shown in maps following the tables, with separate maps for 2021, 2026 and 2036.

Table 10.1 Priority of Responses – Infrastructure Works

ID	Location	Priority Level		
		2021	2026	2036
1a	Outer Orbital Road (North)	Moderate	Moderate	High
1b	Outer Orbital Road (South)	Moderate	High	High
2	Outer Orbital Road Jindalee Road Link	Low	Low	Low
3	Wauchope Inner Bypass	Low	Low	Low
4	Bonny Hills Bypass	Low	Low	Low
5	John Oxley Drive corridor upgrade [4]	Moderate	High	High
6	Lake Road corridor upgrade	Moderate	Moderate	High
7	Hastings River Drive corridor upgrade	Moderate	Moderate	High
8	Ocean Drive corridor upgrade	Moderate	Moderate	High
9	Port Macquarie CBD traffic management review	Moderate	Moderate	Moderate
10	Oxley Highway (west of Comboyne Road) overtaking lanes	Low	Low	Moderate
11	Comboyne Road targeted shoulder widening	Low	Low	Moderate
12	Lorne Road sealing	Low	Moderate	Moderate
13	Pappinbarra Road upgrade	n.a.	n.a.	n.a.
14	Boundary Street / Hastings River Drive Upgrade [5]	High	High	High
15	Hastings River Drive / Hibbard Drive (east) intersection upgrade (signalisation)	Low	Moderate	Moderate
16	Bay Street / Newport Island Road intersection upgrade (channelisation)	Low	Moderate	Moderate
17	Bay Street / Bellbowrie Street intersection upgrade (channelisation)	Low	Moderate	Moderate

[4] *Upgrade required independent of Outer Orbital Road (ID 1) to support local development.*
[5] *Dependent on Airport Precinct Light Industrial development and/or Outer Orbital Road North (ID 1a)*

ID	Location	Priority Level		
		2021	2026	2036
18	Bay Street / Warlters Street / Aston Street intersection upgrade (roundabout)	Low	Moderate	Moderate
19	Buller Street / Hollingworth Street intersection upgrade (signals)	Moderate	High	High
20	William Street / Short Street intersection upgrade (signals)	Moderate	Moderate	High
21	William Street / Munster Street intersection upgrade (signals)	Moderate	Moderate	High
22	Ocean Drive / Gordon Street / Hastings River Drive / Oxley Highway Intersection upgrade (consider turn bans and signal phasing changes) [6]	High	High	High
23	Gordon Street / Horton Street intersection upgrade (signalisation)	High	High	High
24	Gordon Street / Grant Street intersection upgrade (upgrade signals)	n.a.	n.a.	n.a.
25	Central Road / Hindman Street intersection upgrade (roundabout)	Low	Moderate	Moderate
26	Hill Street / Pacific Drive intersection upgrade (channelisation)	Low	Moderate	Moderate
27	Kennedy Drive / Koala Street intersection upgrade (roundabout)	Moderate	High	High
28	Koala Street / Granite Street intersection upgrade (roundabout)	Low	Moderate	Moderate
29	Pacific Drive / Bangalay Drive intersection upgrade (roundabout)	Moderate	High	High
30	Pacific Drive / Lighthouse Road intersection upgrade (roundabout)	Low	Moderate	Moderate
31	Oxley Highway / Cameron Street intersection upgrade (signalisation)	Low	Moderate	High
32	Pembrooke Road upgrade at railway bridge[7]	High	High	High

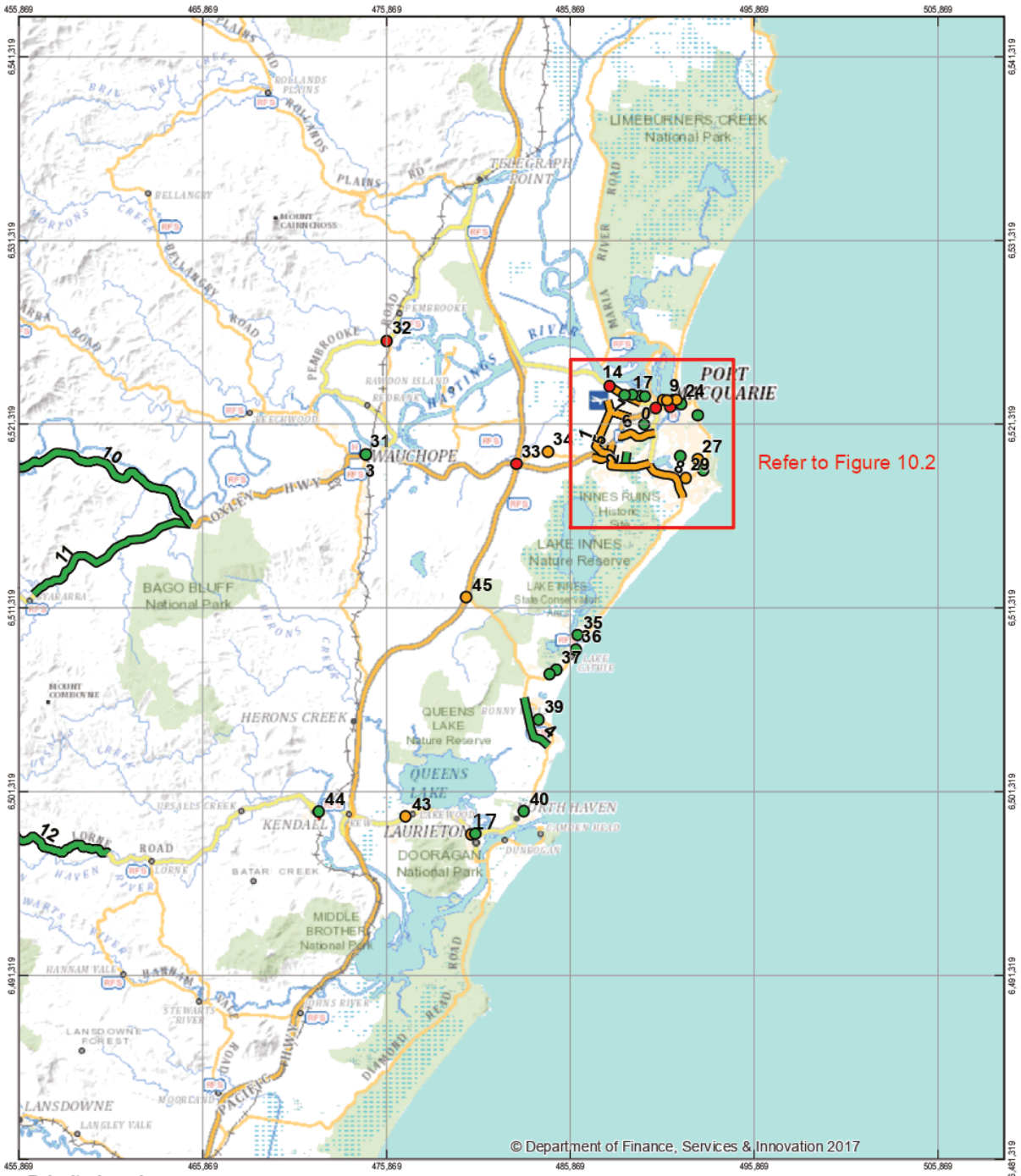
[6] *Short term action required to accommodate Airport Precinct Light Industrial development. Long term treatment not required if Outer Orbital Road (ID 1) is constructed in full.*
[7] *May incorporate sealing unsealed section of Stoney Creek Road*

ID	Location	Priority Level		
		2021	2026	2036
33	Pacific Highway / Oxley Highway interchange upgrade (consider roundabout metering and/or additional approach and circulating lanes)	High	High	High
34	John Oxley Drive / Thrumster Street intersection upgrade (roundabout)	Moderate	High	High
35	Ocean Drive / Evans Street (south) intersection upgrade (roundabout)	Low	Moderate	Moderate
36	Ocean Drive / Lake Cathie Town Centre Access intersection upgrade (signals)	Low	Moderate	High
37	Ocean Drive / Abel Tasman Drive intersection upgrade (signals)	Low	Moderate	High
38	Ocean Drive / New Road intersection upgrade (roundabout)[8]	Low	Moderate	Moderate
39	Ocean Drive / McGilvray Road intersection upgrade (roundabout)	Low	Moderate	Moderate
40	Ocean Drive / Edith Street intersection upgrade (roundabout)	Low	Moderate	Moderate
41	Ocean Drive / Bold Street intersection upgrade (roundabout)	Low	Moderate	Moderate
42	Ocean Drive / Kew Road intersection upgrade (roundabout)	Moderate	High	High
43	Ocean Drive / Sirius Drive intersection upgrade (signalisation)	Moderate	High	High
44	Graham Street / River Street / Comboyne Street intersection upgrade (roundabout or channelisation)	Low	Moderate	Moderate
45	Pacific Highway / Houston Mitchell Drive interchange upgrade (grade separation)	Moderate	High	High

[8] *Subject to adjacent development*

Table 10.2 Priority of Responses – Non-Infrastructure Approaches

ID	Location	Priority Level		
		2021	2026	2036
46	Peak spreading / peak shifting	Low	Moderate	Moderate
47	Land use densification	Moderate	High	High



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Port Macquarie – Hastings Council and Roads and Maritime Services
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 15 Jun 2018

Road Network Improvement Strategy
2021 Overview

Figure 10.1

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Road Network Improvement Strategy
2021 Overview

Figure 10.2

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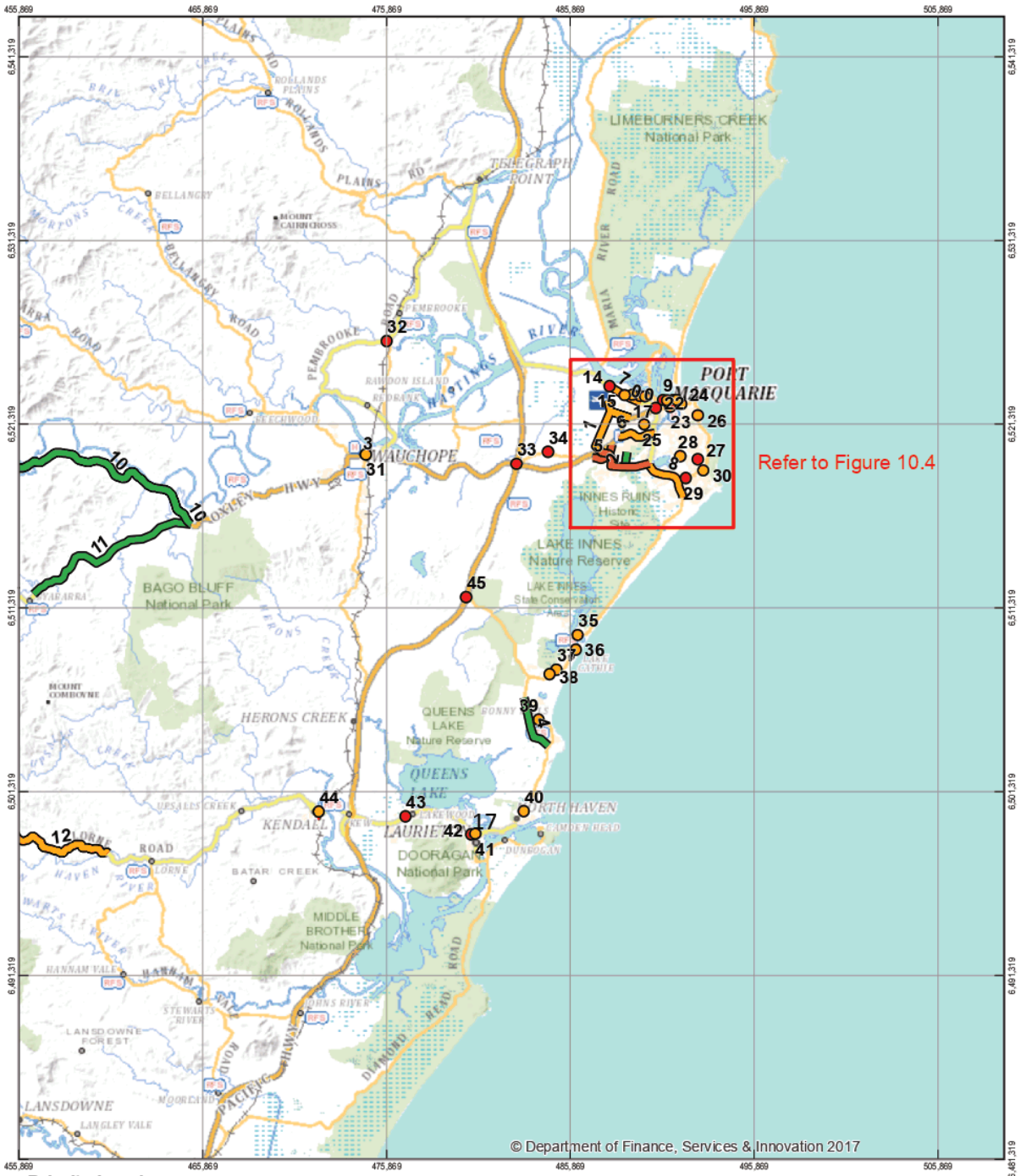

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Road Network Improvement Strategy
2026 Overview

Figure 10.3

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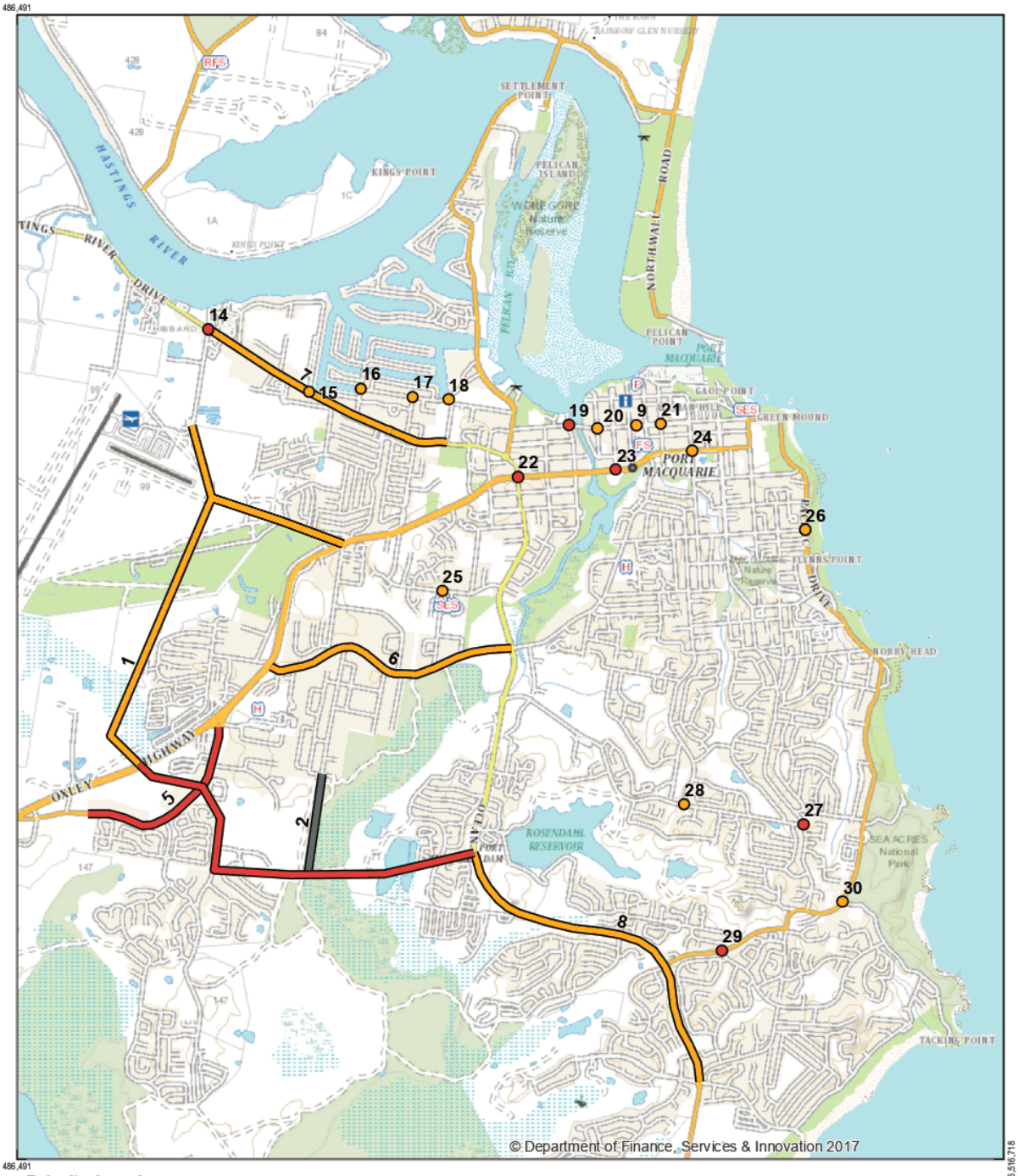

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2026 Overview

Figure 10.4

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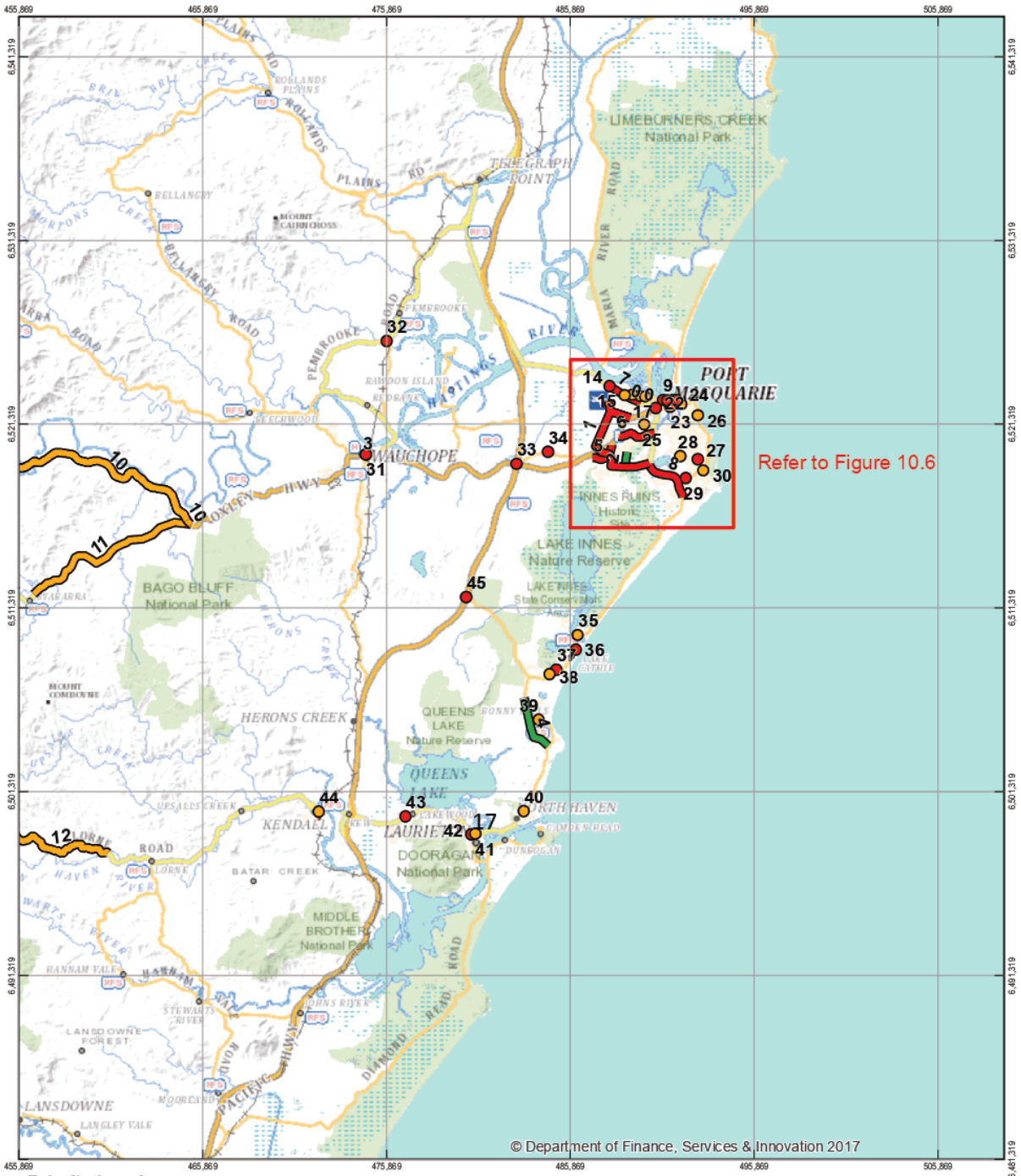

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Figure 10.5

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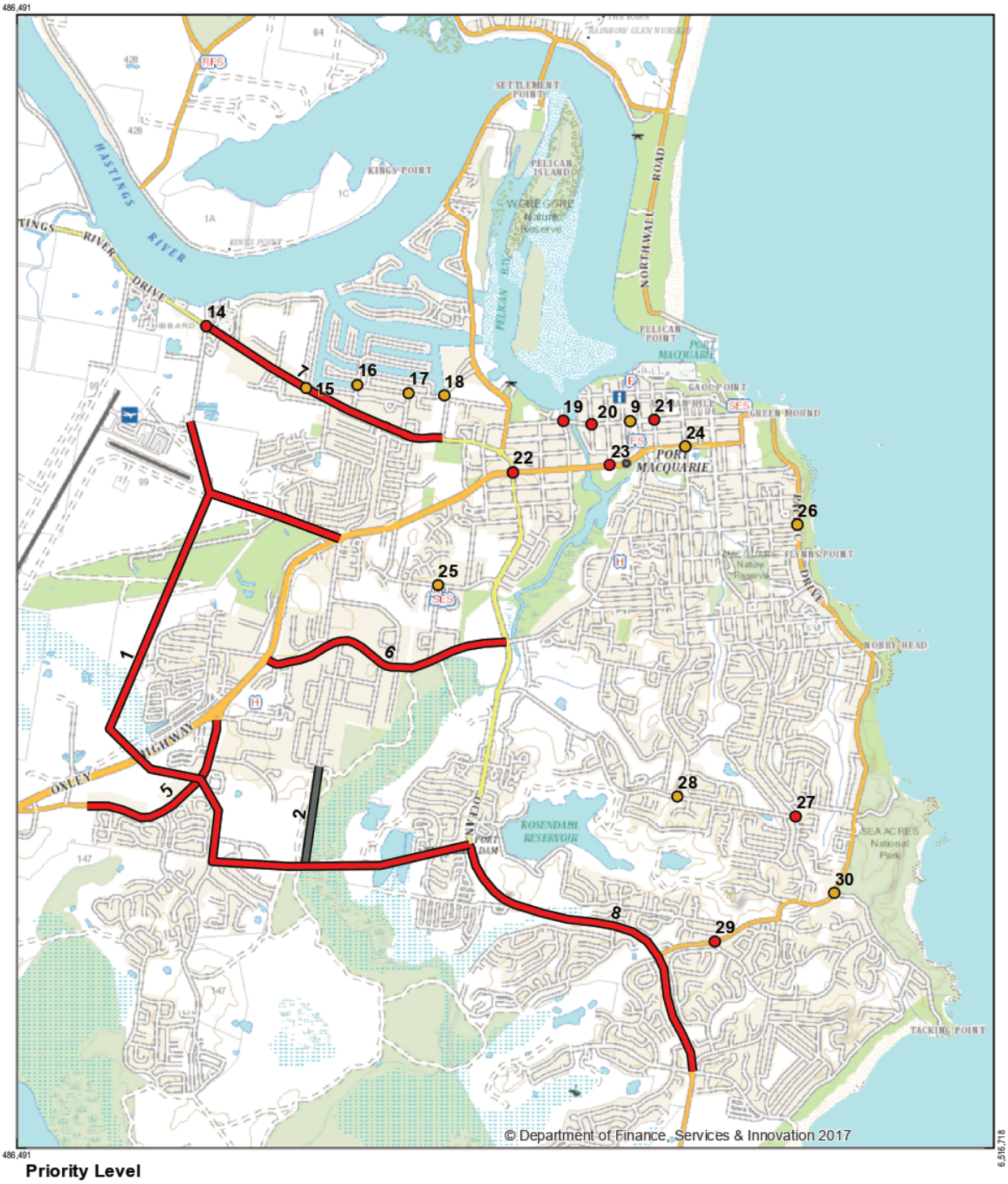

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Road Network Improvement Strategy
2036 Overview

Figure 10.6

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10.1 Future Road Hierarchy

Should some of the treatments listed in Table 10.1 be implemented, there is potential for the function of certain roads to change. Potential changes, compared to the existing function outlined in Table 3.1, are summarised in Table 10.3.

Table 10.3 Potential Functional Road Hierarchy Changes

Road	Existing Function	Future Function
Outer Orbital Road	n.a.	Arterial
Jindalee Road Link	n.a.	Collector
Wauchope Inner Bypass	n.a.	Sub-arterial
Bonny Hills Bypass	n.a.	Arterial
Lake Road (Oxley Highway to Ocean Drive)	Sub-arterial	Sub-arterial
Boundary Street	Collector	Upgrade to Sub-arterial if Outer Orbital Road (north) is constructed
Clifton Drive	Collector	Downgrade to Local if Outer Orbital Road link constructed
John Oxley Drive	Collector	Upgrade to Sub-arterial if Outer Orbital Road (south) is constructed
Major Innes Road	Collector	Upgrade to Sub-arterial if Outer Orbital Road (south) is constructed
Blackbutt Drive	Collector	Upgrade to Sub-arterial if Wauchope Inner Bypass is constructed

11. Conclusion

This report details the outcomes of the Port Macquarie-Hastings Local Government Area Traffic Study, completed by GHD for Port Macquarie-Hastings Council and Roads and Maritime Services. The study has involved collection of various traffic data, reviewing population and land use forecasts, development of a traffic model for part of the study area, and considering the implications of future changes on the long-term operation of the road network.

The population of the Port Macquarie-Hastings Local Government Area is forecast to increase from the current 80,000 people, to over 100,000 by 2036. Growth in population, and by extension traffic demand, will not be uniform, with some parts of the study area not expected to grow significantly from existing, while others are forecast to experience substantial growth.

A key aspect of the methodology used for this study has been a mesoscopic traffic model, developed using the Aimsun modelling software package. Development of the model has been informed by a number of data sources, including traffic volume, travel time and origin-destination surveys collected for this study, population and land use distribution data supplied by Council, and observations of conditions on the existing road network. The model covers the AM (7-10am) and PM (2-6pm) peak periods, and has been calibrated and validated to the traffic survey data. Future growth has been estimated with reference to anticipated changes in population and land use, including development of greenfield areas and infill development. Future models have been developed for years 2021, 2026 and 2036.

The study area road network generally operates well under existing conditions, and is expected to continue operating well in most situations as traffic demand grows over time. There are, however, some locations where capacity is constrained and future growth, particularly associated with expansion of the urban area, would result in poor performance and difficulties for local traffic to access the arterial road network.

A range of potential responses to the future traffic needs of the study area have been identified, including constructing new road links, corridor upgrades, localised works and non-infrastructure approaches such as land use planning and demand management.

Projects such as the Outer Orbital Road, connecting Ocean Drive, Oxley Highway and Hastings River Drive, would remove through traffic from the inner Port Macquarie area, and allow easier access for local traffic.

Intersection upgrades along major corridors, generally from roundabout control to traffic signal control, improves the reliability for local access and through traffic, but potentially at the expense of increased travel times for through traffic (due to the operation of signals). In the long-term, however, such upgrades are expected to be necessary if the needs of both local traffic and through traffic are to be met.

In established urban areas, intersection upgrades, including from give-way control to roundabout control, would facilitate safer accessibility for local traffic, as well as acting to reduce traffic speeds in these locations.

Non-infrastructure approaches, which seek to manage demand for private car travel across the study area, and to manage expectations of how the network could or should perform in the future, are also critical, as for much of the day the road network is operating below capacity. Shifting some demand into peak shoulder or off-peak travel periods reduces the peak capacity that needs to be provided, and makes more efficient use of the network, and can reduce the need for infrastructure upgrades.

A road network improvement strategy has been formulated as a result of the study, with the High priority recommendations as follows:

- Short term (approximately 2021):
  - Boundary Street / Hastings River Drive intersection upgrade
  - Ocean Drive / Gordon Street / Hastings River Drive / Oxley Highway intersection upgrade
  - Pacific Highway / Oxley Highway interchange upgrade
  - Gordon Street / Horton Street intersection upgrade
- Medium term (approximately 2026):
  - Outer Orbital Road (South) – Oxley Highway to Ocean Drive
  - John Oxley Drive corridor upgrade
  - Pacific Highway / Houston Mitchell Drive intersection upgrade
  - Buller Street / Hollingworth Street intersection upgrade
  - Kennedy Street / Koala Street intersection upgrade
  - Pacific Drive / Bangalay Drive intersection upgrade
  - John Oxley Drive / Thrumster Street intersection upgrade
  - Ocean Drive / Kew Road intersection upgrade
  - Ocean Drive / Sirius Drive intersection upgrade
- Longer term (approximately 2036 or beyond):
  - Outer Orbital Road (North) – Oxley Highway to Hastings River Drive
  - Lake Road corridor upgrade
  - Hastings River Drive corridor upgrade
  - Ocean Drive (north) corridor upgrade – Matthew Flinders Drive to Lake Road
  - William Street / Munster Street intersection upgrade
  - William Street / Short Street intersection Upgrade
  - Ocean Drive / Abel Tasman Drive intersection upgrade
  - Ocean Drive / Lake Cathie Town Centre intersection upgrade
- Ongoing, with future acceleration
  - Land use densification

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Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	T. Bickerstaff	E. Jackson		S. Keevil-Jones		22/06/18

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Port Macquarie-Hastings Council and Roads and Maritime Services

Port Macquarie - Hastings Local Government Area

Traffic Study

VOLUME 2 – Traffic Model Outputs

June 2018

WATER | ENERGY & RESOURCES | ENVIRONMENT | PROPERTY & BUILDINGS | TRANSPORTATION

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Appendix F Base Model Trip Generation and Attraction

Appendix G Model – Land Use Alignment

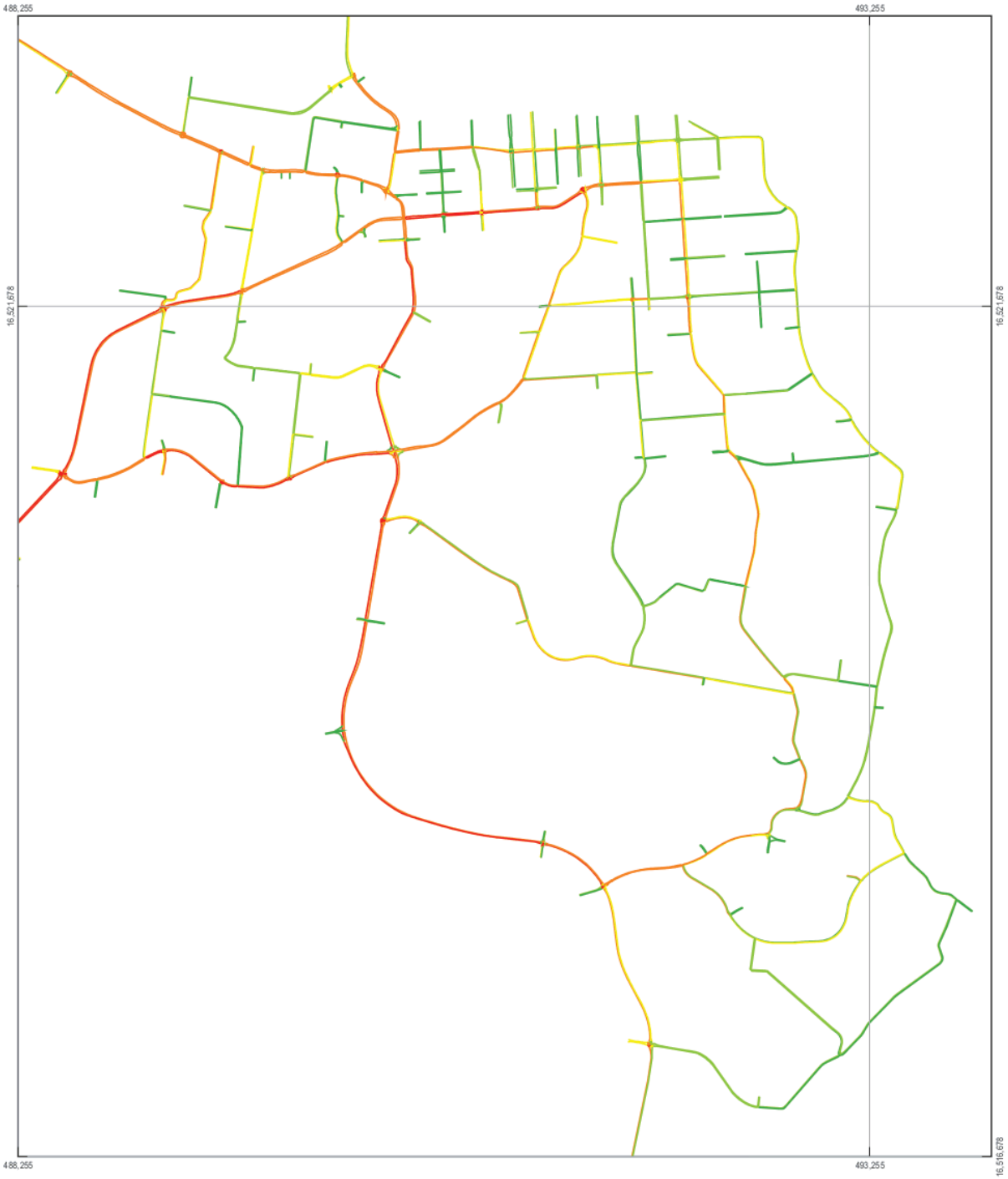
Appendix H Model Zone Growth Rates

Appendix I Traffic Data Summary

Appendices

Appendix A Base Case Volume Plots

2016 AM Peak



LEGEND
Traffic Volumes (veh/hr)

0 - 100 | 250 - 500 | 1000 - 2500
100 - 250 | 500 - 1000

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Traffic Volumes
2016 AM Peak (0800-0900)

Job Number 22-18116
Revision A
Date 04 Sep 2017

Figure A.1

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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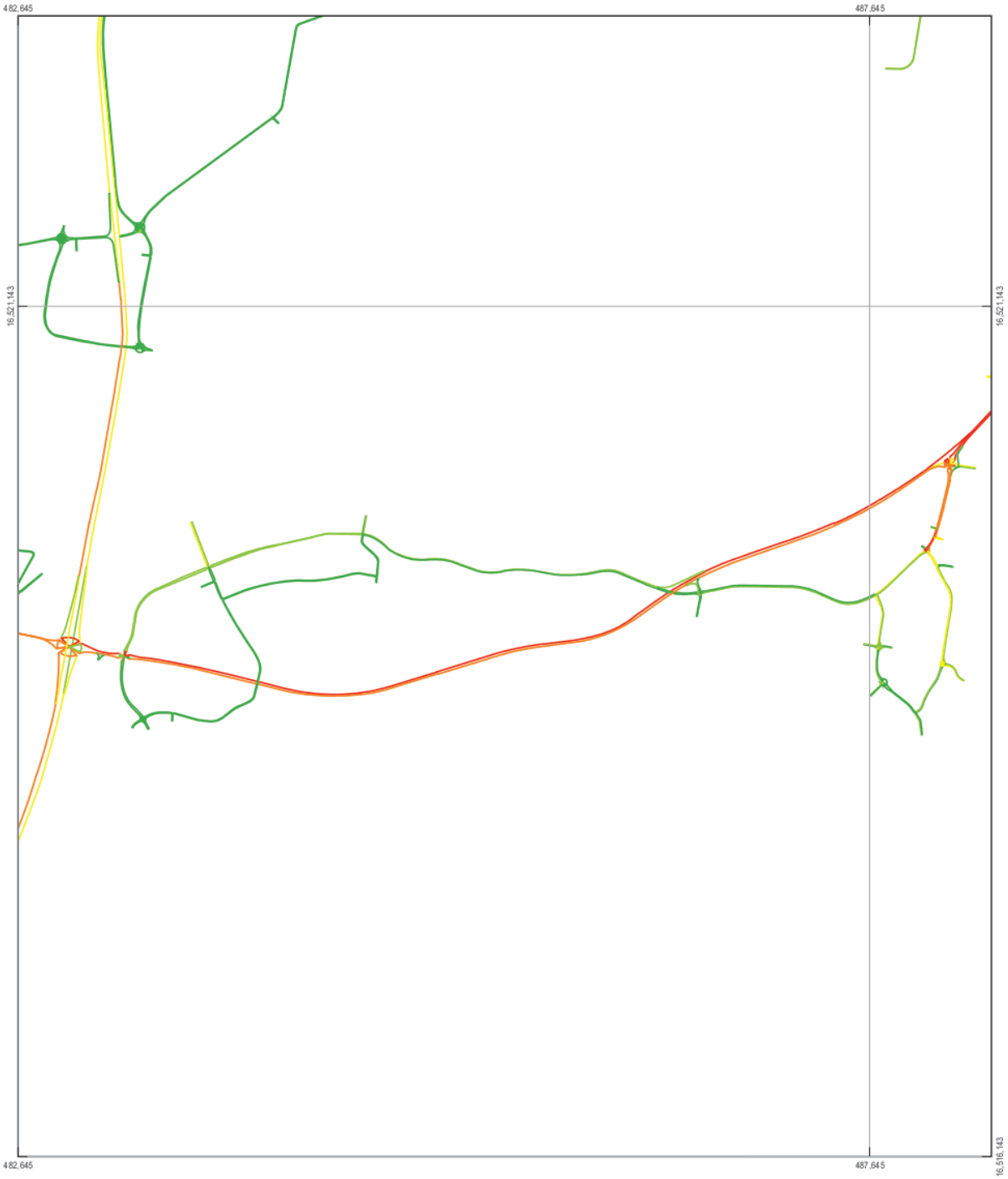

LEGEND
Traffic Volumes (veh/hr)

0 - 100 | 250 - 500 | 1000 - 2500
100 - 250 | 500 - 1000

Paper Size A4
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Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Traffic Volumes
2016 AM Peak (0800-0900)

Job Number 22-18116
Revision A
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Figure A.2

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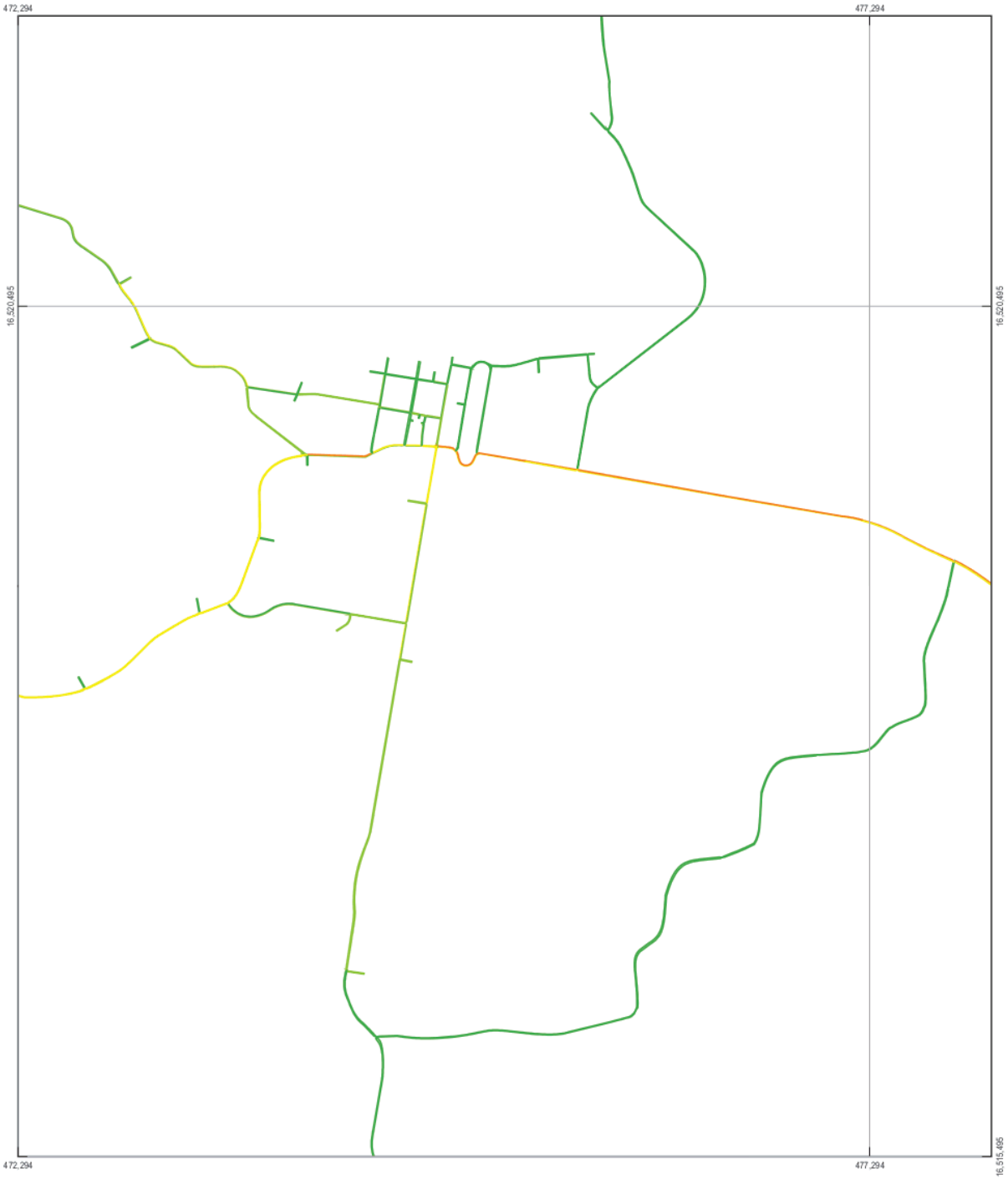

LEGEND
Traffic Volumes (veh/hr)

0 - 100
100 - 250
250 - 500
500 - 1000
1000 - 2500

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Traffic Volumes
2016 AM Peak (0800-0900)

Job Number 22-18116
Revision A
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Figure A.3

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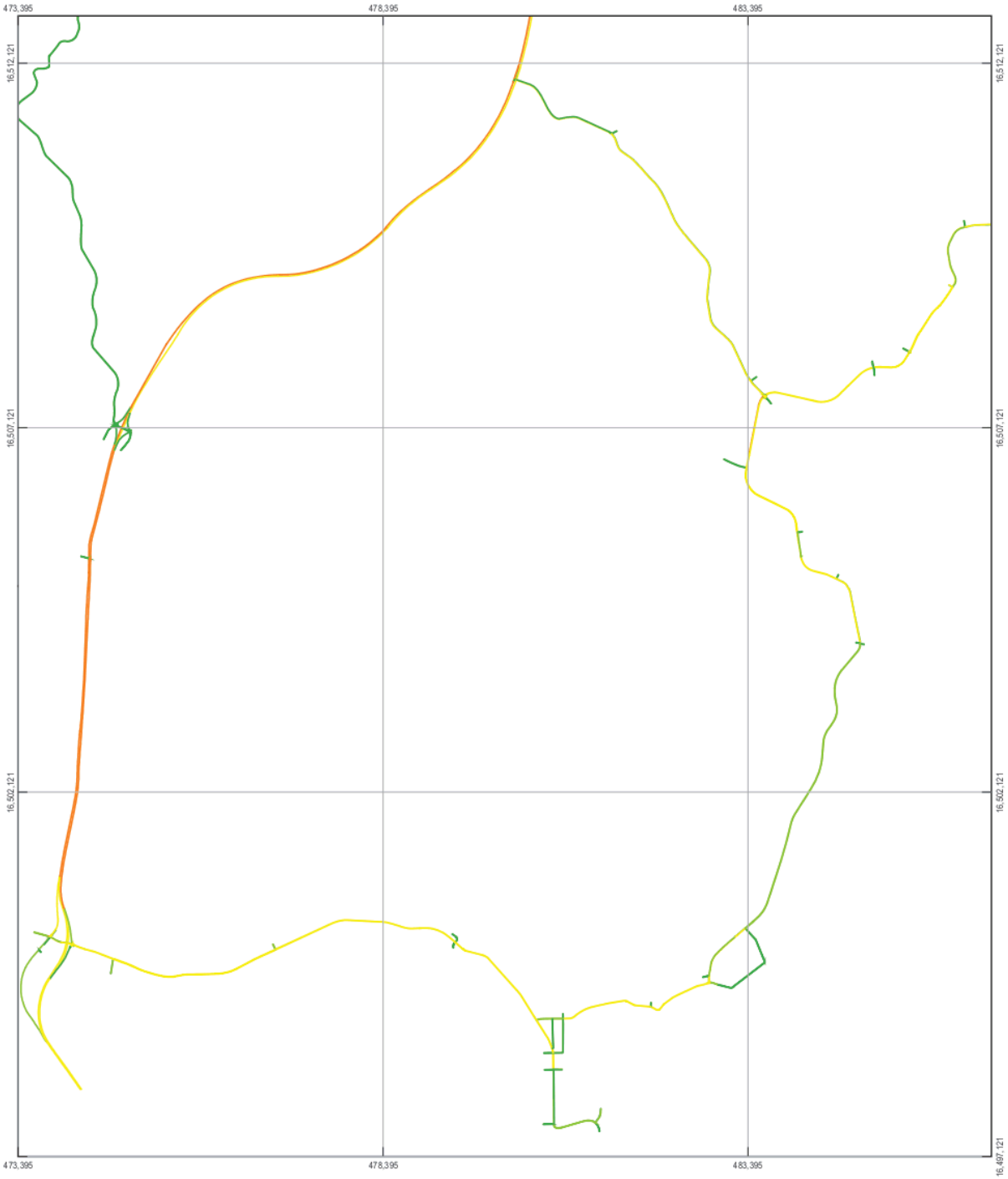

LEGEND
Traffic Volumes (veh/hr)

0 - 100
250 - 500
1000 - 2500
100 - 250
500 - 1000

Paper Size A4
0 250 500 1,000 1,500 2,000
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Traffic Volumes
2016 AM Peak (0800-0900)

Job Number 22-18116
Revision A
Date 04 Sep 2017

Figure A.4

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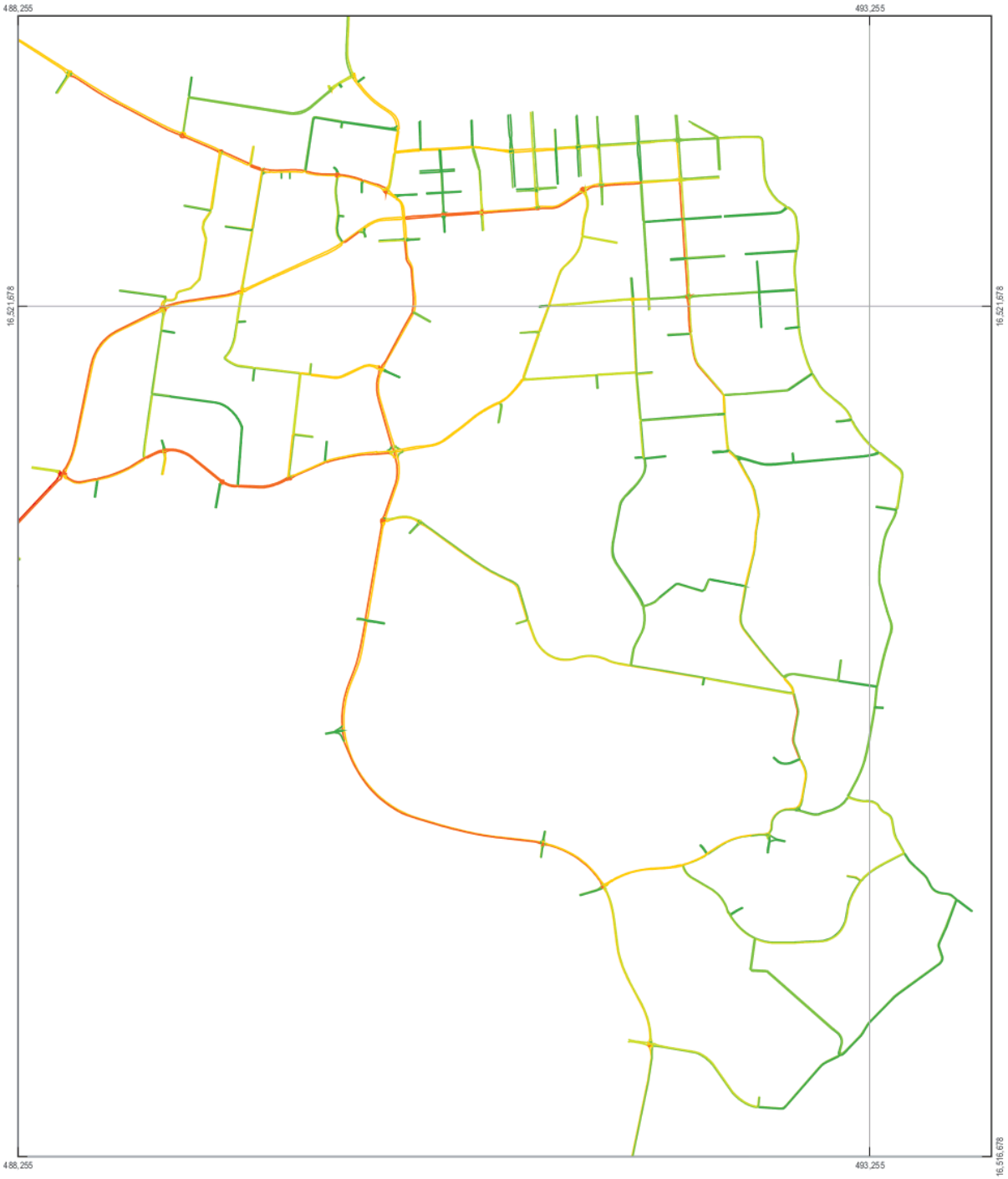
2021 AM Peak



LEGEND
Traffic Volumes (veh/hr)

0 - 100
100 - 250
250 - 500
500 - 1000
1000 - 2500
2500 - 5000

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Traffic Volumes
2021 AM Peak (0800-0900)

Job Number 22-18116
Revision A
Date 04 Sep 2017

Figure A.5

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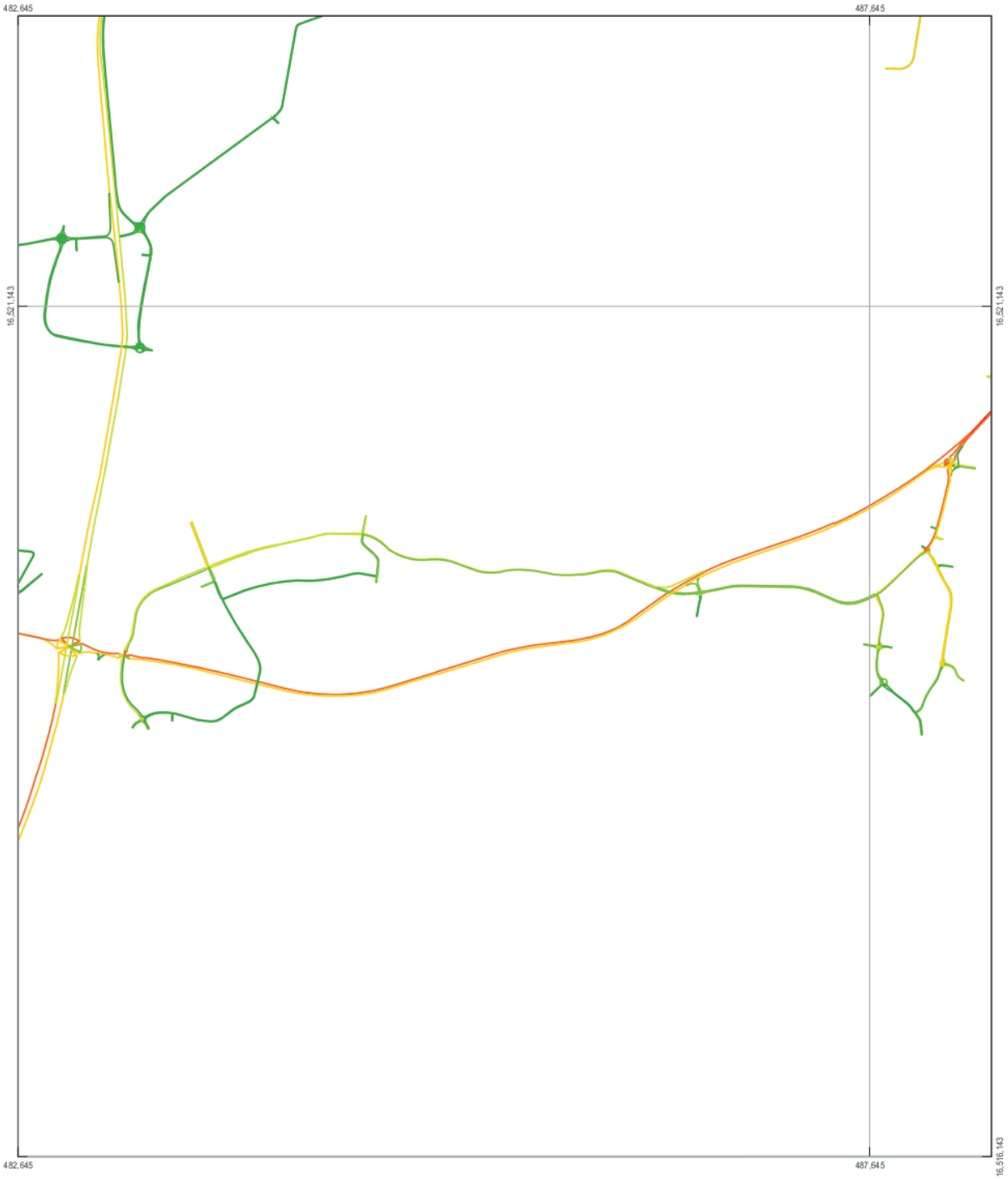

LEGEND
Traffic Volumes (veh/hr)

0 - 100
100 - 250
250 - 500
500 - 1000
1000 - 2500
2500 - 5000

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Traffic Volumes
2021 AM Peak (0800-0900)

Job Number 22-18116
Revision A
Date 04 Sep 2017

Figure A.6

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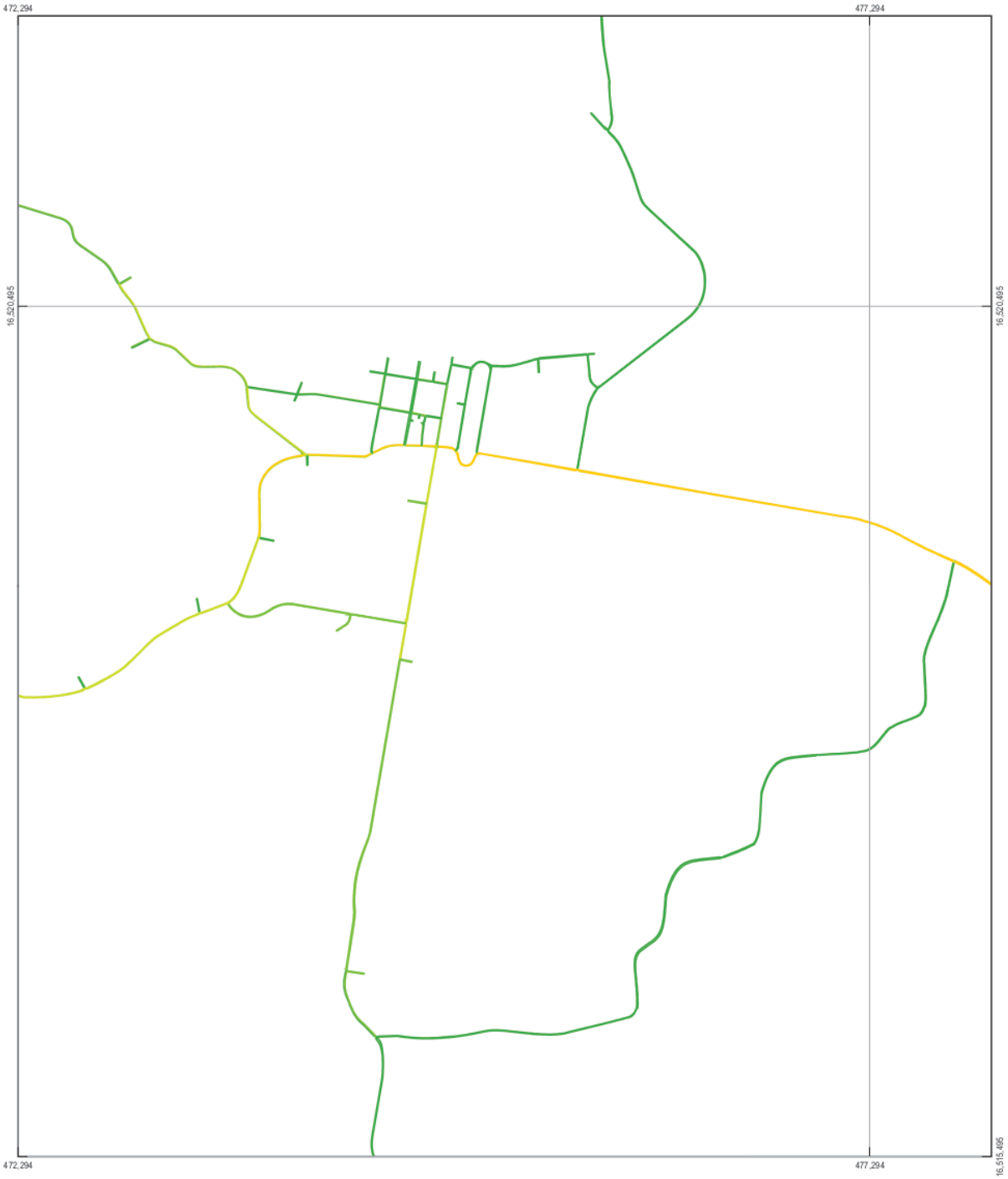

LEGEND
Traffic Volumes (veh/hr)

0 - 100
100 - 250
250 - 500
500 - 1000
1000 - 2500
2500 - 5000

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Traffic Volumes
2021 AM Peak (0800-0900)

Job Number 22-18116
Revision A
Date 04 Sep 2017

Figure A.7

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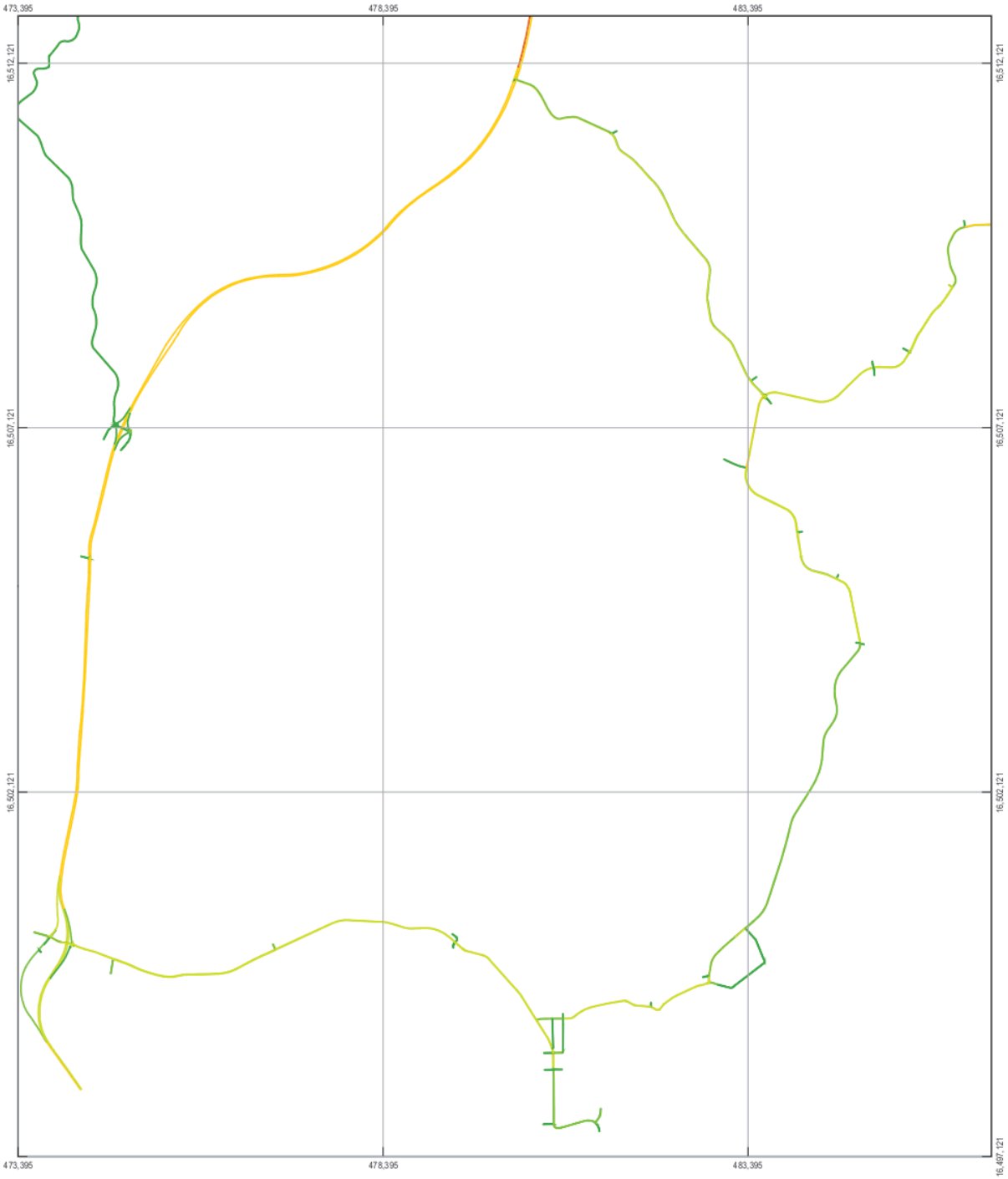

LEGEND
Traffic Volumes (veh/hr)

0 - 100
100 - 250
250 - 500
500 - 1000
1000 - 2500
2500 - 5000

Paper Size A4
0 250 500 1,000 1,500 2,000
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Traffic Volumes
2021 AM Peak (0800-0900)

Job Number 22-18116
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Figure A.8

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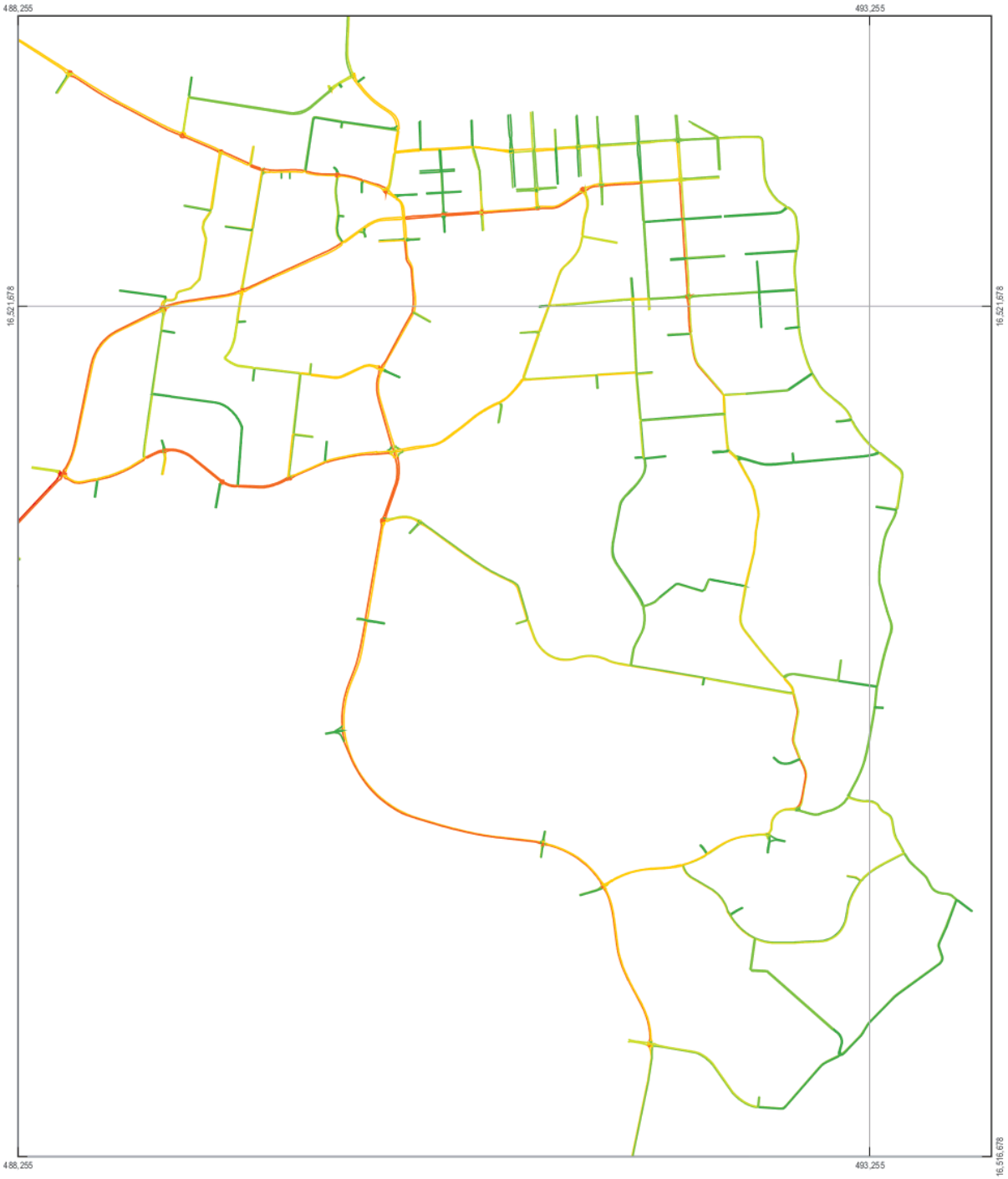
2026 AM Peak



LEGEND
Traffic Volumes (veh/hr)

0 - 100 | 250 - 500 | 1000 - 2500
100 - 250 | 500 - 1000 | 2500 - 5000

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Traffic Volumes
2026 AM Peak (0800-0900)

Job Number 22-18116
Revision A
Date 04 Sep 2017

Figure A.9

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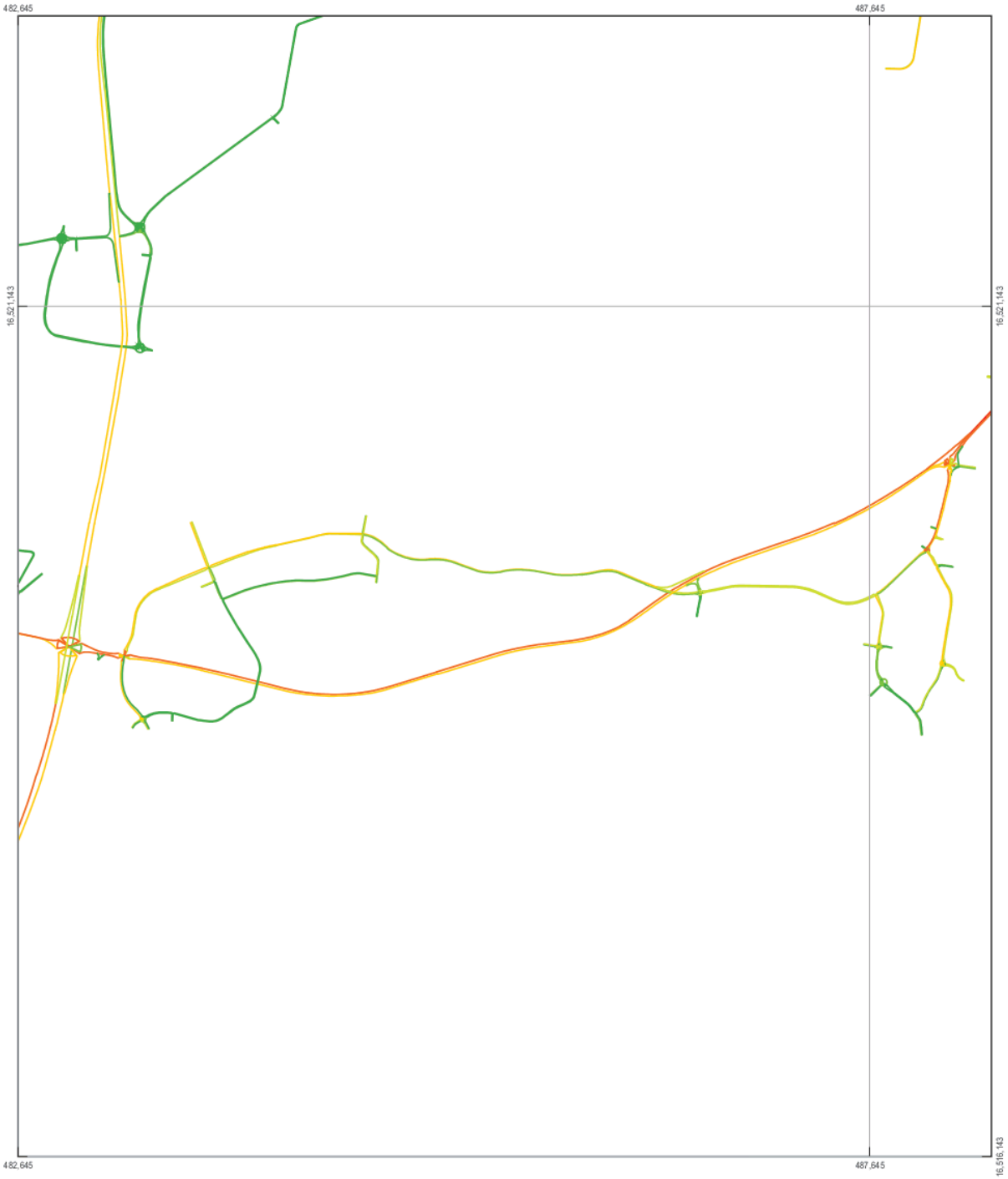

LEGEND
Traffic Volumes (veh/hr)

0 - 100
100 - 250
250 - 500
500 - 1000
1000 - 2500
2500 - 5000

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Traffic Volumes
2026 AM Peak (0800-0900)

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Figure A.10

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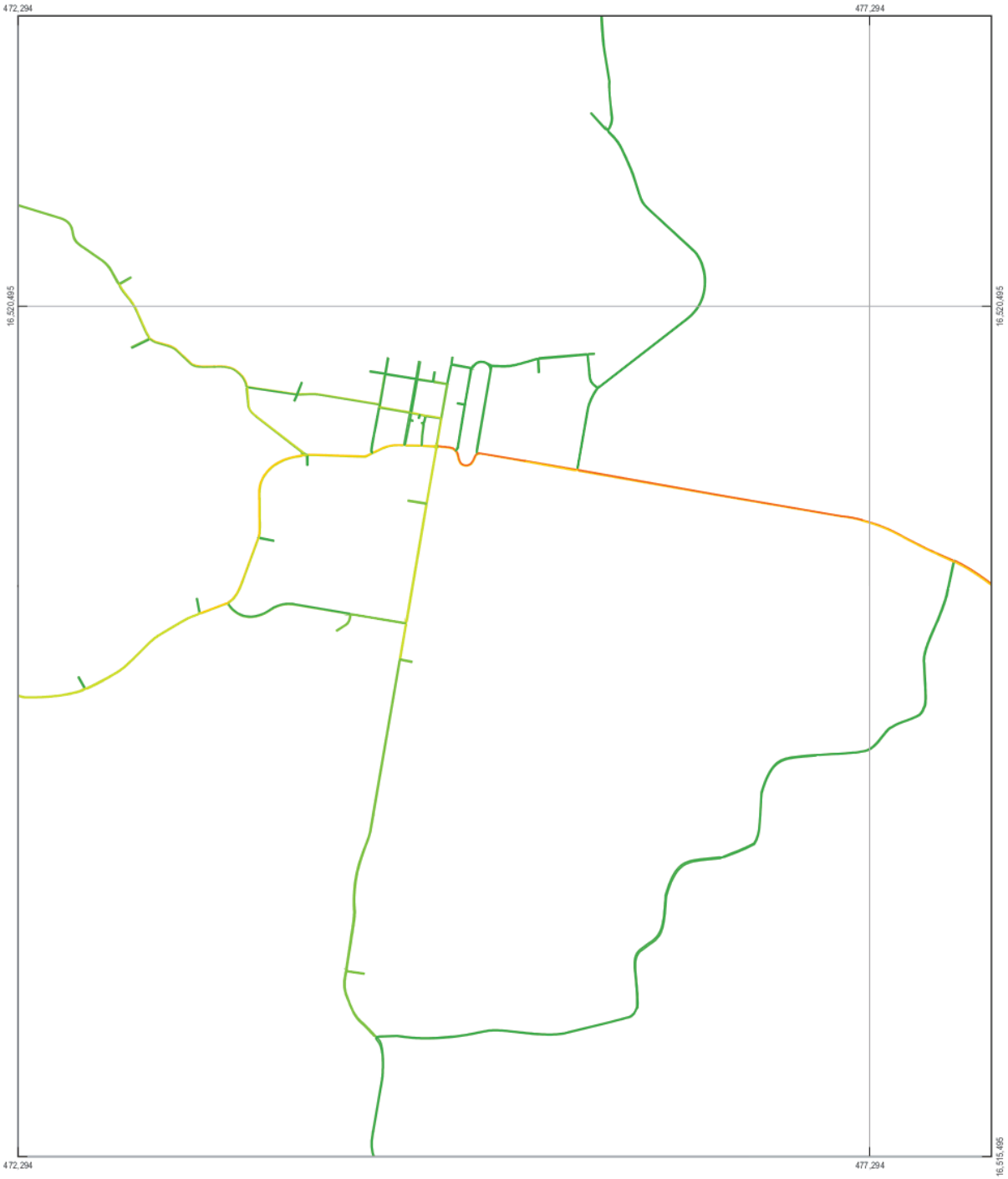

LEGEND
Traffic Volumes (veh/hr)

0 - 100
100 - 250
250 - 500
500 - 1000
1000 - 2500
2500 - 5000

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Traffic Volumes
2026 AM Peak (0800-0900)

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Revision A
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Figure A.11

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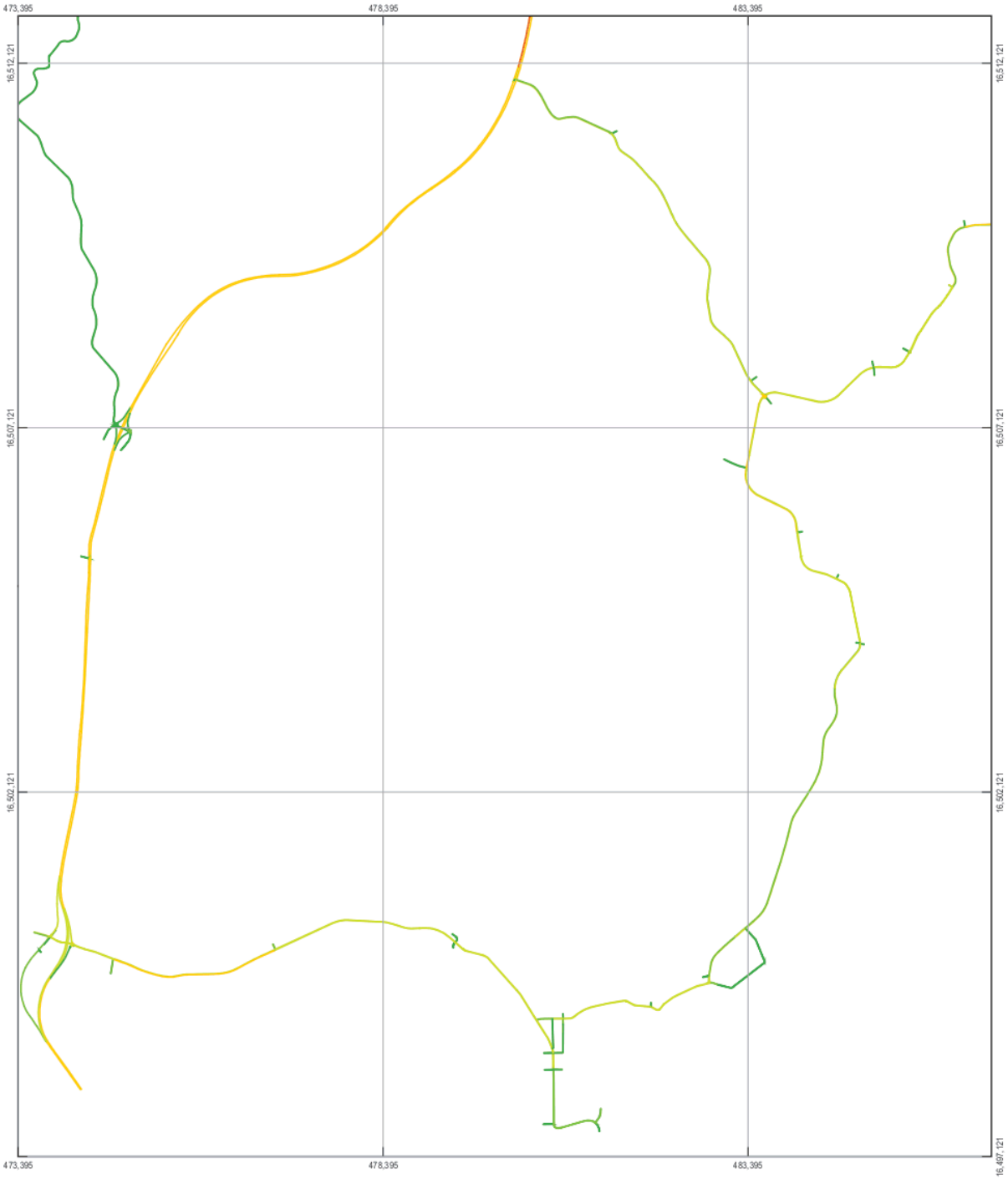

LEGEND
Traffic Volumes (veh/hr)

0 - 100
100 - 250
250 - 500
500 - 1000
1000 - 2500
2500 - 5000

Paper Size A4
0 250 500 1,000 1,500 2,000
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Traffic Volumes
2026 AM Peak (0800-0900)

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Figure A.12

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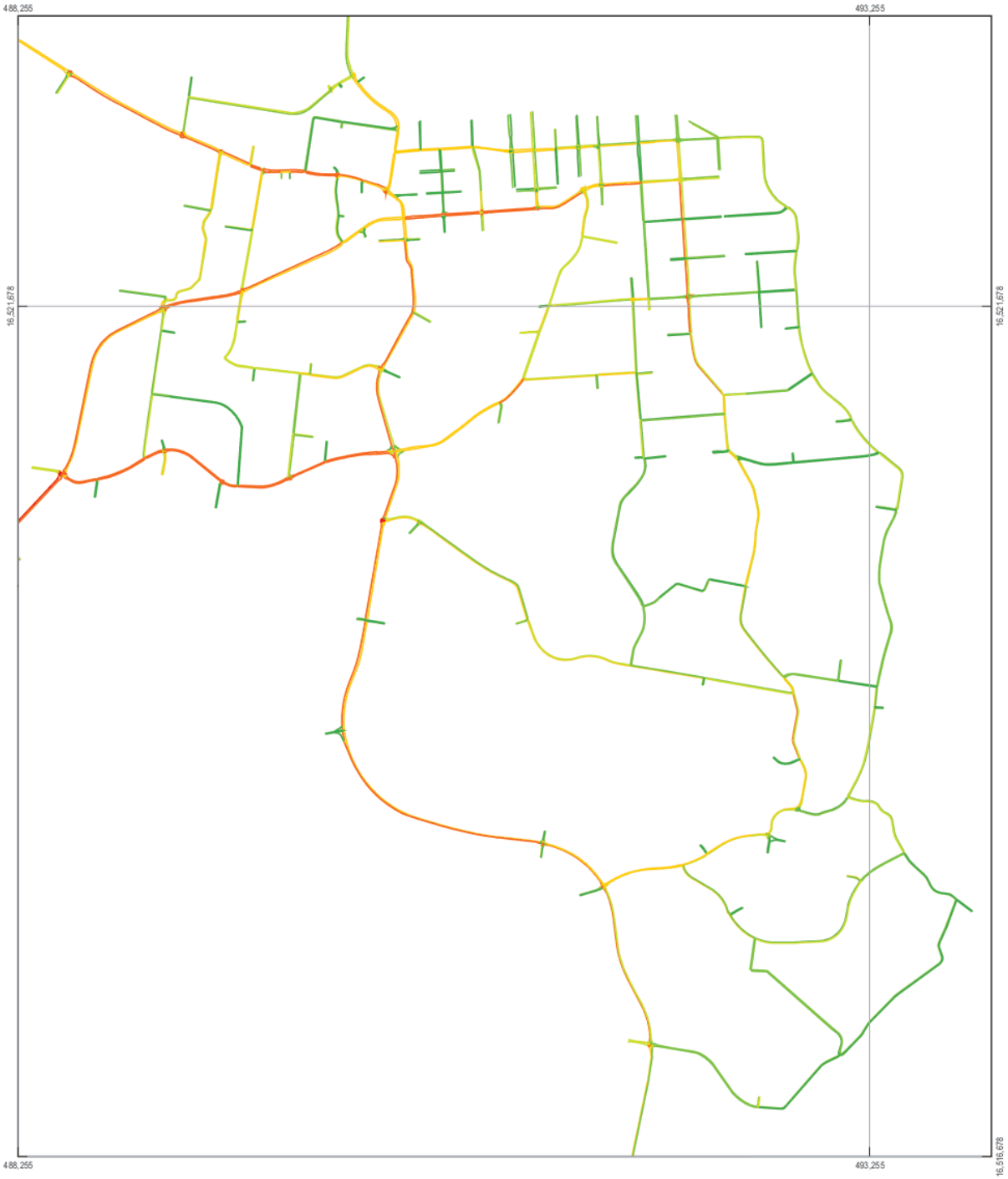
2036 AM Peak



LEGEND
Traffic Volumes (veh/hr)

0 - 100
100 - 250
250 - 500
500 - 1000
1000 - 2500
2500 - 5000

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Traffic Volumes
2036 AM Peak (0800-0900)

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Figure A.13

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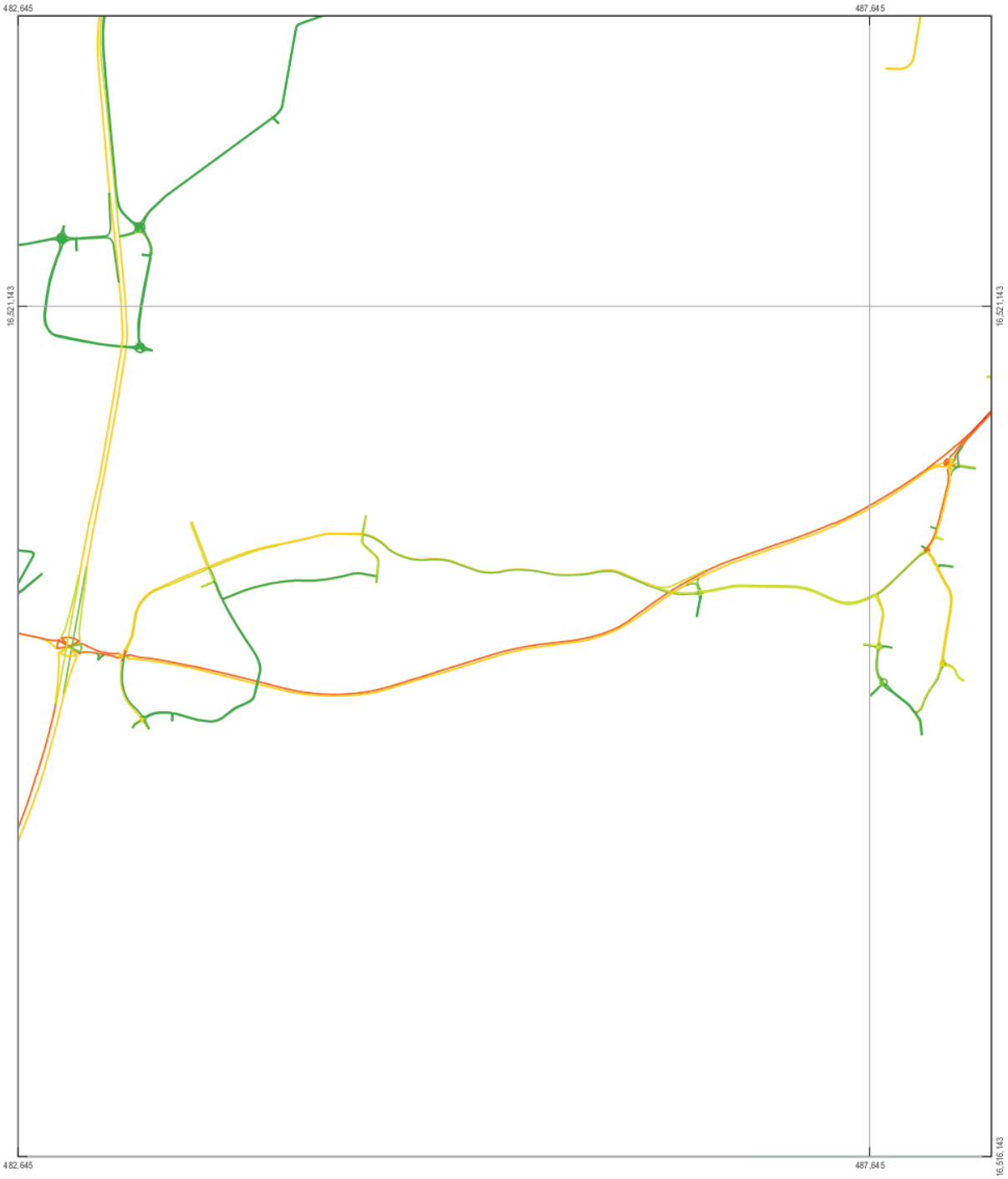
Data source: GHD, 2017 Created by:mbrooks



LEGEND
Traffic Volumes (veh/hr)

0 - 100
100 - 250
250 - 500
500 - 1000
1000 - 2500
2500 - 5000

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Traffic Volumes
2036 AM Peak (0800-0900)

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Figure A.14

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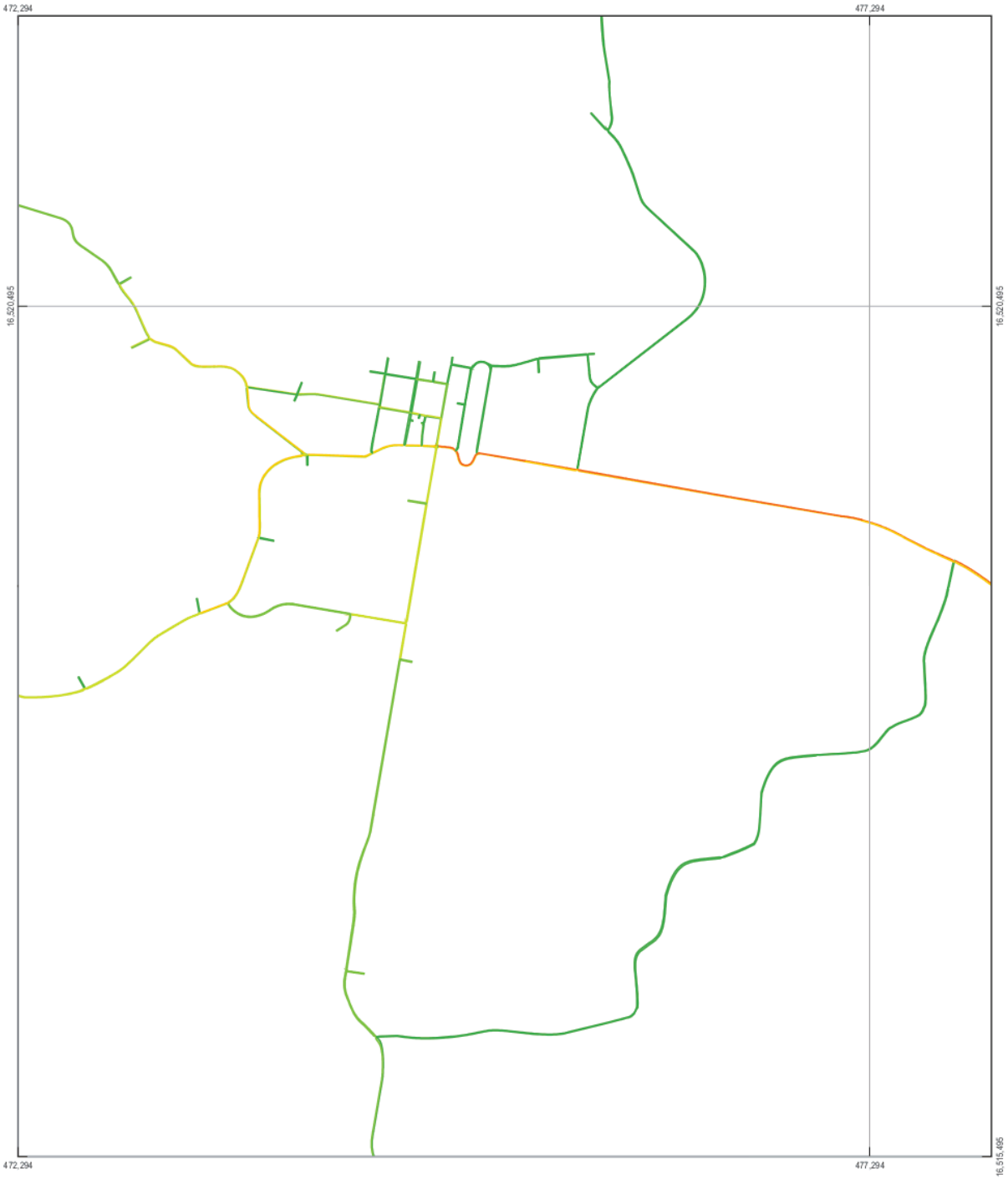

LEGEND
Traffic Volumes (veh/hr)

0 - 100
100 - 250
250 - 500
500 - 1000
1000 - 2500
2500 - 5000

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

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Traffic Volumes
2036 AM Peak (0800-0900)

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Figure A.15

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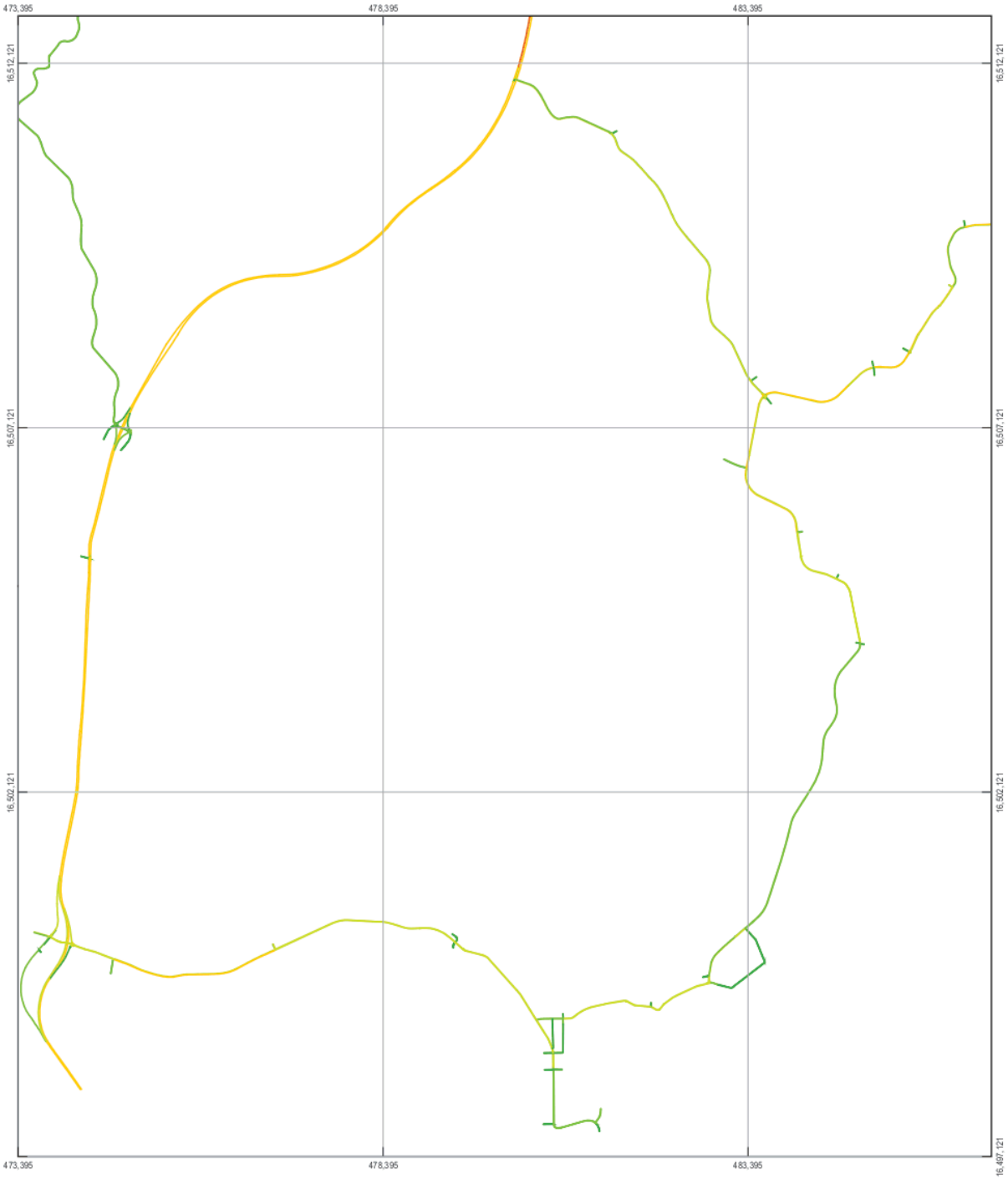
Data source: GHD, 2017 Created by:mbrooks



LEGEND
Traffic Volumes (veh/hr)

0 - 100
100 - 250
250 - 500
500 - 1000
1000 - 2500
2500 - 5000

Paper Size A4
0 250 500 1,000 1,500 2,000
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Traffic Volumes
2036 AM Peak (0800-0900)

Job Number 22-18116
Revision A
Date 04 Sep 2017

Figure A.16

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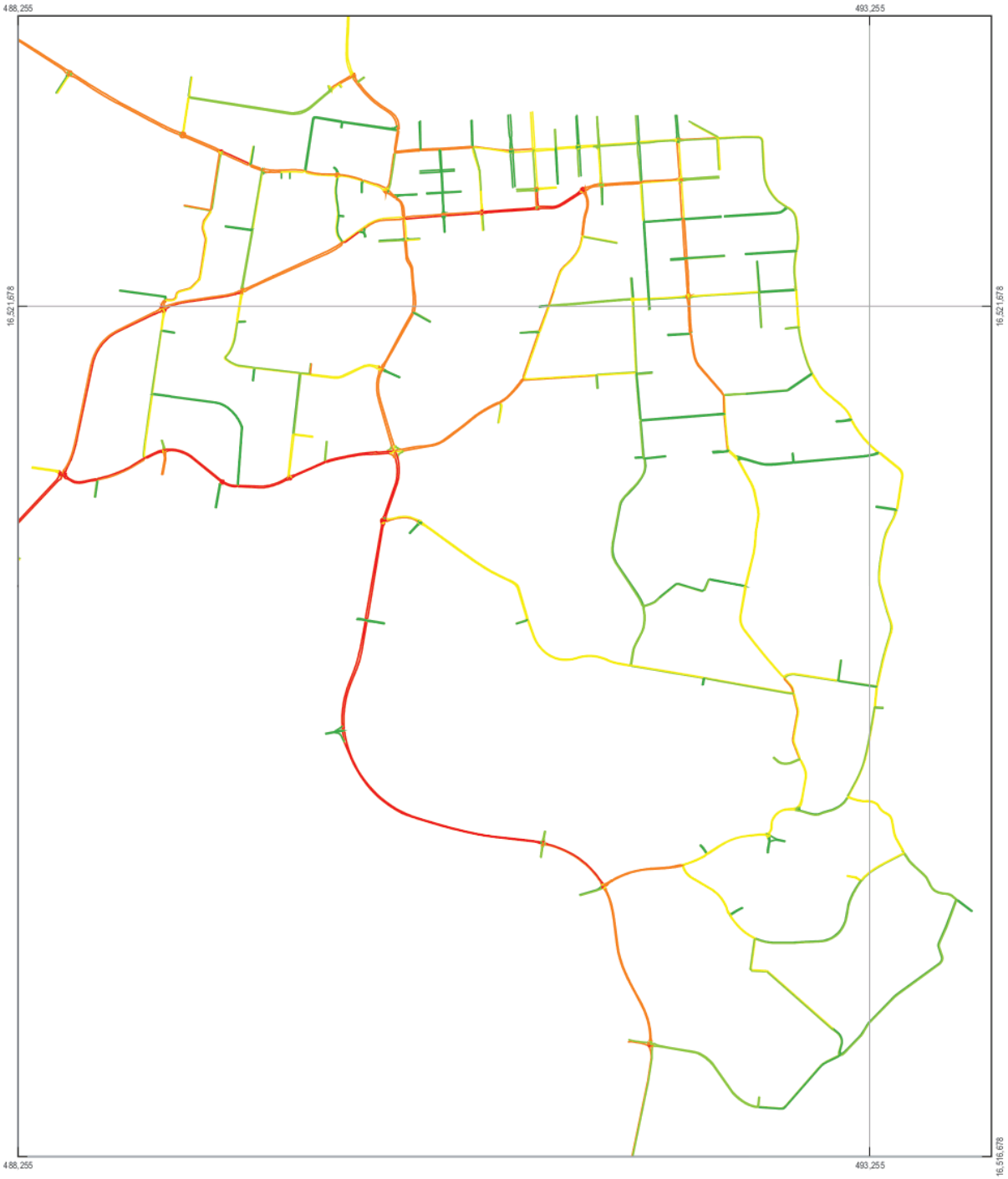
Data source: GHD, 2017 Created by:mbrooks

2016 PM Peak



LEGEND
Traffic Volumes (veh/hr)

0 - 100
250 - 500
1000 - 2500
100 - 250
500 - 1000

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Traffic Volumes
2016 PM Peak (1500-1600)

Job Number 22-18116
Revision A
Date 04 Sep 2017

Figure A.17

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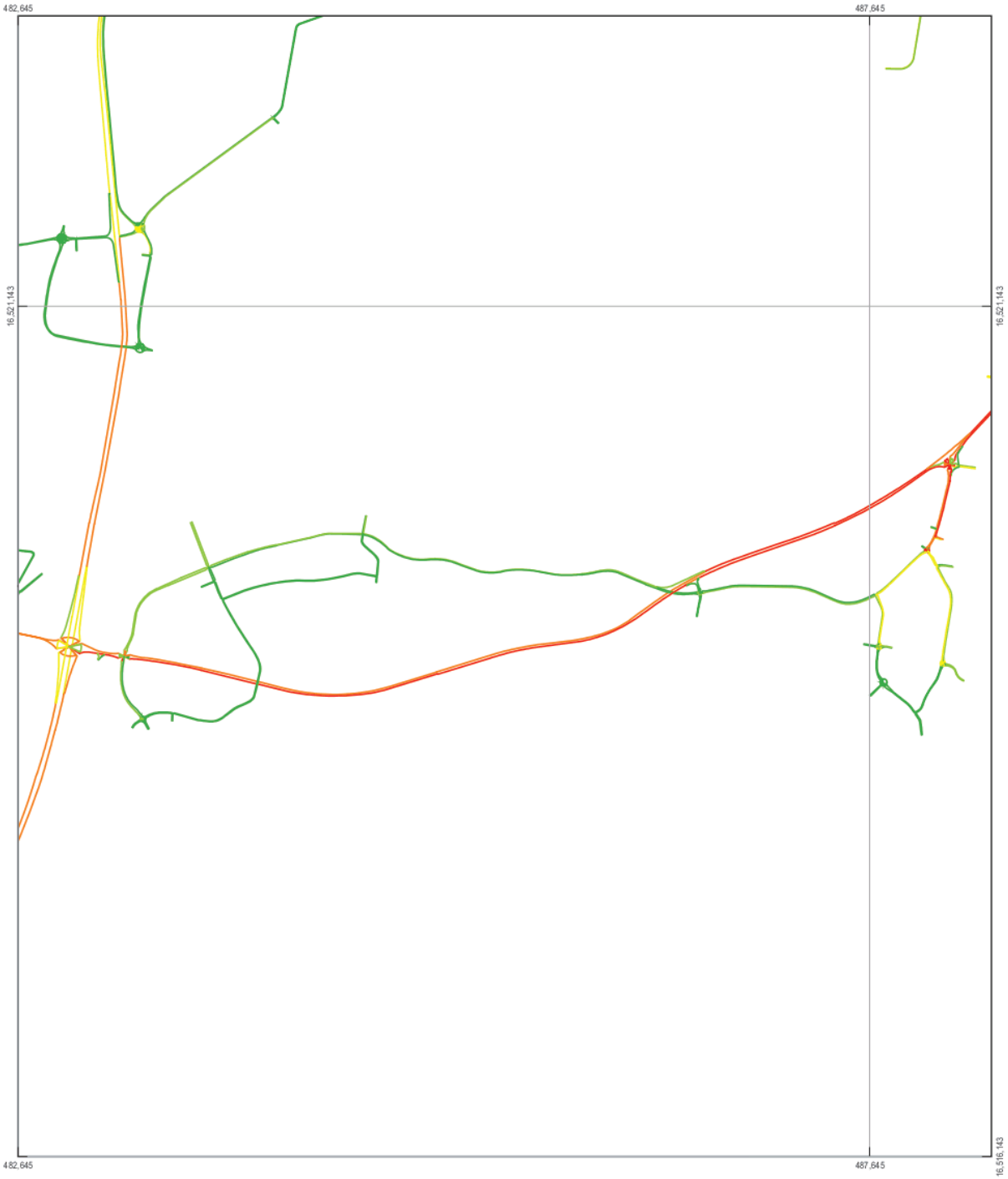
Data source: GHD, 2017 Created by:mbrooks



LEGEND
Traffic Volumes (veh/hr)

0 - 100 | 250 - 500 | 1000 - 2500
100 - 250 | 500 - 1000

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Traffic Volumes
2016 PM Peak (1500-1600)

Job Number 22-18116
Revision A
Date 04 Sep 2017

Figure A.18

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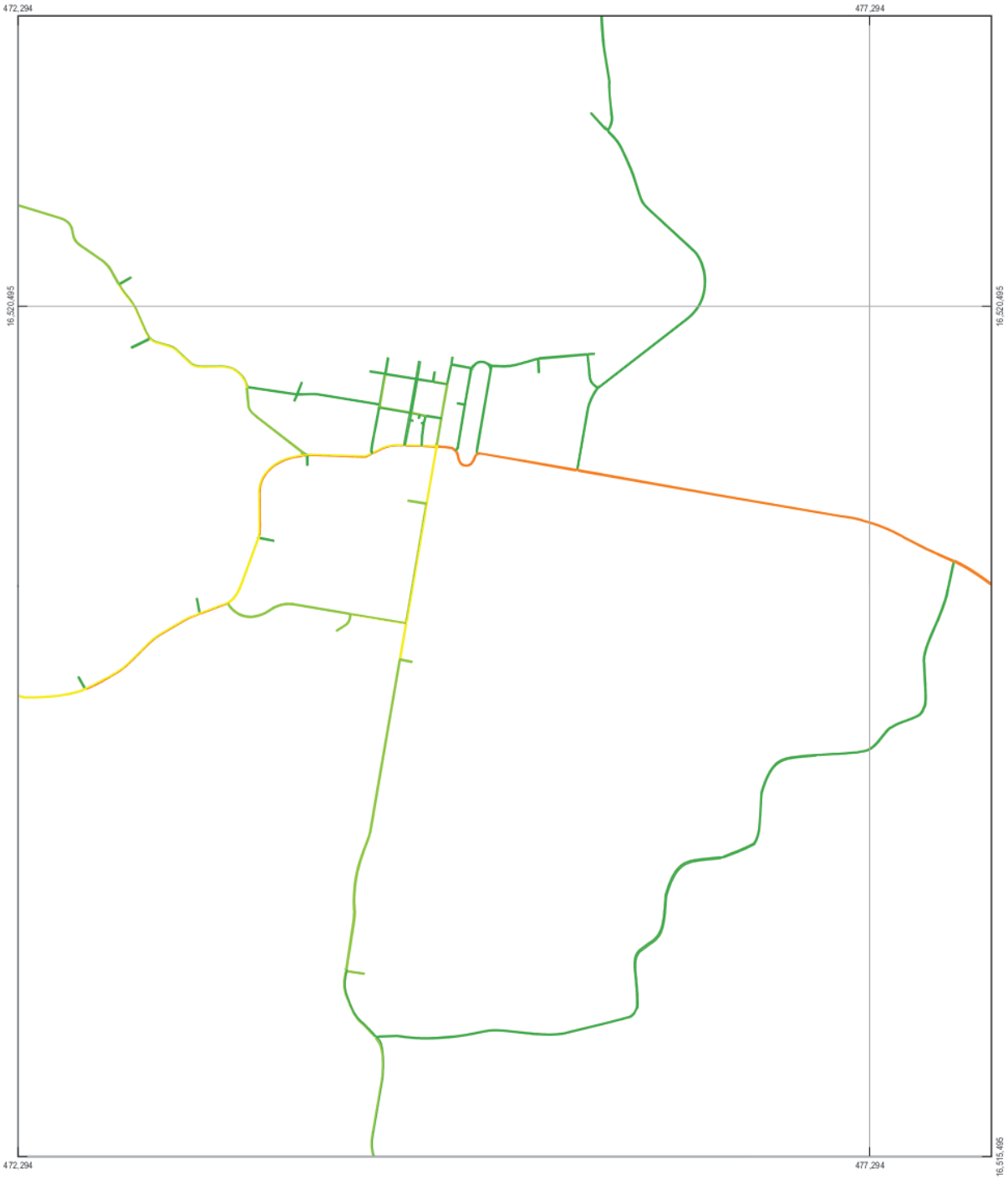
Data source: GHD, 2017 Created by:mbrooks



LEGEND
Traffic Volumes (veh/hr)

0 - 100
250 - 500
1000 - 2500
100 - 250
500 - 1000

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Traffic Volumes
2016 PM Peak (1500-1600)

Job Number 22-18116
Revision A
Date 04 Sep 2017

Figure A.19

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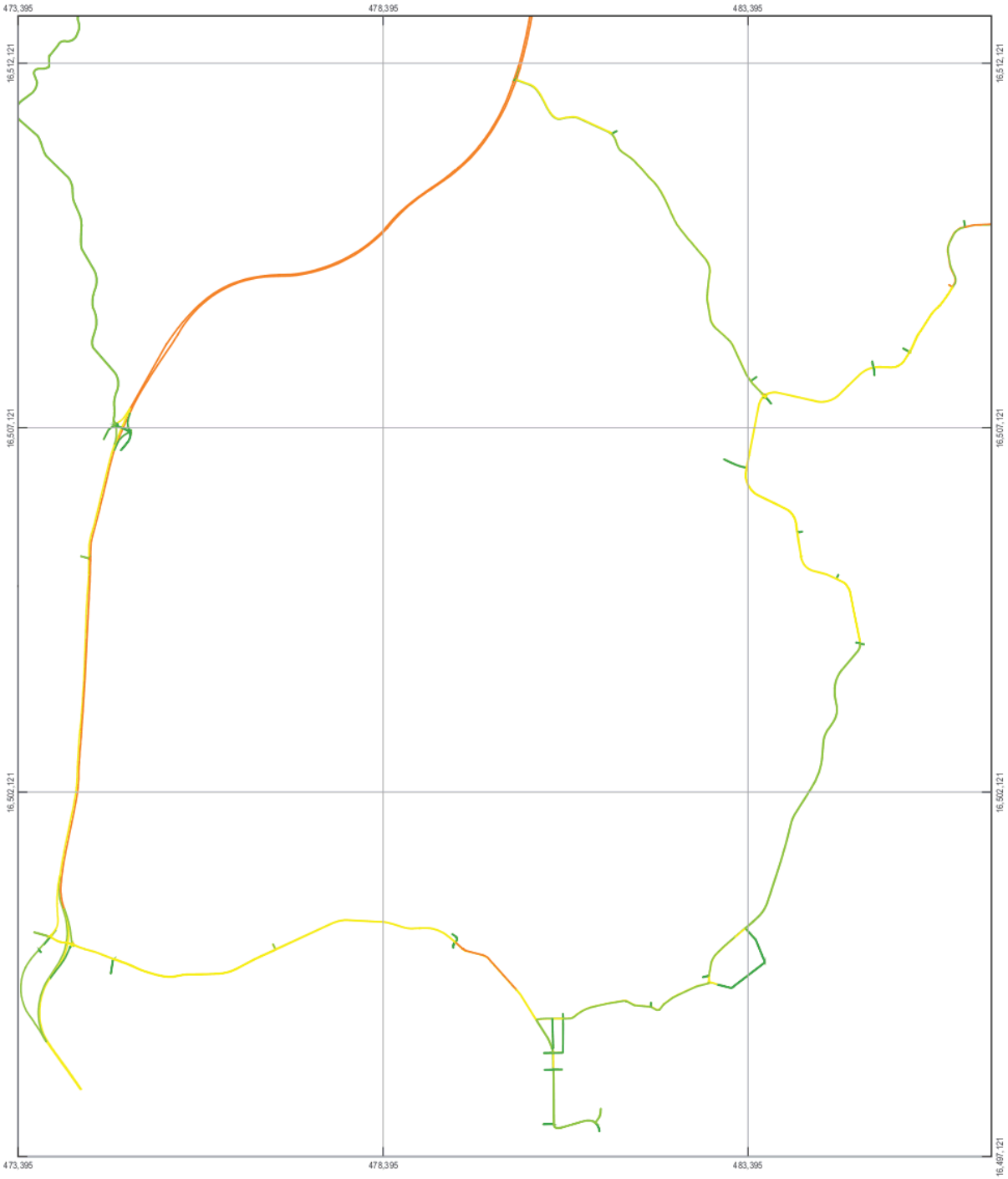
Data source: GHD, 2017 Created by:mbrooks



LEGEND
Traffic Volumes (veh/hr)

0 - 100
250 - 500
1000 - 2500
100 - 250
500 - 1000

Paper Size A4
0 250 500 1,000 1,500 2,000
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Traffic Volumes
2016 PM Peak (1500-1600)

Job Number 22-18116
Revision A
Date 04 Sep 2017

Figure A.20

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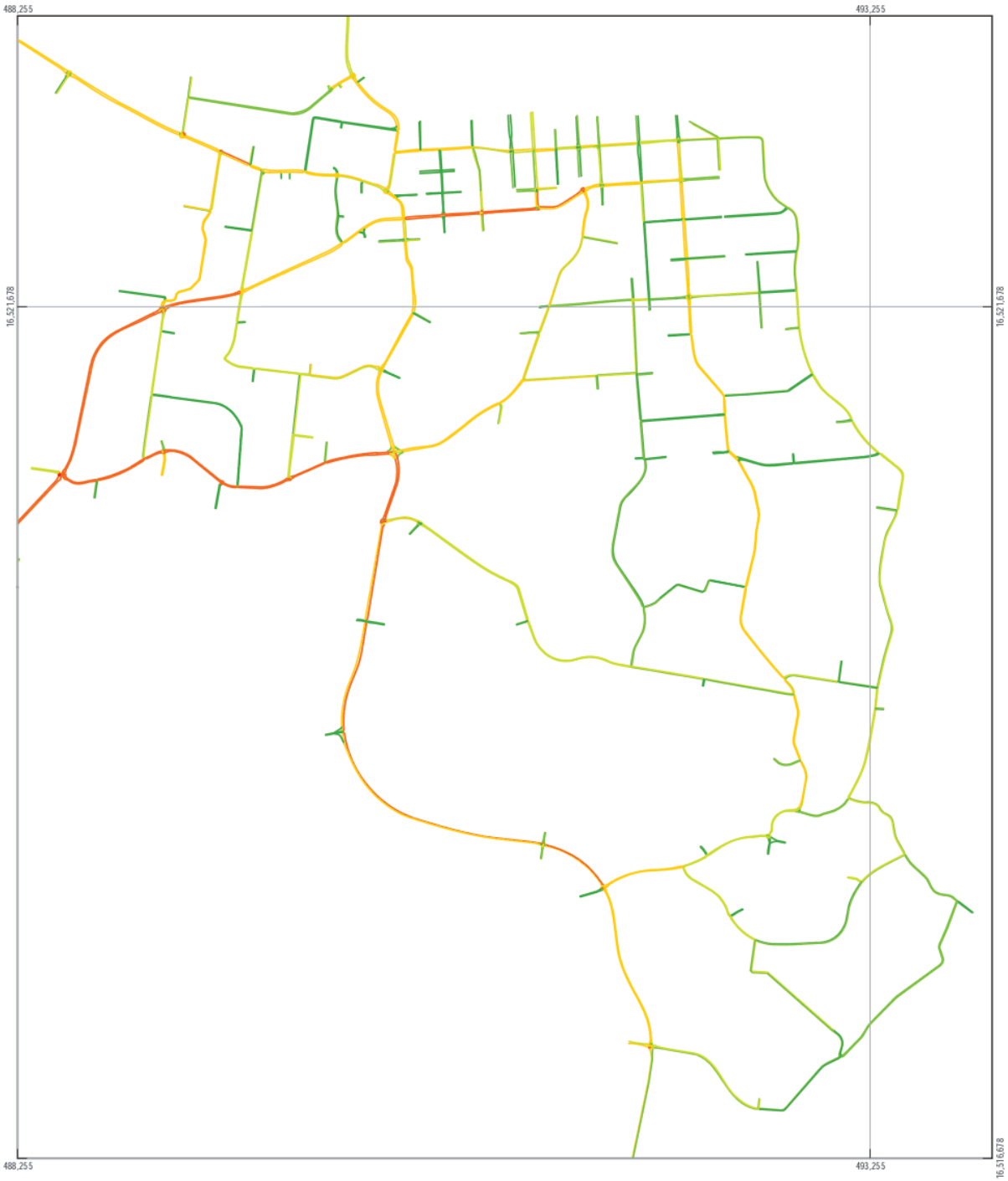
2021 PM Peak



LEGEND
Traffic Volumes (veh/hr)

0 - 100
100 - 250
250 - 500
500 - 1000
1000 - 2500
2500 - 5000

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Traffic Volumes
2021 PM Peak (1500-1600)

Job Number 22-18116
Revision A
Date 04 Sep 2017

Figure A.21

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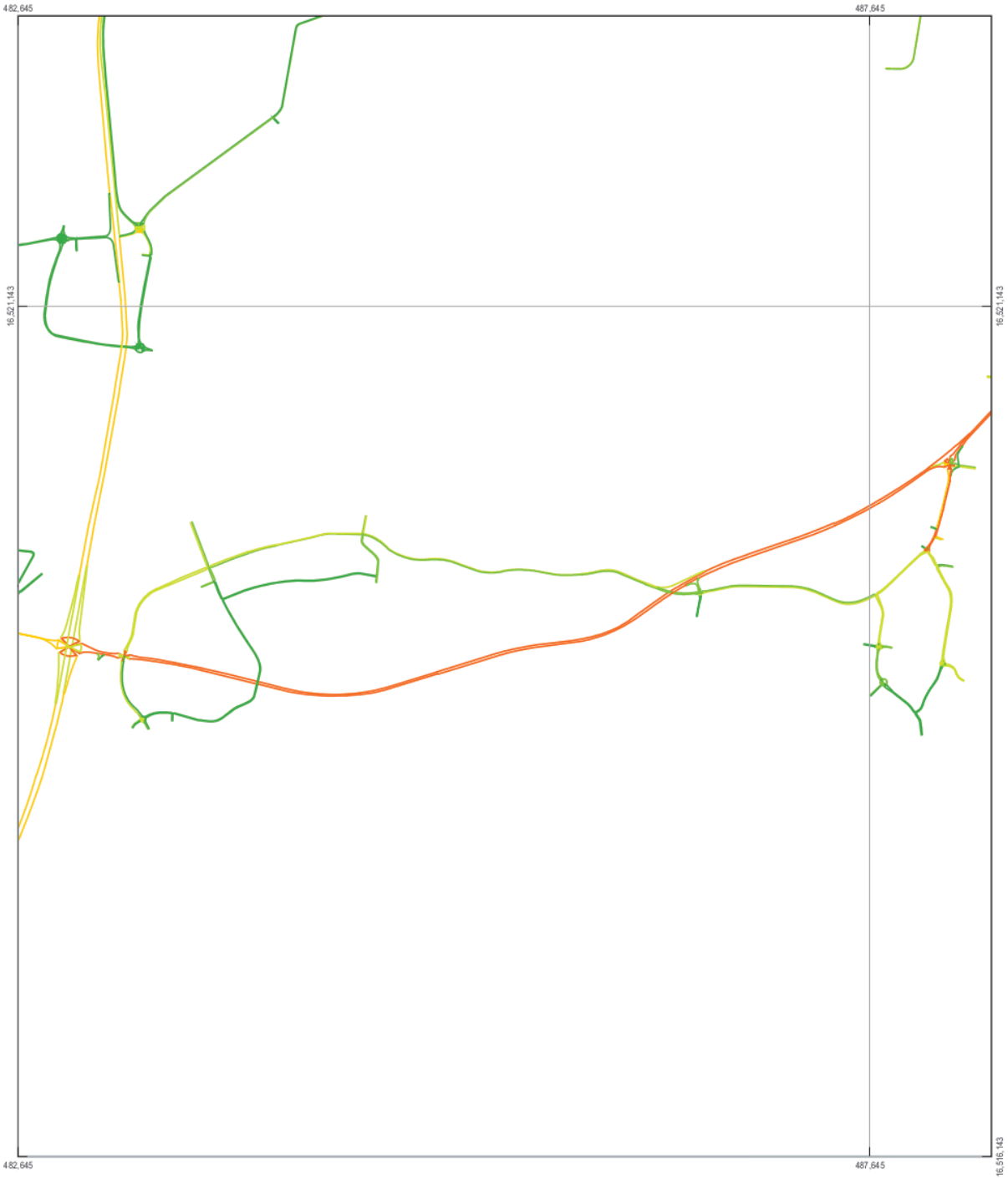
Data source: GHD, 2017 Created by:mbrooks



LEGEND
Traffic Volumes (veh/hr)

0 - 100
100 - 250
250 - 500
500 - 1000
1000 - 2500
2500 - 5000

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Traffic Volumes
2021 PM Peak (1500-1600)

Job Number 22-18116
Revision A
Date 04 Sep 2017

Figure A.22

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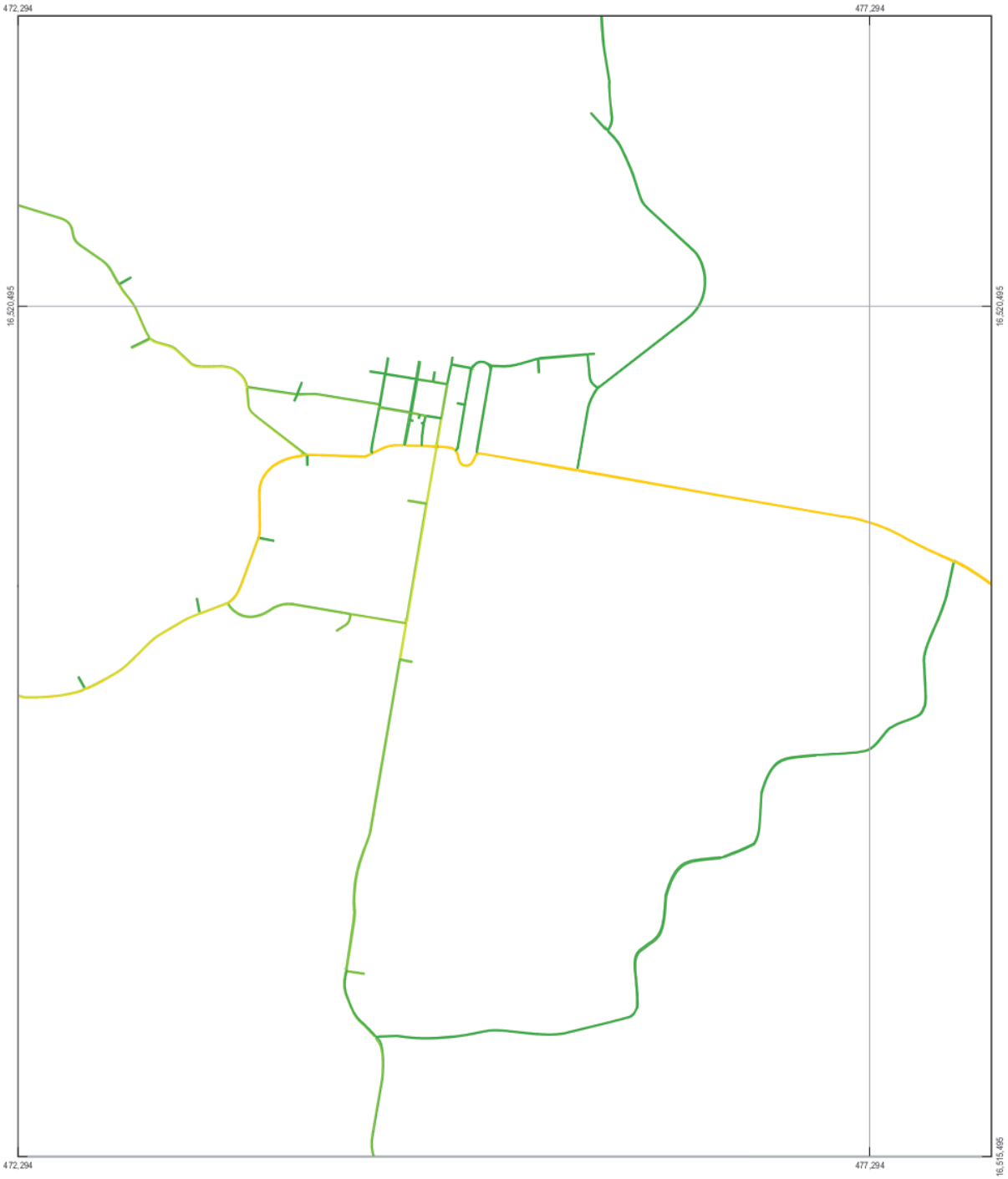
Data source: GHD, 2017 Created by:mbrooks



LEGEND
Traffic Volumes (veh/hr)

0 - 100
100 - 250
250 - 500
500 - 1000
1000 - 2500
2500 - 5000

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Traffic Volumes
2021 PM Peak (1500-1600)

Job Number 22-18116
Revision A
Date 04 Sep 2017

Figure A.23

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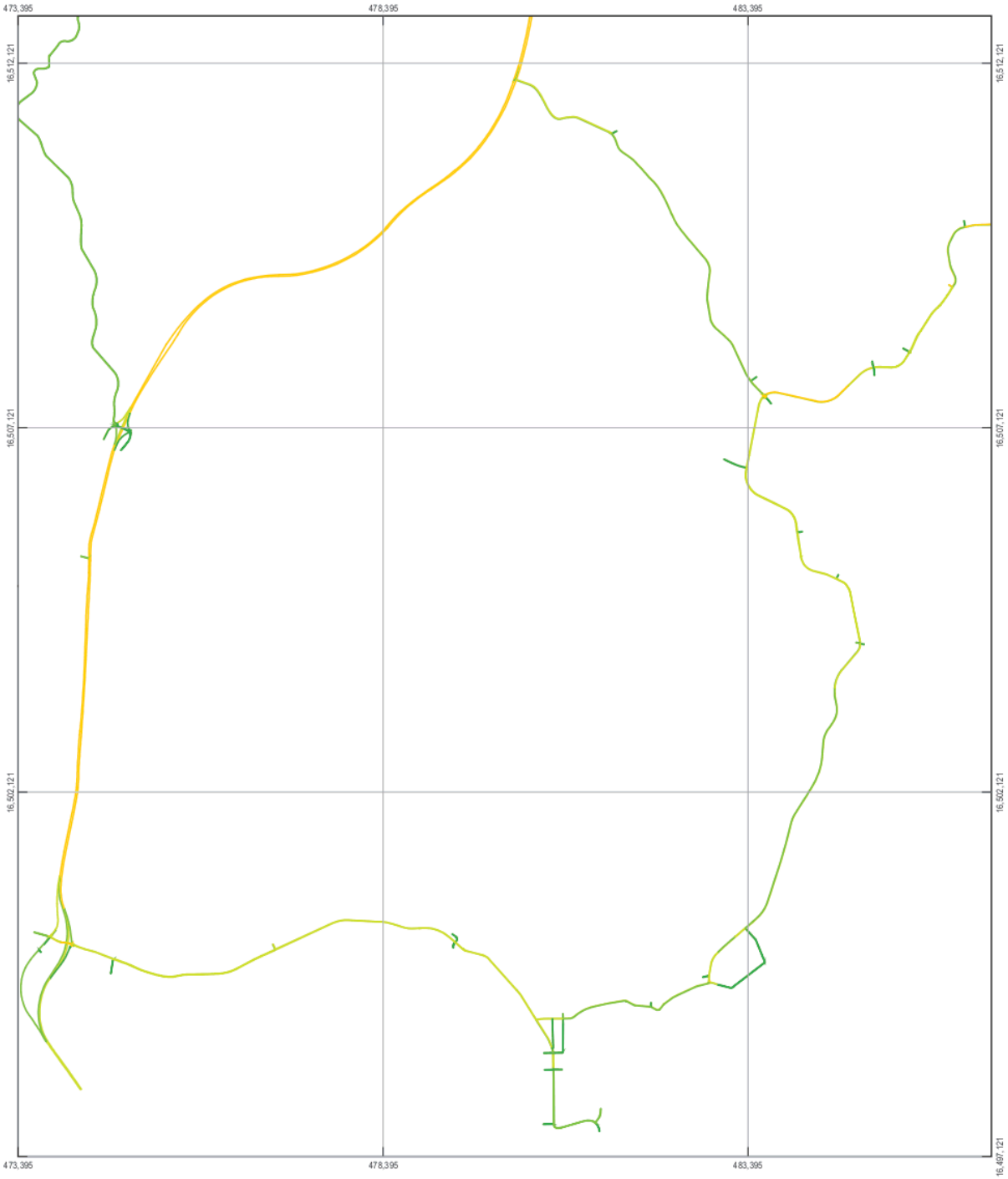

LEGEND
Traffic Volumes (veh/hr)

0 - 100
100 - 250
250 - 500
500 - 1000
1000 - 2500
2500 - 5000

Paper Size A4
0 250 500 1,000 1,500 2,000
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Traffic Volumes
2021 PM Peak (1500-1600)

Job Number 22-18116
Revision A
Date 04 Sep 2017

Figure A.24

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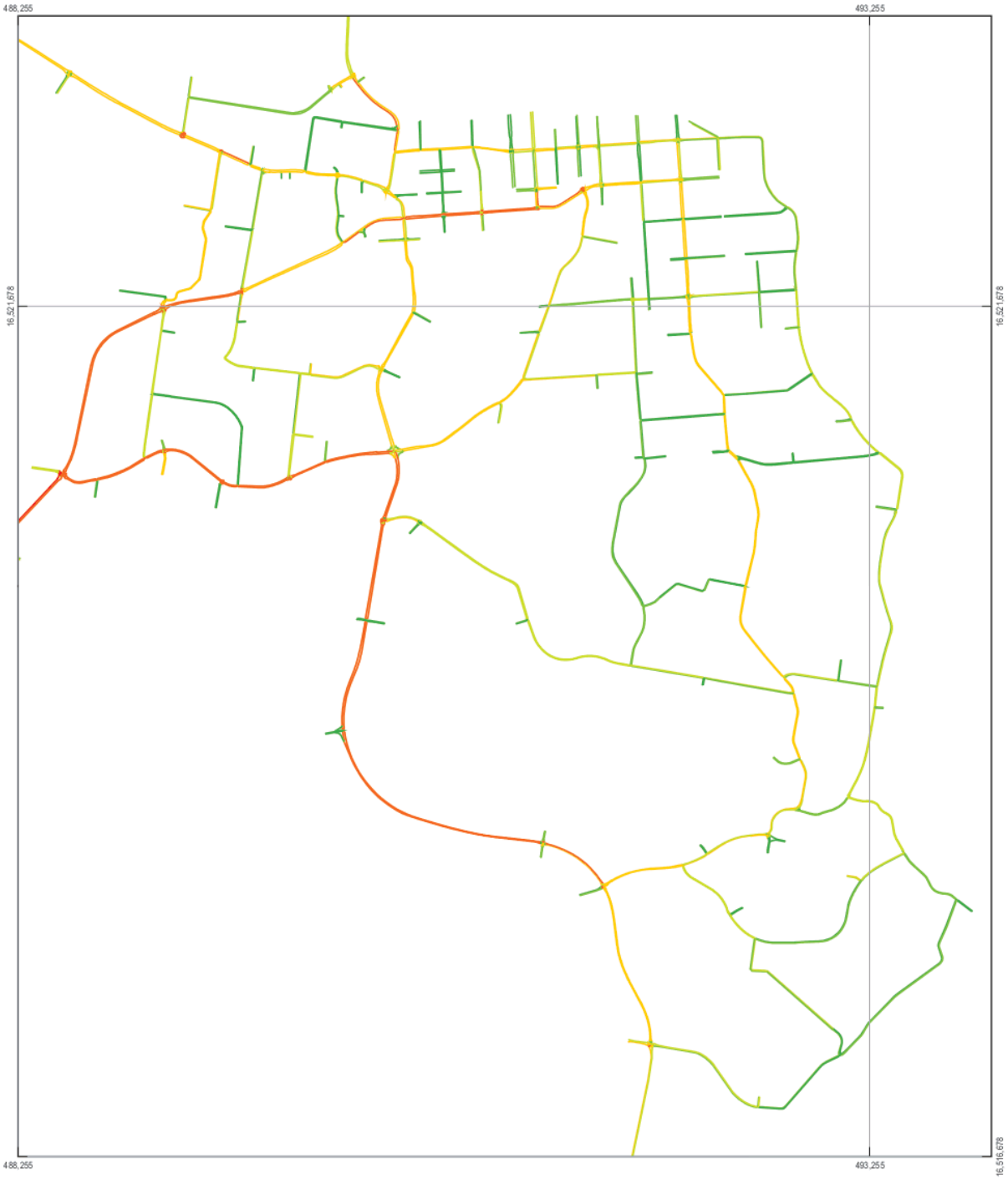
2026 PM Peak



LEGEND
Traffic Volumes (veh/hr)

0 - 100
100 - 250
250 - 500
500 - 1000
1000 - 2500
2500 - 5000

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Traffic Volumes
2026 PM Peak (1500-1600)

Job Number 22-18116
Revision A
Date 04 Sep 2017

Figure A.25

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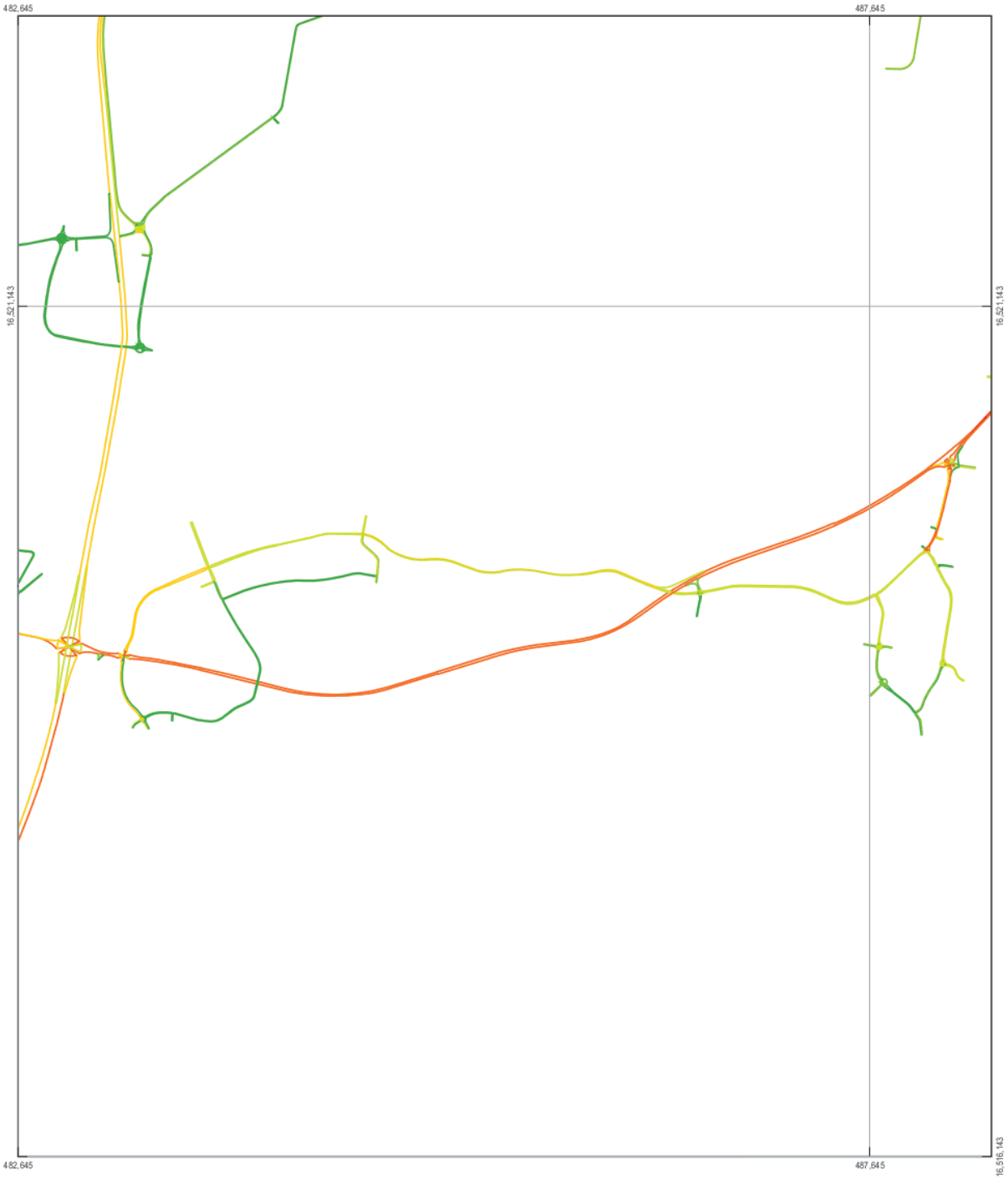

LEGEND
Traffic Volumes (veh/hr)

0 - 100
100 - 250
250 - 500
500 - 1000
1000 - 2500
2500 - 5000

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Traffic Volumes
2026 PM Peak (1500-1600)

Job Number 22-18116
Revision A
Date 04 Sep 2017

Figure A.26

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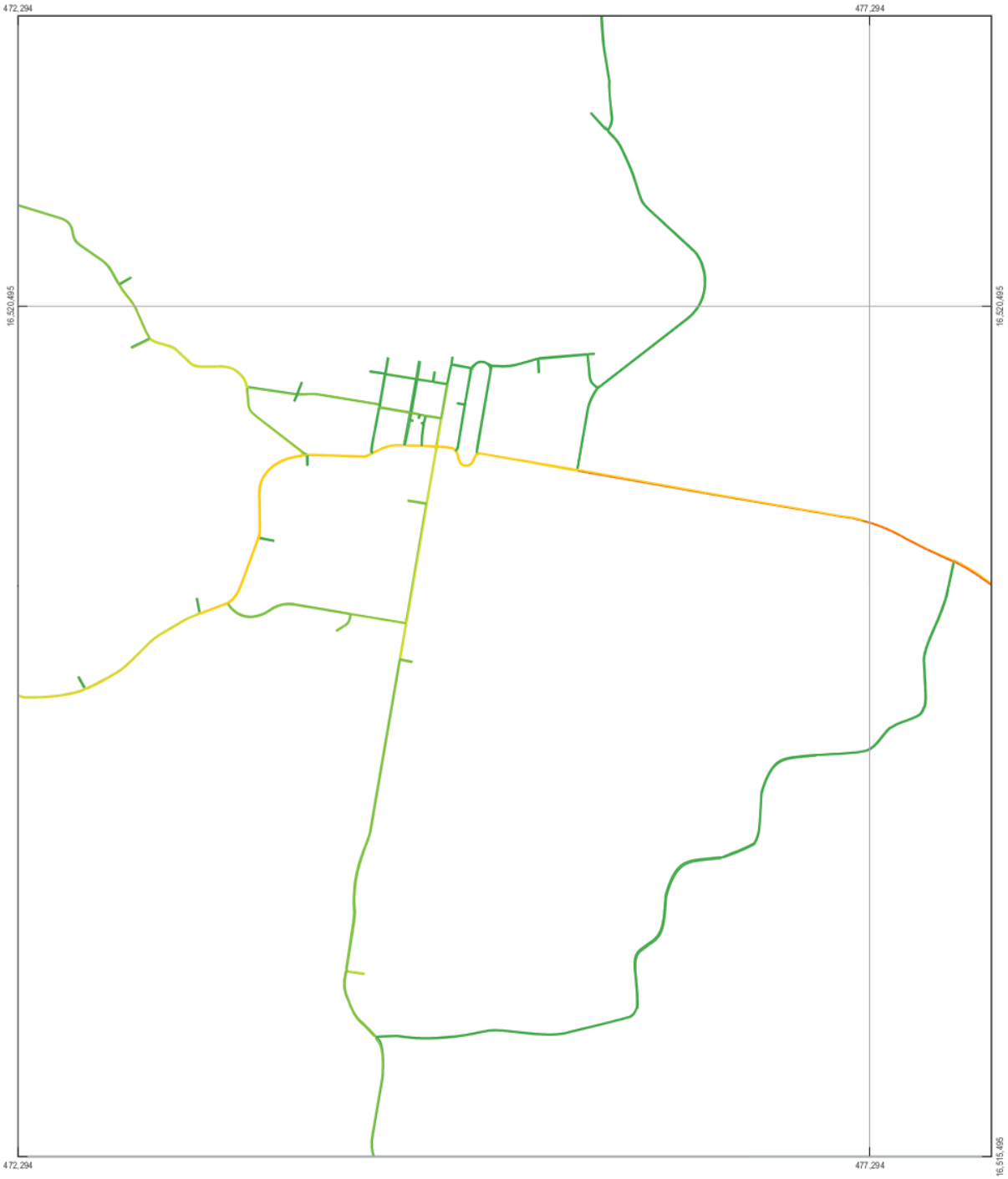

LEGEND
Traffic Volumes (veh/hr)

0 - 100
100 - 250
250 - 500
500 - 1000
1000 - 2500
2500 - 5000

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Traffic Volumes
2026 PM Peak (1500-1600)

Job Number 22-18116
Revision A
Date 04 Sep 2017

Figure A.27

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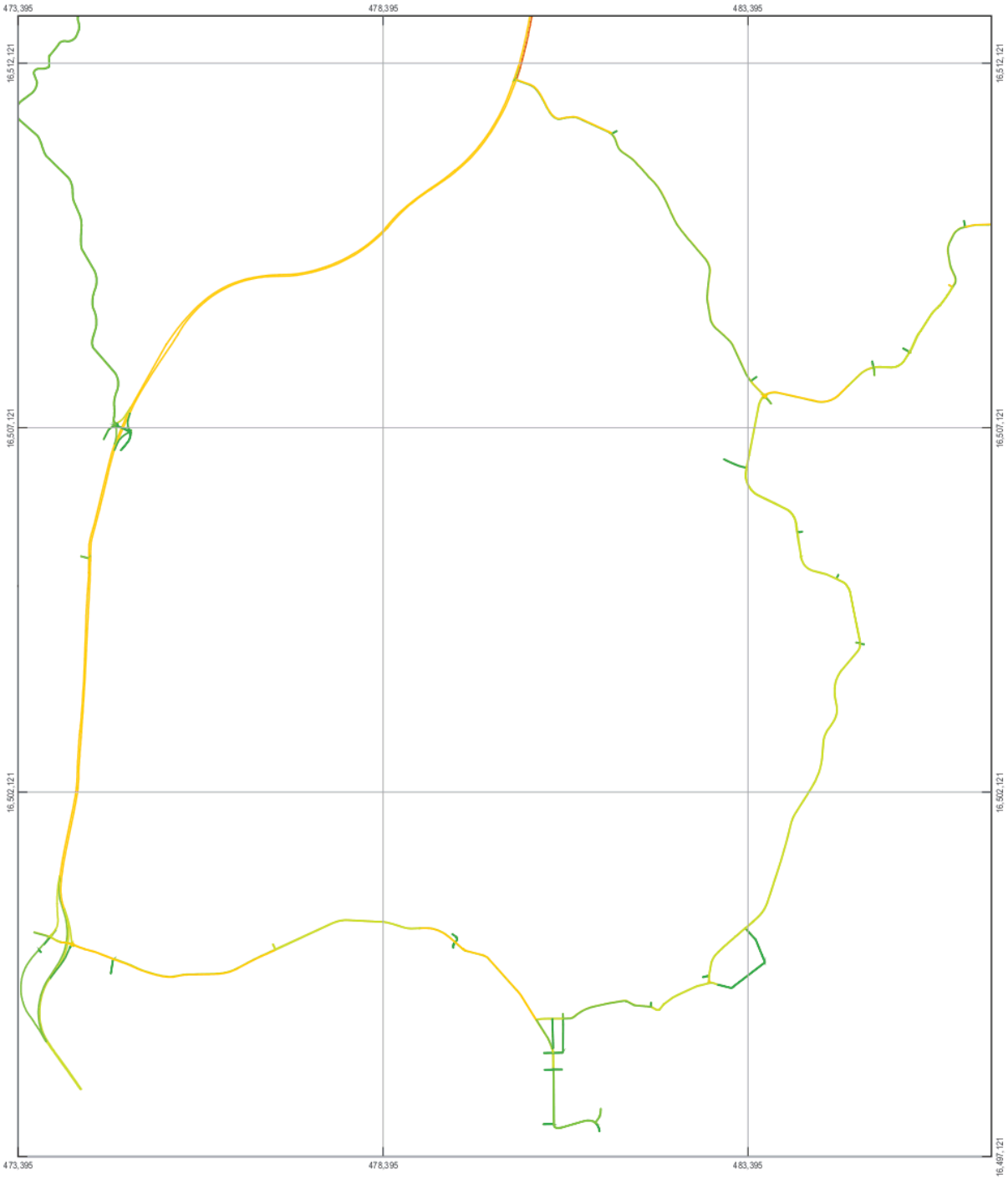
Data source: GHD, 2017 Created by:mbrooks



LEGEND
Traffic Volumes (veh/hr)

0 - 100
100 - 250
250 - 500
500 - 1000
1000 - 2500
2500 - 5000

Paper Size A4
0 250 500 1,000 1,500 2,000
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Traffic Volumes
2026 PM Peak (1500-1600)

Job Number 22-18116
Revision A
Date 04 Sep 2017

Figure A.28

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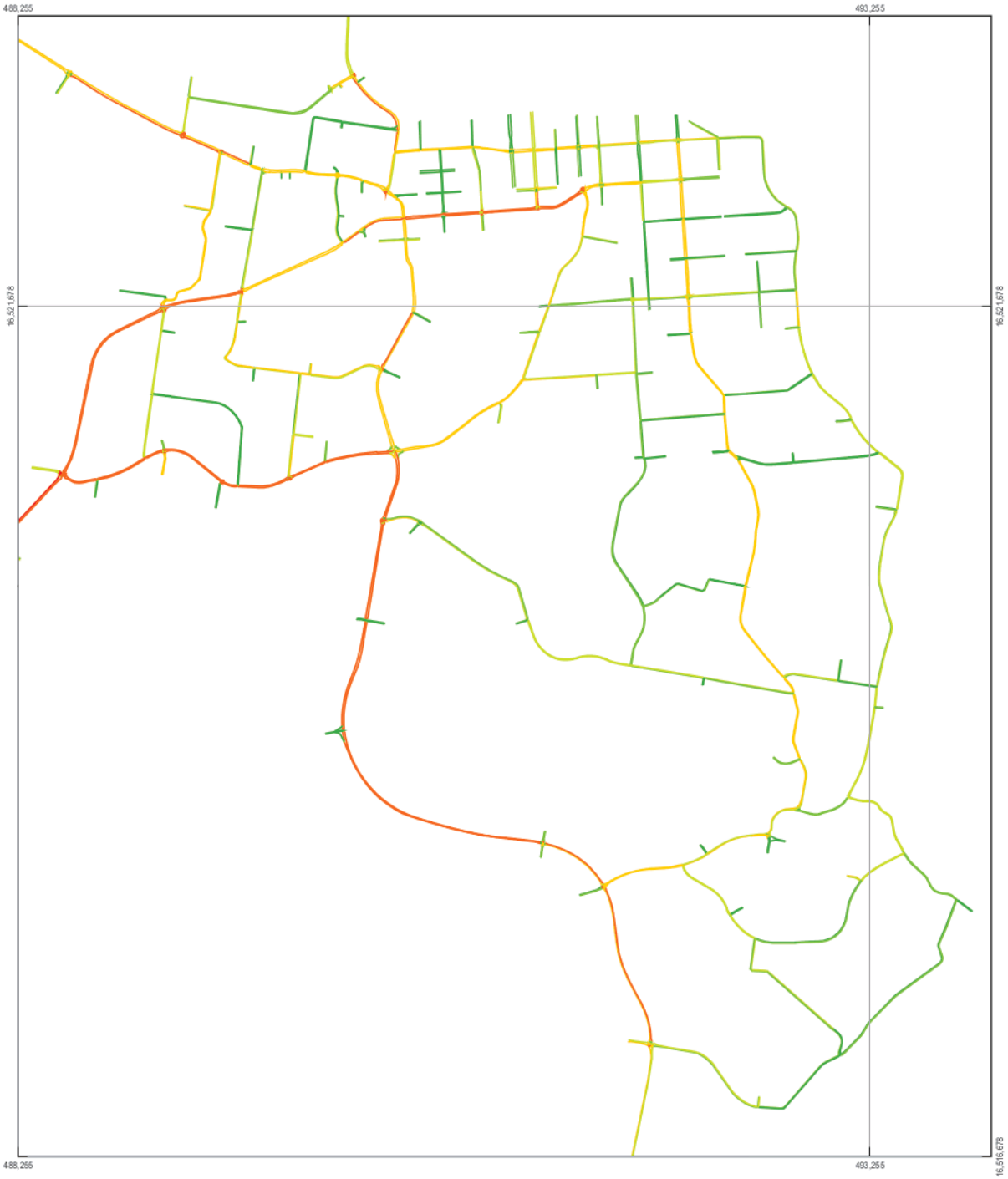
Data source: GHD, 2017 Created by:mbrooks

2036 PM Peak



LEGEND
Traffic Volumes (veh/hr)

0 - 100
100 - 250
250 - 500
500 - 1000
1000 - 2500
2500 - 5000

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Traffic Volumes
2036 PM Peak (1500-1600)

Job Number 22-18116
Revision A
Date 04 Sep 2017

Figure A.29

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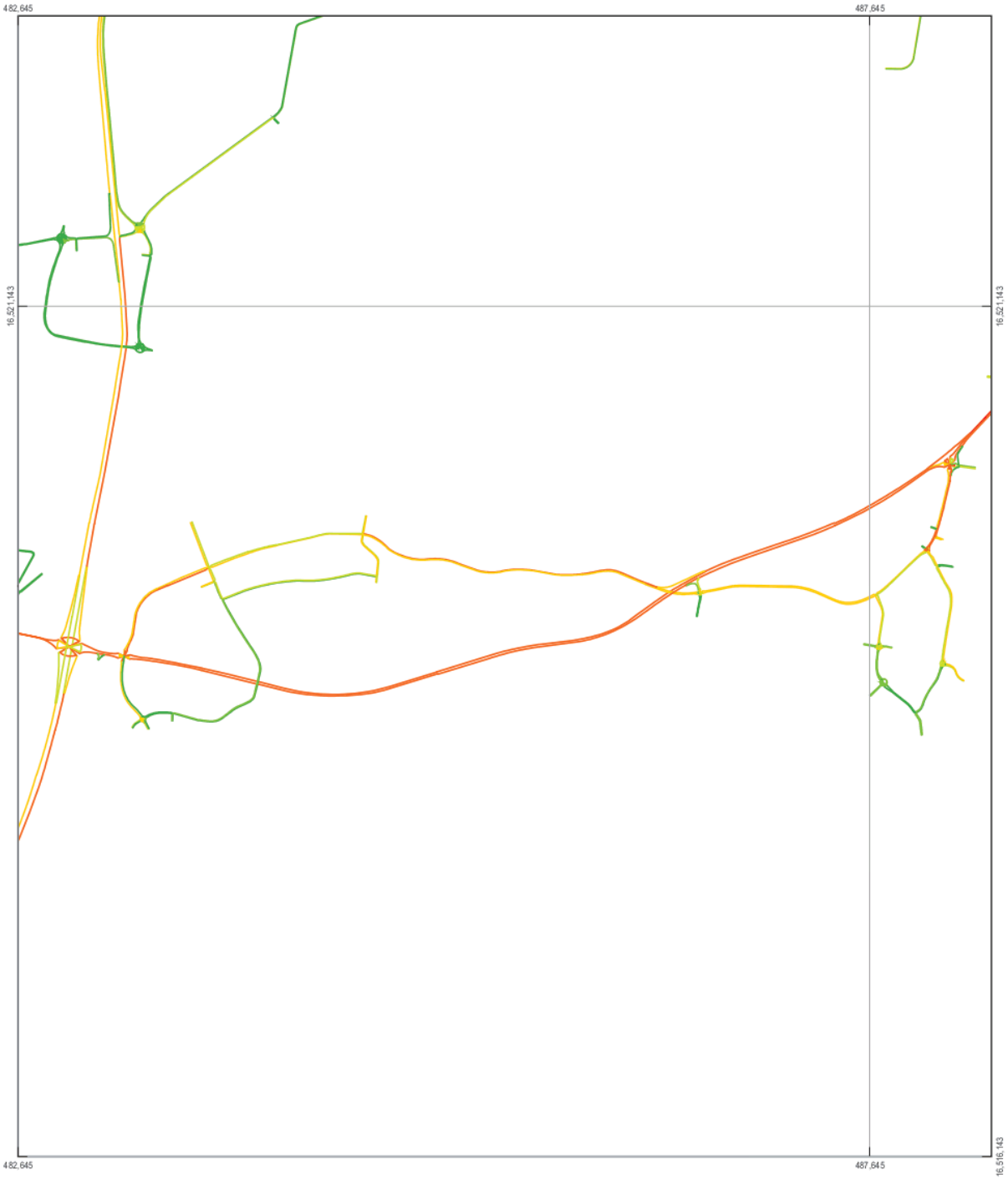
Data source: GHD, 2017 Created by:mbrooks



LEGEND
Traffic Volumes (veh/hr)

0 - 100
100 - 250
250 - 500
500 - 1000
1000 - 2500
2500 - 5000

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Traffic Volumes
2036 PM Peak (1500-1600)

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Revision A
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Figure A.30

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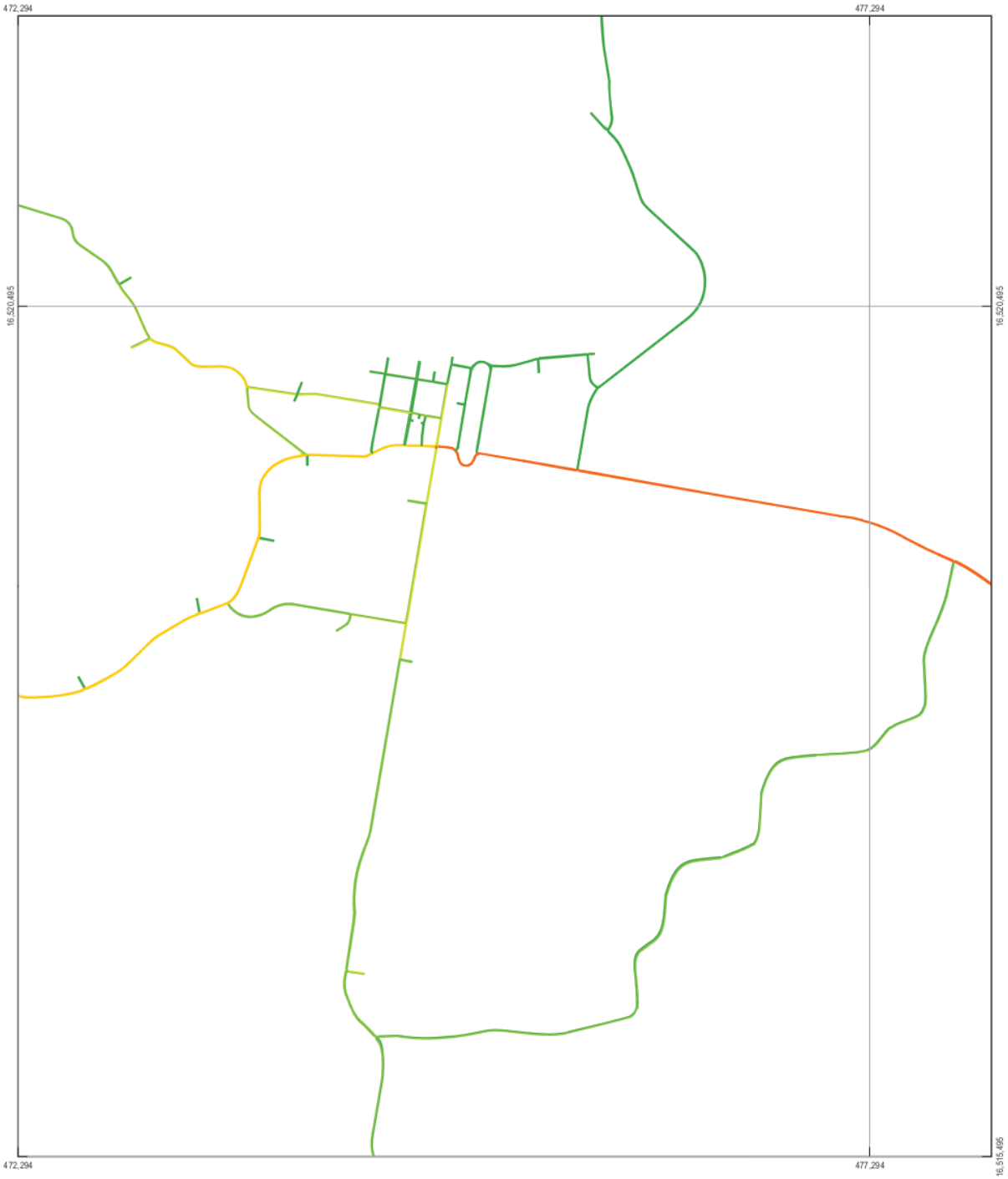
Data source: GHD, 2017 Created by:mbrooks



LEGEND
Traffic Volumes (veh/hr)

0 - 100
100 - 250
250 - 500
500 - 1000
1000 - 2500
2500 - 5000

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Traffic Volumes
2036 PM Peak (1500-1600)

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Figure A.31

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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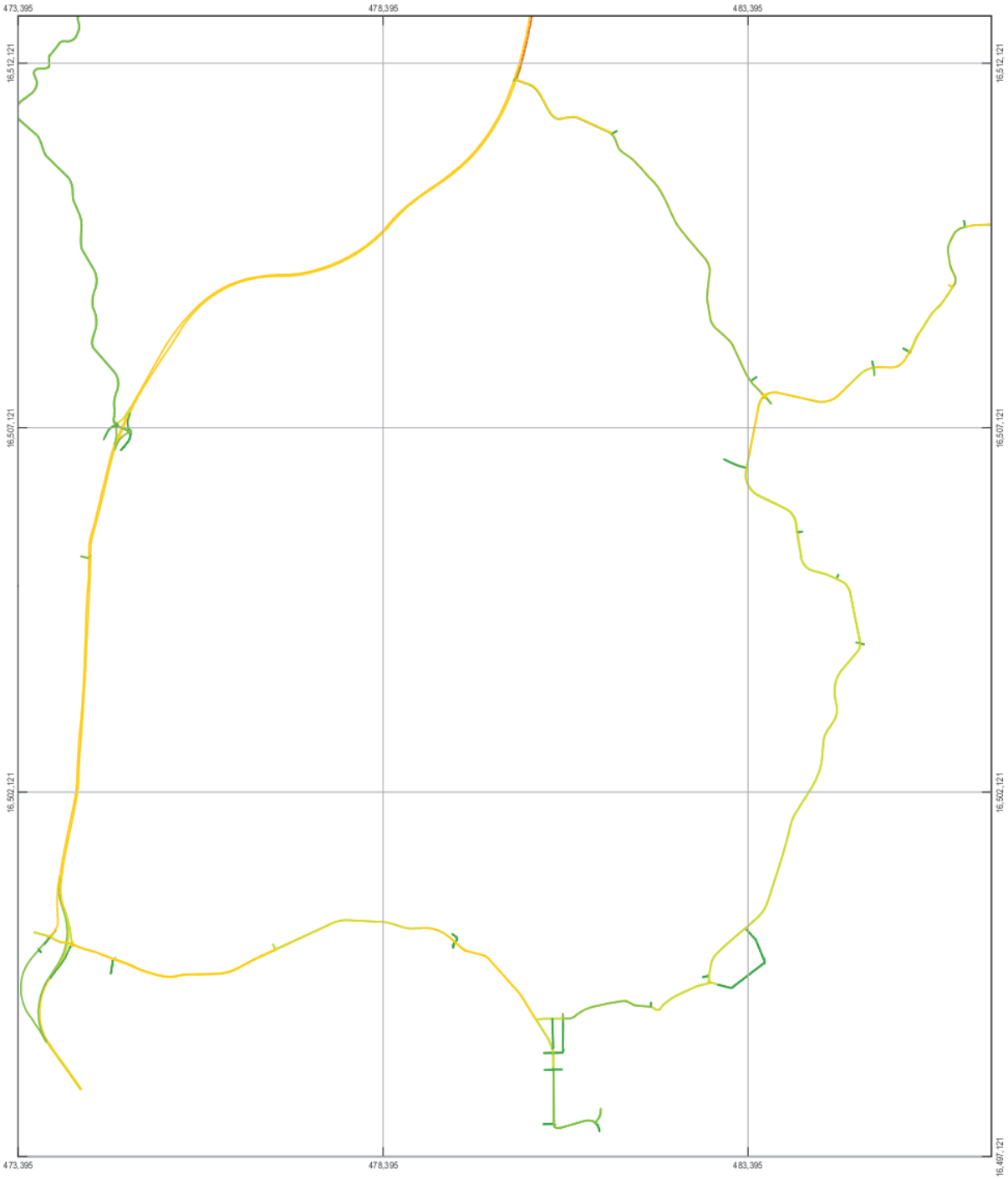
Data source: GHD, 2017 Created by:mbrooks



LEGEND
Traffic Volumes (veh/hr)

0 - 100
100 - 250
250 - 500
500 - 1000
1000 - 2500
2500 - 5000

Paper Size A4
0 250 500 1,000 1,500 2,000
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Traffic Volumes
2036 PM Peak (1500-1600)

Job Number 22-18116
Revision A
Date 04 Sep 2017

Figure A.32

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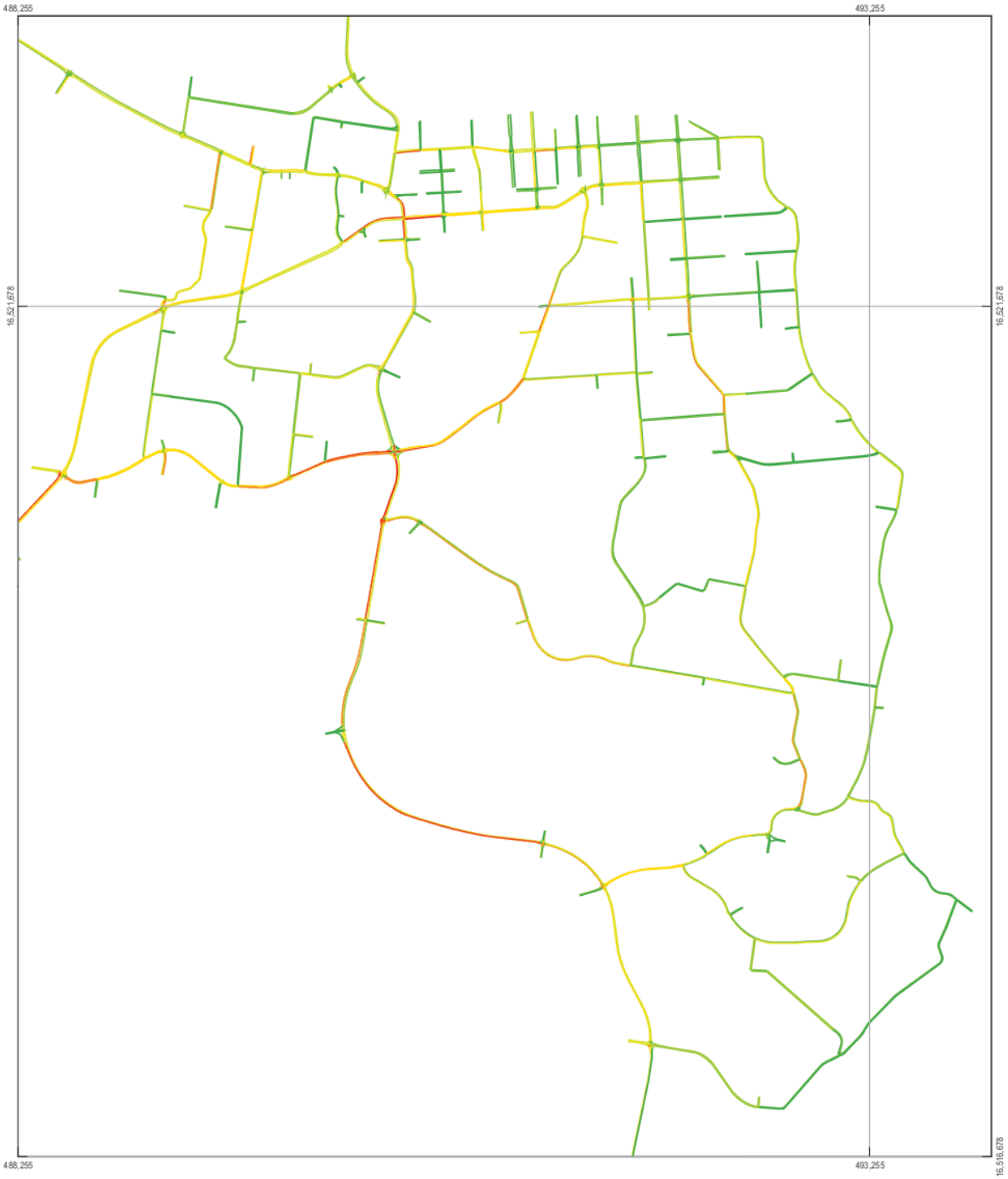
Data source: GHD, 2017 Created by:mbrooks

Appendix B Base Case Lane Density Plots

2016 AM Peak



LEGEND
Link Densities (veh/km)

0 - 2 | 2 - 4 | 4 - 6 | 6 - 10 | 10 - 15 | 15 - 20 | 20 - 40 | 40 - 100

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Link Densities
2016 AM Peak (0800-0900)

Job Number 22-18116
Revision A
Date 04 Sep 2017

Figure B.1

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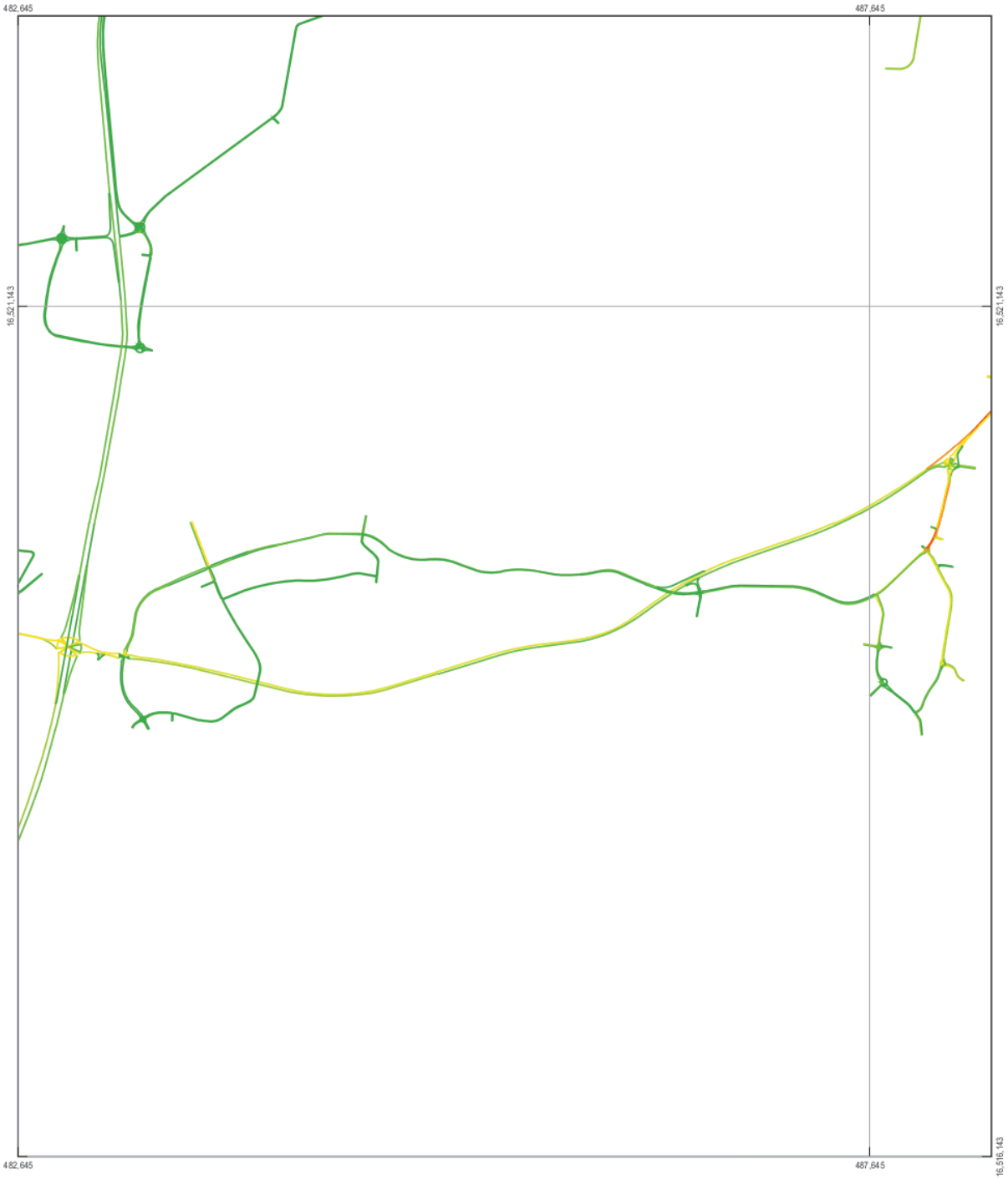
Data source: GHD, 2017 Created by:mbrooks



LEGEND
Link Densities (veh/km)

0 - 2 | 2 - 4 | 4 - 6 | 6 - 10 | 10 - 15 | 15 - 20 | 20 - 40 | 40 - 100

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Link Densities
2016 AM Peak (0800-0900)

Job Number 22-18116
Revision A
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Figure B.2

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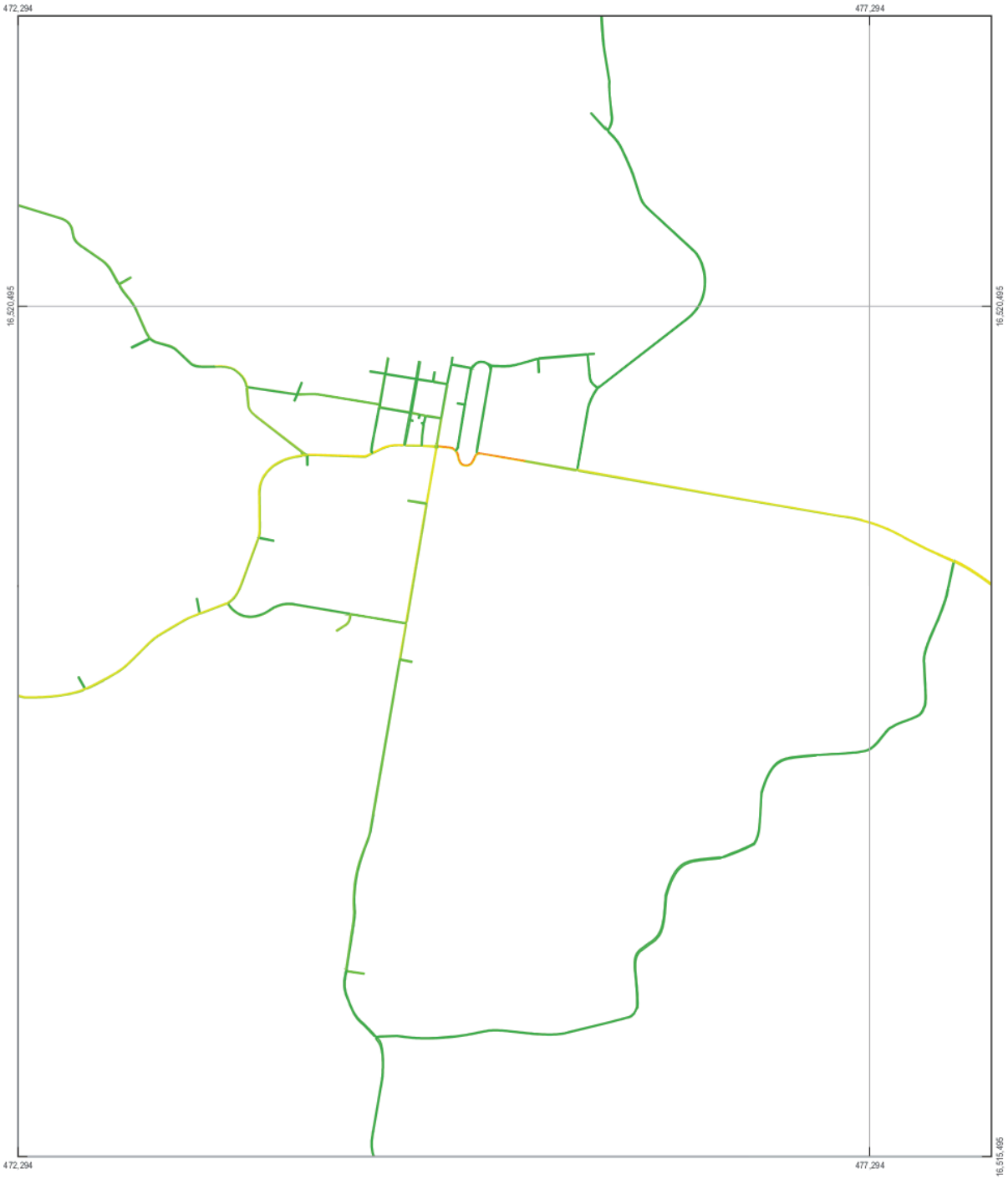
Data source: GHD, 2017 Created by:mbrooks



LEGEND
Link Densities (veh/km)

0 - 2 | 2 - 4 | 4 - 6 | 6 - 10 | 10 - 15 | 15 - 20 | 20 - 40 | 40 - 100

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Link Densities
2016 AM Peak (0800-0900)

Job Number 22-18116
Revision A
Date 04 Sep 2017

Figure B.3

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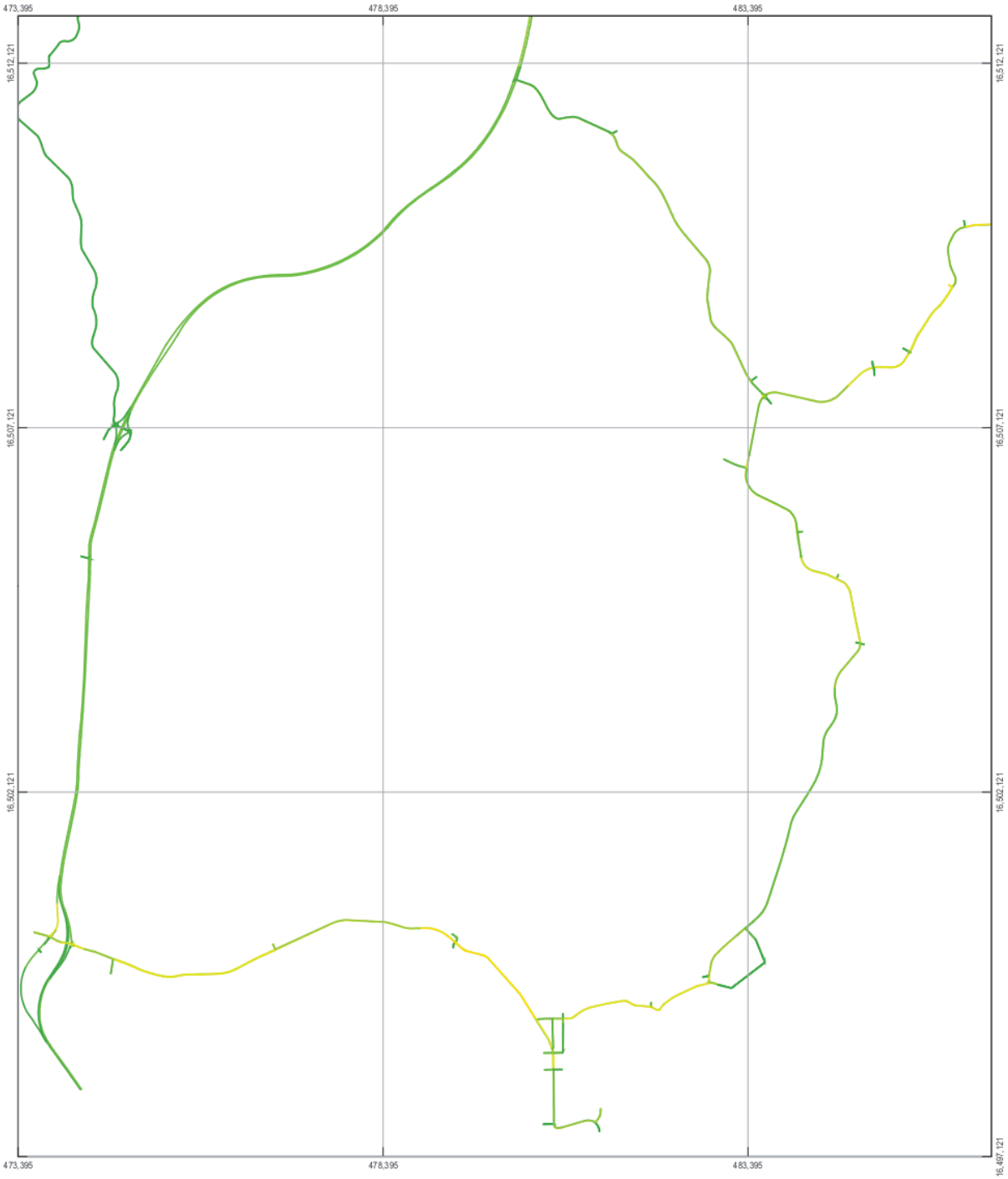
Data source: GHD, 2017 Created by:mbrooks



LEGEND
Link Densities (veh/km)

0 - 2 | 4 - 6 | 10 - 15 | 20 - 40
2 - 4 | 6 - 10 | 15 - 20 | 40 - 100

Paper Size A4
0 250 500 1,000 1,500 2,000
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Link Densities
2016 AM Peak (0800-0900)

Job Number 22-18116
Revision A
Date 04 Sep 2017

Figure B.4

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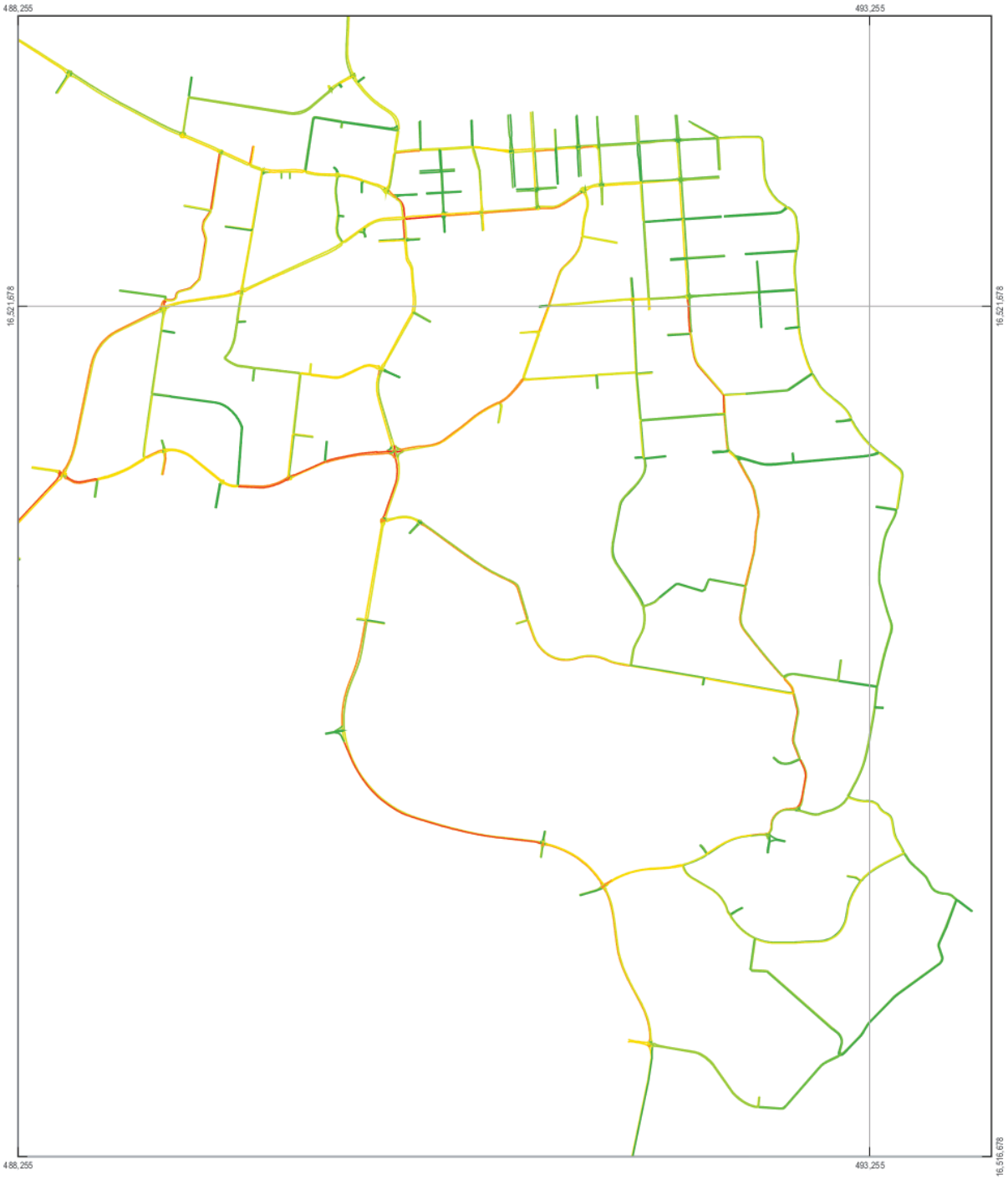
Data source: GHD, 2017 Created by:mbrooks

2021 AM Peak



LEGEND
Link Densities (veh/km)

0 - 2 | 2 - 4 | 4 - 6 | 6 - 10 | 10 - 15 | 15 - 20 | 20 - 40 | 40 - 100

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Link Densities
2021 AM Peak (0800-0900)

Job Number 22-18116
Revision A
Date 05 Sep 2017

Figure B.5

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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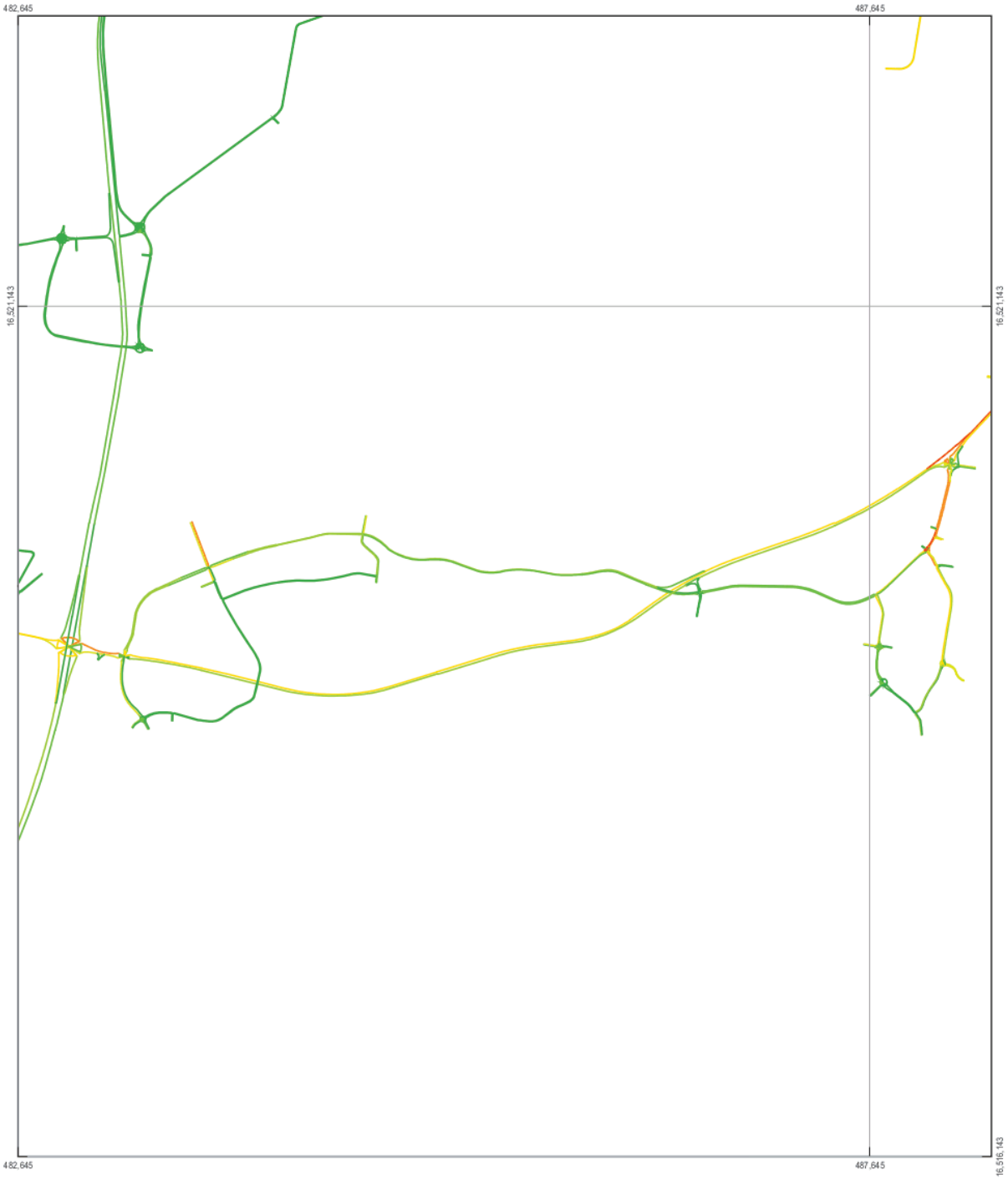
Data source: GHD, 2017 Created by:mbrooks



LEGEND
Link Densities (veh/km)

0 - 2 | 2 - 4 | 4 - 6 | 6 - 10 | 10 - 15 | 15 - 20 | 20 - 40 | 40 - 100

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Link Densities
2021 AM Peak (0800-0900)

Job Number 22-18116
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Figure B.6

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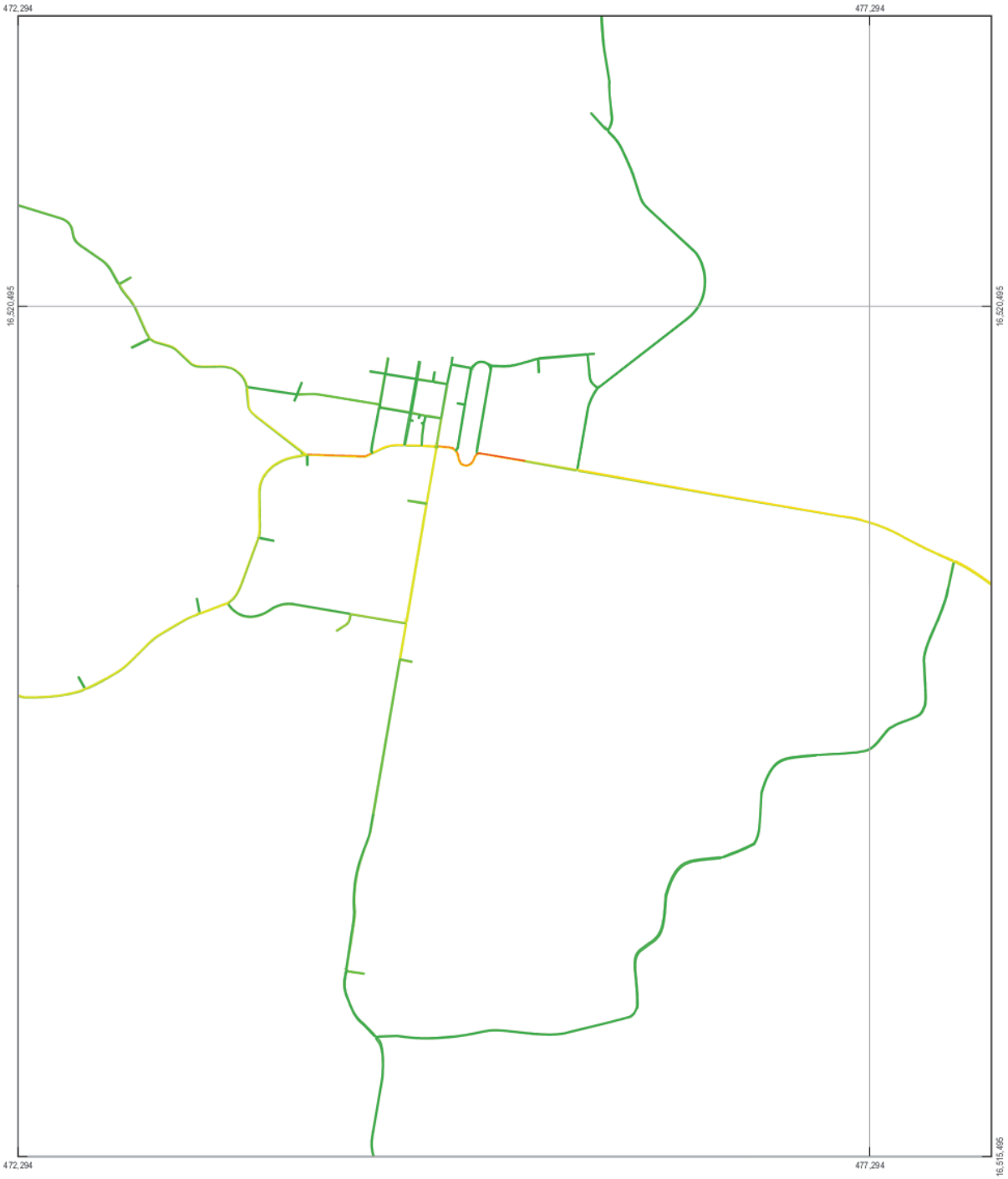
Data source: GHD, 2017 Created by:mbrooks



LEGEND
Link Densities (veh/km)

0 - 2 | 4 - 6 | 10 - 15 | 20 - 40
2 - 4 | 6 - 10 | 15 - 20 | 40 - 100

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Link Densities
2021 AM Peak (0800-0900)

Job Number 22-18116
Revision A
Date 05 Sep 2017

Figure B.7

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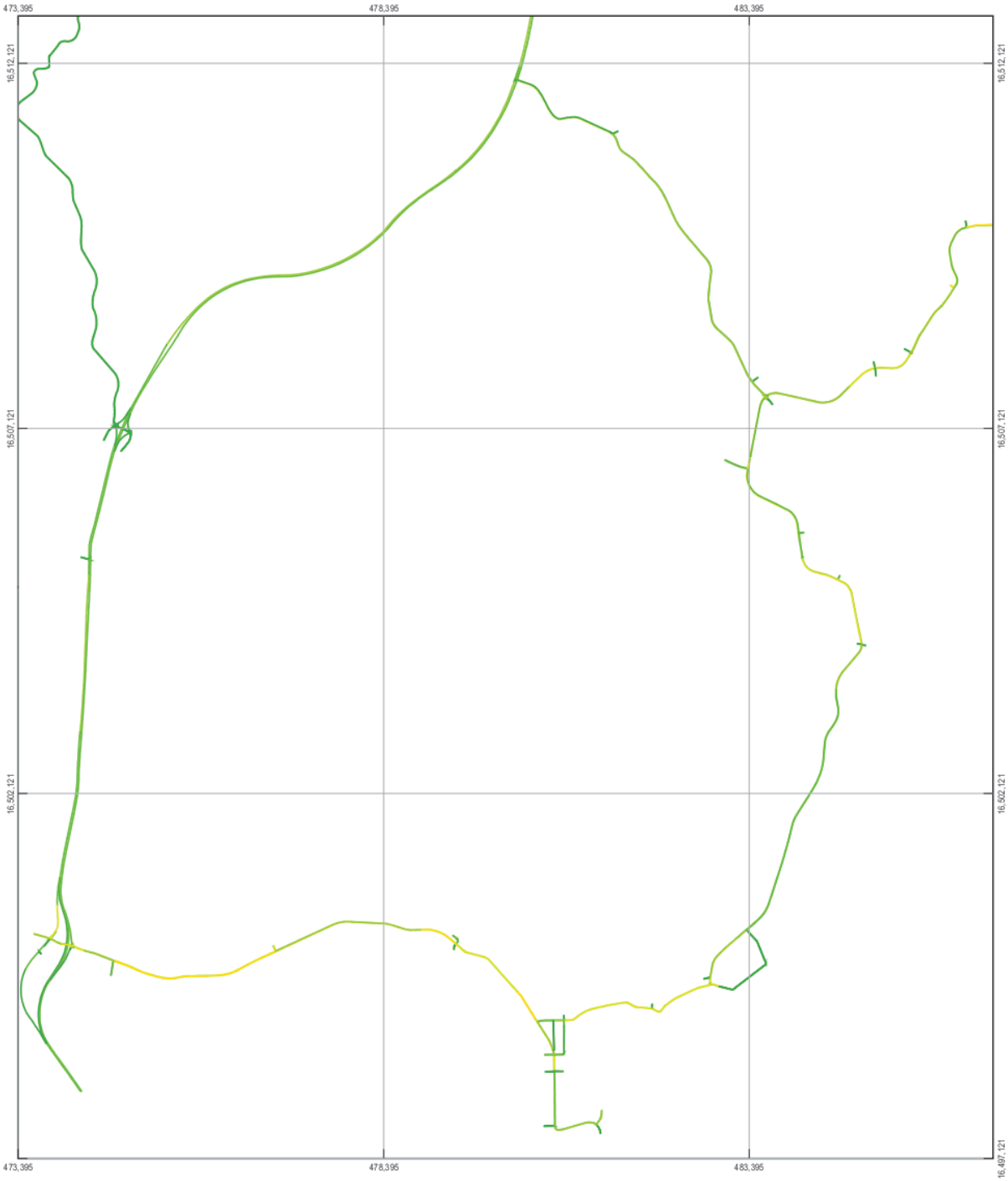
Data source: GHD, 2017 Created by:mbrooks



LEGEND
Link Densities (veh/km)

0 - 2 | 4 - 6 | 10 - 15 | 20 - 40
2 - 4 | 6 - 10 | 15 - 20 | 40 - 100

Paper Size A4
0 250 500 1,000 1,500 2,000
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Link Densities
2021 AM Peak (0800-0900)

Job Number 22-18116
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Figure B.8

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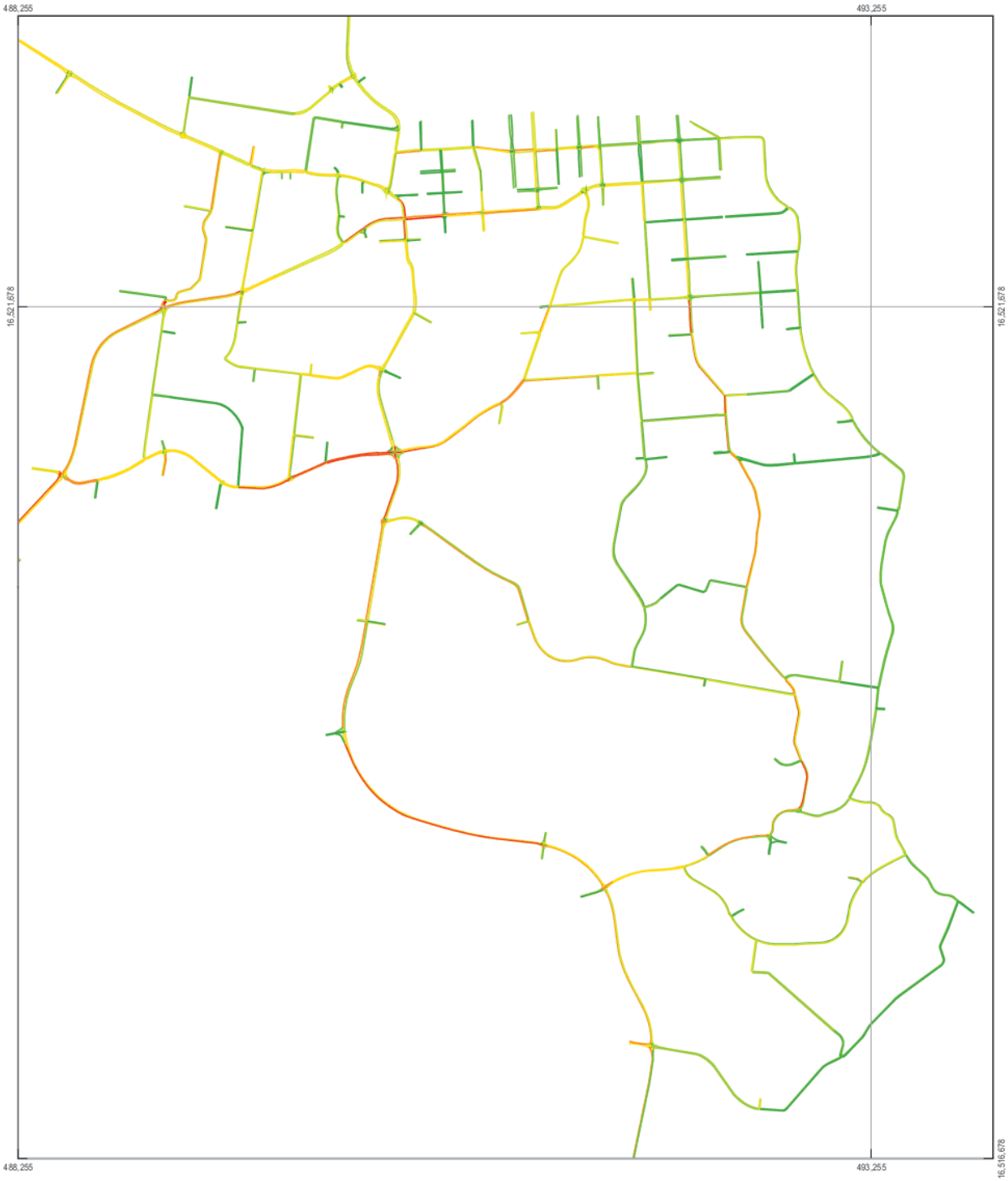
Data source: GHD, 2017 Created by:mbrooks

2026 AM Peak



LEGEND
Link Densities (veh/km)

0 - 2 | 2 - 4 | 4 - 6 | 6 - 10 | 10 - 15 | 15 - 20 | 20 - 40 | 40 - 100

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Link Densities
2026 AM Peak (0800-0900)

Job Number 22-18116
Revision A
Date 05 Sep 2017

Figure B.9

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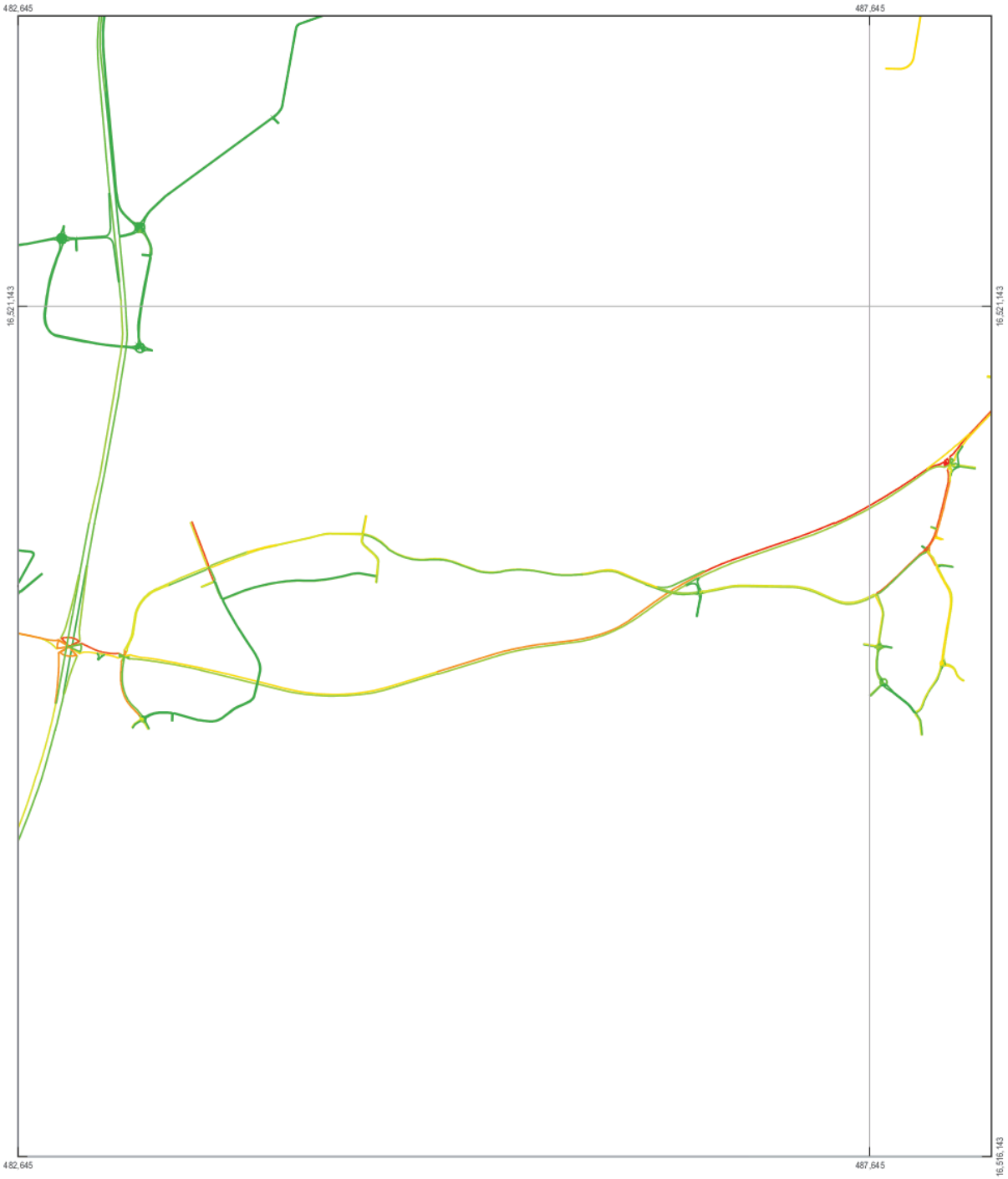
Data source: GHD, 2017 Created by:mbrooks



LEGEND
Link Densities (veh/km)

0 - 2 | 2 - 4 | 4 - 6 | 6 - 10 | 10 - 15 | 15 - 20 | 20 - 40 | 40 - 100

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Link Densities
2026 AM Peak (0800-0900)

Job Number 22-18116
Revision A
Date 05 Sep 2017

Figure B.10

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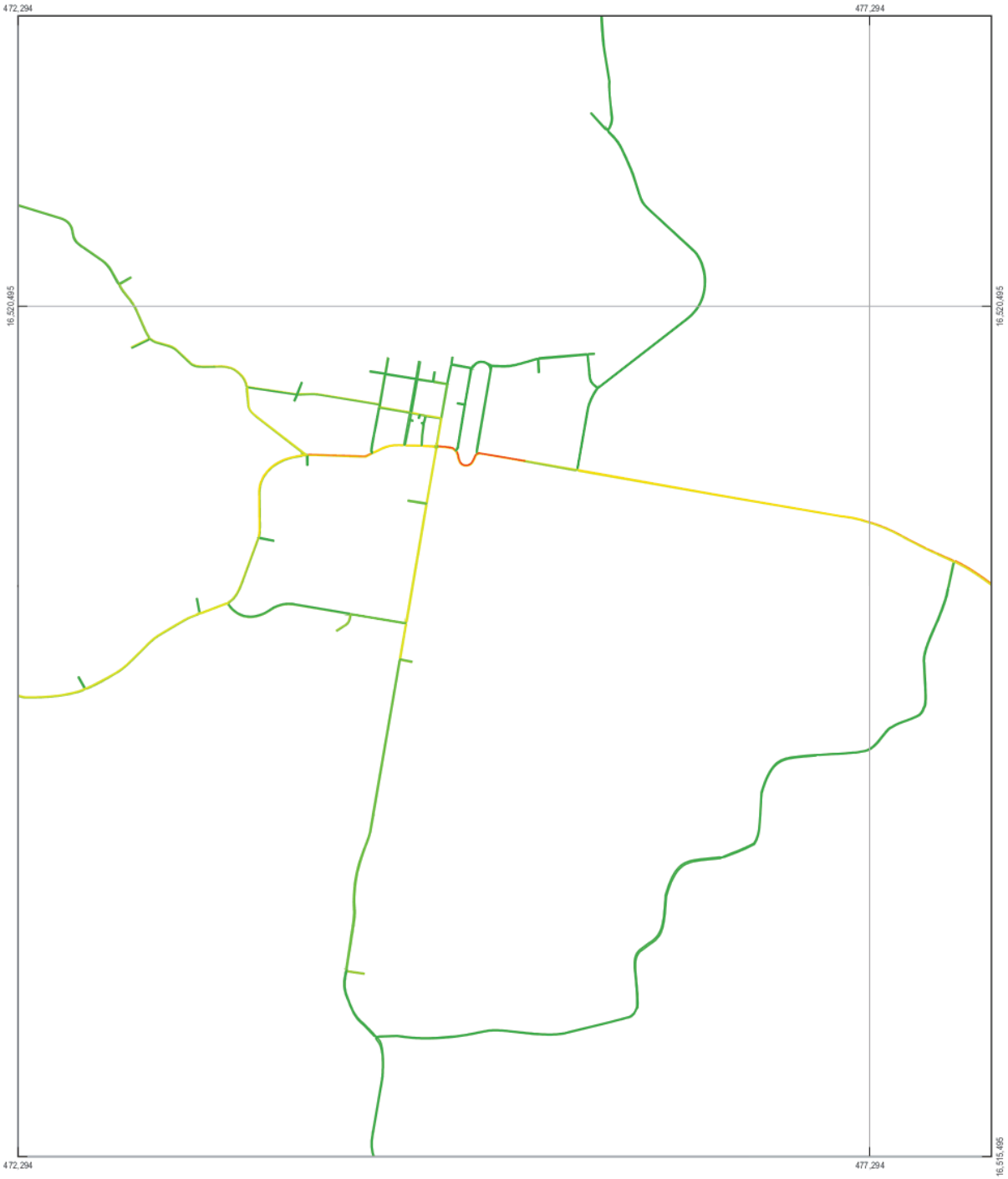
Data source: GHD, 2017 Created by:mbrooks



LEGEND
Link Densities (veh/km)

0 - 2 | 2 - 4 | 4 - 6 | 6 - 10 | 10 - 15 | 15 - 20 | 20 - 40 | 40 - 100

Paper Size A4
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Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Link Densities
2026 AM Peak (0800-0900)

Job Number 22-18116
Revision A
Date 05 Sep 2017

Figure B.11

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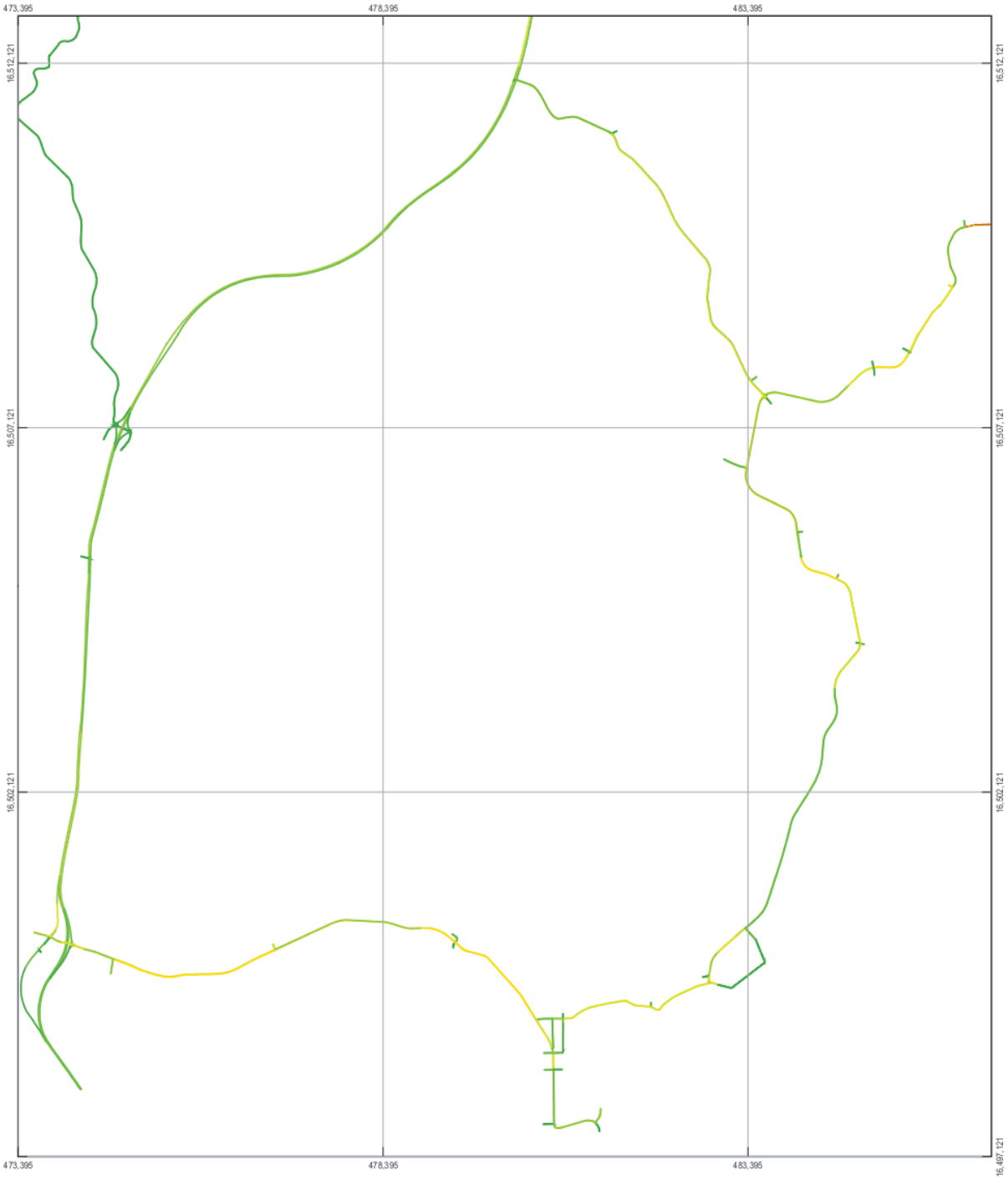

LEGEND
Link Densities (veh/km)

0 - 2 | 4 - 6 | 10 - 15 | 20 - 40
2 - 4 | 6 - 10 | 15 - 20 | 40 - 100

Paper Size A4
0 250 500 1,000 1,500 2,000
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Link Densities
2026 AM Peak (0800-0900)

Job Number 22-18116
Revision A
Date 05 Sep 2017

Figure B.12

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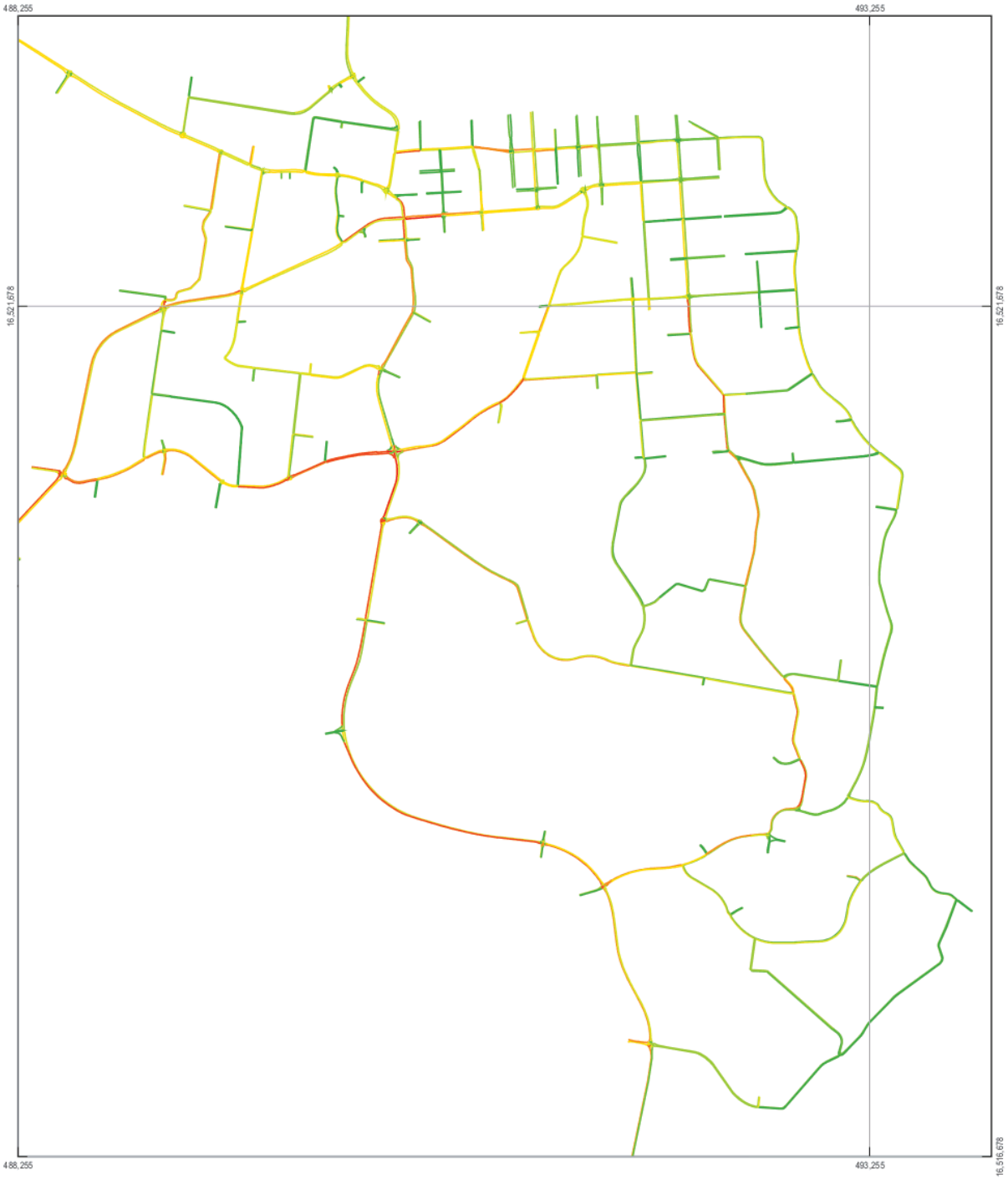
Data source: GHD, 2017 Created by:mbrooks

2036 AM Peak



LEGEND
Link Densities (veh/km)

0 - 2 | 2 - 4 | 4 - 6 | 6 - 10 | 10 - 15 | 15 - 20 | 20 - 40 | 40 - 100

Paper Size A4
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Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Link Densities
2036 AM Peak (0800-0900)

Job Number 22-18116
Revision A
Date 05 Sep 2017

Figure B.13

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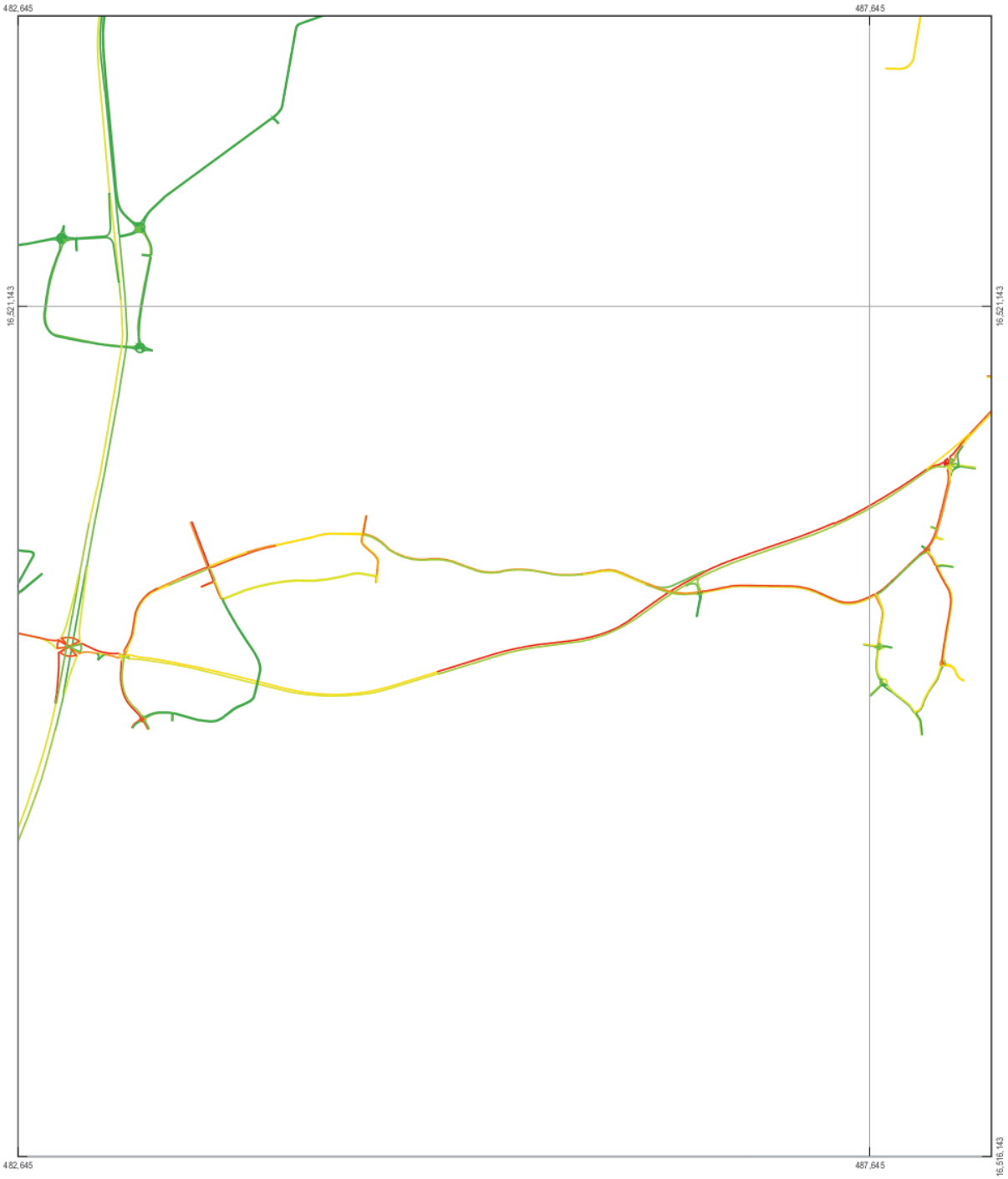
Data source: GHD, 2017 Created by:mbrooks



LEGEND
Link Densities (veh/km)

0 - 2 | 2. - 4 | 4 - 6 | 6 - 10 | 10 - 15 | 15 - 20 | 20 - 40 | 40 - 100

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

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Local Government Area Traffic Study

Link Densities
2036 AM Peak (0800-0900)

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Figure B.14

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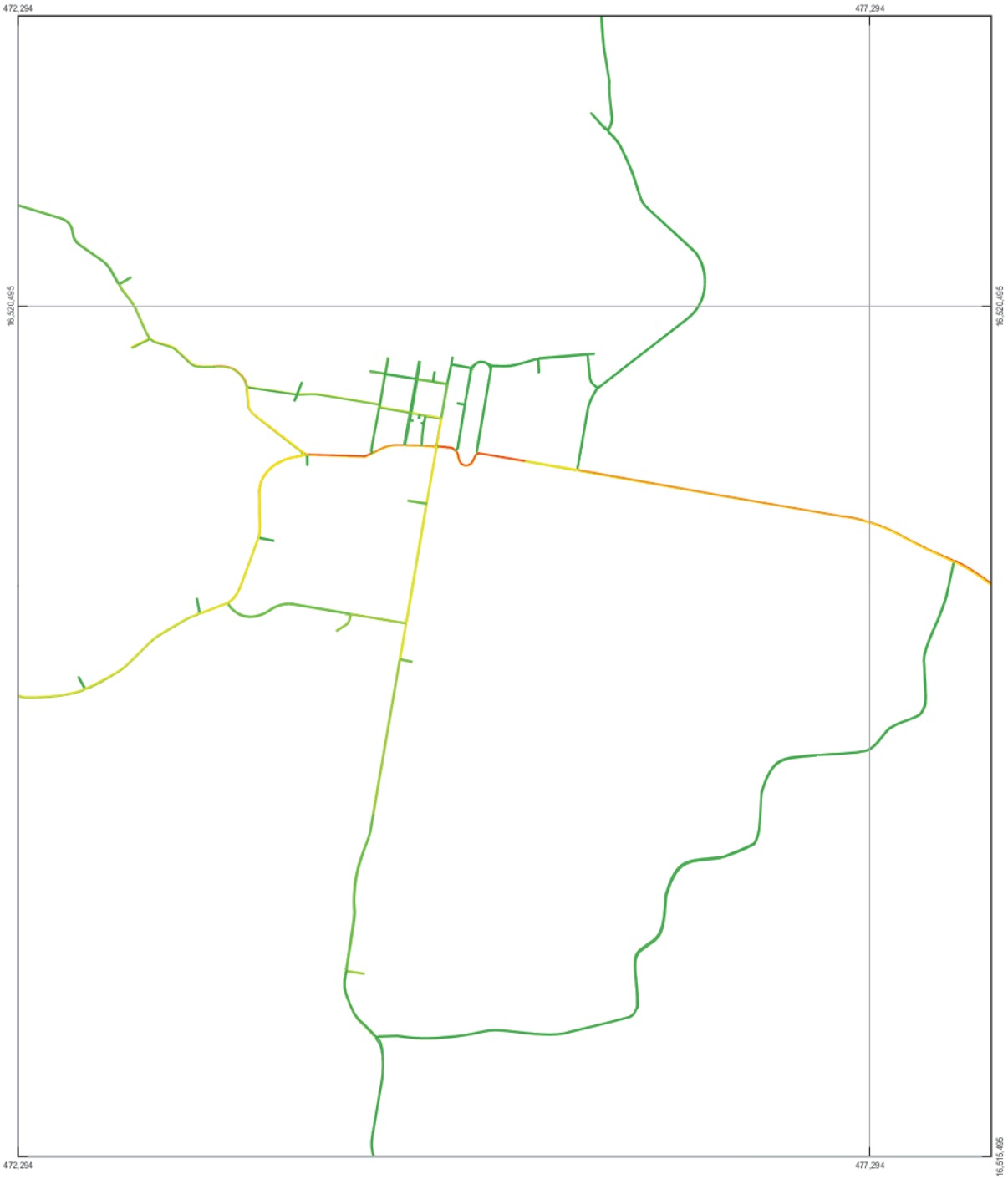
Data source: GHD, 2017 Created by:mbrooks



LEGEND
Link Densities (veh/km)

0 - 2 | 2 - 4 | 4 - 6 | 6 - 10 | 10 - 15 | 15 - 20 | 20 - 40 | 40 - 100

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

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Link Densities
2036 AM Peak (0800-0900)

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Figure B.15

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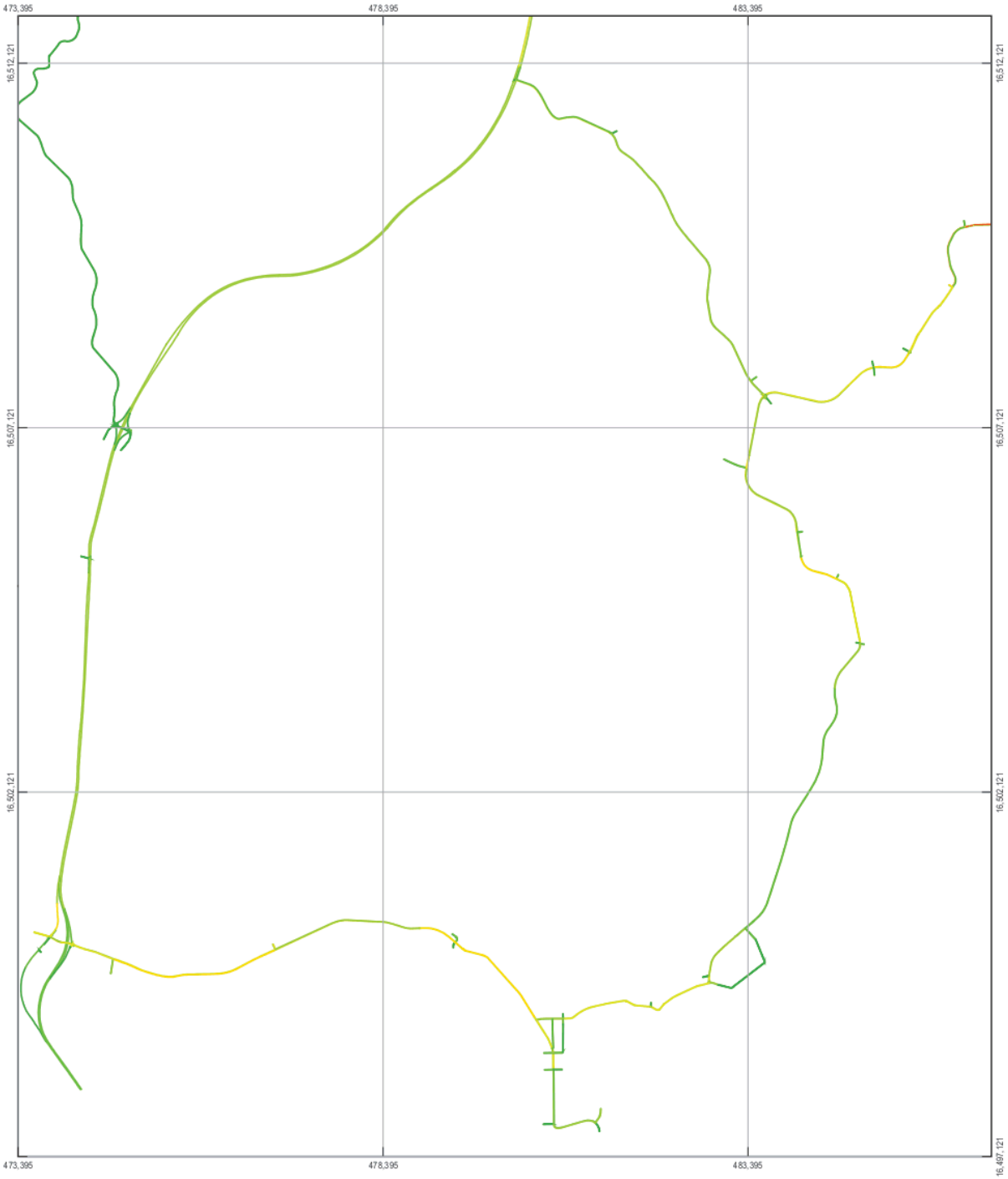
Data source: GHD, 2017 Created by:mbrooks



LEGEND
Link Densities (veh/km)

0 - 2 | 4 - 6 | 10 - 15 | 20 - 40
2 - 4 | 6 - 10 | 15 - 20 | 40 - 100

Paper Size A4
0 250 500 1,000 1,500 2,000
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Link Densities
2036 AM Peak (0800-0900)

Job Number 22-18116
Revision A
Date 05 Sep 2017

Figure B.16

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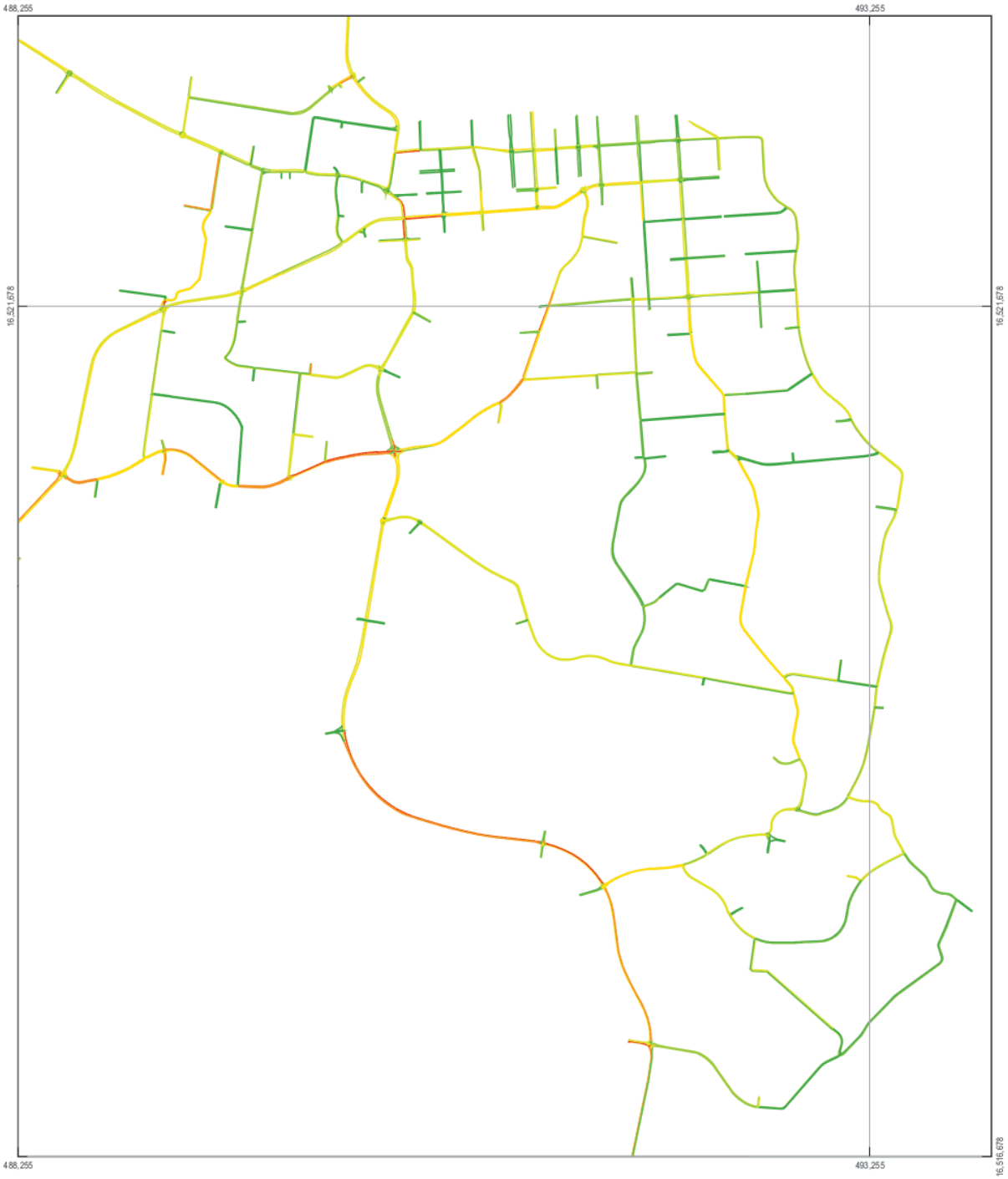
Data source: GHD, 2017 Created by:mbrooks

2016 PM Peak



LEGEND
Link Densities (veh/km)

0 - 2 | 2 - 4 | 4 - 6 | 6 - 10 | 10 - 15 | 15 - 20 | 20 - 40 | 40 - 100

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Link Densities
2016 PM Peak (1500-1600)

Job Number 22-18116
Revision A
Date 05 Sep 2017

Figure B.17

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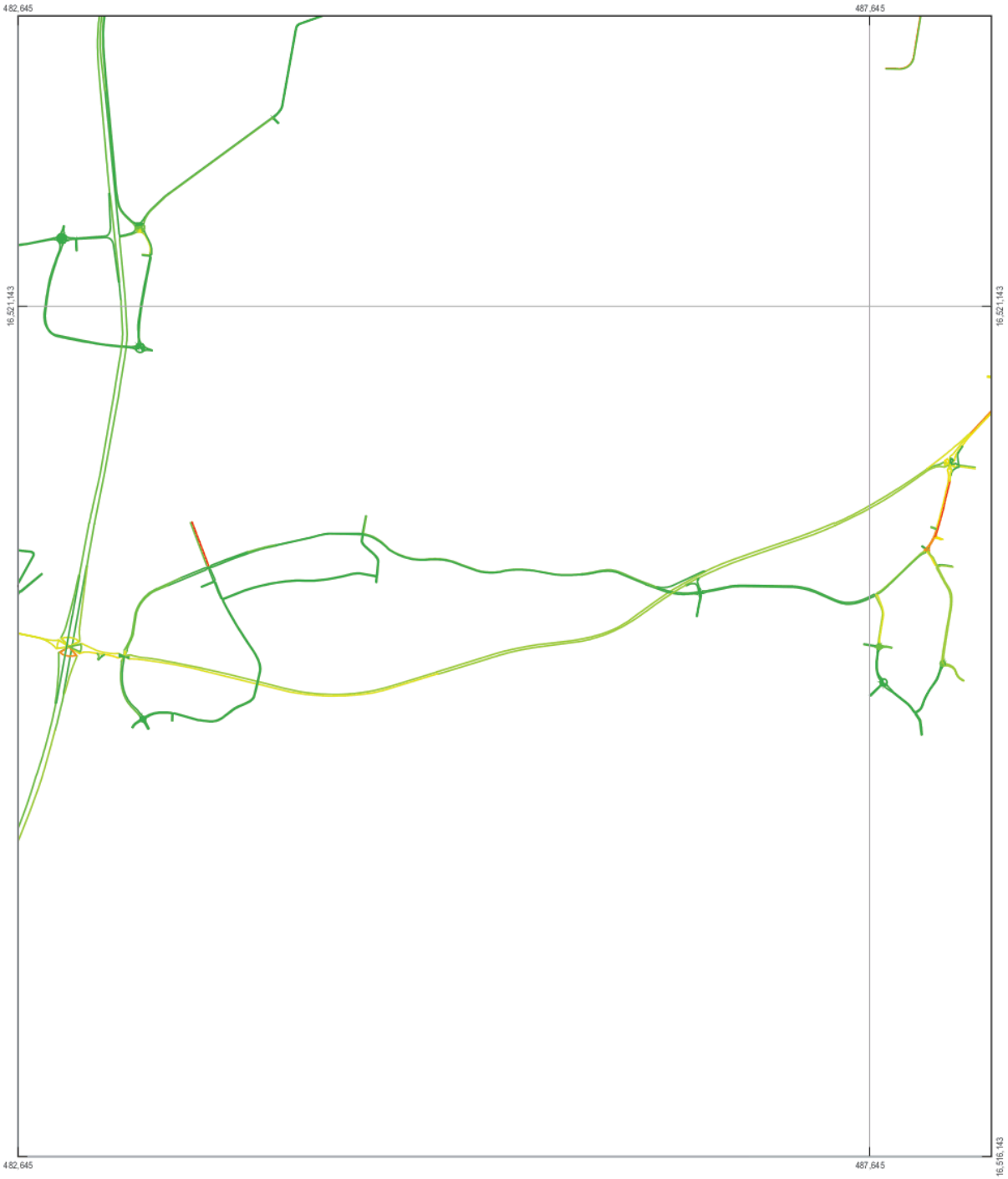
Data source: GHD, 2017 Created by:mbrooks



LEGEND
Link Densities (veh/km)

0 - 2 | 2 - 4 | 4 - 6 | 6 - 10 | 10 - 15 | 15 - 20 | 20 - 40 | 40 - 100

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Link Densities
2016 PM Peak (1500-1600)

Job Number 22-18116
Revision A
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Figure B.18

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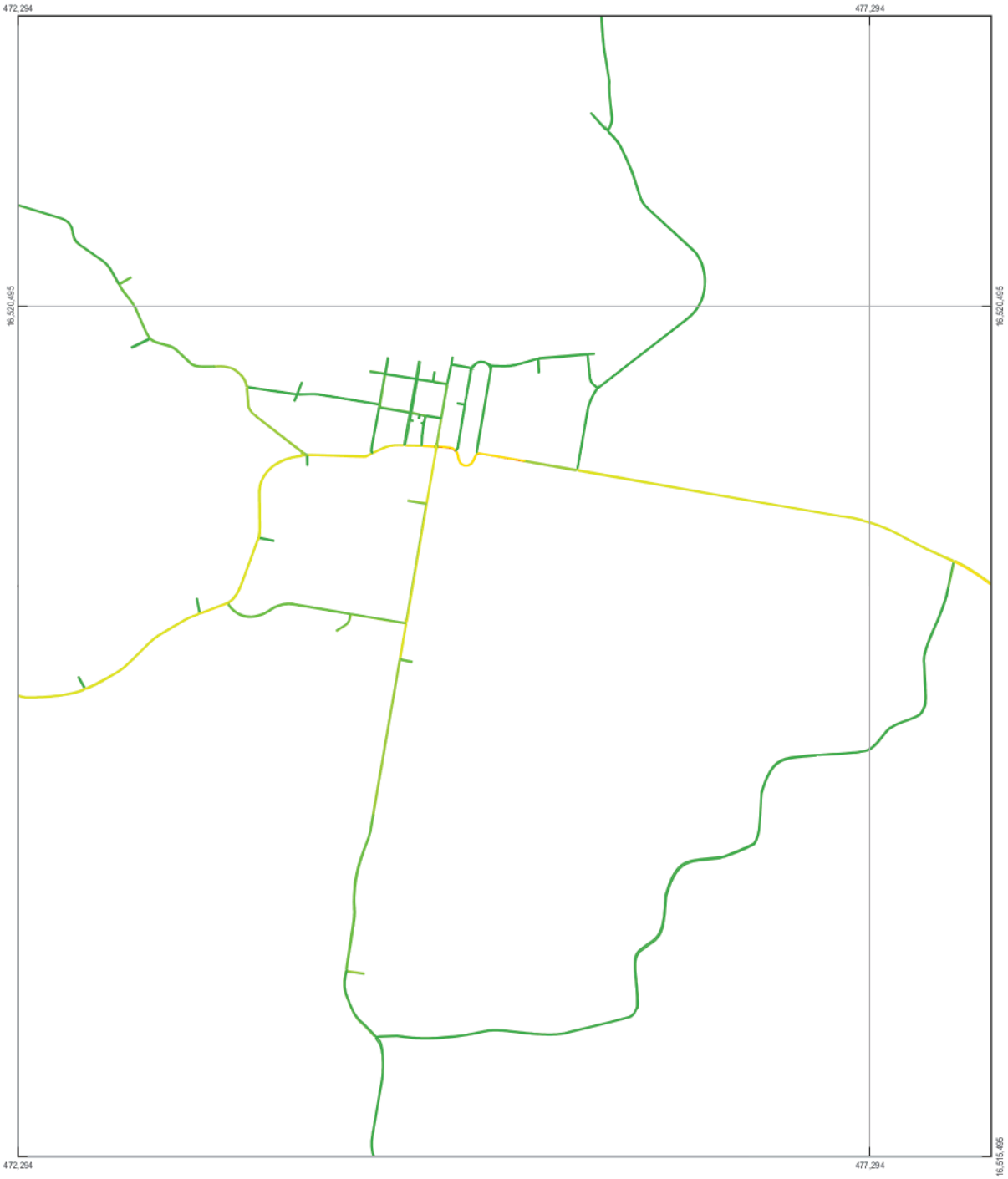
Data source: GHD, 2017 Created by:mbrooks



LEGEND
Link Densities (veh/km)

0 - 2 | 2 - 4 | 4 - 6 | 6 - 10 | 10 - 15 | 15 - 20 | 20 - 40 | 40 - 100

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Link Densities
2016 PM Peak (1500-1600)

Job Number 22-18116
Revision A
Date 05 Sep 2017

Figure B.19

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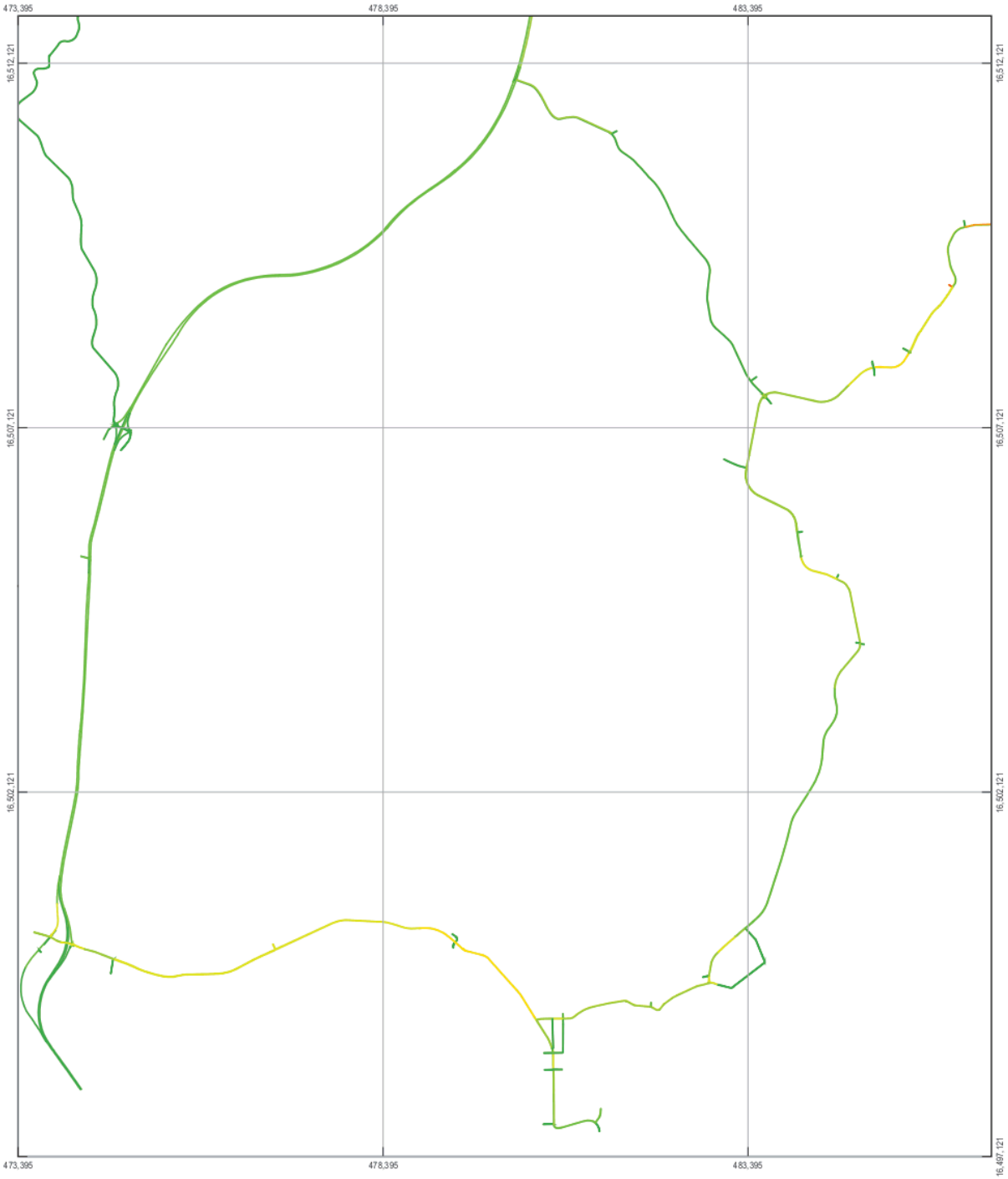
Data source: GHD, 2017 Created by:mbrooks



LEGEND
Link Densities (veh/km)

0 - 2 | 4 - 6 | 10 - 15 | 20 - 40
2 - 4 | 6 - 10 | 15 - 20 | 40 - 100

Paper Size A4
0 250 500 1,000 1,500 2,000
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Link Densities
2016 PM Peak (1500-1600)

Job Number 22-18116
Revision A
Date 05 Sep 2017

Figure B.20

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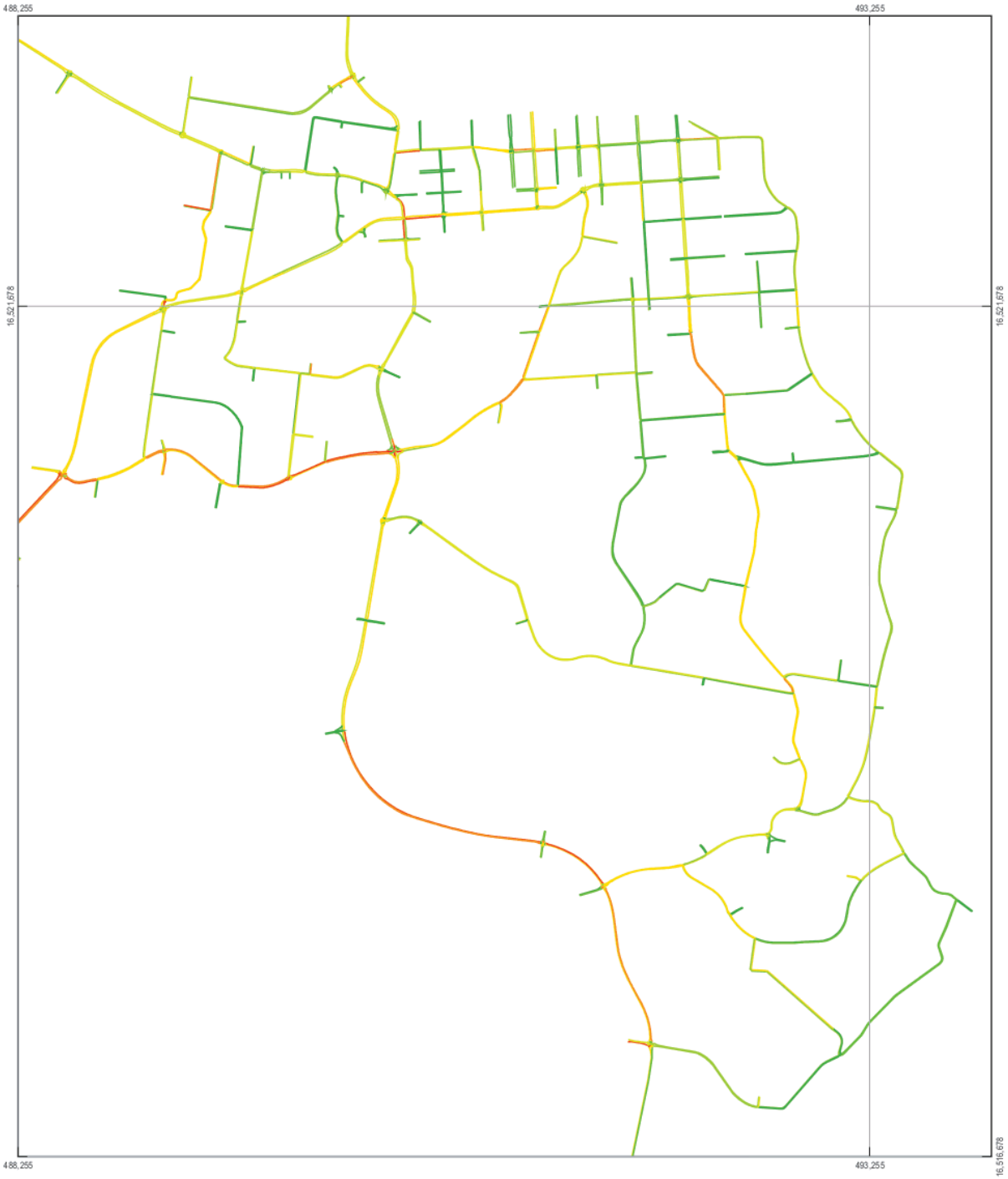
Data source: GHD, 2017 Created by:mbrooks

2021 PM Peak



LEGEND
Link Densities (veh/km)

0 - 2 | 2 - 4 | 4 - 6 | 6 - 10 | 10 - 15 | 15 - 20 | 20 - 40 | 40 - 100

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Link Densities
2021 PM Peak (1500-1600)

Job Number 22-18116
Revision A
Date 05 Sep 2017

Figure B.21

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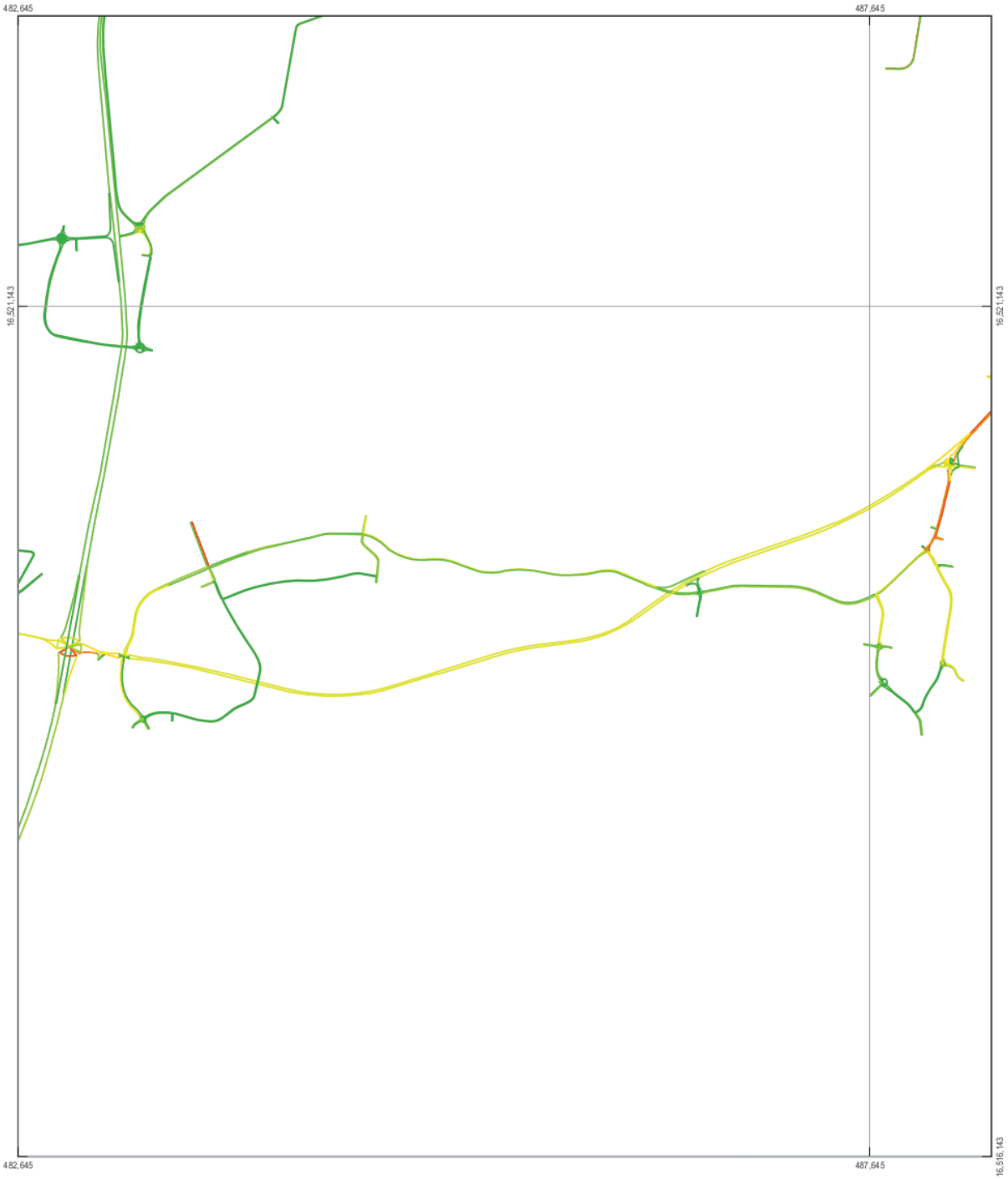
Data source: GHD, 2017 Created by:mbrooks



LEGEND
Link Densities (veh/km)

0 - 2 | 2 - 4 | 4 - 6 | 6 - 10 | 10 - 15 | 15 - 20 | 20 - 40 | 40 - 100

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Link Densities
2021 PM Peak (1500-1600)

Job Number 22-18116
Revision A
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Figure B.22

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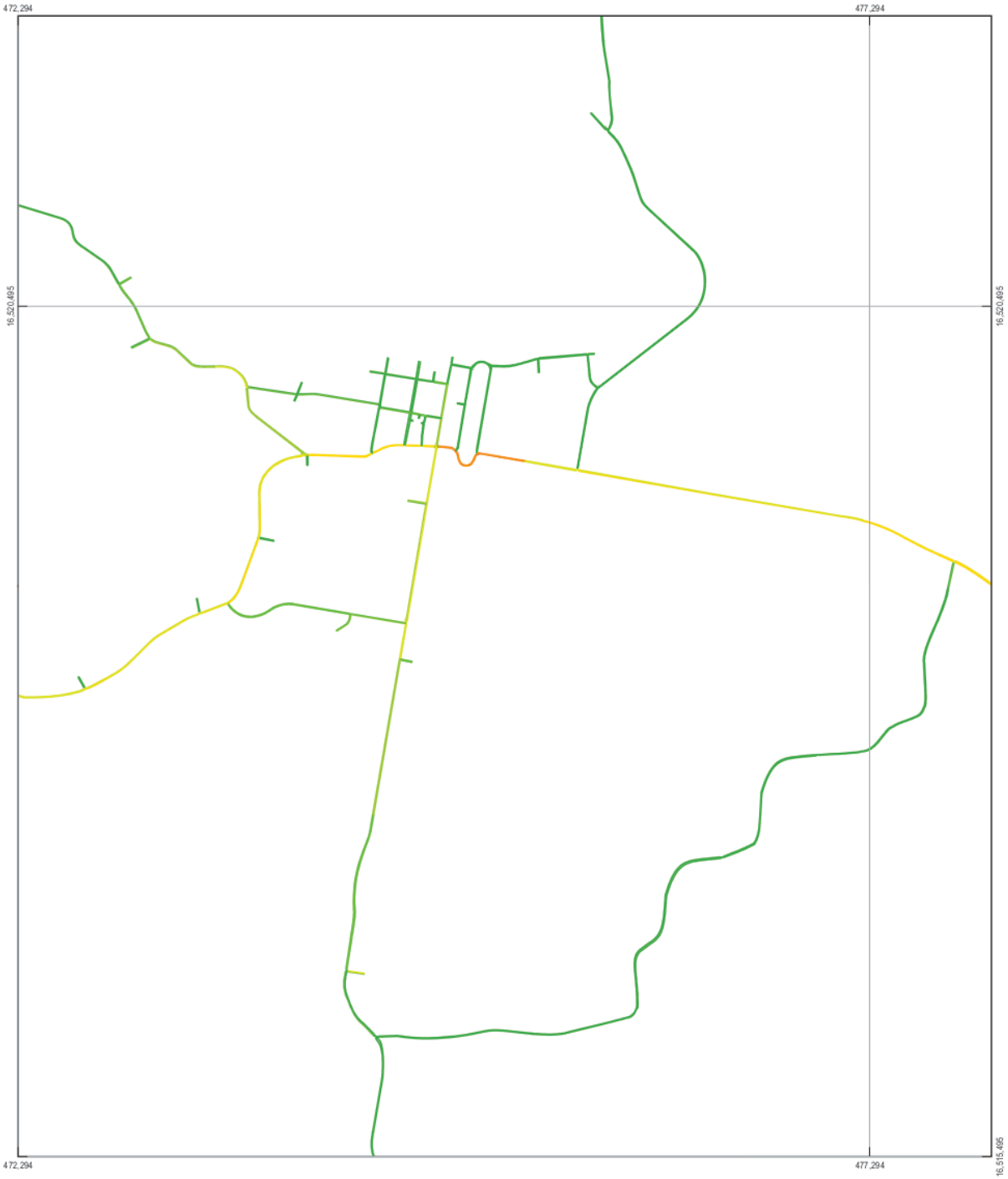
Data source: GHD, 2017 Created by:mbrooks



LEGEND
Link Densities (veh/km)

0 - 2 | 2 - 4 | 4 - 6 | 6 - 10 | 10 - 15 | 15 - 20 | 20 - 40 | 40 - 100

Paper Size A4
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Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

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Local Government Area Traffic Study

Link Densities
2021 PM Peak (1500-1600)

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Figure B.23

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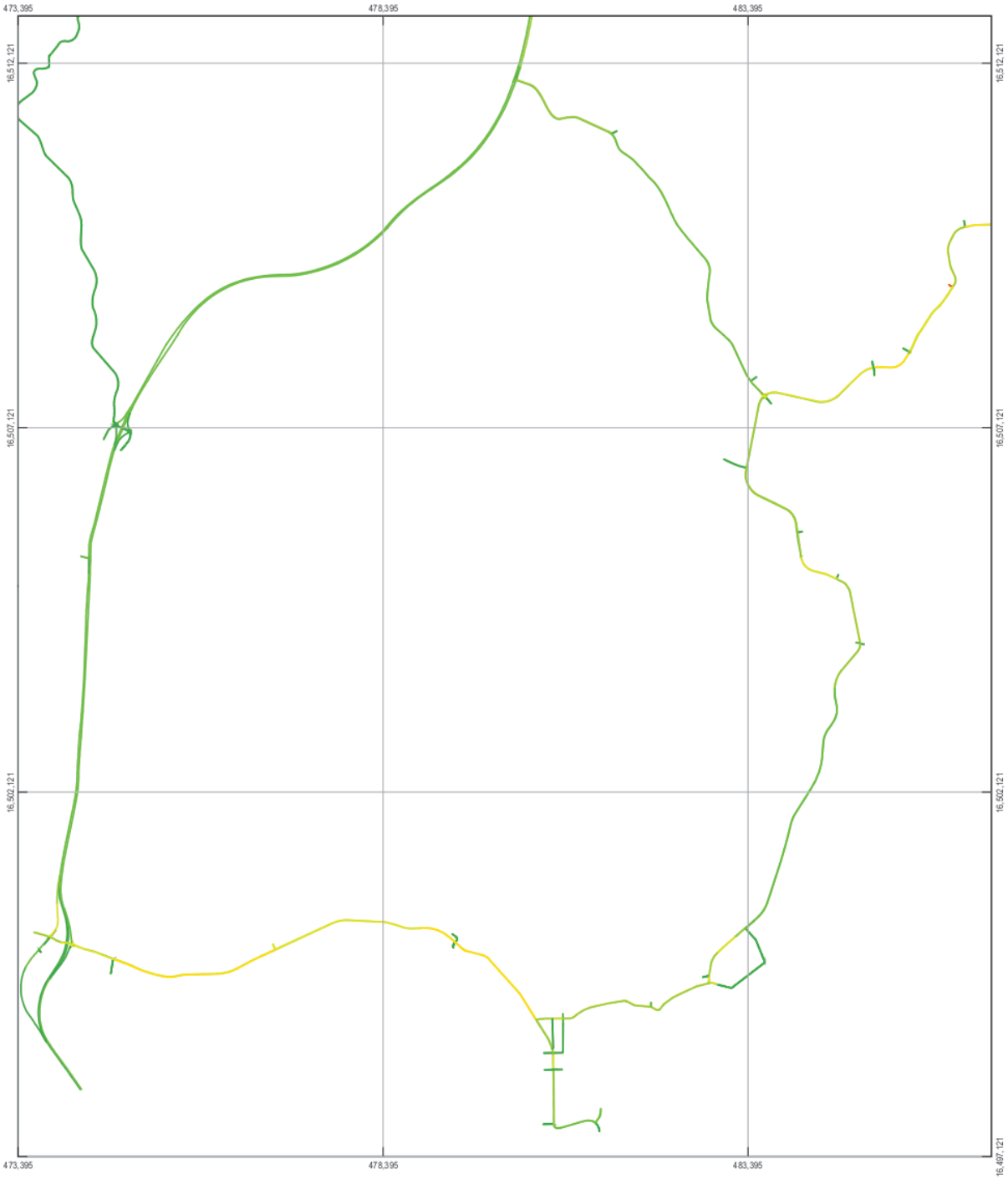

LEGEND
Link Densities (veh/km)

0 - 2 | 4 - 6 | 10 - 15 | 20 - 40
2 - 4 | 6 - 10 | 15 - 20 | 40 - 100

Paper Size A4
0 250 500 1,000 1,500 2,000
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Link Densities
2021 PM Peak (1500-1600)

Job Number 22-18116
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Figure B.24

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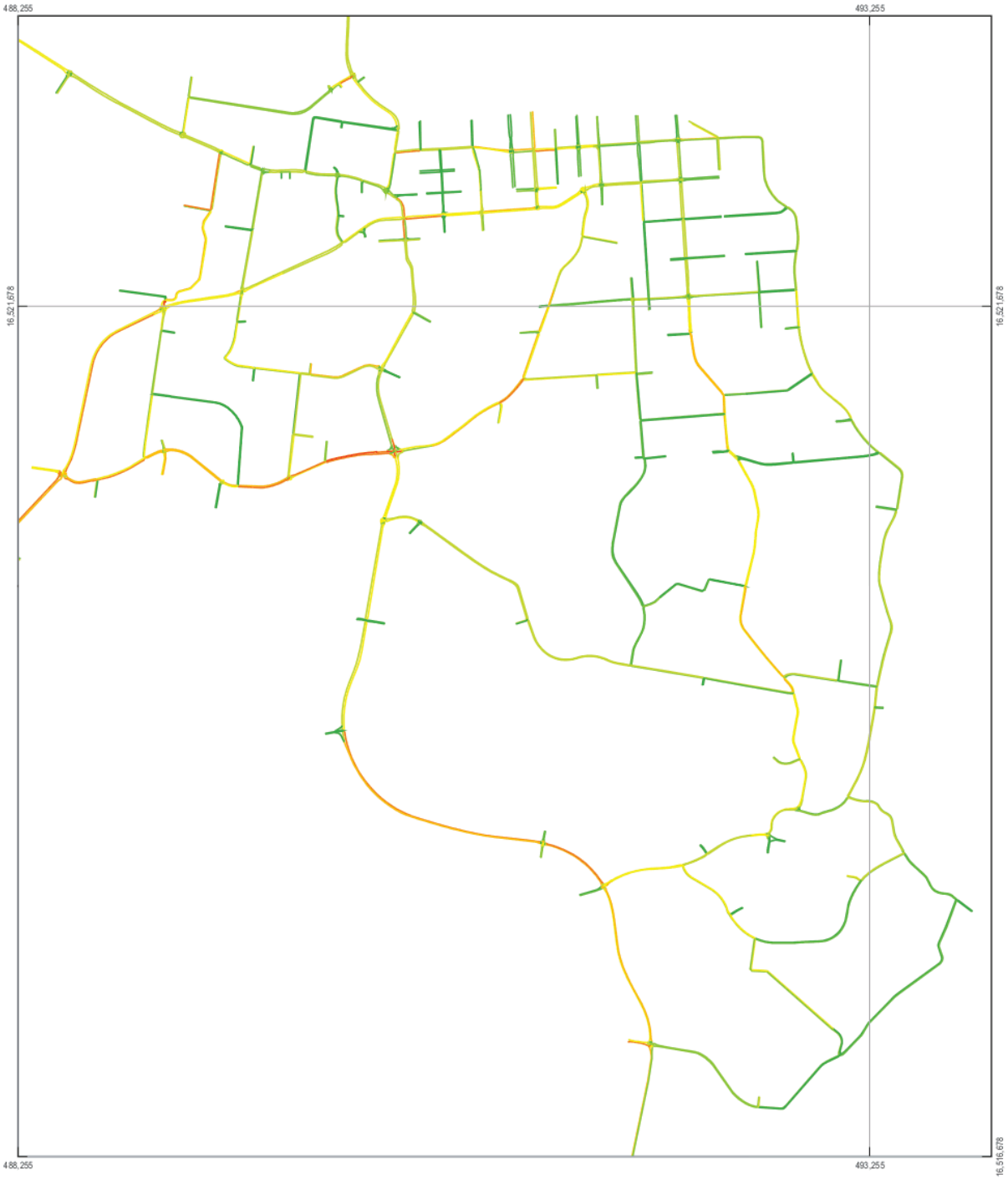
Data source: GHD, 2017 Created by:mbrooks

2026 PM Peak



LEGEND
Link Densities (veh/km)

0 - 2 | 2 - 4 | 4 - 6 | 6 - 10 | 10 - 15 | 15 - 20 | 20 - 40 | 40 - 100 | 100 - 120

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Link Densities
2026 PM Peak (1500-1600)

Job Number 22-18116
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Date 05 Sep 2017

Figure B.25

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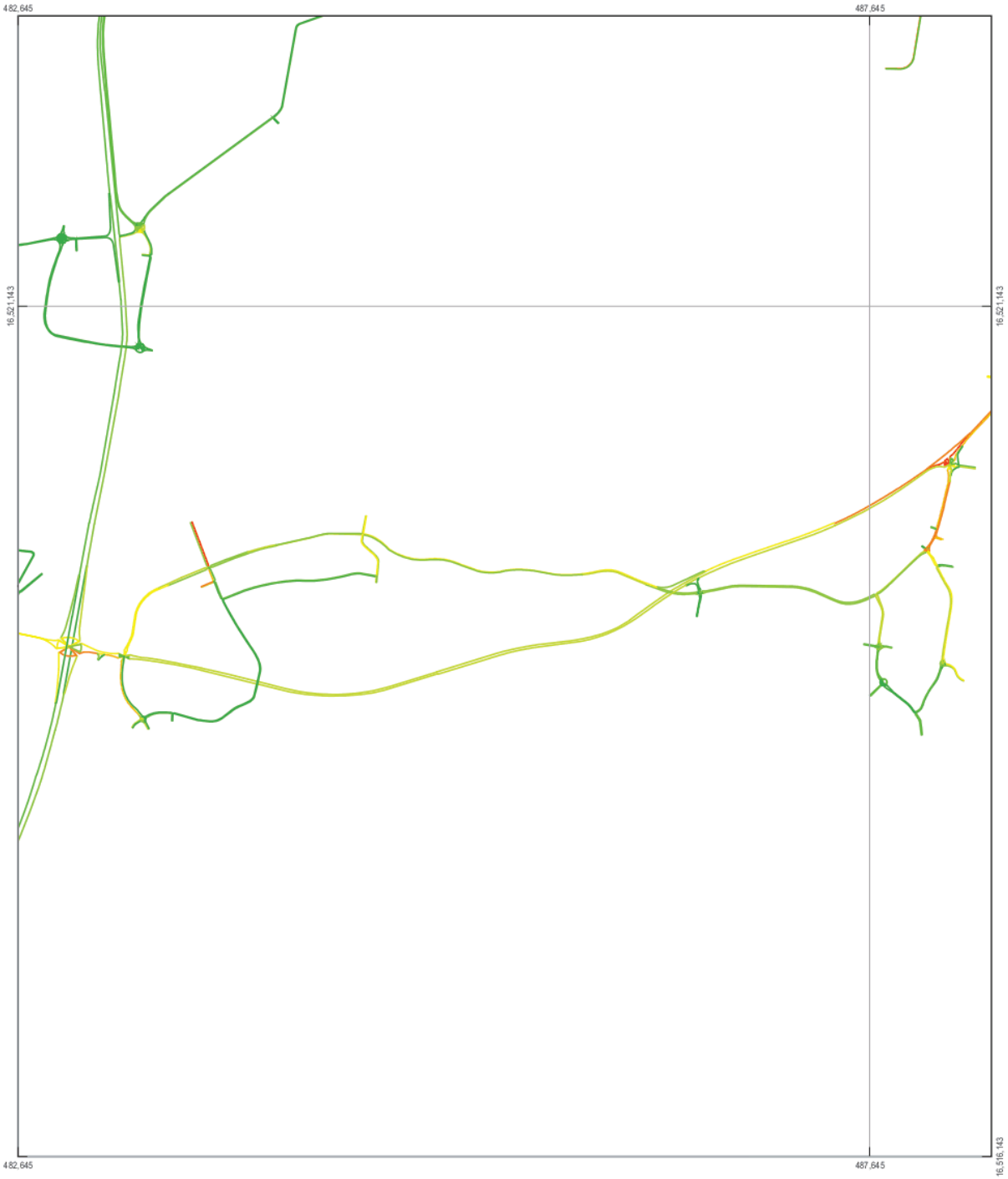
Data source: GHD, 2017 Created by:mbrooks



LEGEND
Link Densities (veh/km)

0 - 2 | 2 - 4 | 4 - 6 | 6 - 10 | 10 - 15 | 15 - 20 | 20 - 40 | 40 - 100 | 100 - 120

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Link Densities
2026 PM Peak (1500-1600)

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Figure B.26

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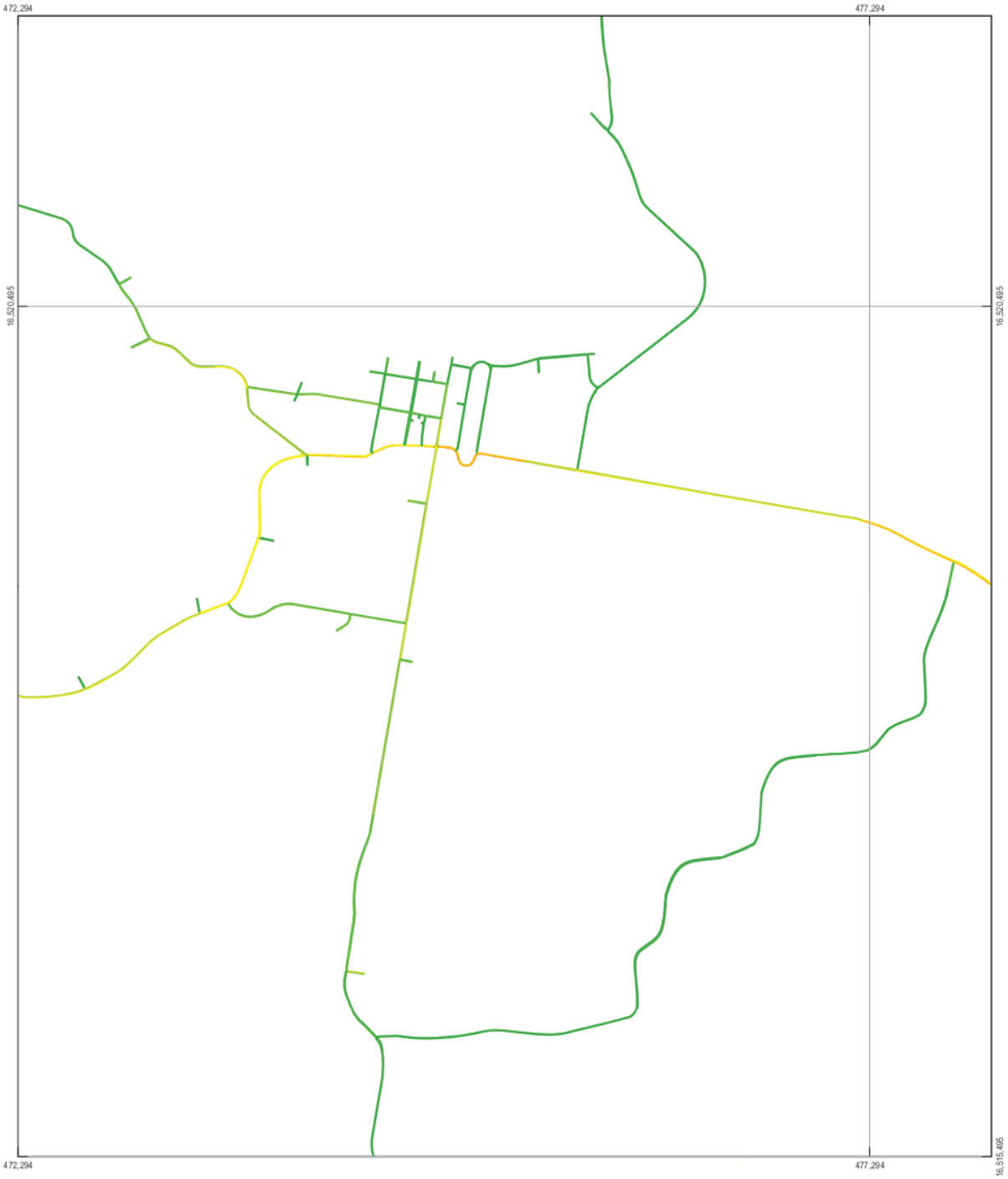
Data source: GHD, 2017 Created by:mbrooks



LEGEND
Link Densities (veh/km)

0 - 2 | 2 - 4 | 4 - 6 | 6 - 10 | 10 - 15 | 15 - 20 | 20 - 40 | 40 - 100 | 100 - 120

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Link Densities
2026 PM Peak (1500-1600)

Job Number 22-18116
Revision A
Date 05 Sep 2017

Figure B.27

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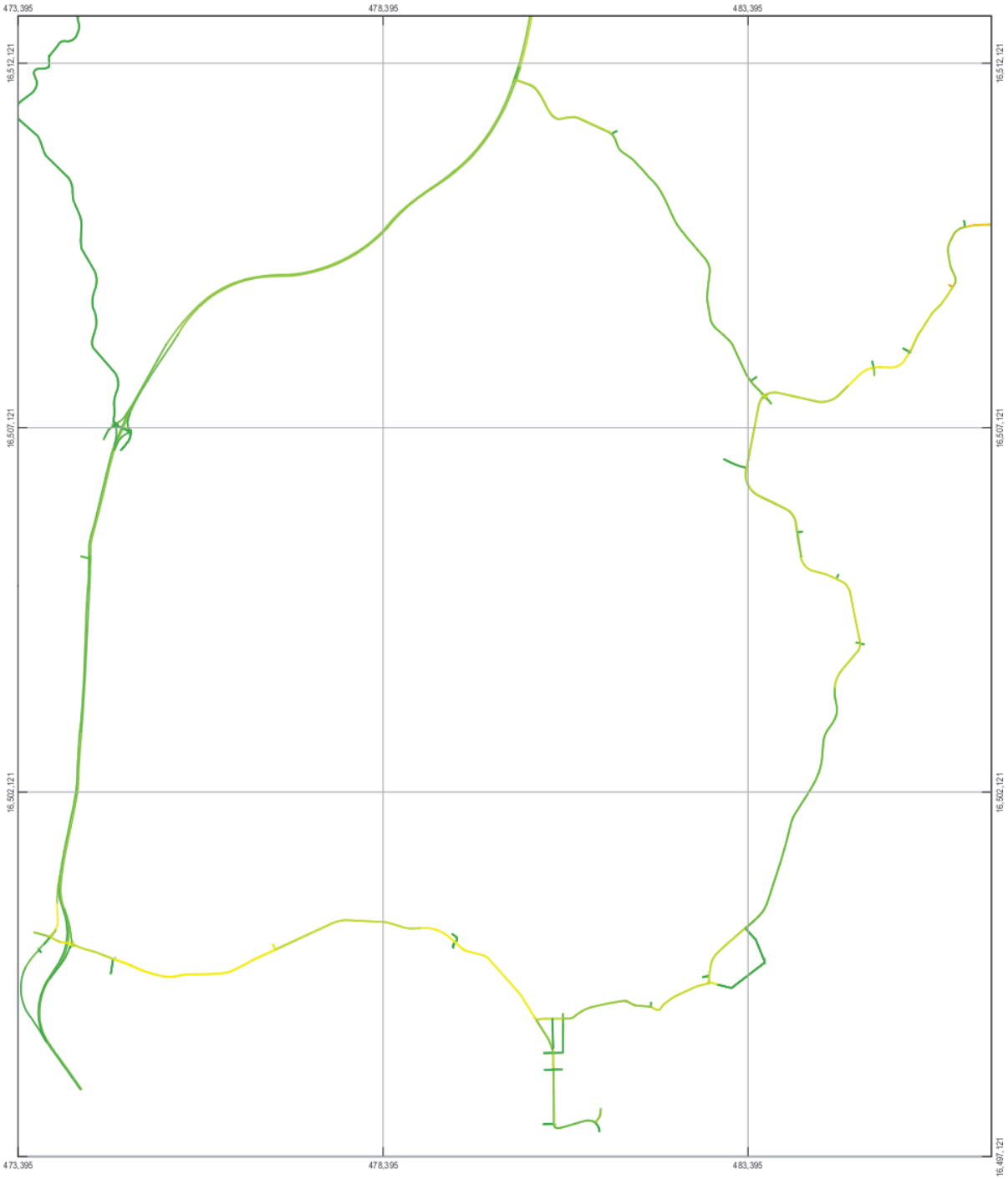
Data source: GHD, 2017 Created by:mbrooks



LEGEND
Link Densities (veh/km)

0 - 2 | 2 - 4 | 4 - 6 | 6 - 10 | 10 - 15 | 15 - 20 | 20 - 40 | 40 - 100 | 100 - 120

Paper Size A4
0 250 500 1,000 1,500 2,000
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Link Densities
2026 PM Peak (1500-1600)

Job Number 22-18116
Revision A
Date 05 Sep 2017

Figure B.28

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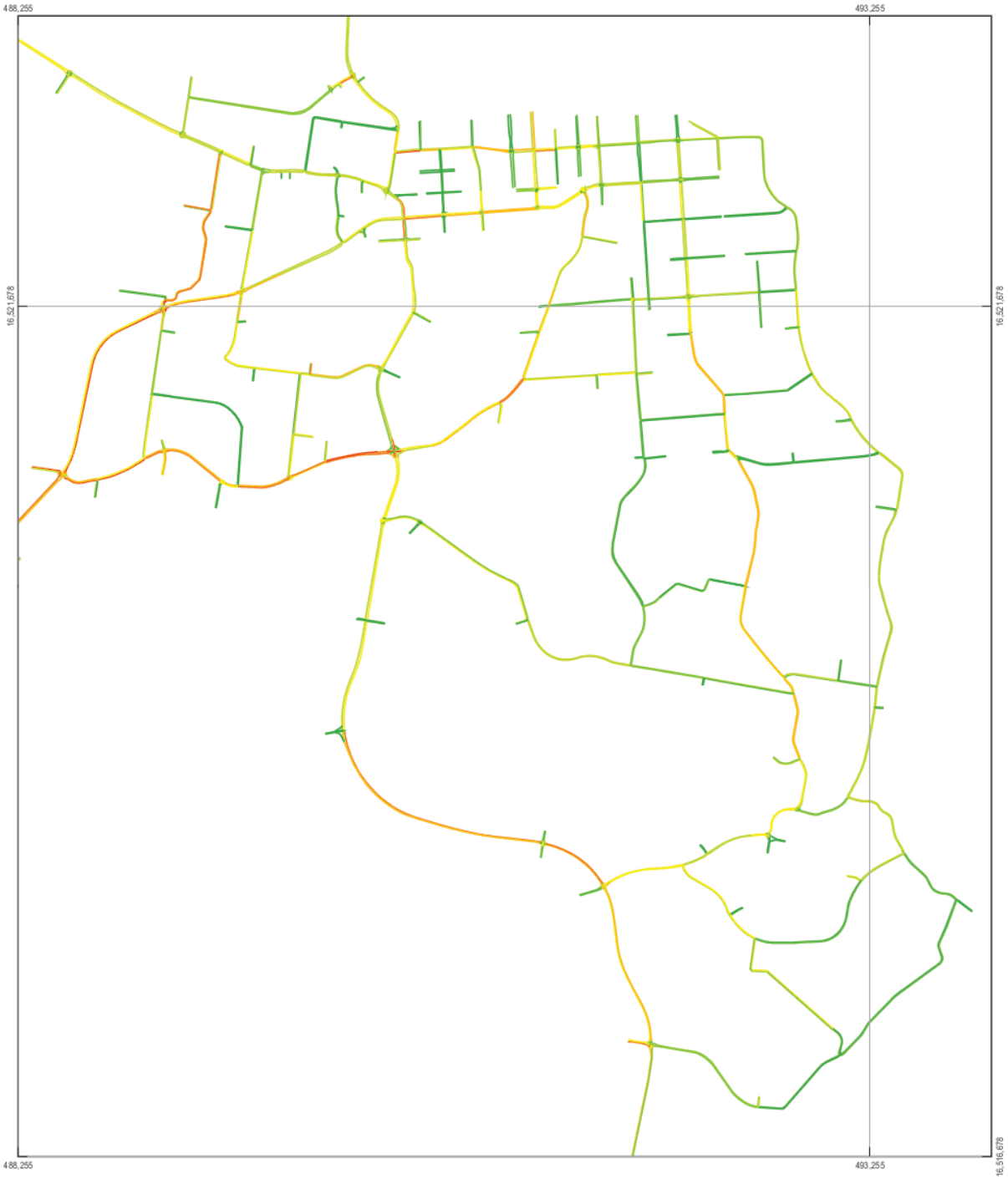
Data source: GHD, 2017 Created by:mbrooks

2036 PM Peak



LEGEND
Link Densities (veh/km)

0 - 2 | 2 - 4 | 4 - 6 | 6 - 10 | 10 - 15 | 15 - 20 | 20 - 40 | 40 - 100 | 100 - 120

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Link Densities
2036 PM Peak (1500-1600)

Job Number 22-18116
Revision A
Date 05 Sep 2017

Figure B.29

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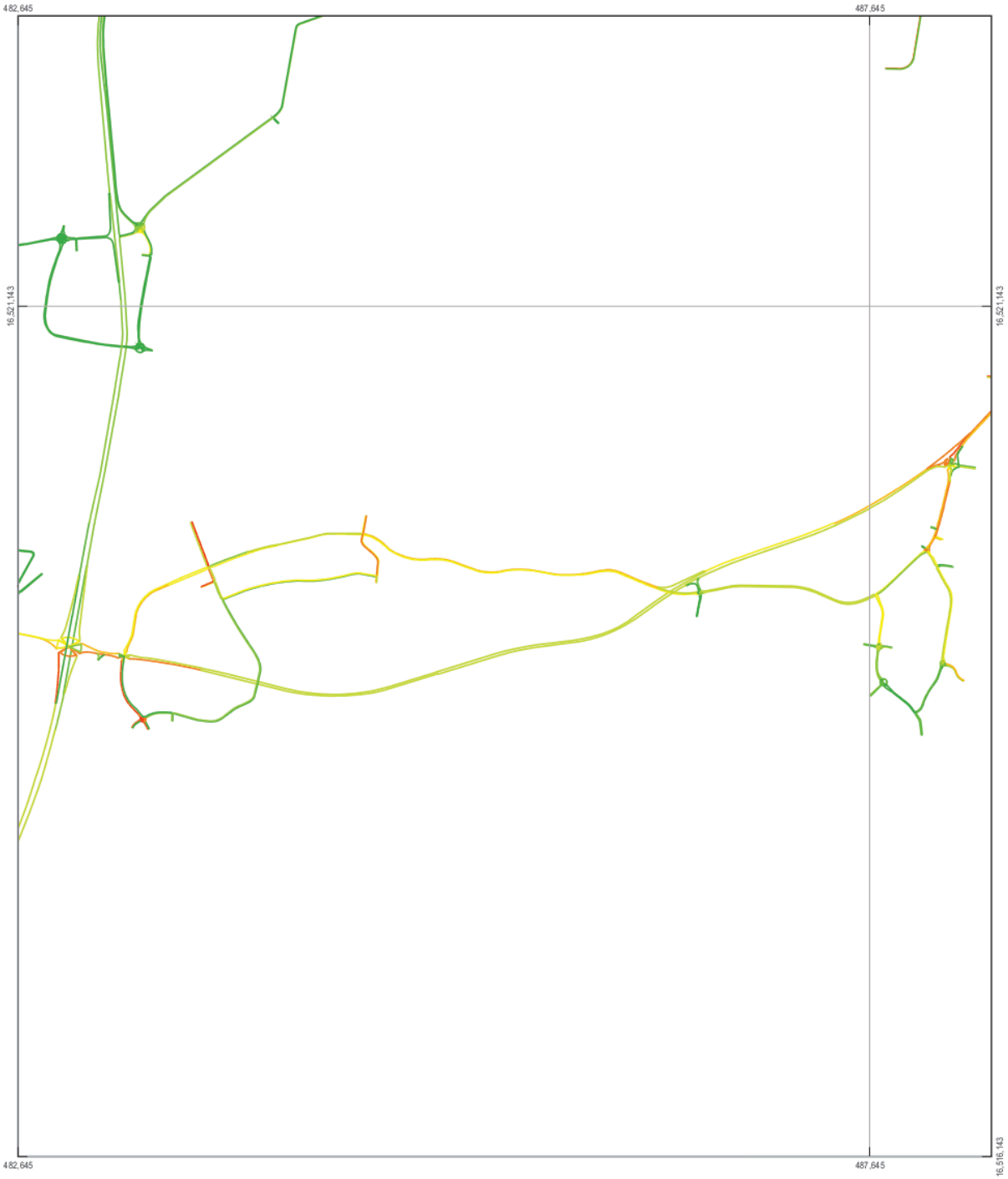
Data source: GHD, 2017 Created by:mbrooks



LEGEND
Link Densities (veh/km)

0 - 2 | 2 - 4 | 4 - 6 | 6 - 10 | 10 - 15 | 15 - 20 | 20 - 40 | 40 - 100 | 100 - 120

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Link Densities
2036 PM Peak (1500-1600)

Job Number 22-18116
Revision A
Date 05 Sep 2017

Figure B.30

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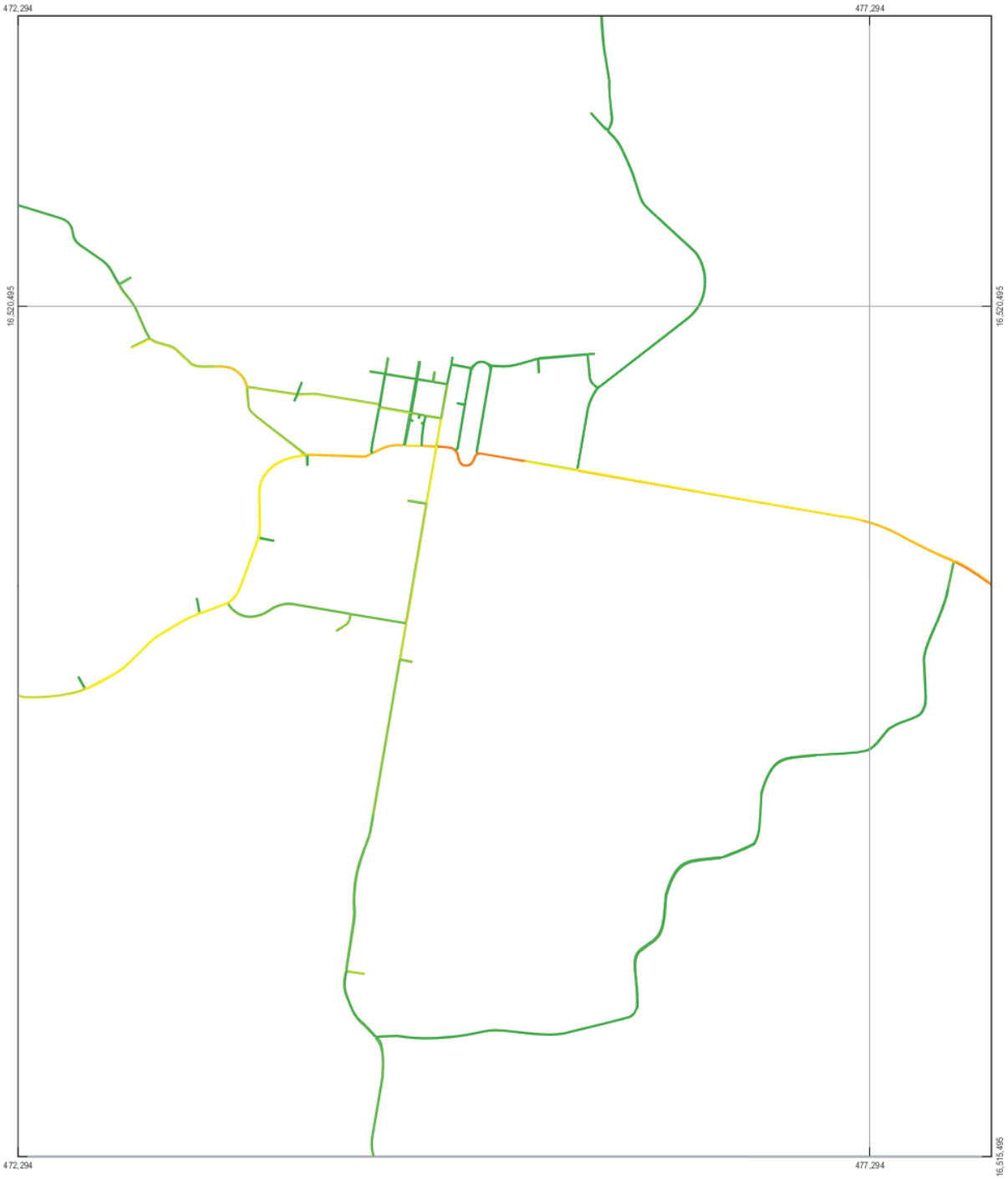
Data source: GHD, 2017 Created by:mbrooks



LEGEND
Link Densities (veh/km)

0 - 2 | 2 - 4 | 4 - 6 | 6 - 10 | 10 - 15 | 15 - 20 | 20 - 40 | 40 - 100 | 100 - 120

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Link Densities
2036 PM Peak (1500-1600)

Job Number 22-18116
Revision A
Date 05 Sep 2017

Figure B.31

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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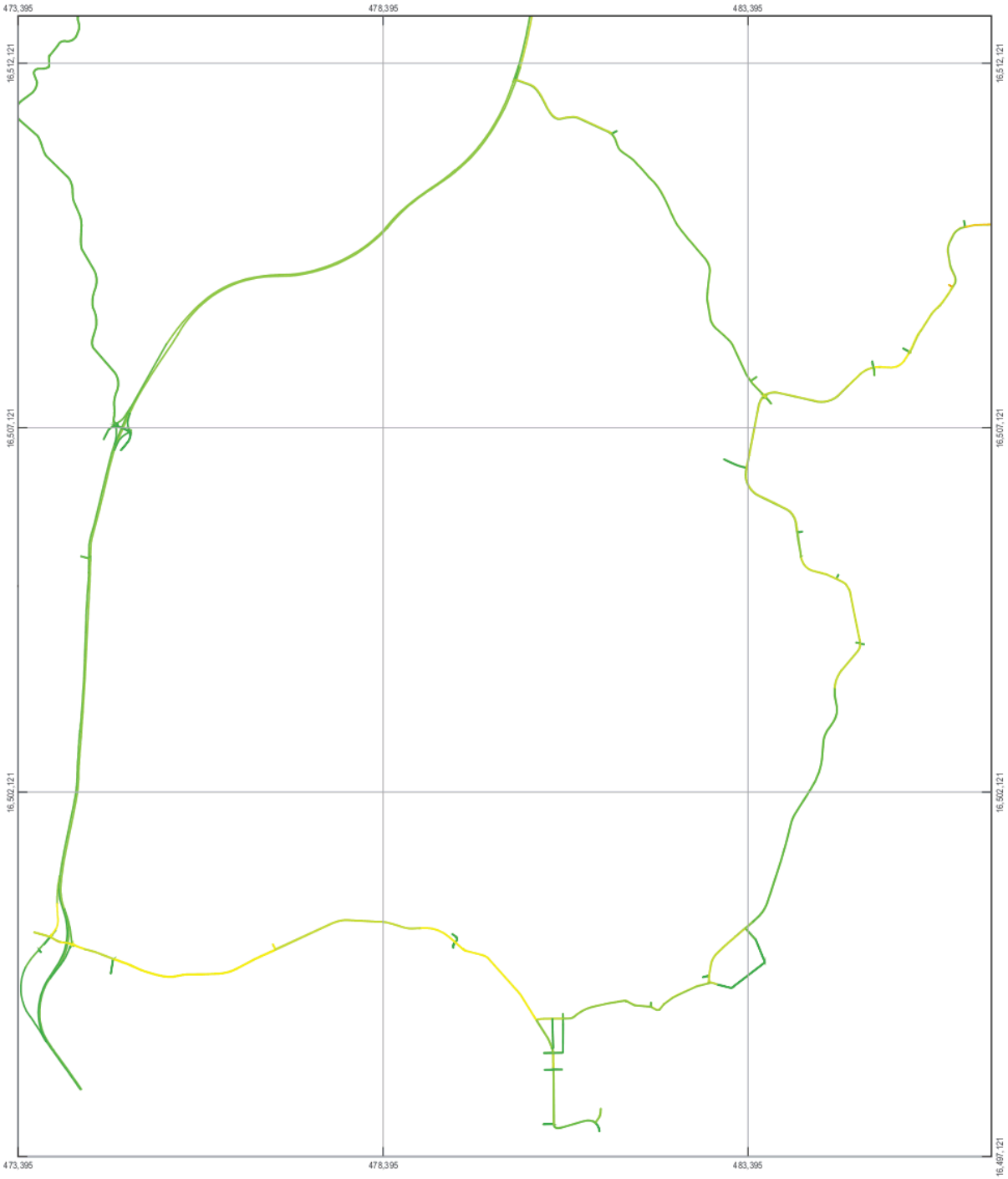
Data source: GHD, 2017 Created by:mbrooks



LEGEND
Link Densities (veh/km)

0 - 2 | 2 - 4 | 4 - 6 | 6 - 10 | 10 - 15 | 15 - 20 | 20 - 40 | 40 - 100 | 100 - 120

Paper Size A4
0 250 500 1,000 1,500 2,000
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Link Densities
2036 PM Peak (1500-1600)

Job Number 22-18116
Revision A
Date 05 Sep 2017

Figure B.32

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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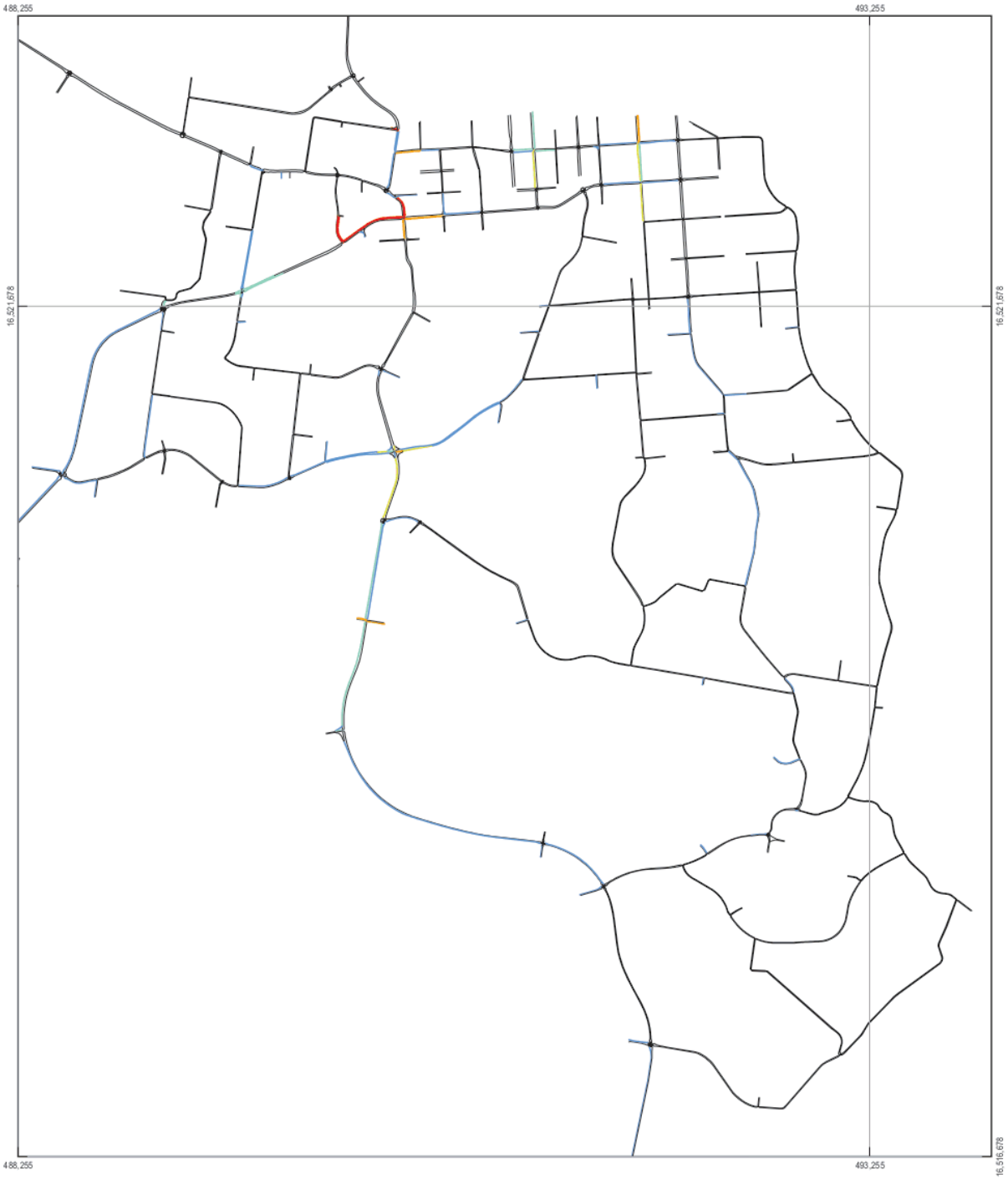
Data source: GHD, 2017 Created by:mbrooks

Appendix C Base Case Speed Plots

2016 AM Peak



LEGEND
Vehicle Speed / Posted Speed Limit

0 - 30% | 40 - 50% | 67 - 85%
30 - 40% | 50 - 67% | 85 - 100%

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 06 Sep 2017

Vehicle Speed / Post Speed Limit
2016 AM Peak (0800-0900)

Figure C.1

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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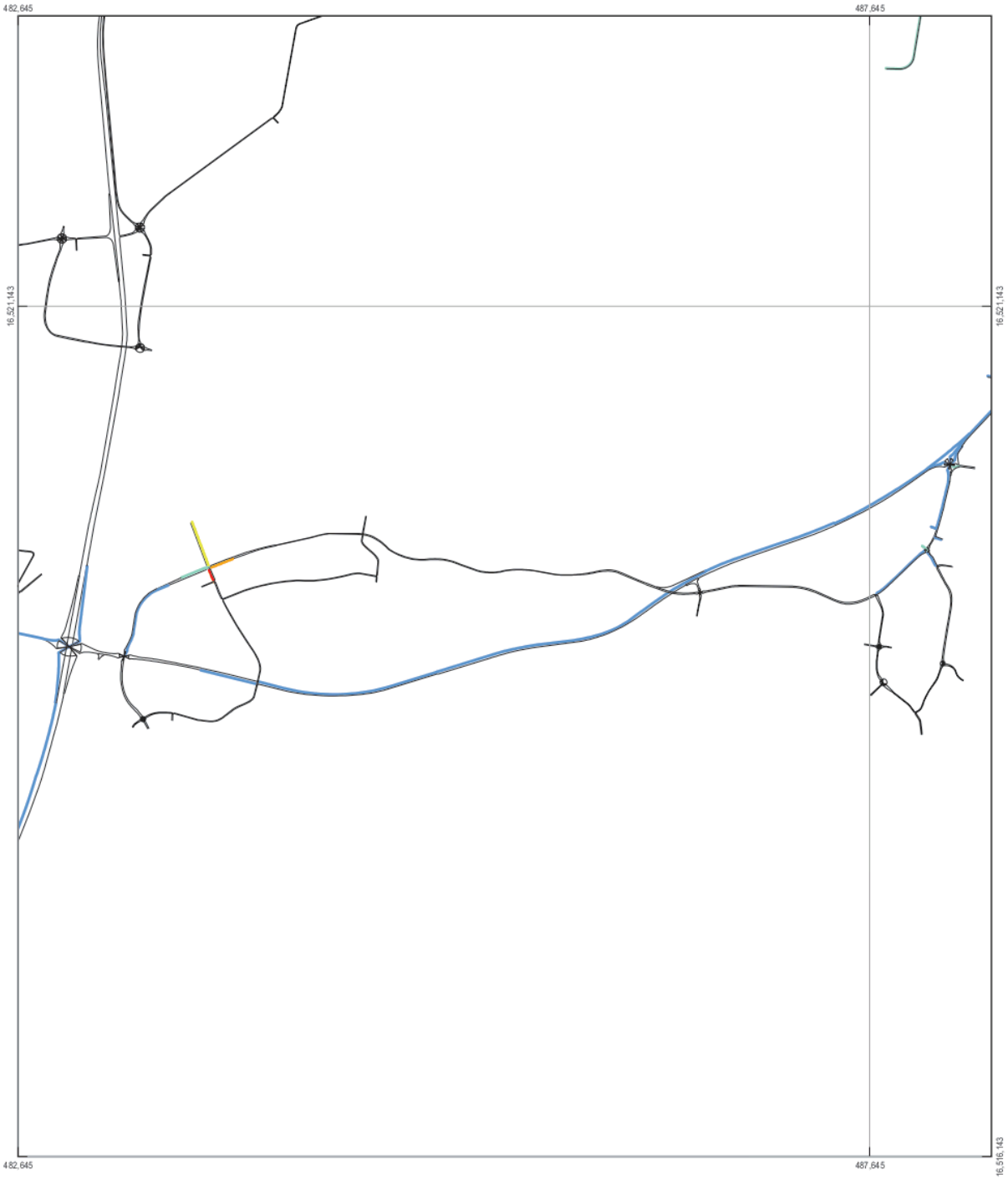

LEGEND
Vehicle Speed / Posted Speed Limit

0 - 30% | 40 - 50% | 67 - 85%
30 - 40% | 50 - 67% | 85 - 100%

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 06 Sep 2017

Vehicle Speed / Posted Speed Limit
2016 AM Peak (0800-0900)

Figure C.2

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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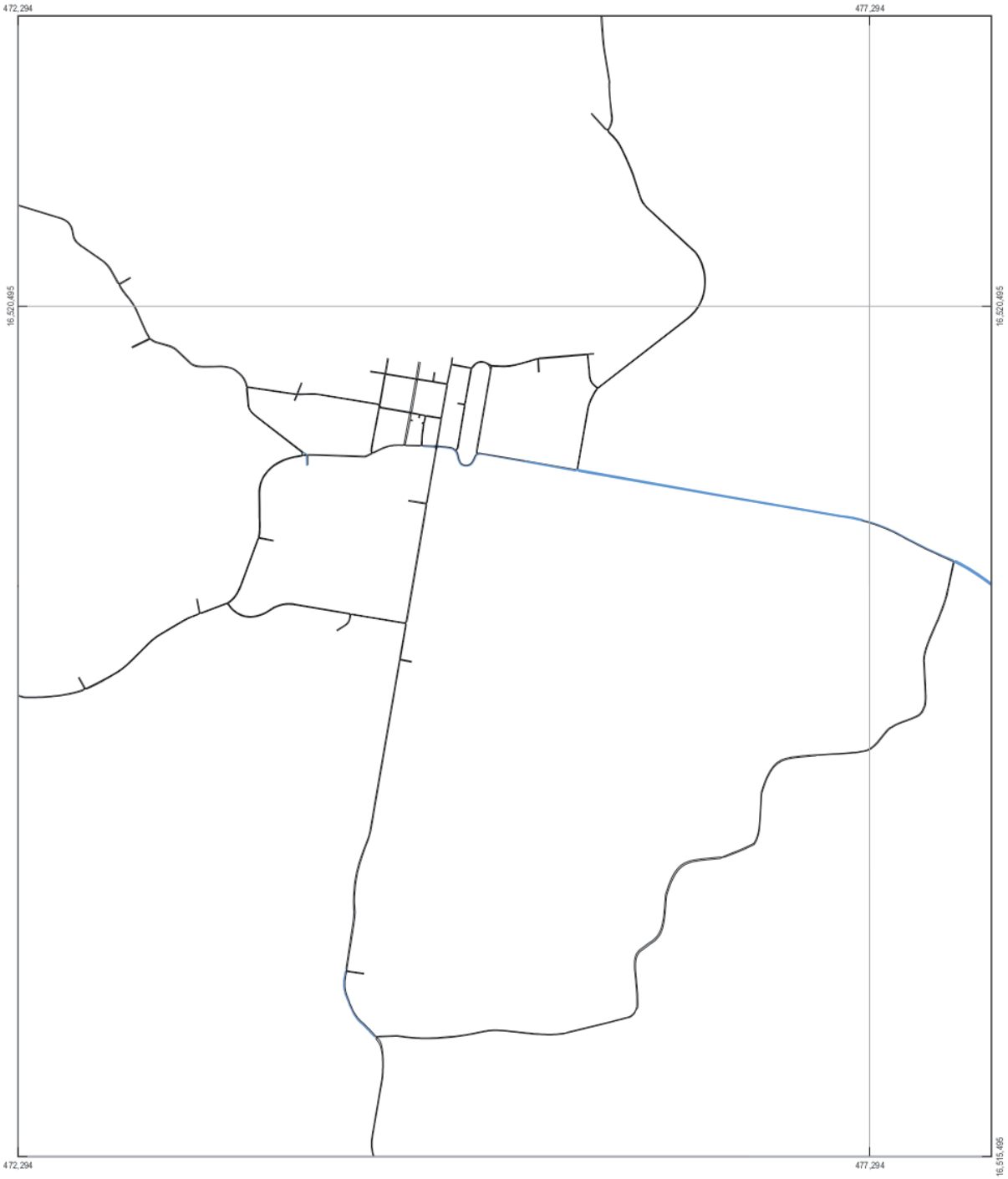
Data source: GHD, 2017 Created by:MBrooks



LEGEND
Vehicle Speed / Posted Speed Limit

0 - 30% | 40 - 50% | 67 - 85%
30 - 40% | 50 - 67% | 85 - 100%

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 06 Sep 2017

Vehicle Speed / Posted Speed Limit
2016 AM Peak (0800-0900)

Figure C.3

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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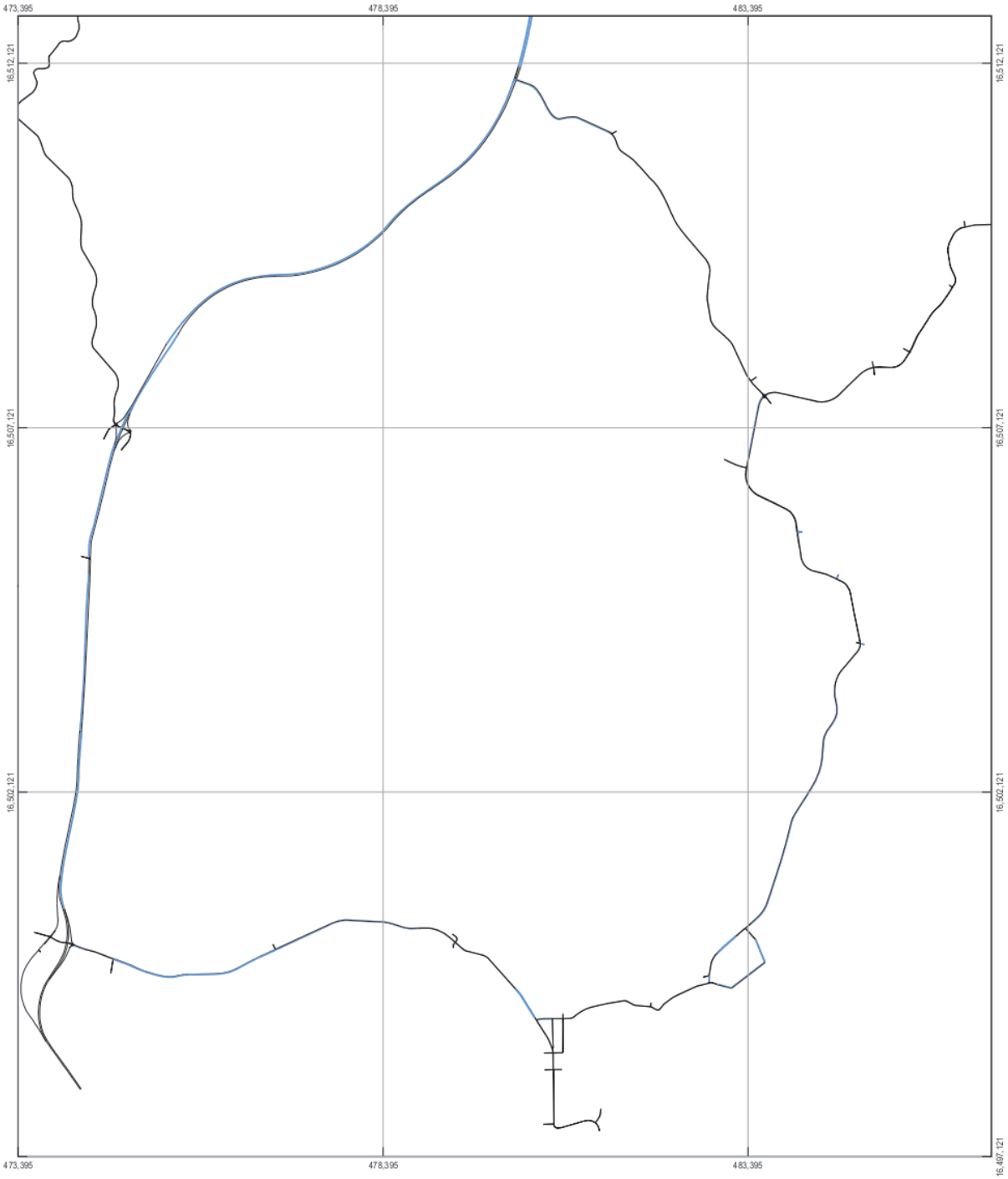
Data source: GHD, 2017 Created by:MBrooks



LEGEND
Vehicle Speed / Posted Speed Limit

0 - 30% | 40 - 50% | 67 - 85%
30 - 40% | 50 - 67% | 85 - 100%

Paper Size A4
0 250 500 1,000 1,500 2,000
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

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Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 06 Sep 2017

Vehicle Speed / Posted Speed Limit
2016 AM Peak (0800-0900)

Figure C.4

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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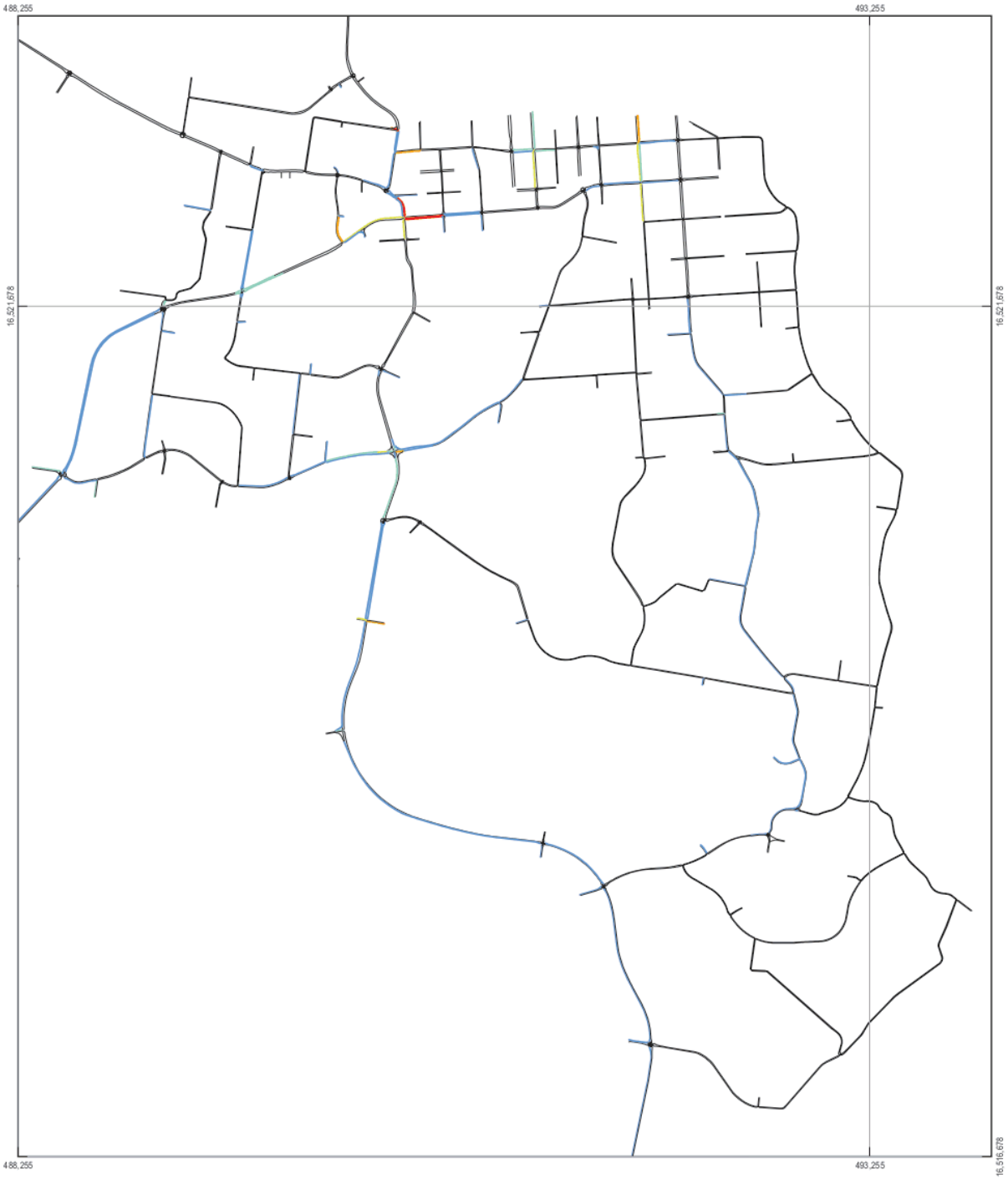
Data source: GHD, 2017 Created by:MBrooks

2021 AM Peak



LEGEND
Vehicle Speed / Posted Speed Limit

0 - 30% | 40 - 50% | 67 - 85%
30 - 40% | 50 - 67% | 85 - 100%

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 06 Sep 2017

Vehicle Speed / Post Speed Limit
2021 AM Peak (0800-0900)

Figure C.5

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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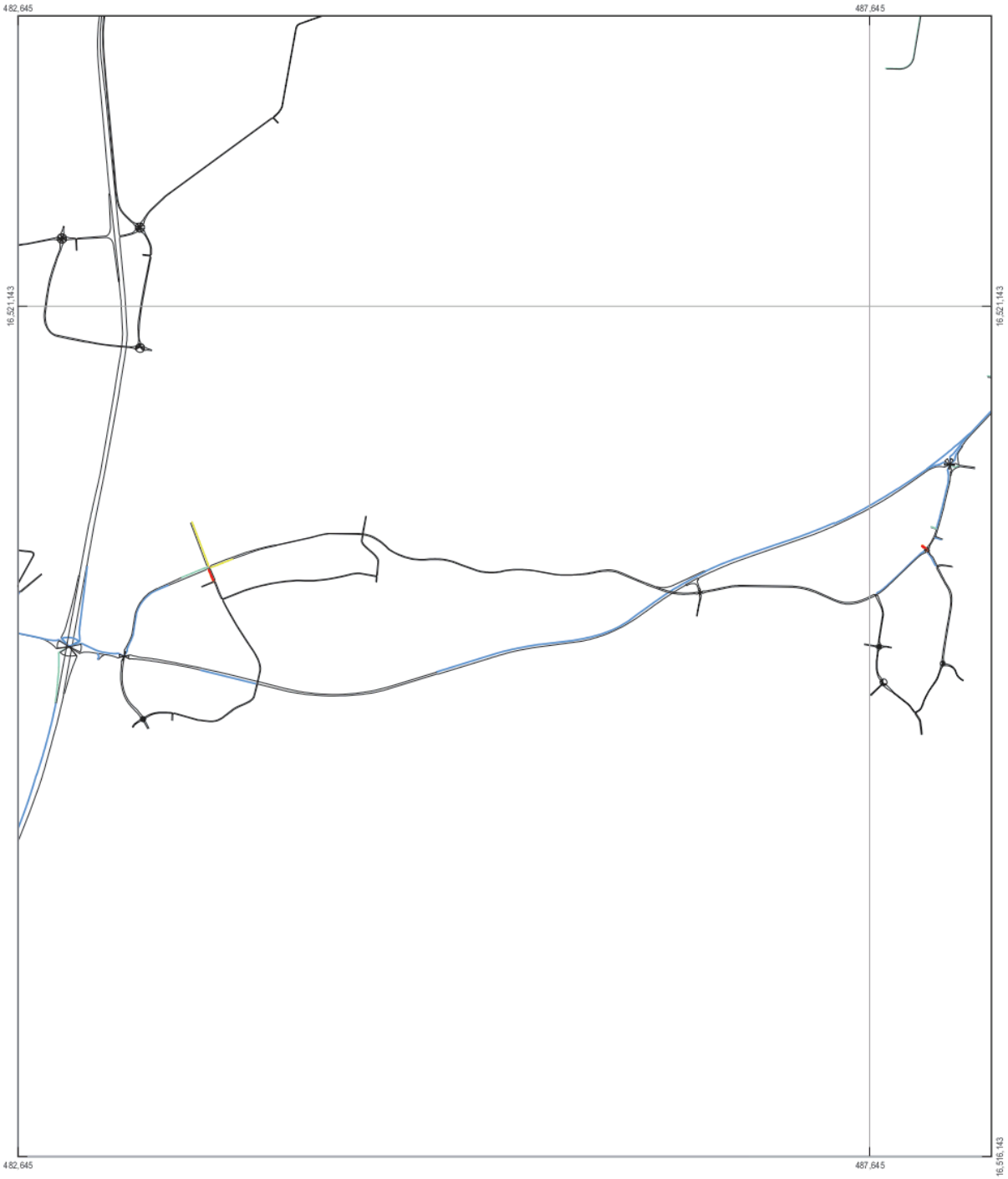
Data source: GHD, 2017 Created by:MBrooks



LEGEND
Vehicle Speed / Posted Speed Limit

0 - 30% 40 - 50% 67 - 85%

30 - 40% 50 - 67% 85 - 100%

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 06 Sep 2017

Vehicle Speed / Posted Speed Limit
2021 AM Peak (0800-0900)

Figure C.6

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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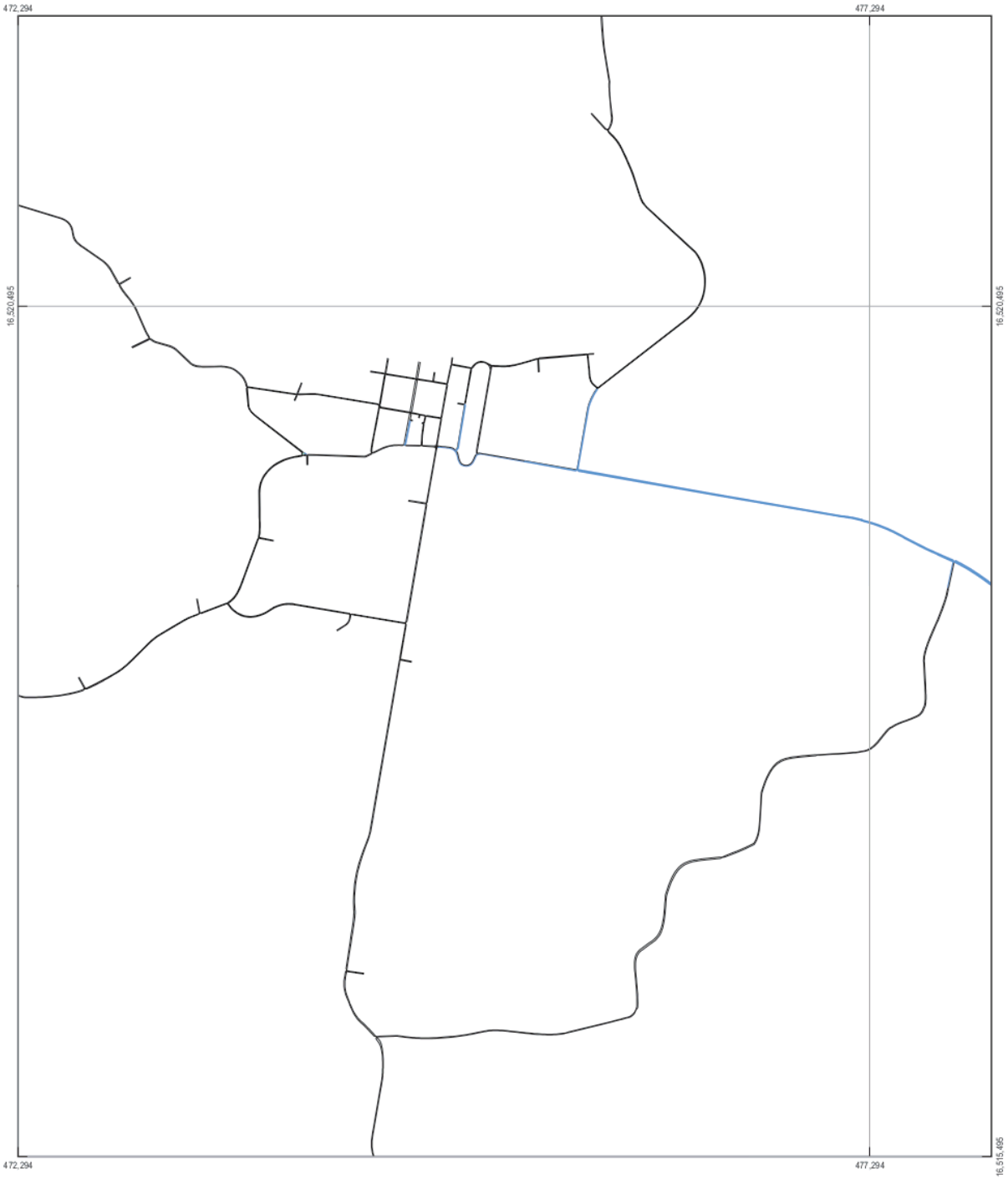
Data source: GHD, 2017 Created by:MBrooks



LEGEND
Vehicle Speed / Posted Speed Limit

0 - 30% | 40 - 50% | 67 - 85%
30 - 40% | 50 - 67% | 85 - 100%

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 06 Sep 2017

Vehicle Speed / Posted Speed Limit
2021 AM Peak (0800-0900)

Figure C.7

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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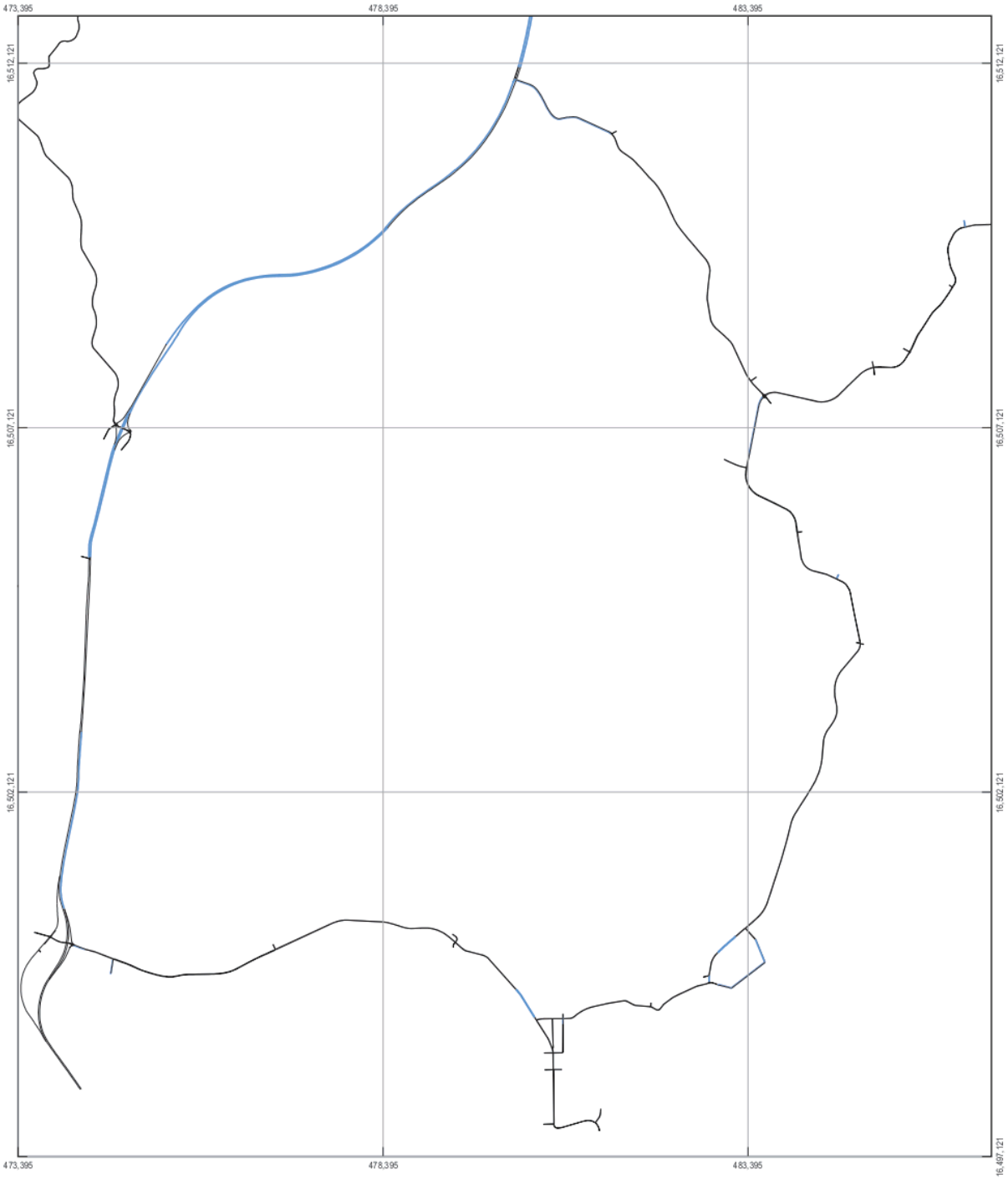
Data source: GHD, 2017 Created by:MBrooks



LEGEND
Vehicle Speed / Posted Speed Limit

0 - 30% | 40 - 50% | 67 - 85%
30 - 40% | 50 - 67% | 85 - 100%

Paper Size A4
0 250 500 1,000 1,500 2,000
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

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Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 06 Sep 2017

Vehicle Speed / Posted Speed Limit
2021 AM Peak (0800-0900)

Figure C.8

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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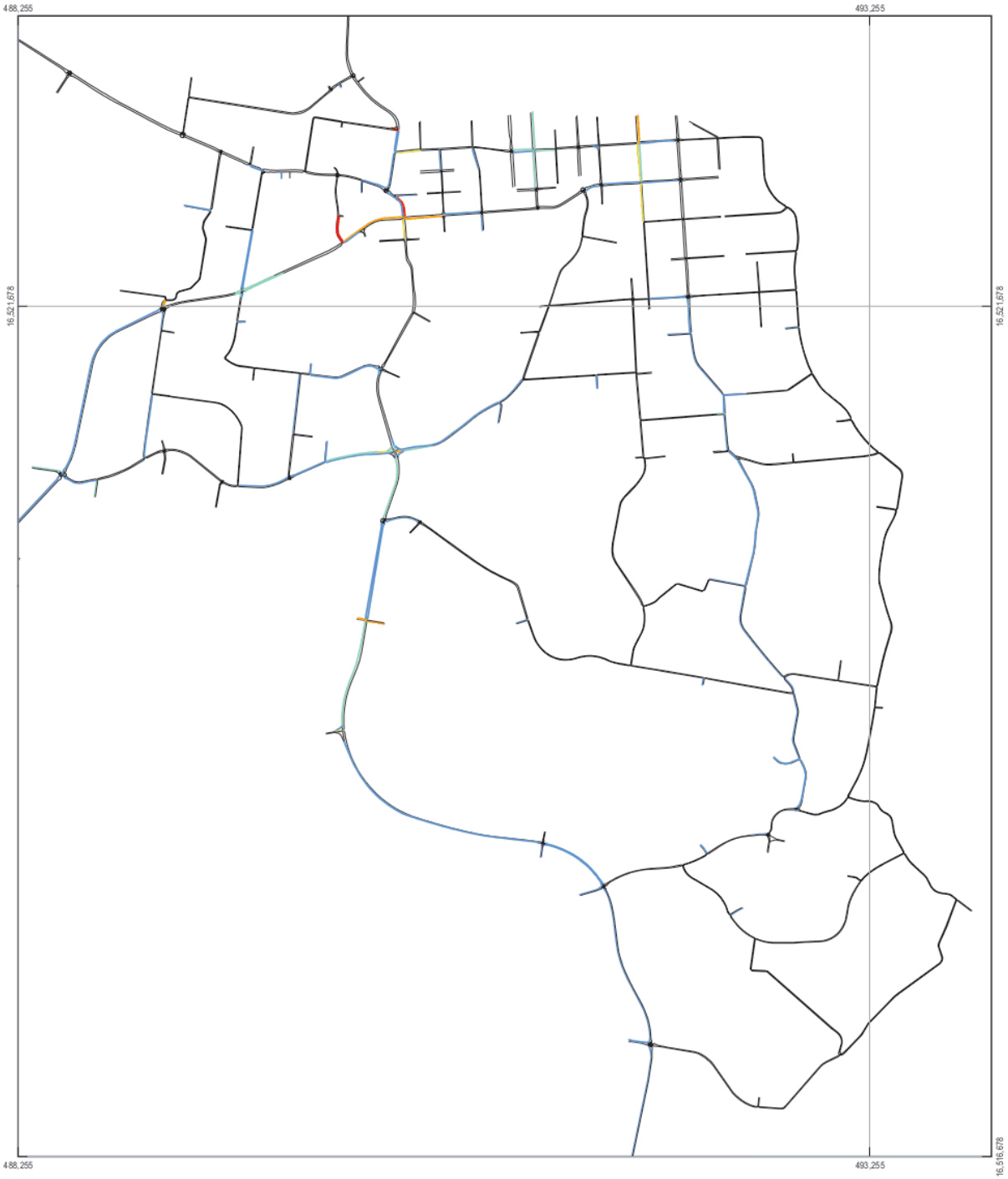
Data source: GHD, 2017 Created by:MBrooks

2026 AM Peak



LEGEND
Vehicle Speed / Posted Speed Limit

0 - 30% | 40 - 50% | 67 - 85%
30 - 40% | 50 - 67% | 85 - 100%

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 06 Sep 2017

Vehicle Speed / Post Speed Limit
2026 AM Peak (0800-0900)

Figure C.9

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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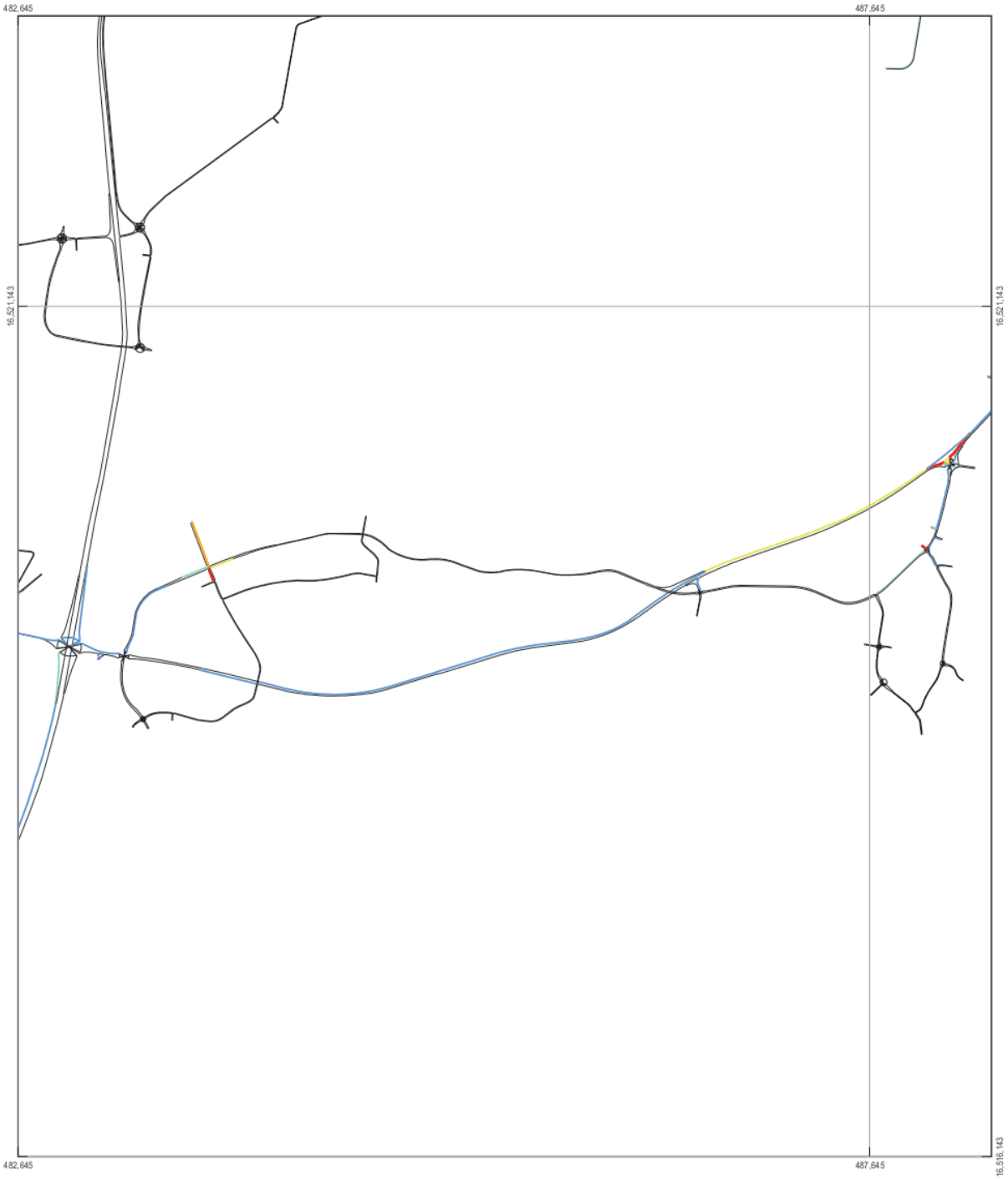
Data source: GHD, 2017 Created by:MBrooks



LEGEND
Vehicle Speed / Posted Speed Limit

0 - 30% 40 - 50% 67 - 85%

30 - 40% 50 - 67% 85 - 100%

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 06 Sep 2017

Vehicle Speed / Posted Speed Limit
2026 AM Peak (0800-0900)

Figure C.10

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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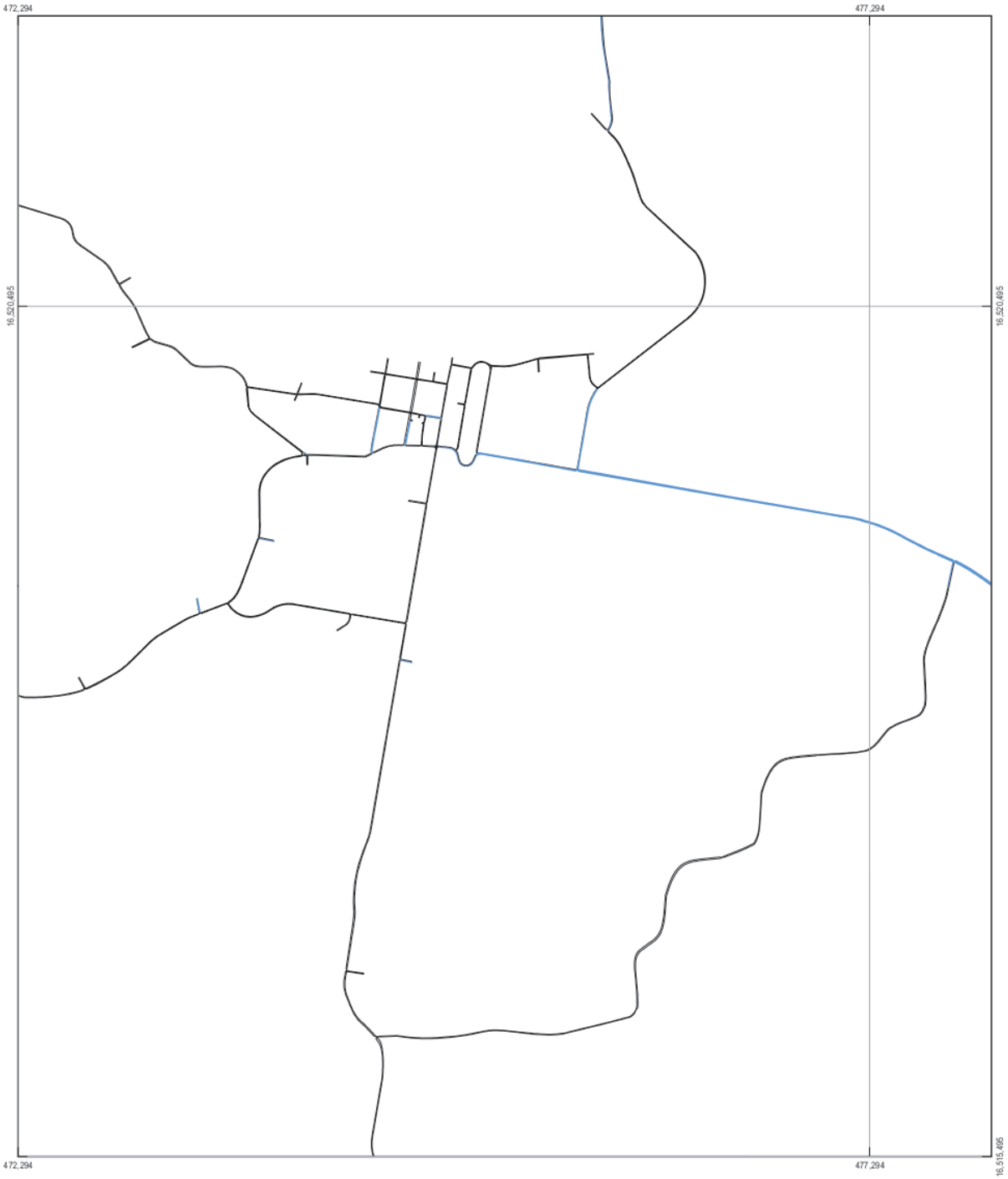

LEGEND
Vehicle Speed / Posted Speed Limit

0 - 30% | 40 - 50% | 67 - 85%
30 - 40% | 50 - 67% | 85 - 100%

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 06 Sep 2017

Vehicle Speed / Posted Speed Limit
2026 AM Peak (0800-0900)

Figure C.11

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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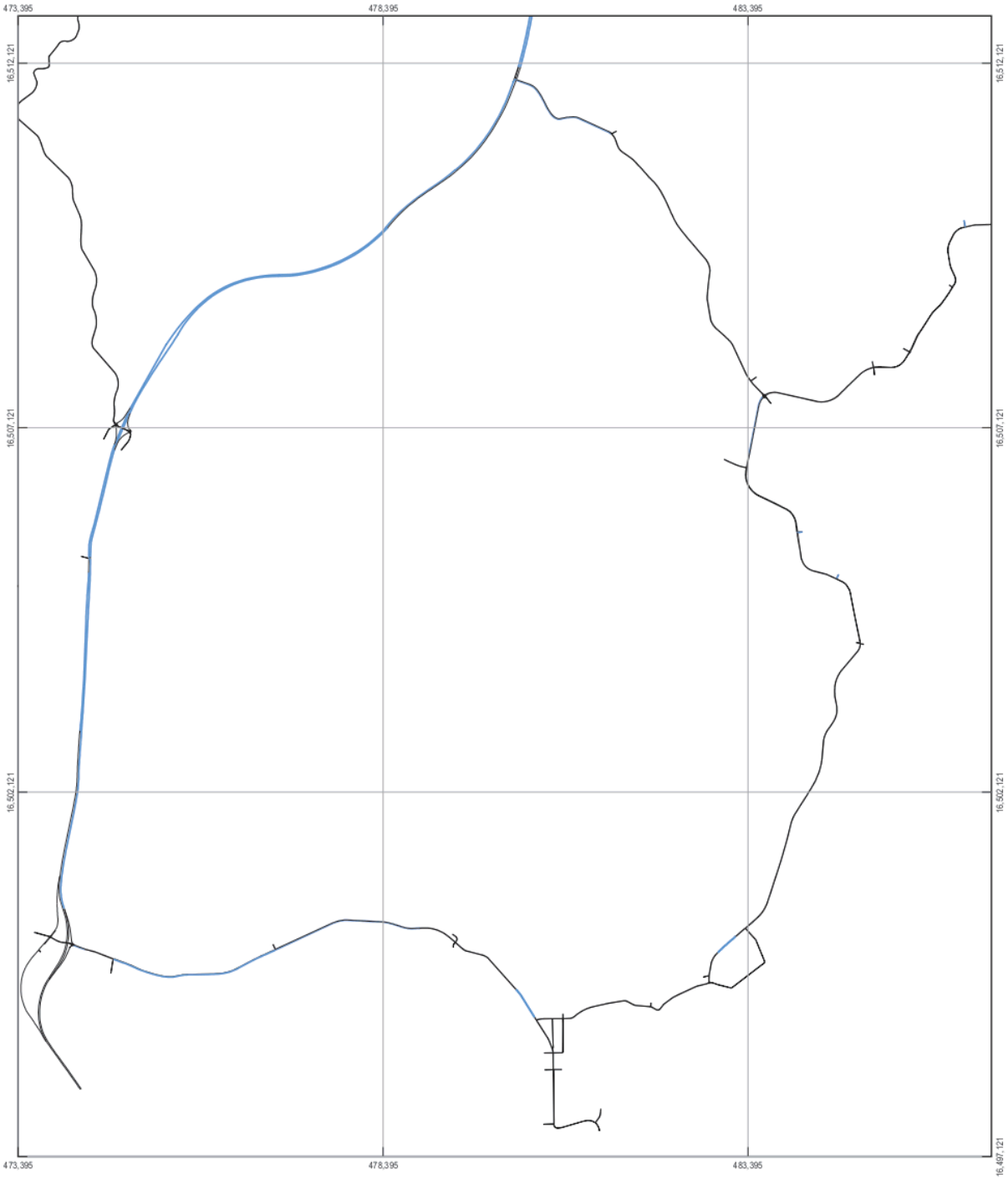
Data source: GHD, 2017 Created by:MBrooks



LEGEND
Vehicle Speed / Posted Speed Limit

0 - 30% | 40 - 50% | 67 - 85%
30 - 40% | 50 - 67% | 85 - 100%

Paper Size A4
0 250 500 1,000 1,500 2,000
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

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Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 06 Sep 2017

Vehicle Speed / Posted Speed Limit
2026 AM Peak (0800-0900)

Figure C.12

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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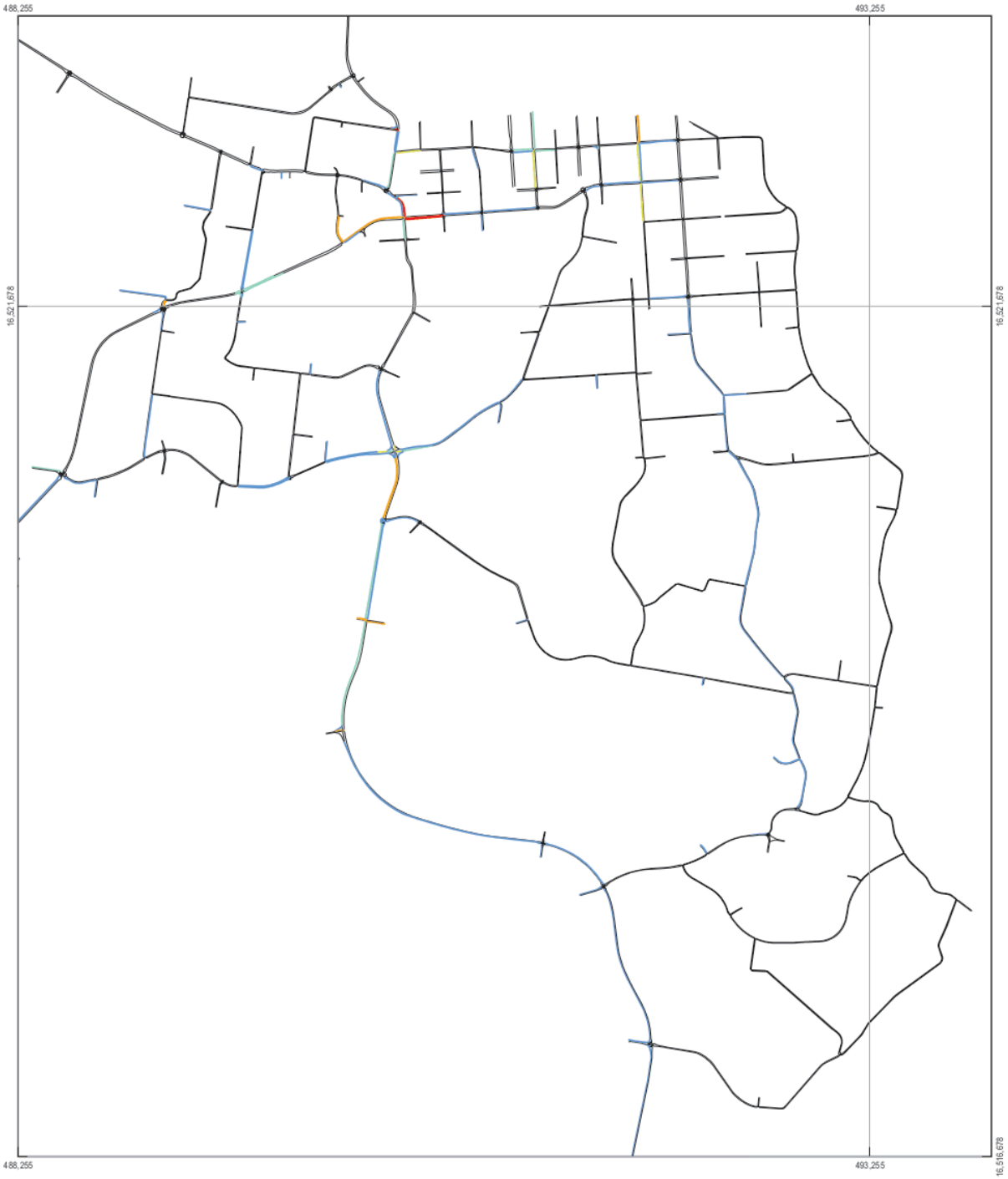
Data source: GHD, 2017 Created by:MBrooks

2036 AM Peak



LEGEND
Vehicle Speed / Posted Speed Limit

0 - 30% | 40 - 50% | 67 - 85%
30 - 40% | 50 - 67% | 85 - 100%

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 06 Sep 2017

Vehicle Speed / Post Speed Limit
2036 AM Peak (0800-0900)

Figure C.13

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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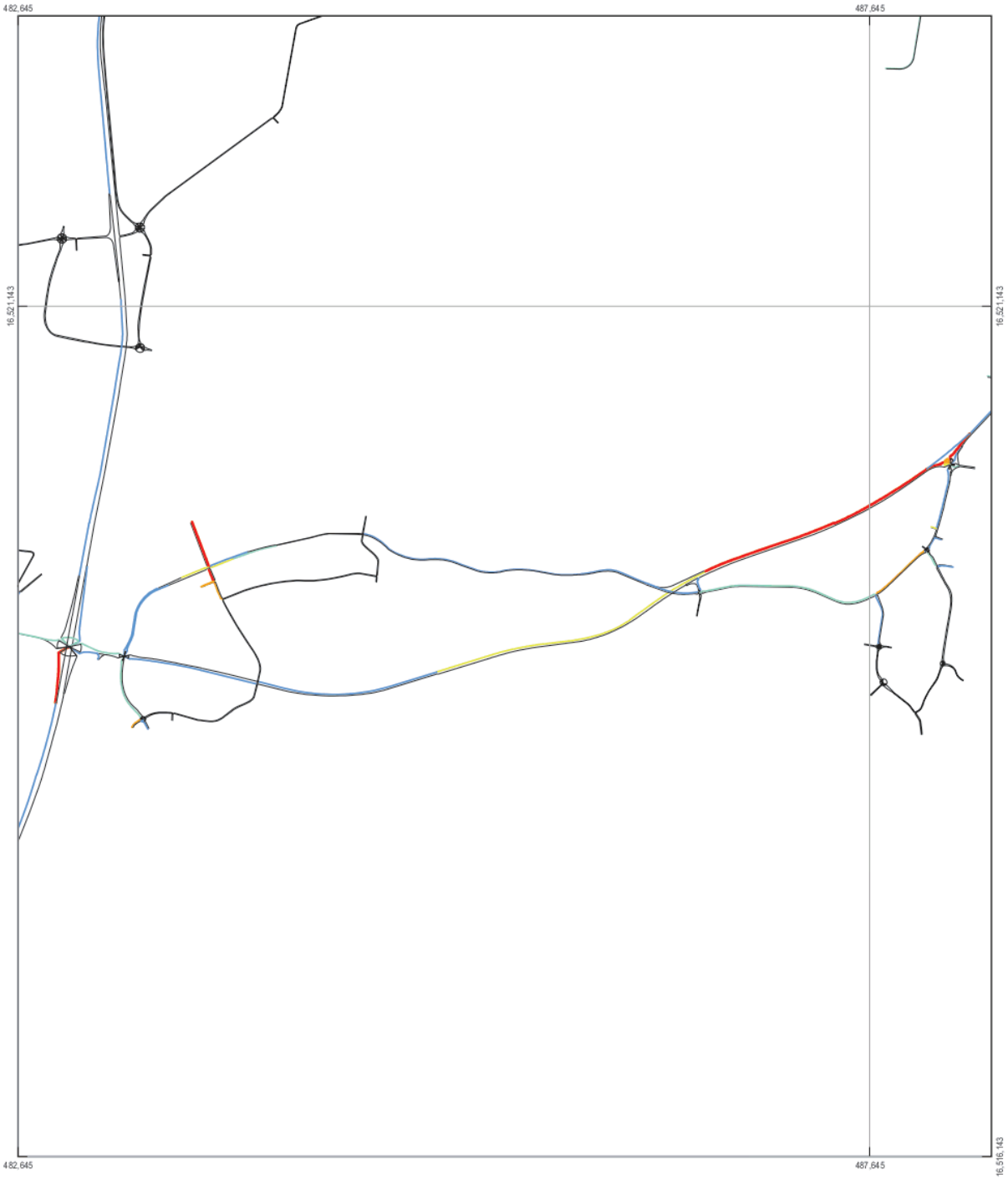
Data source: GHD, 2017 Created by:MBrooks



LEGEND
Vehicle Speed / Posted Speed Limit

0 - 30% | 40 - 50% | 67 - 85%
30 - 40% | 50 - 67% | 85 - 100%

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

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Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 06 Sep 2017

Vehicle Speed / Posted Speed Limit
2036 AM Peak (0800-0900)

Figure C.14

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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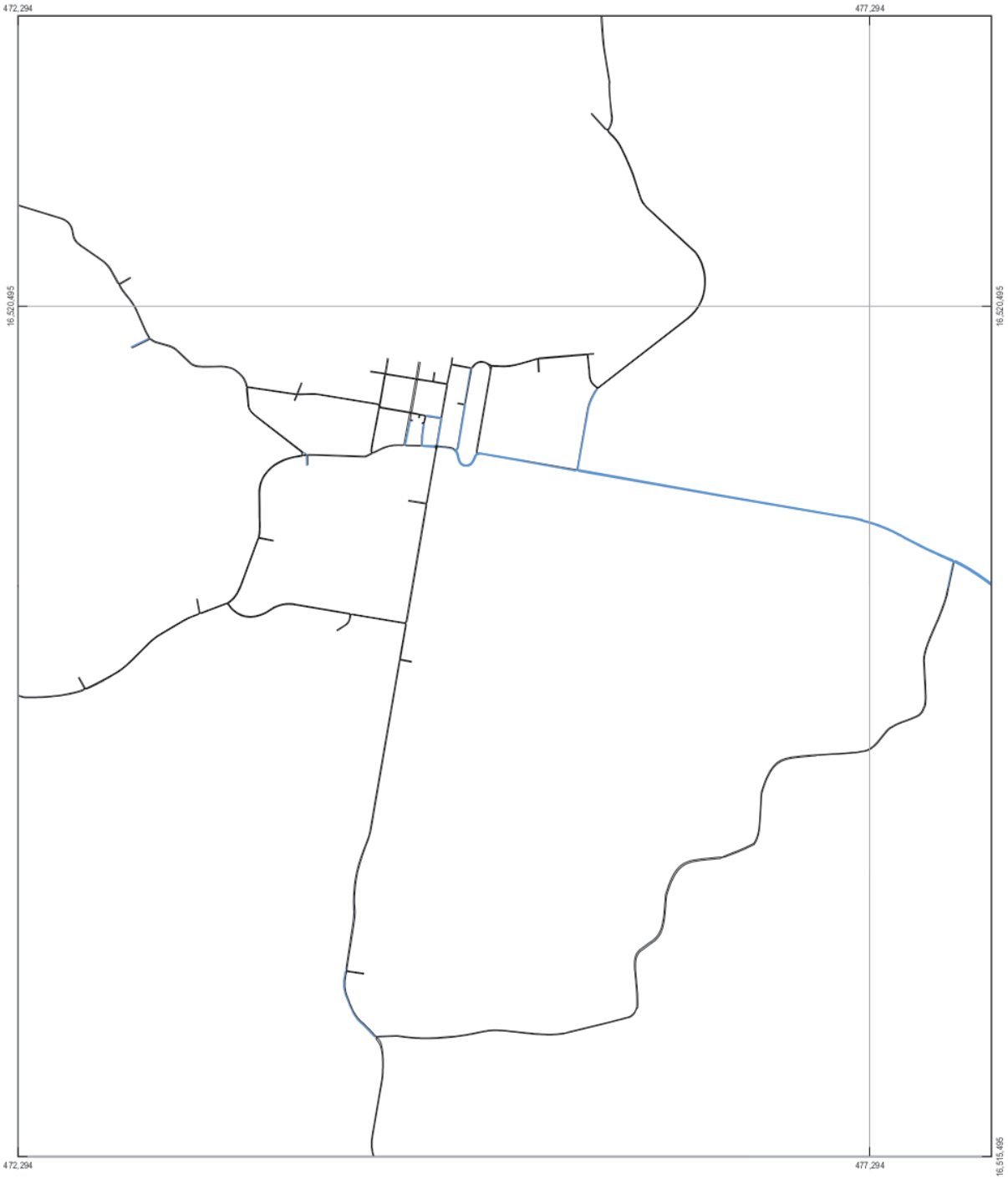
Data source: GHD, 2017 Created by:MBrooks



LEGEND
Vehicle Speed / Posted Speed Limit

0 - 30% | 40 - 50% | 67 - 85%
30 - 40% | 50 - 67% | 85 - 100%

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

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Vehicle Speed / Posted Speed Limit
2036 AM Peak (0800-0900)

Figure C.15

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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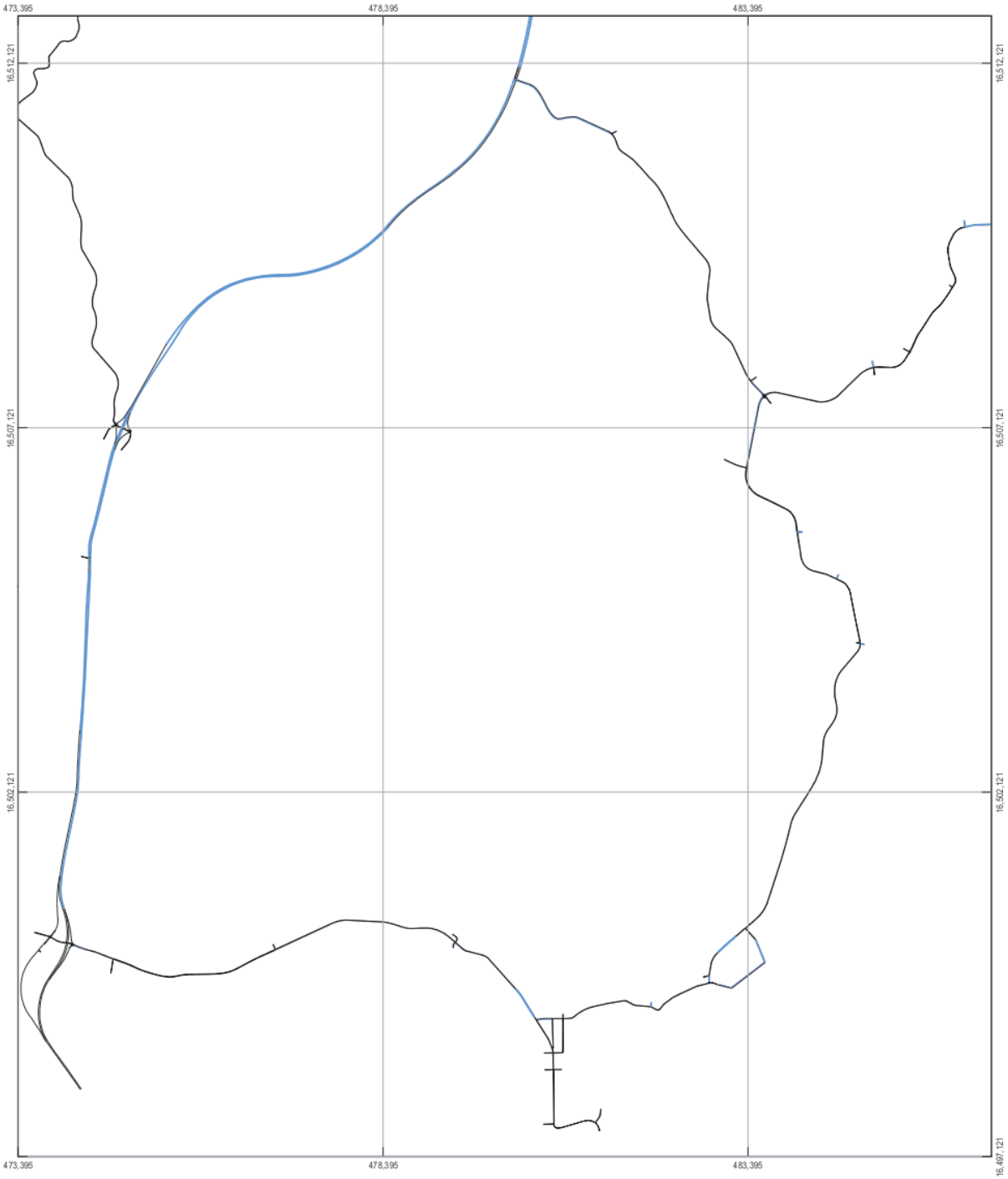
Data source: GHD, 2017 Created by:MBrooks



LEGEND
Vehicle Speed / Posted Speed Limit

0 - 30% | 40 - 50% | 67 - 85%
30 - 40% | 50 - 67% | 85 - 100%

Paper Size A4
0 250 500 1,000 1,500 2,000
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

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Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 06 Sep 2017

Vehicle Speed / Posted Speed Limit
2036 AM Peak (0800-0900)

Figure C.16

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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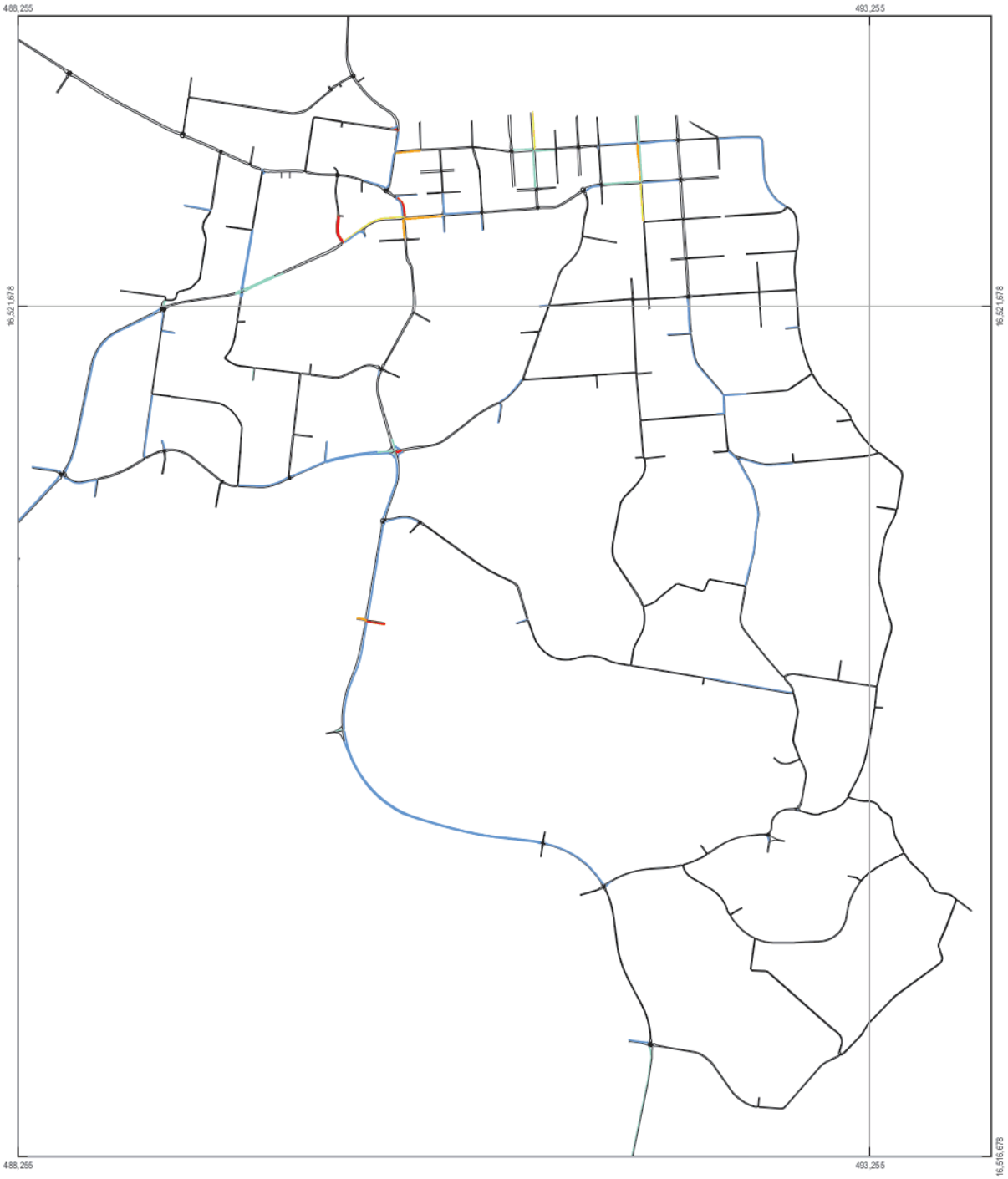
Data source: GHD, 2017 Created by:MBrooks

2016 PM Peak



LEGEND
Vehicle Speed / Posted Speed Limit

0 - 30% | 40 - 50% | 67 - 85%
30 - 40% | 50 - 67% | 85 - 100%

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 06 Sep 2017

Vehicle Speed / Post Speed Limit
2016 PM Peak (1500-1600)

Figure C.17

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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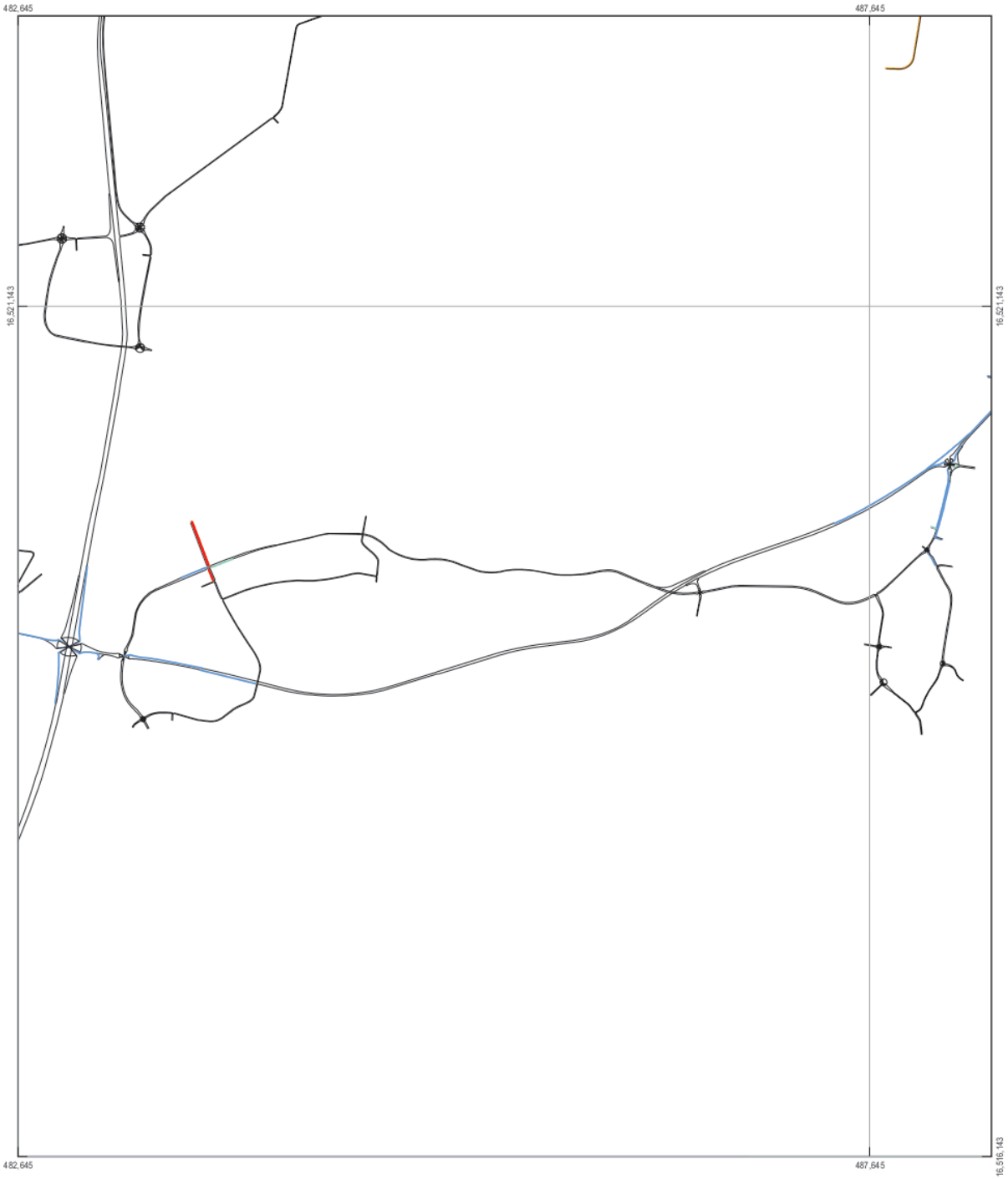
Data source: GHD, 2017 Created by:MBrooks



LEGEND
Vehicle Speed / Posted Speed Limit

0 - 30% | 40 - 50% | 67 - 85%
30 - 40% | 50 - 67% | 85 - 100%

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 06 Sep 2017

Vehicle Speed / Posted Speed Limit
2016 PM Peak (1500-1600)

Figure C.18

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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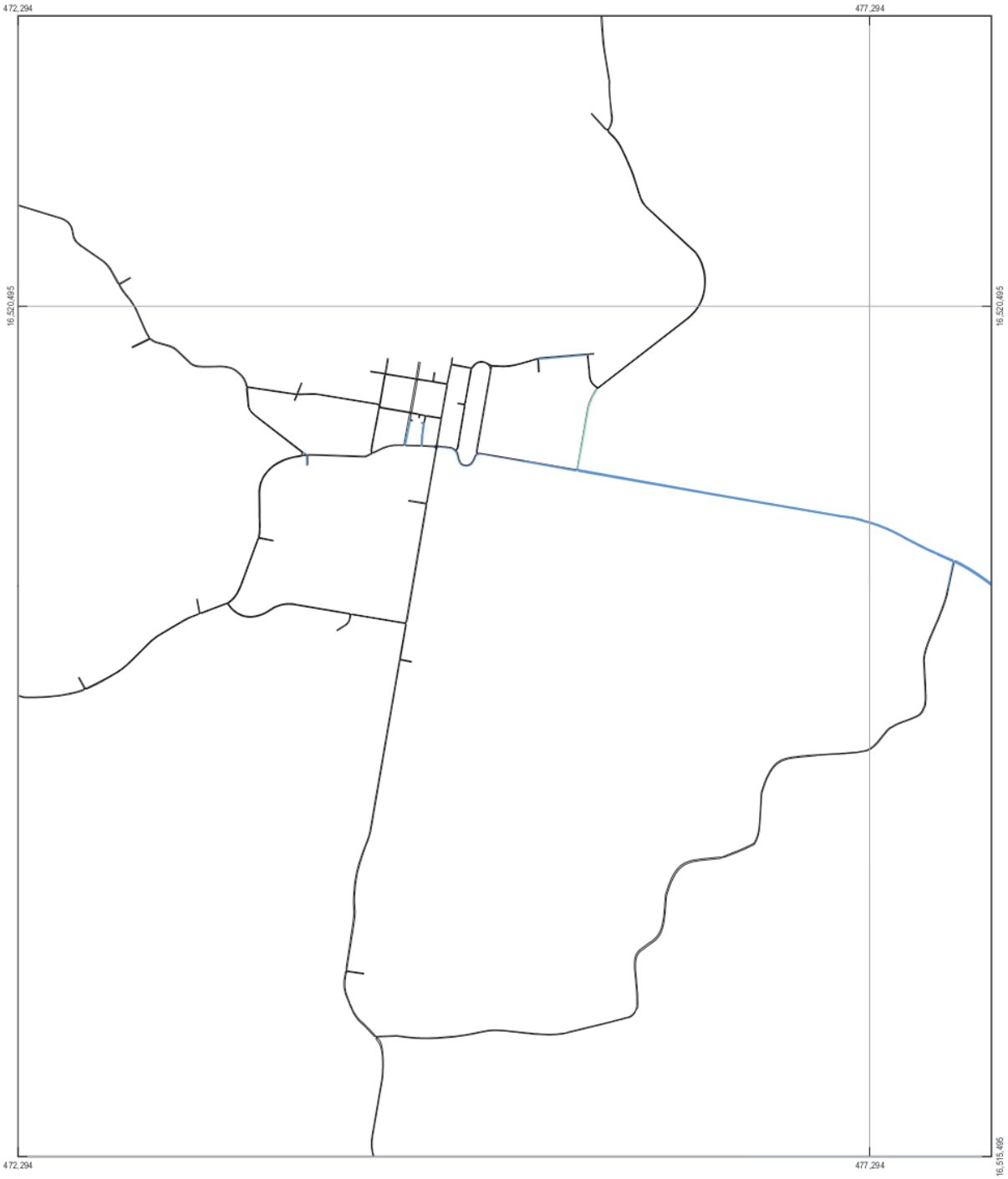
Data source: GHD, 2017 Created by:MBrooks



LEGEND
Vehicle Speed / Posted Speed Limit

0 - 30% | 40 - 50% | 67 - 85%
30 - 40% | 50 - 67% | 85 - 100%

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
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Date 06 Sep 2017

Vehicle Speed / Posted Speed Limit
2016 PM Peak (1500-1600)

Figure C.19

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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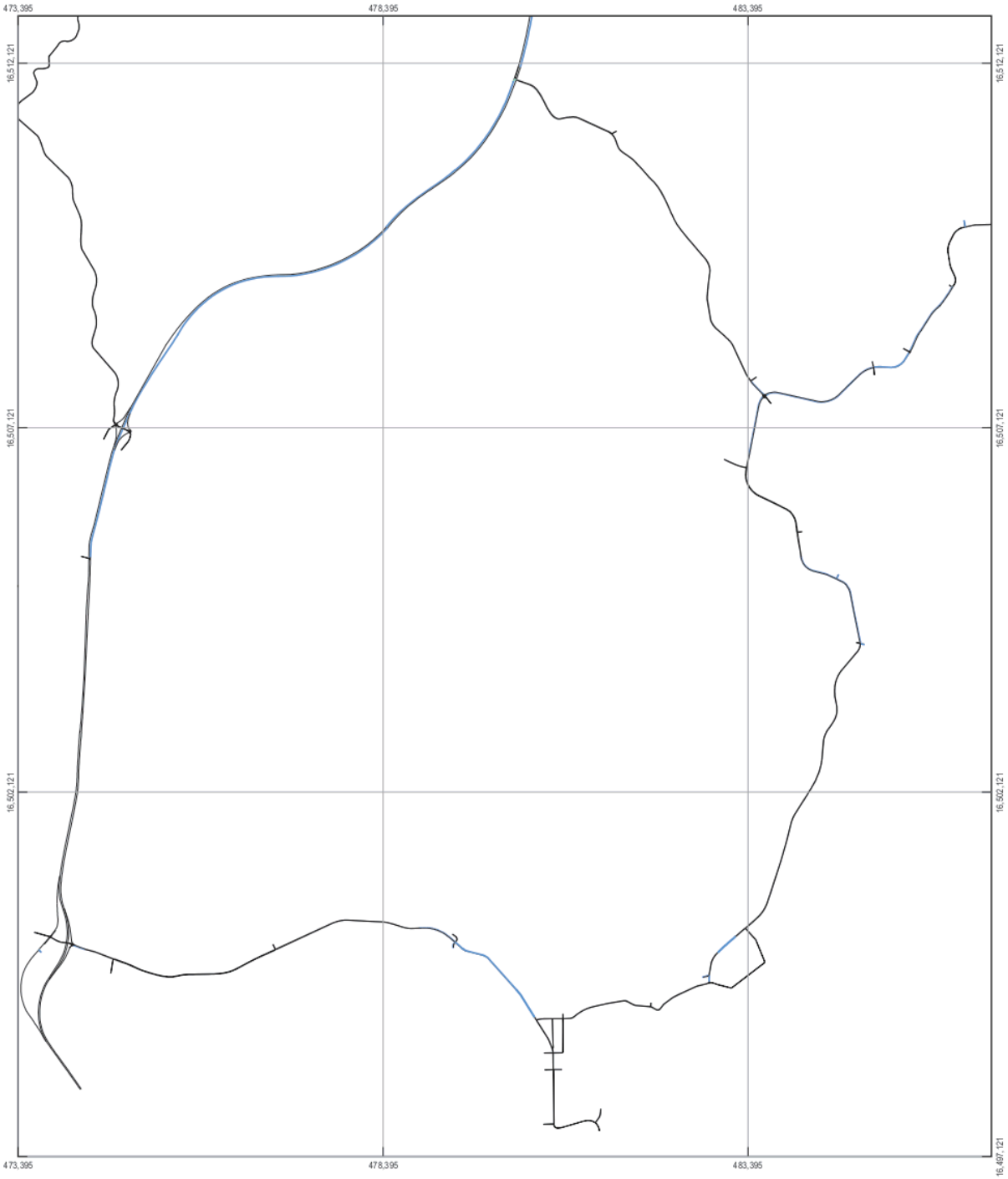
Data source: GHD, 2017 Created by:MBrooks



LEGEND
Vehicle Speed / Posted Speed Limit

0 - 30% | 40 - 50% | 67 - 85%
30 - 40% | 50 - 67% | 85 - 100%

Paper Size A4
0 250 500 1,000 1,500 2,000
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
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Date 06 Sep 2017

Vehicle Speed / Posted Speed Limit
2016 PM Peak (1500-1600)

Figure C.20

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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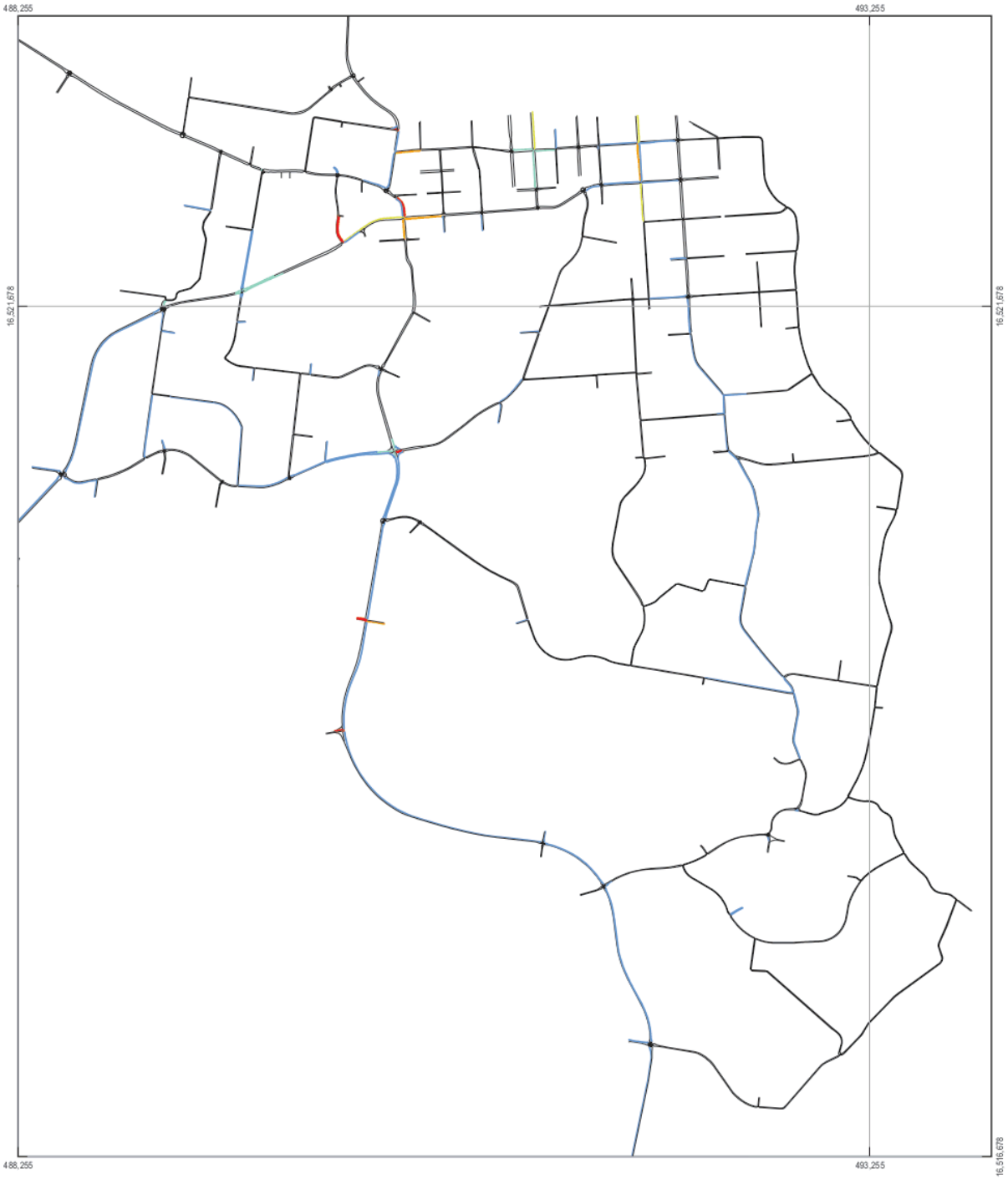
Data source: GHD, 2017 Created by:MBrooks

2021 PM Peak



LEGEND
Vehicle Speed / Posted Speed Limit

0 - 30% | 40 - 50% | 67 - 85%
30 - 40% | 50 - 67% | 85 - 100%

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 06 Sep 2017

Vehicle Speed / Post Speed Limit
2021 PM Peak (1500-1600)

Figure C.21

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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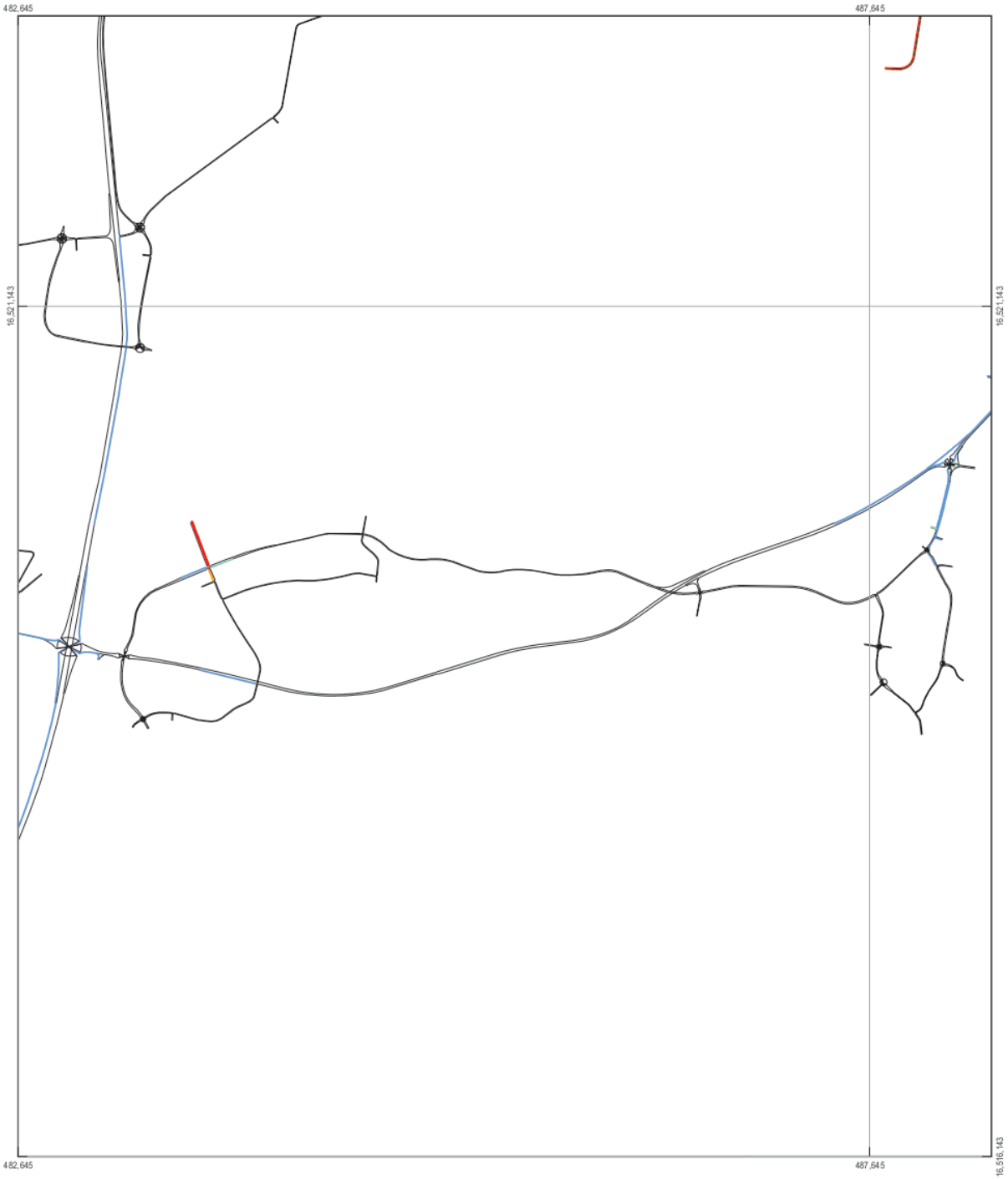
Data source: GHD, 2017 Created by:MBrooks



LEGEND
Vehicle Speed / Posted Speed Limit

0 - 30% | 40 - 50% | 67 - 85%
30 - 40% | 50 - 67% | 85 - 100%

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

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Date 06 Sep 2017

Vehicle Speed / Posted Speed Limit
2021 PM Peak (1500-1600)

Figure C.22

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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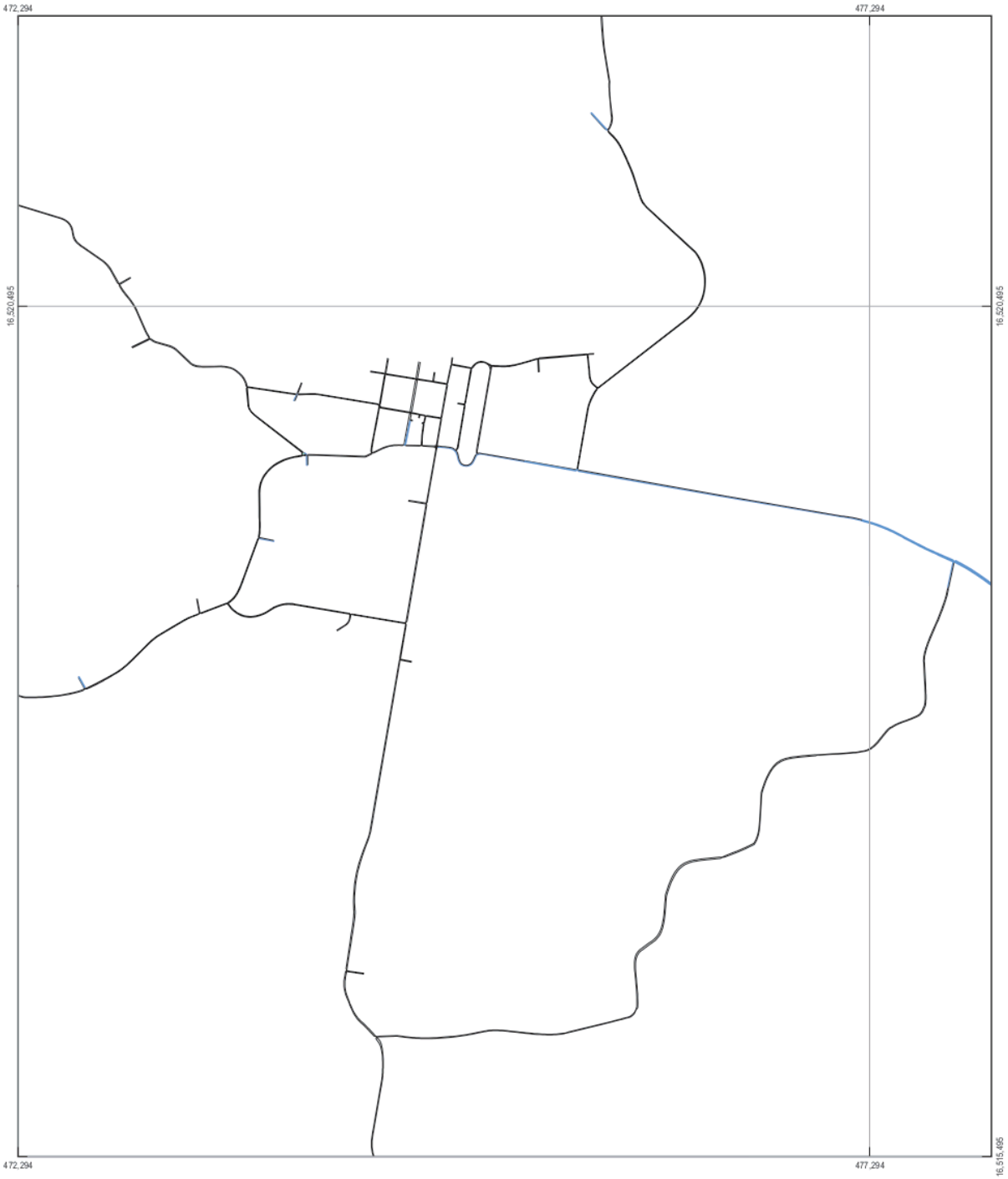
Data source: GHD, 2017 Created by:MBrooks



LEGEND
Vehicle Speed / Posted Speed Limit

0 - 30% | 40 - 50% | 67 - 85%
30 - 40% | 50 - 67% | 85 - 100%

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 06 Sep 2017

Vehicle Speed / Posted Speed Limit
2021 PM Peak (1500-1600)

Figure C.23

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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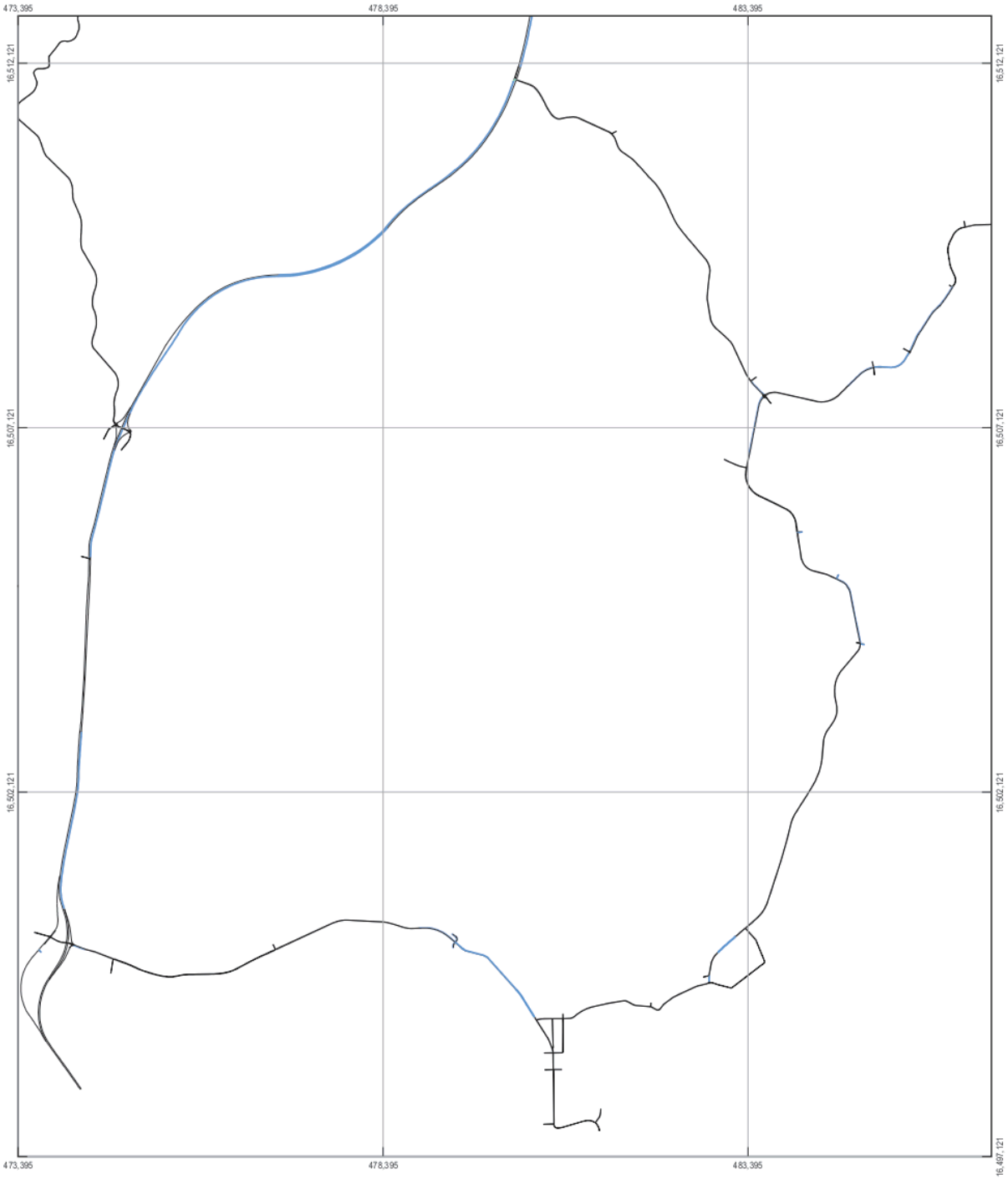

LEGEND
Vehicle Speed / Posted Speed Limit

0 - 30% | 40 - 50% | 67 - 85%
30 - 40% | 50 - 67% | 85 - 100%

Paper Size A4
0 250 500 1,000 1,500 2,000
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

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Local Government Area Traffic Study

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Date 06 Sep 2017

Vehicle Speed / Posted Speed Limit
2021 PM Peak (1500-1600)

Figure C.24

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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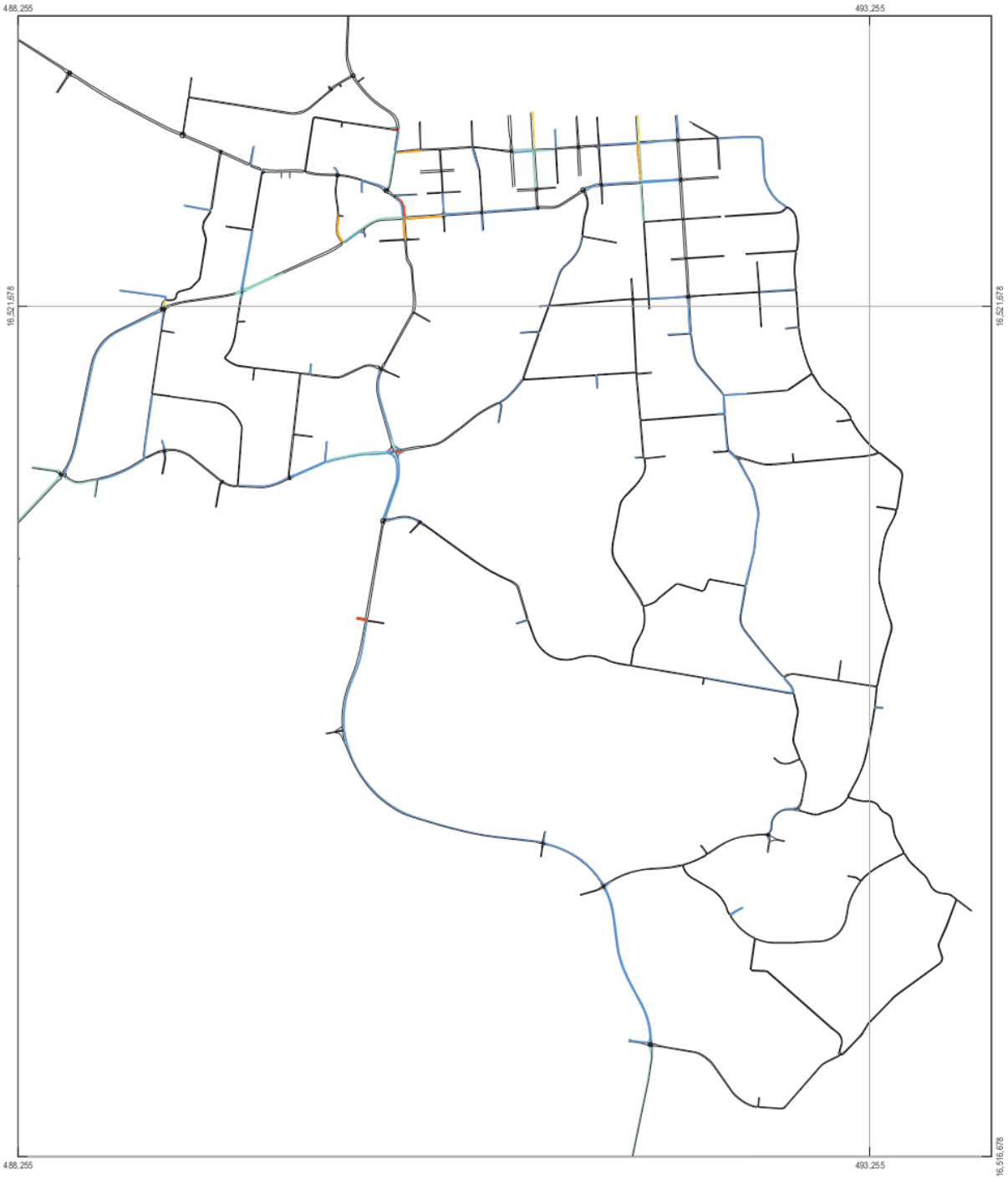
Data source: GHD, 2017 Created by:MBrooks

2026 PM Peak



LEGEND
Vehicle Speed / Posted Speed Limit

0 - 30% | 40 - 50% | 67 - 85%
30 - 40% | 50 - 67% | 85 - 100%

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 06 Sep 2017

Vehicle Speed / Post Speed Limit
2026 PM Peak (1500-1600)

Figure C.25

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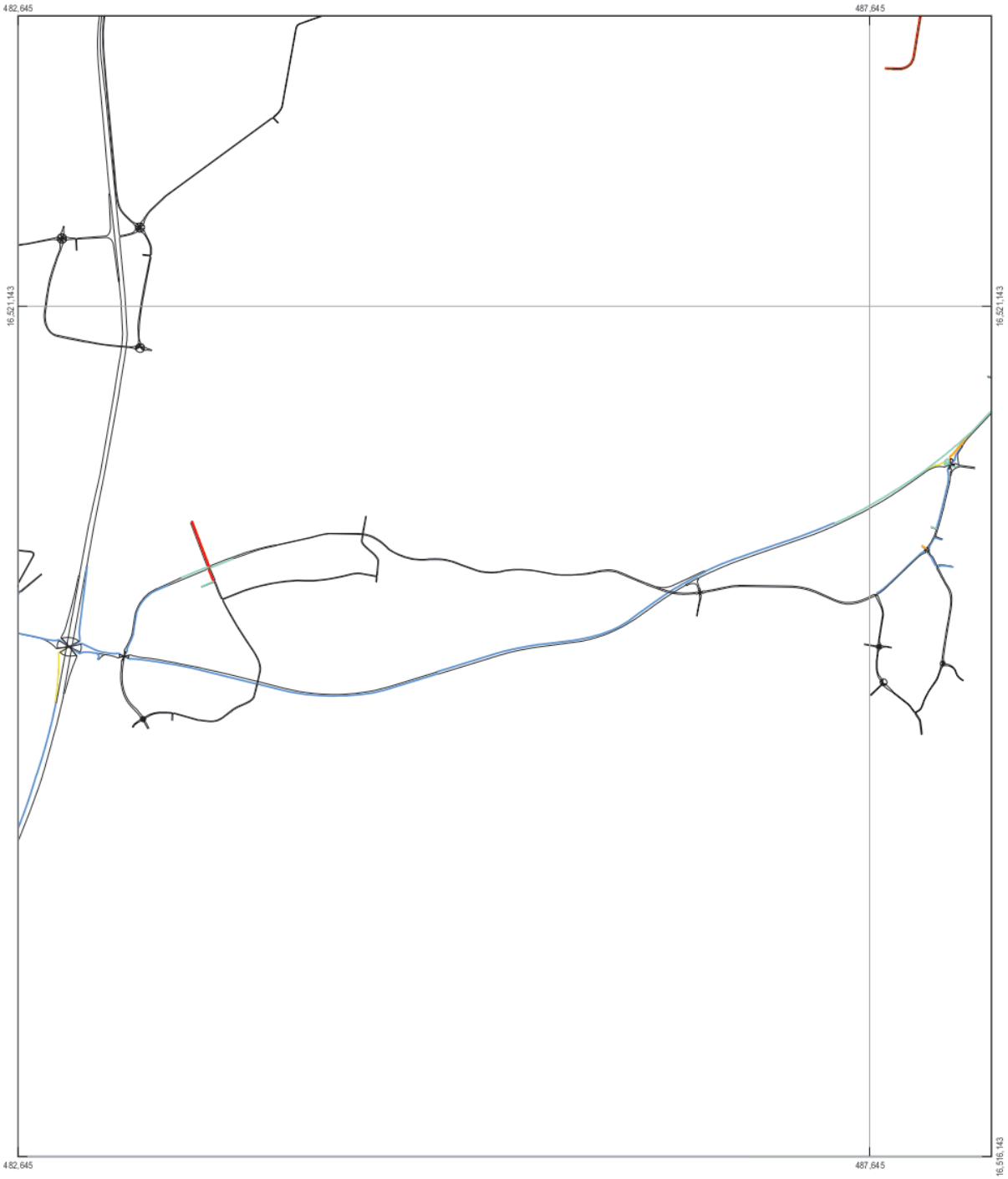
Data source: GHD, 2017 Created by:MBrooks



LEGEND
Vehicle Speed / Posted Speed Limit

0 - 30% | 40 - 50% | 67 - 85%
30 - 40% | 50 - 67% | 85 - 100%

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

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Revision A
Date 06 Sep 2017

Vehicle Speed / Posted Speed Limit
2026 PM Peak (1500-1600)

Figure C.26

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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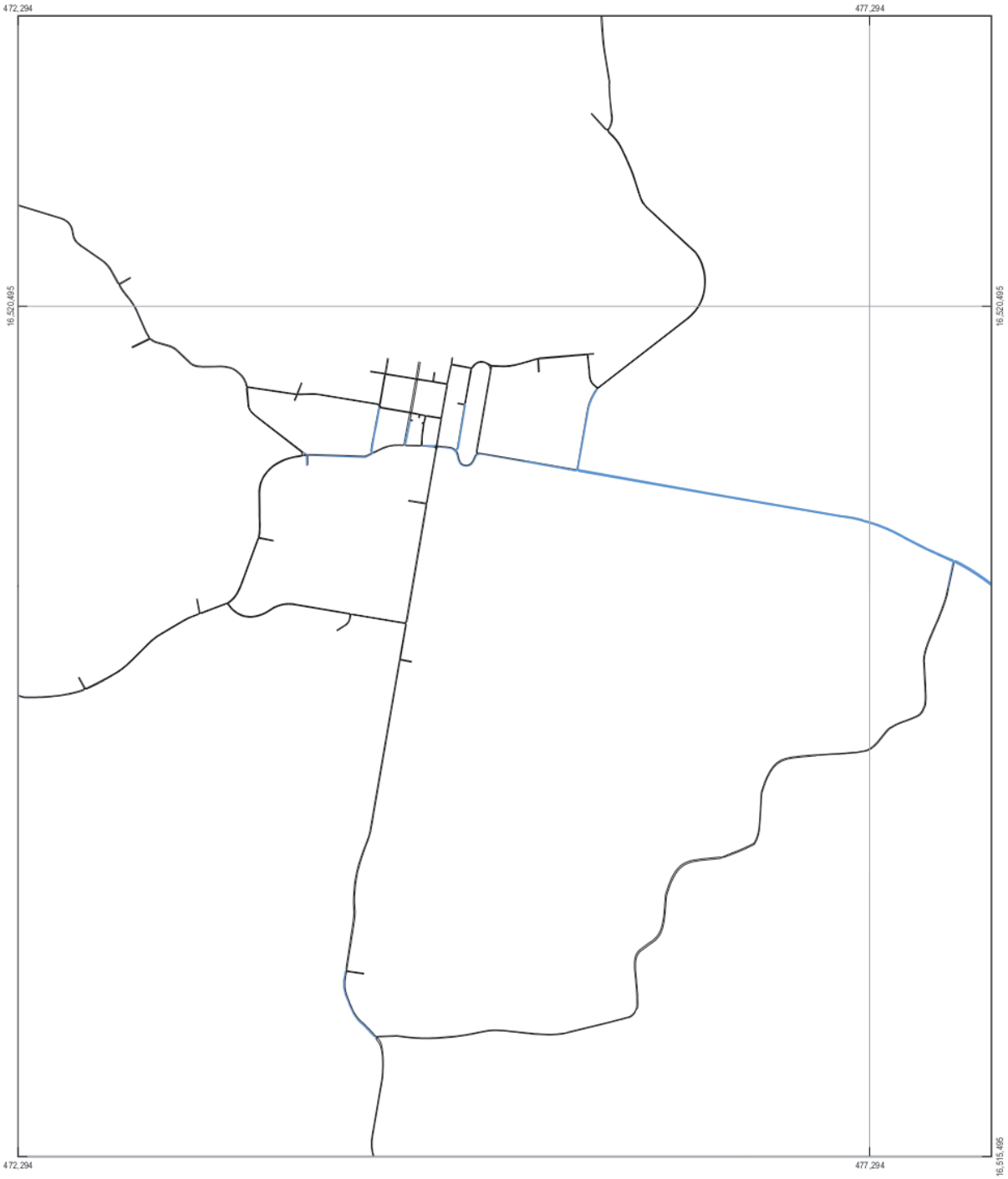

LEGEND
Vehicle Speed / Posted Speed Limit

0 - 30% | 40 - 50% | 67 - 85%
30 - 40% | 50 - 67% | 85 - 100%

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

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Local Government Area Traffic Study

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Revision A
Date 06 Sep 2017

Vehicle Speed / Posted Speed Limit
2026 PM Peak (1500-1600)

Figure C.27

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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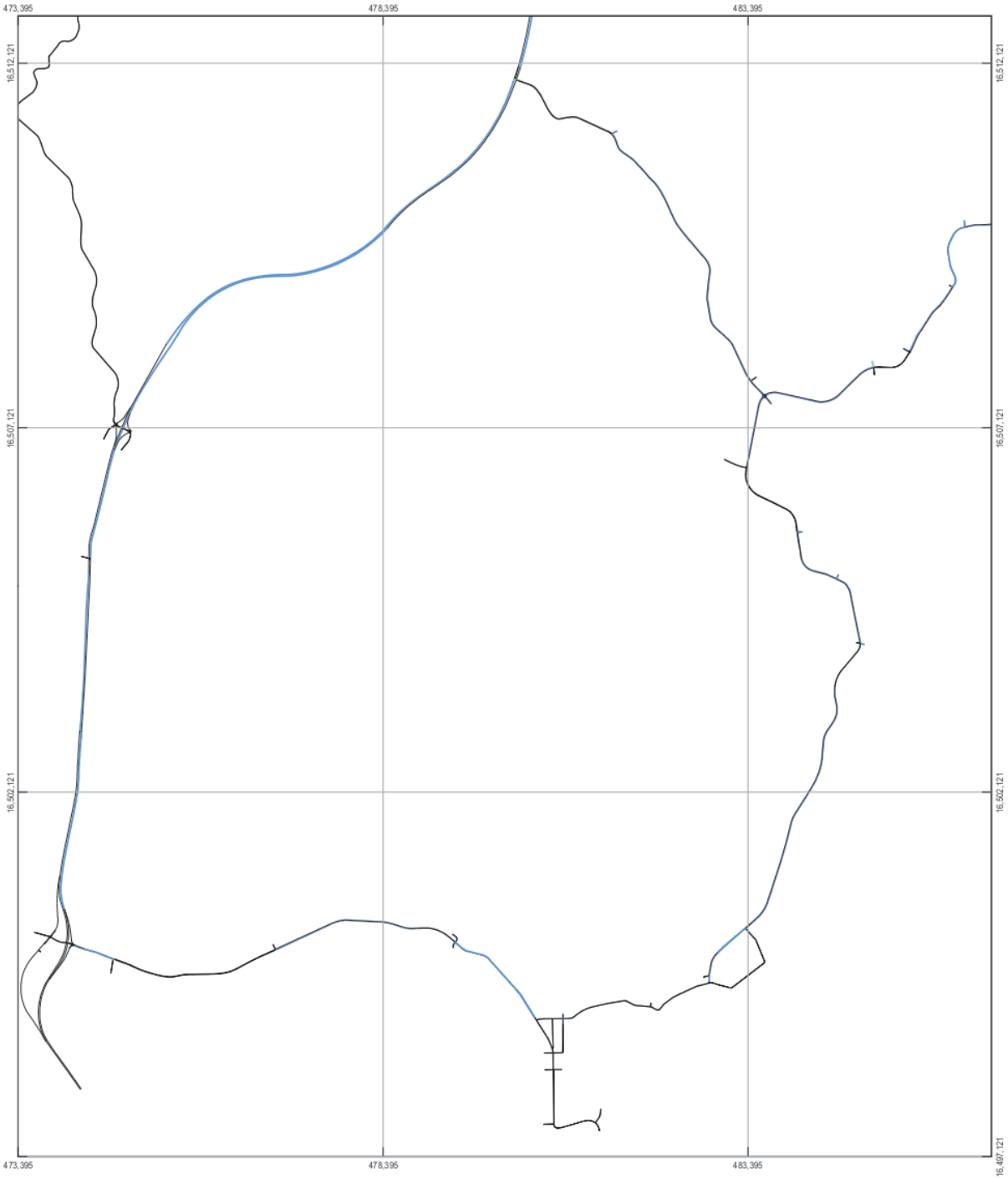
Data source: GHD, 2017 Created by:MBrooks



LEGEND
Vehicle Speed / Posted Speed Limit

0 - 30% | 40 - 50% | 67 - 85%
30 - 40% | 50 - 67% | 85 - 100%

Paper Size A4
0 250 500 1,000 1,500 2,000
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
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Date 06 Sep 2017

Vehicle Speed / Posted Speed Limit
2026 PM Peak (1500-1600)

Figure C.28

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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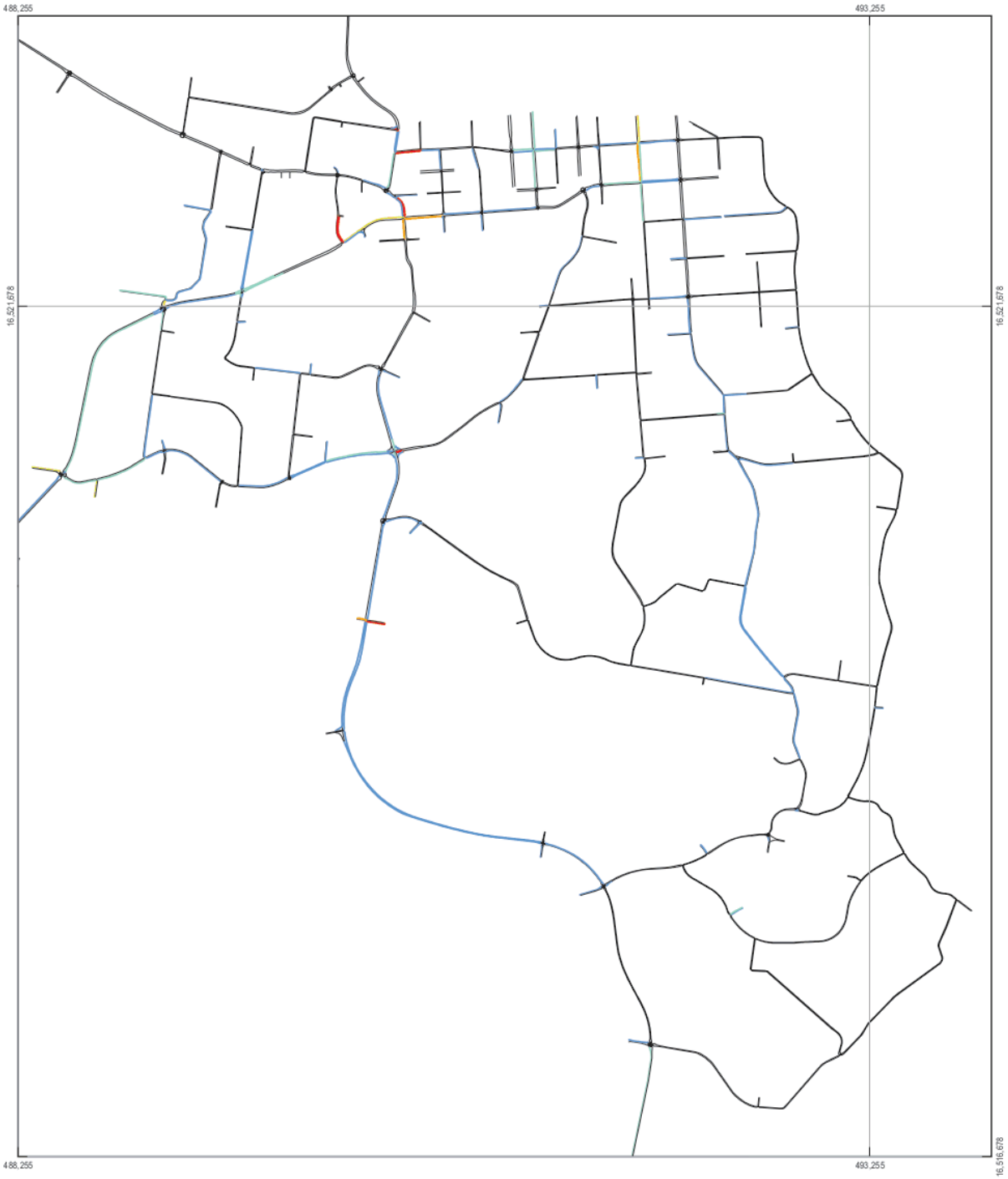
Data source: GHD, 2017 Created by:MBrooks

2036 PM Peak



LEGEND
Vehicle Speed / Posted Speed Limit

0 - 30% | 40 - 50% | 67 - 85%
30 - 40% | 50 - 67% | 85 - 100%

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

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Vehicle Speed / Post Speed Limit
2036 PM Peak (1500-1600)

Figure C.29

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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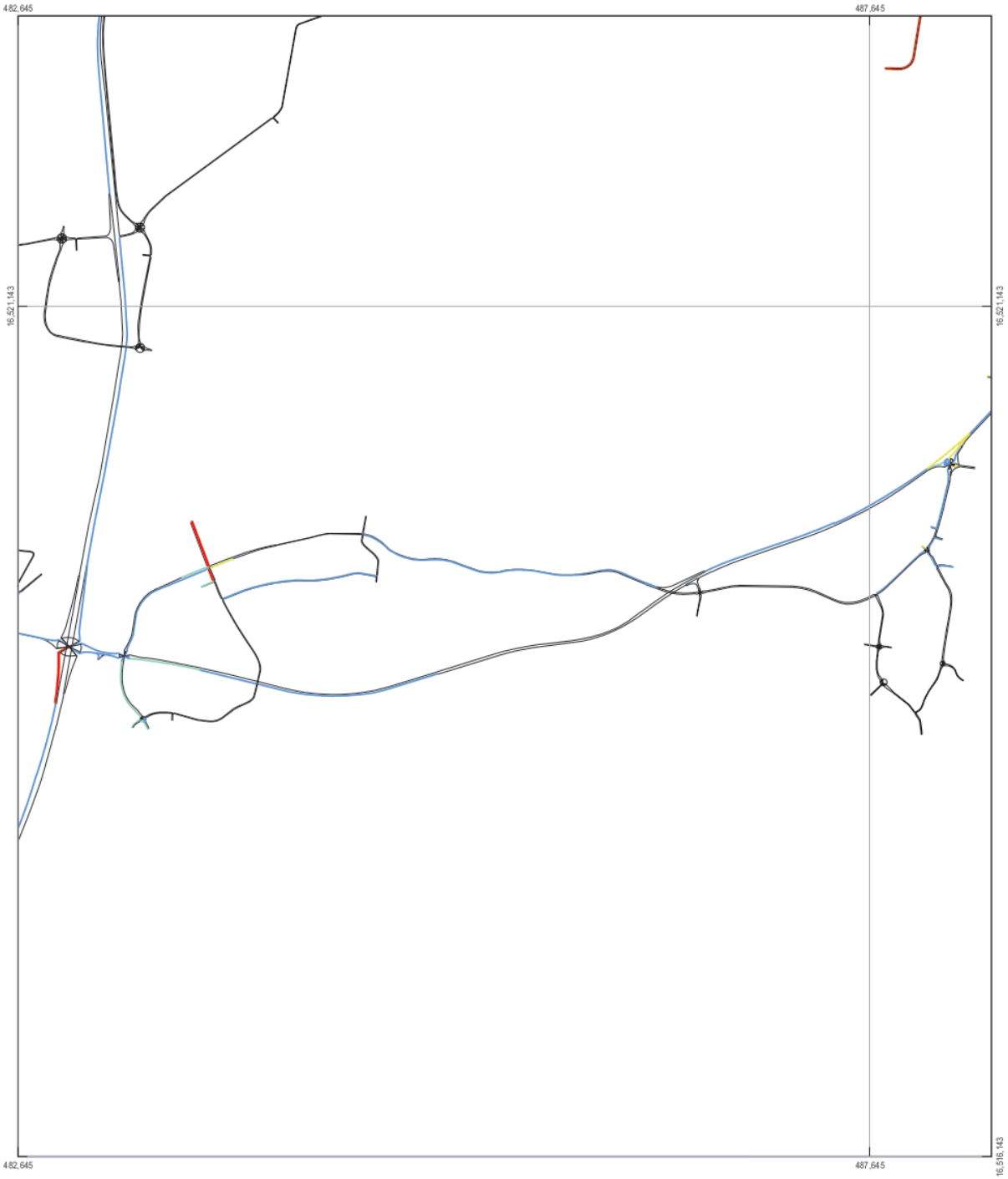
Data source: GHD, 2017 Created by:MBrooks



LEGEND
Vehicle Speed / Posted Speed Limit

0 - 30% 40 - 50% 67 - 85%

30 - 40% 50 - 67% 85 - 100%

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

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Date 06 Sep 2017

Vehicle Speed / Posted Speed Limit
2036 PM Peak (1500-1600)

Figure C.30

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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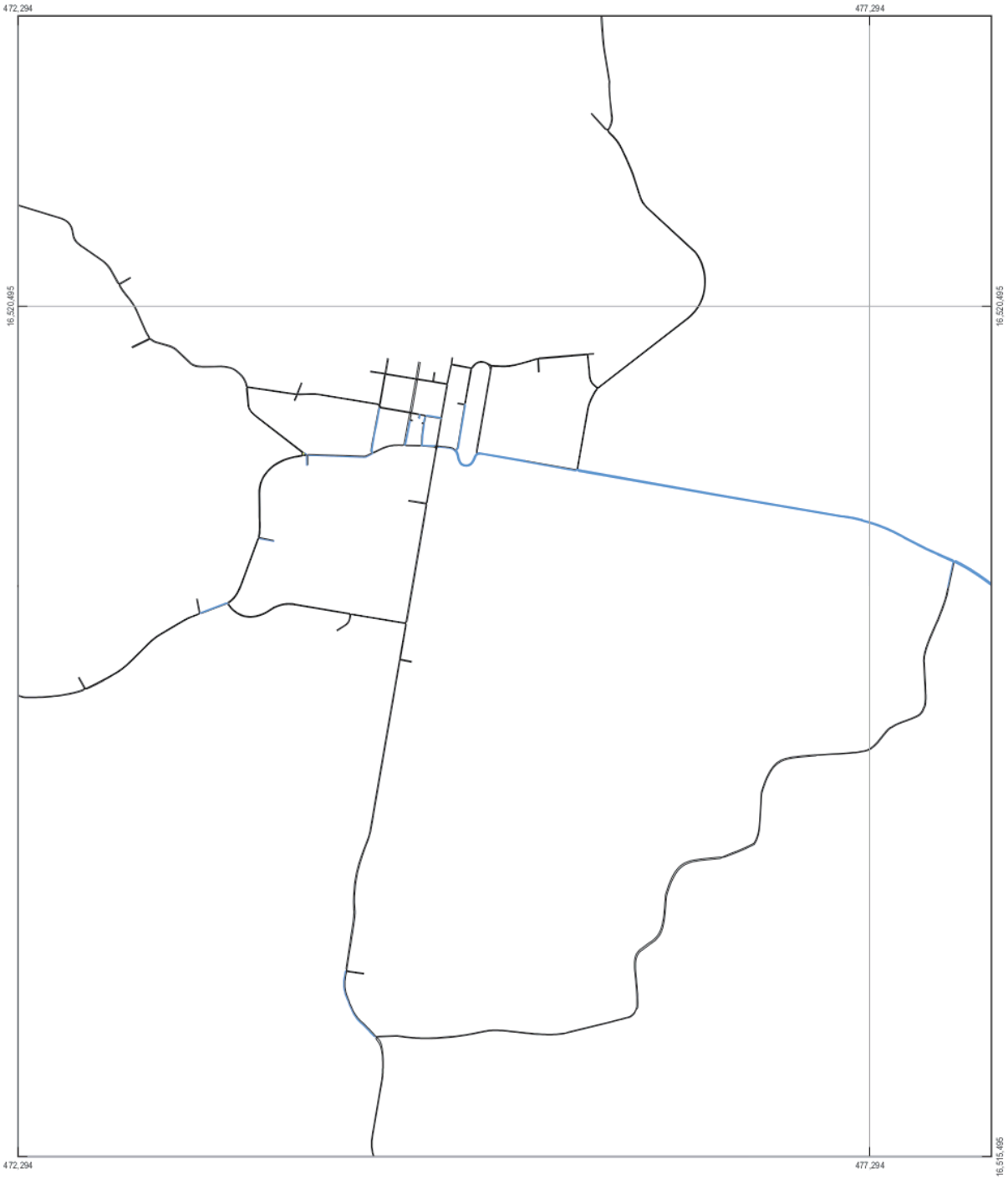
Data source: GHD, 2017 Created by:MBrooks



LEGEND
Vehicle Speed / Posted Speed Limit

0 - 30% | 40 - 50% | 67 - 85%
30 - 40% | 50 - 67% | 85 - 100%

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

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Date 06 Sep 2017

Vehicle Speed / Posted Speed Limit
2036 PM Peak (1500-1600)

Figure C.31

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

G:\22\18116\GIS\Maps\Final Maps\Speed_PM_2036_003_20170905.mxd

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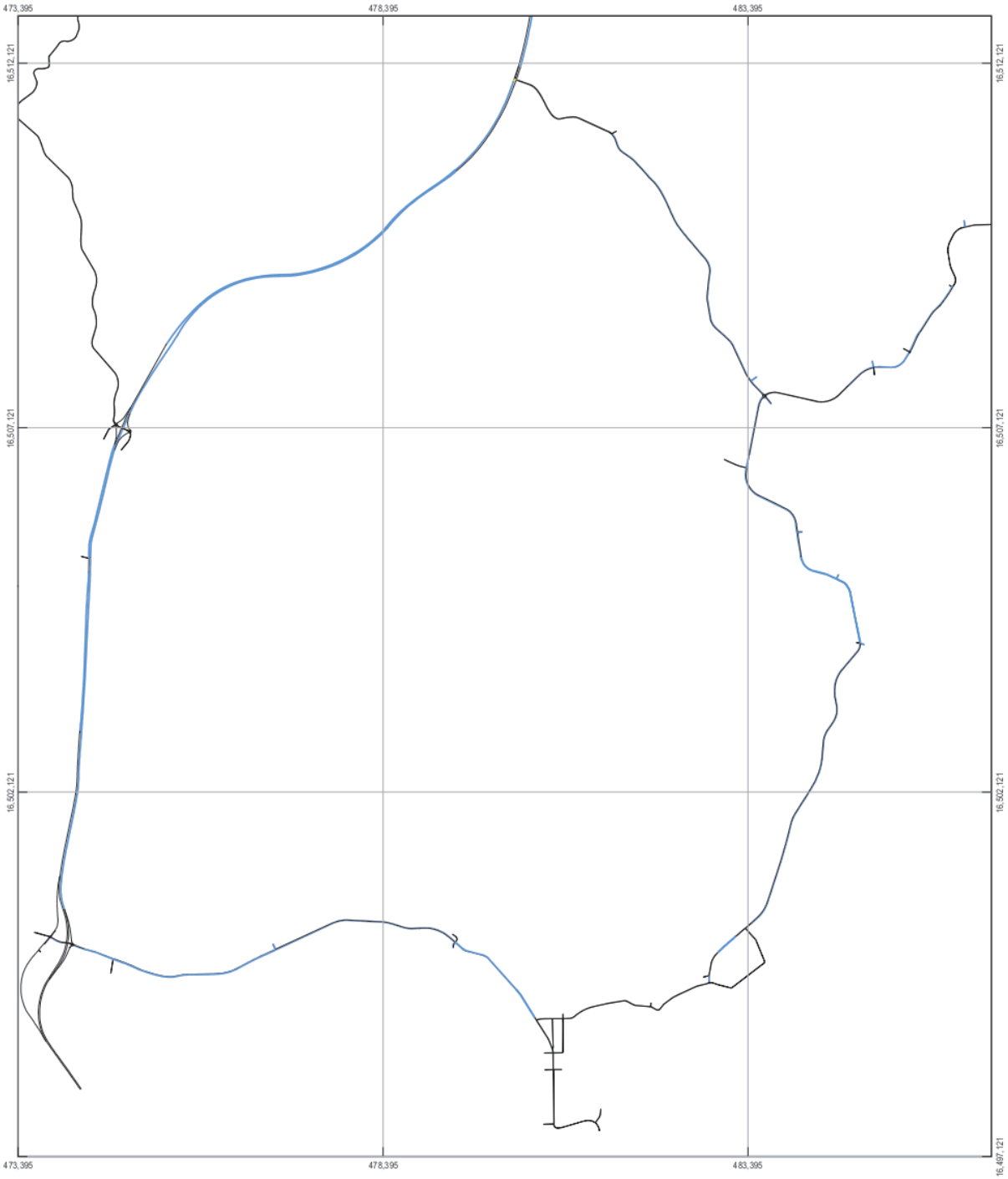
Data source: GHD, 2017 Created by:MBrooks



LEGEND
Vehicle Speed / Posted Speed Limit

0 - 30% | 40 - 50% | 67 - 85%
30 - 40% | 50 - 67% | 85 - 100%

Paper Size A4
0 250 500 1,000 1,500 2,000
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 06 Sep 2017

Vehicle Speed / Posted Speed Limit
2036 PM Peak (1500-1600)

Figure C.32

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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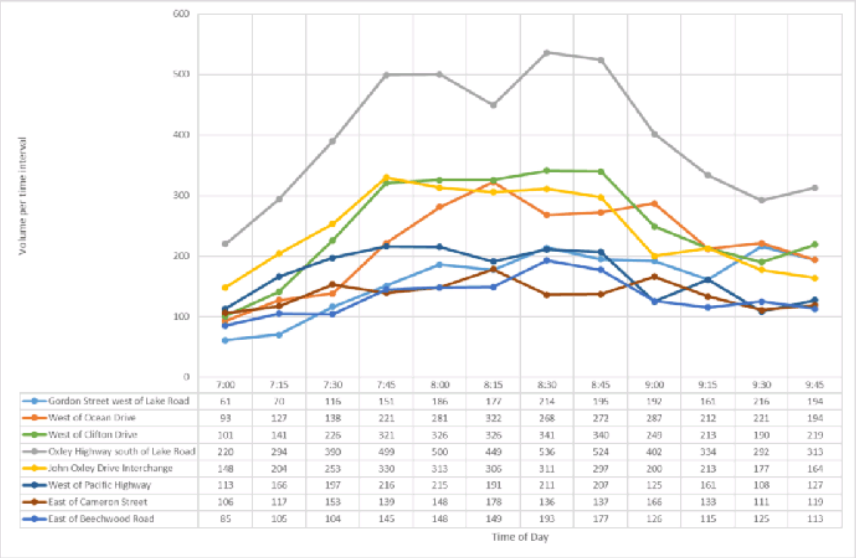
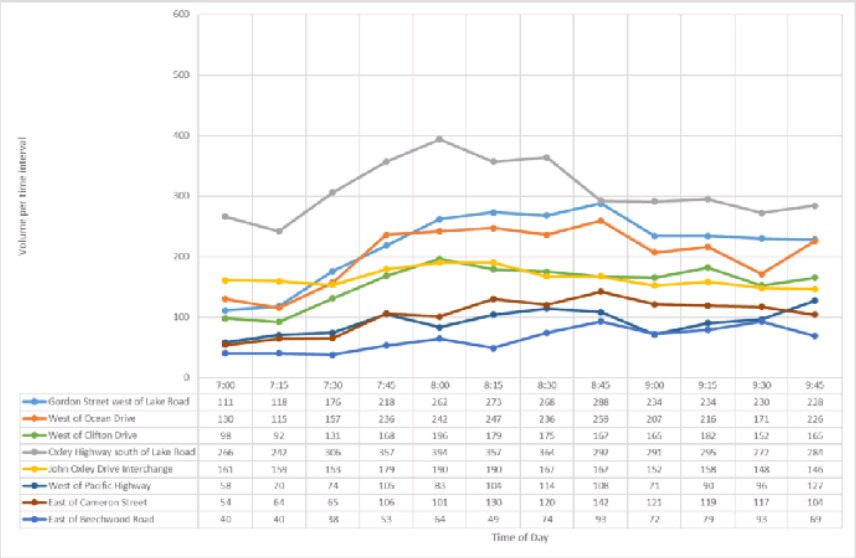
Data source: GHD, 2017 Created by:MBrooks

Appendix D Base Case Volume Profile Graphs



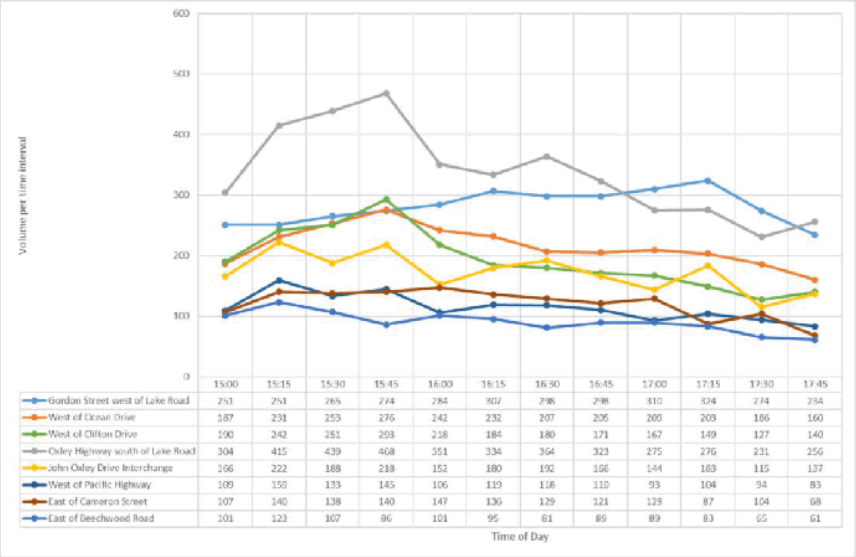
	7:00	7:15	7:30	7:45	8:00	8:15	8:30	8:45	9:00	9:15	9:30	9:45
Gordon Street west of Lake Road	61	70	116	151	186	177	214	195	192	161	216	194
West of Ocean Drive	93	127	138	221	281	322	268	272	287	212	221	194
West of Clifton Drive	101	141	226	321	326	326	341	340	249	213	190	219
Oxley Highway south of Lake Road	220	294	390	499	500	449	536	524	402	334	292	313
John Oxley Drive Interchange	148	204	253	330	313	306	311	297	200	213	177	164
West of Pacific Highway	113	166	197	216	215	191	211	207	125	161	108	127
East of Cameron Street	106	117	153	139	148	178	136	137	166	133	111	119
East of Beechwood Road	85	105	104	145	148	149	193	177	126	115	125	113

Figure D.1 Oxley Highway 2016 AM Eastbound Traffic Volume Profile



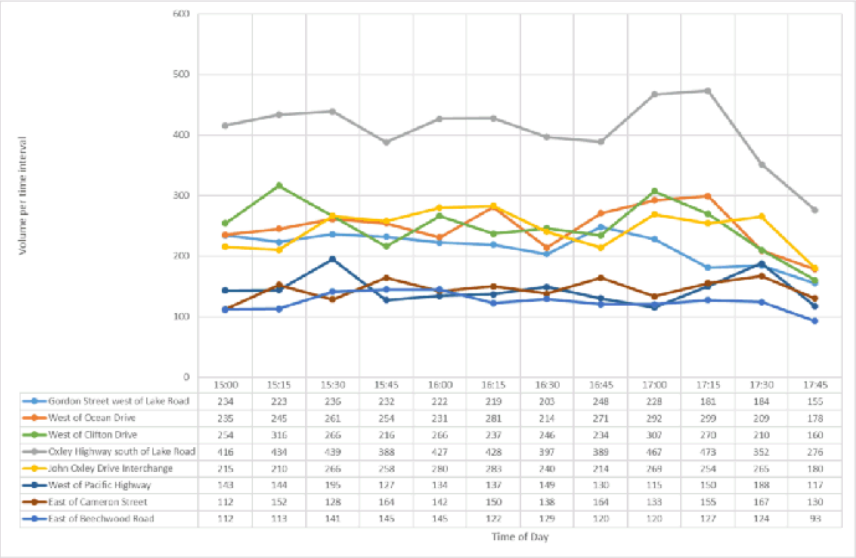
	7:00	7:15	7:30	7:45	8:00	8:15	8:30	8:45	9:00	9:15	9:30	9:45
Gordon Street west of Lake Road	111	118	176	218	262	273	268	288	234	234	230	228
West of Ocean Drive	130	115	157	236	242	247	236	259	207	216	171	226
West of Clifton Drive	98	92	131	168	196	179	175	167	165	182	152	165
Oxley Highway south of Lake Road	266	242	306	357	394	357	364	290	291	295	272	284
John Oxley Drive Interchange	161	159	154	179	190	190	167	167	152	198	148	146
West of Pacific Highway	58	70	74	105	83	104	114	108	71	90	96	122
East of Cameron Street	54	64	65	106	101	130	120	142	121	119	117	104
East of Beechwood Road	40	40	38	53	64	49	74	93	72	79	93	69

Figure D.2 Oxley Highway 2016 AM Westbound Traffic Volume Profile



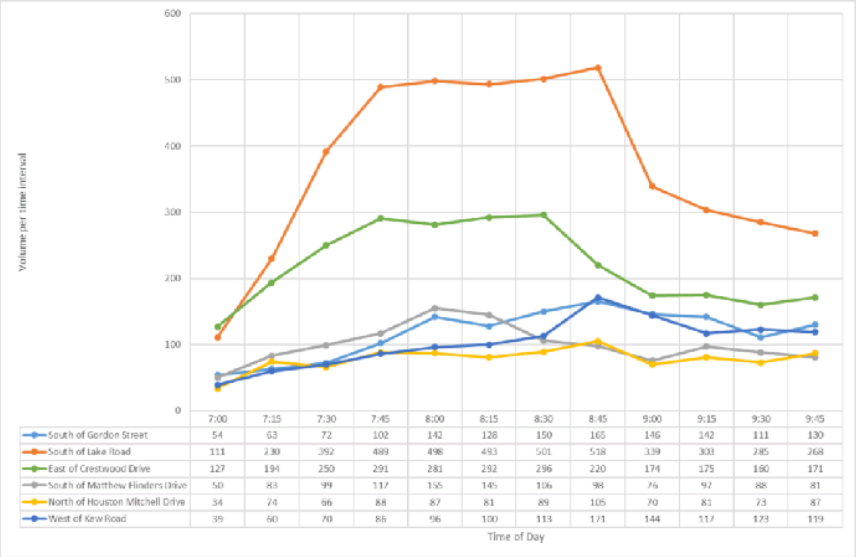
	15:00	15:15	15:30	15:45	16:00	16:15	16:30	16:45	17:00	17:15	17:30	17:45
Gordon Street west of Lake Road	251	251	265	274	284	307	298	298	310	324	274	234
West of Ocean Drive	187	231	253	276	242	232	207	205	200	203	186	160
West of Clifton Drive	190	242	251	293	218	184	180	171	167	149	127	140
Oxley Highway south of Lake Road	304	415	439	468	351	334	364	323	275	276	231	256
John Oxley Drive Interchange	166	222	188	218	152	180	192	166	144	183	115	137
West of Pacific Highway	109	150	133	145	106	119	118	110	93	104	94	83
East of Cameron Street	107	140	138	140	147	136	129	121	129	87	104	68
East of Beechwood Road	101	123	107	86	101	95	61	89	89	83	65	61

Figure D.3 Oxley Highway 2016 PM Eastbound Traffic Volume Profile



	15:00	15:15	15:30	15:45	16:00	16:15	16:30	16:45	17:00	17:15	17:30	17:45
Gordon Street west of Lake Road	234	223	236	232	222	219	203	248	228	181	184	155
West of Ocean Drive	235	245	261	254	231	281	214	271	292	299	209	178
West of Clifton Drive	254	316	266	216	266	237	246	234	307	270	210	160
Oxley Highway south of Lake Road	416	434	439	388	427	428	397	389	467	473	352	276
John Oxley Drive Interchange	215	210	266	258	280	283	240	214	269	254	265	180
West of Pacific Highway	143	144	195	127	134	137	149	130	115	150	188	117
East of Cameron Street	112	152	128	164	142	150	138	164	133	155	167	130
East of Beechwood Road	112	113	141	145	145	122	179	120	120	127	124	93

Figure D.4 Oxley Highway 2016 PM Westbound Traffic Volume Profile

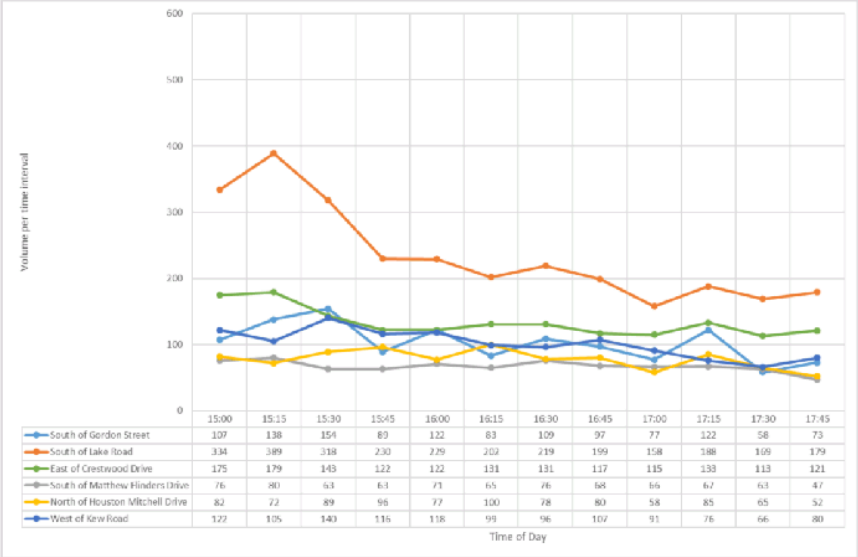


	7:00	7:15	7:30	7:45	8:00	8:15	8:30	8:45	9:00	9:15	9:30	9:45
South of Gordon Street	54	63	72	102	142	128	150	165	146	142	111	130
South of Lake Road	111	230	392	489	498	493	501	518	339	303	285	268
East of Crestwood Drive	127	194	250	291	281	292	296	220	174	175	160	171
South of Matthew Flinders Drive	50	83	99	117	155	145	106	98	76	92	88	81
North of Houston Mitchell Drive	34	74	66	88	87	81	89	105	70	81	73	87
West of Kew Road	39	60	70	86	96	100	113	171	144	117	123	119

Figure D.5 Ocean Drive 2016 AM Northbound Traffic Volume Profile

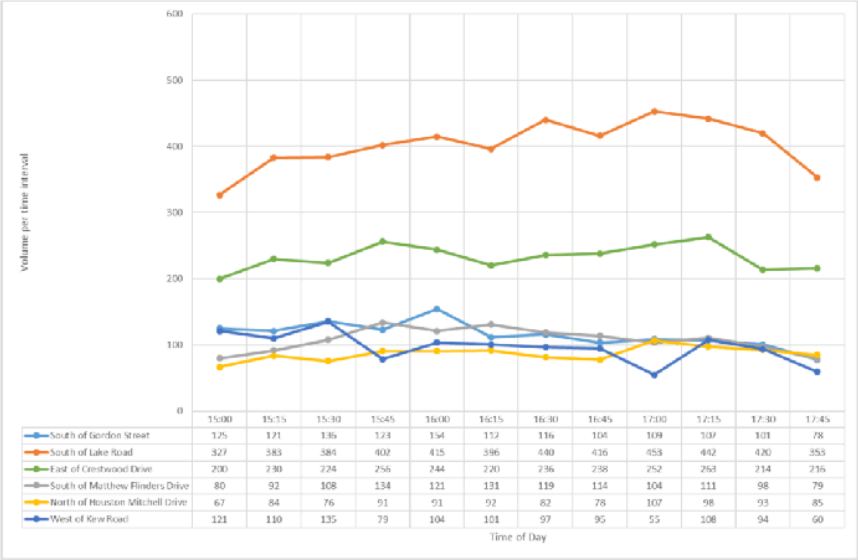
	7:00	7:15	7:30	7:45	8:00	8:15	8:30	8:45	9:00	9:15	9:30	9:45
South of Gordon Street	34	47	55	58	99	99	116	81	98	115	110	108
South of Lake Road	98	103	134	178	199	247	280	227	206	202	180	189
East of Crestwood Drive	79	73	79	93	114	147	161	132	143	118	99	118
South of Matthew Flinders Drive	57	60	51	51	83	70	57	47	93	67	68	77
North of Houston Mitchell Drive	31	53	61	89	85	70	106	64	65	53	72	73
West of Kew Road	50	70	70	60	103	119	113	117	127	103	89	105

Figure D.6 Ocean Drive 2016 AM Southbound Traffic Volume Profile



	15:00	15:15	15:30	15:45	16:00	16:15	16:30	16:45	17:00	17:15	17:30	17:45
South of Gordon Street	107	138	154	89	122	83	109	97	77	122	58	73
South of Lake Road	334	389	318	230	229	202	219	199	158	188	169	179
East of Crestwood Drive	175	179	143	122	122	131	131	117	115	133	113	121
South of Matthew Flinders Drive	76	80	63	63	71	65	76	68	66	67	63	47
North of Houston Mitchell Drive	82	72	89	96	77	100	78	80	58	85	65	52
West of Kew Road	122	105	140	116	118	99	96	107	91	76	66	80

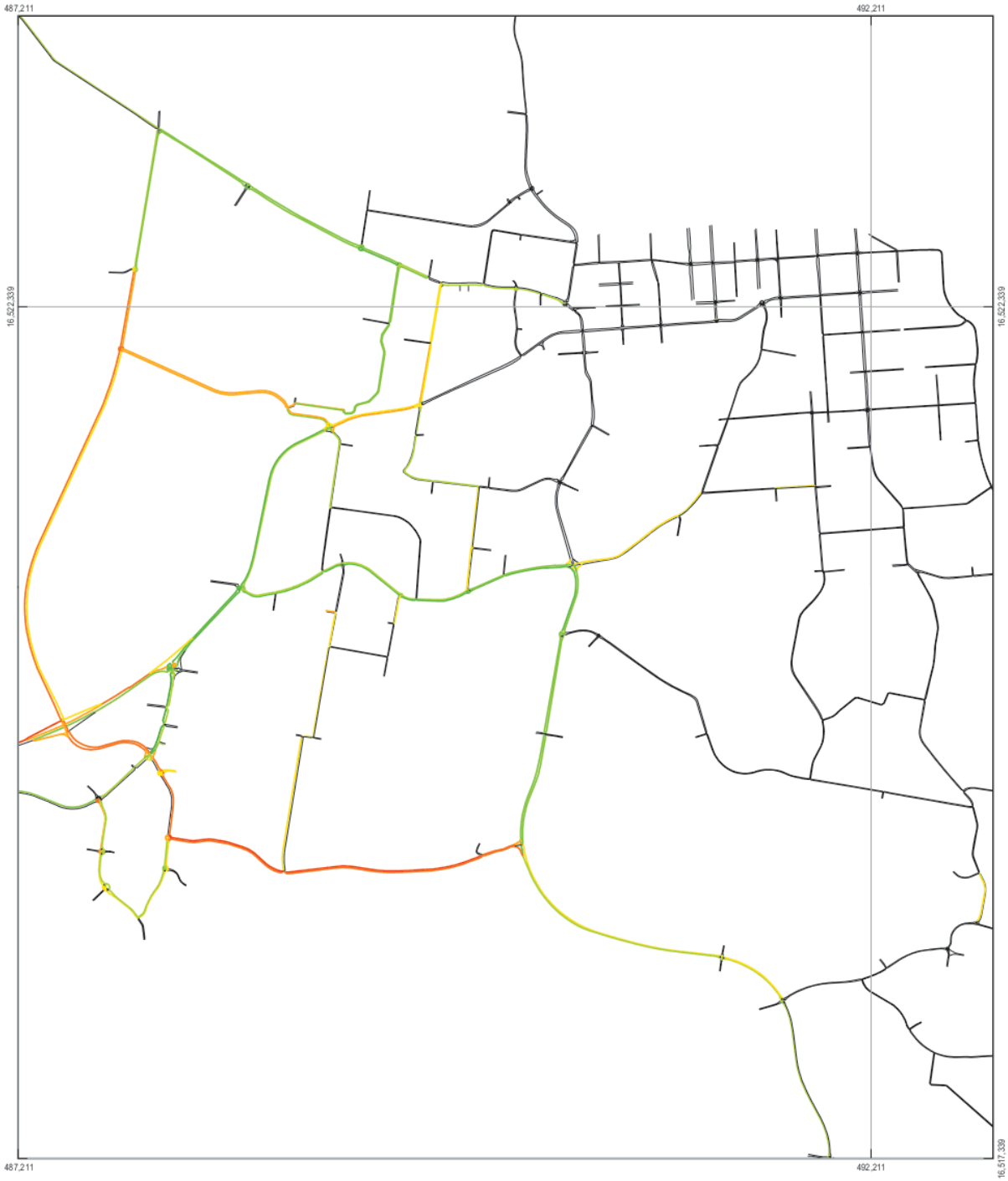
Figure D.7 Ocean Drive 2016 PM Northbound Traffic Volume Profile



	15:00	15:15	15:30	15:45	16:00	16:15	16:30	16:45	17:00	17:15	17:30	17:45
South of Gordon Street	125	121	136	123	154	112	116	104	109	107	101	78
South of Lake Road	327	383	384	402	415	396	440	416	453	442	420	353
East of Crestwood Drive	200	230	224	256	244	220	236	238	252	263	214	216
South of Matthew Flinders Drive	80	92	108	134	121	131	119	114	104	111	98	79
North of Houston Mitchell Drive	67	84	76	91	91	92	82	78	107	98	93	85
West of Kew Road	121	110	135	79	104	101	97	95	55	108	94	60

Figure D.8 Ocean Drive 2016 PM Southbound Traffic Volume Profile

Appendix E Scenario Volume Comparison Plots



LEGEND
Traffic Volume Difference (veh/hr)

-2000 - -1000 | -500 - -250 | -100 - 100 | 250 - 500 | 1000 - 2000
-1000 - -500 | -250 - -100 | 100 - 250 | 500 - 1000 | 2000 - 3000

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 06 Sep 2017

Traffic Volume Change with Orbital
2036 AM Peak (0800-0900)

Figure E.1

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

G:\22\18116\GIS\Maps\Final Maps\Volume_Compare_Orbital_AM_2036_001_20170906.mxd

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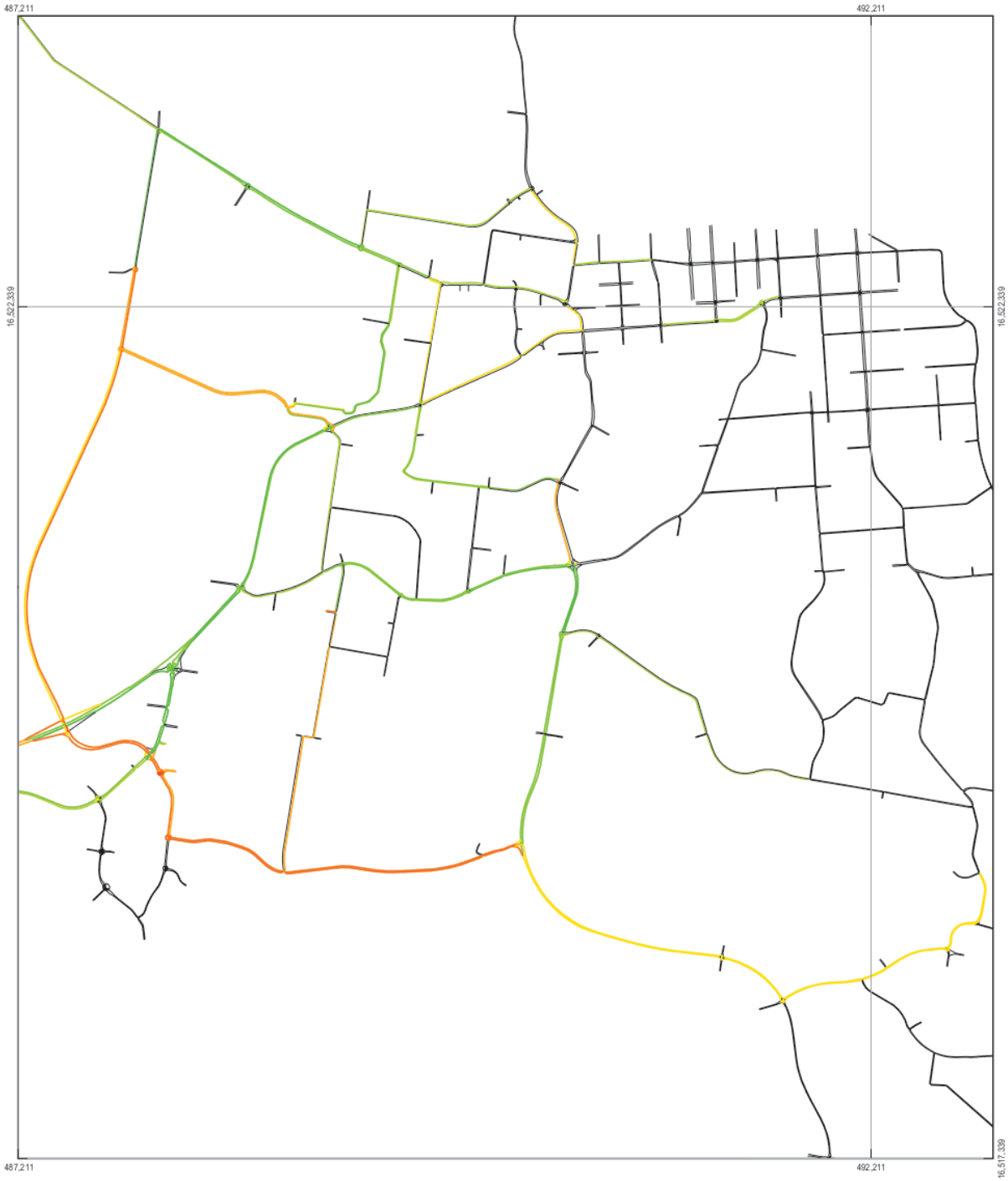

LEGEND
Traffic Volume Difference (veh/hr)

-2000 - -1000 | -500 - -250 | -100 - 100 | 250 - 500 | 1000 - 2000
-1000 - -500 | -250 - -100 | 100 - 250 | 500 - 1000 | 2000 - 3000

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 06 Sep 2017

Traffic Volume Change with Orbital
2036 PM Peak (1500-1600)

Figure E.2

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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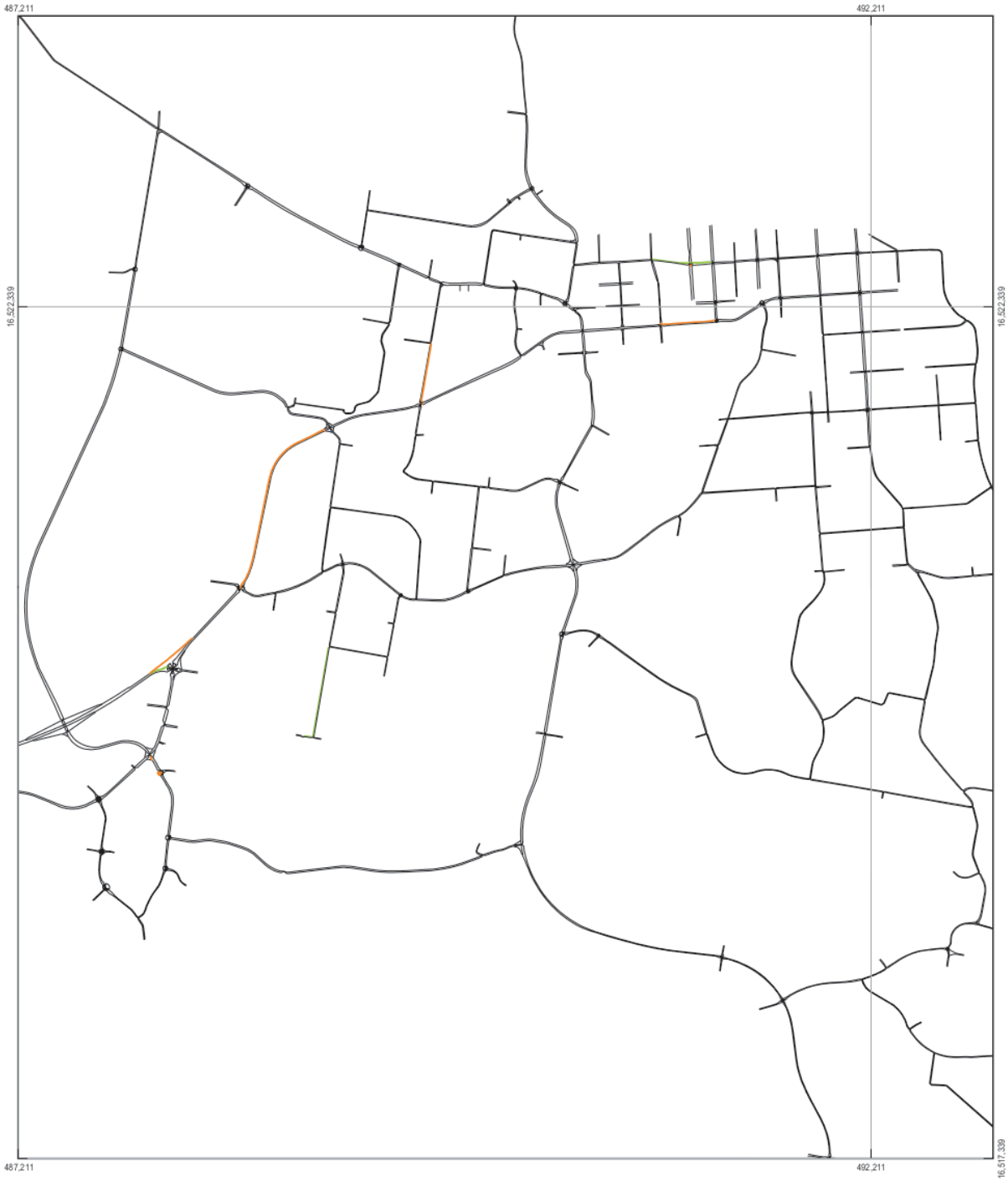
Data source: GHD, 2017 Created by:MBrooks



LEGEND
Traffic Volume Difference (veh/hr)

-500 - -250 | -100 - 100 | 250 - 500

-250 - -100 | 100 - 250

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 06 Sep 2017

Traffic Volume Change - Option 1 v Option 2
2036 AM Peak (0800-0900)

Figure E.3

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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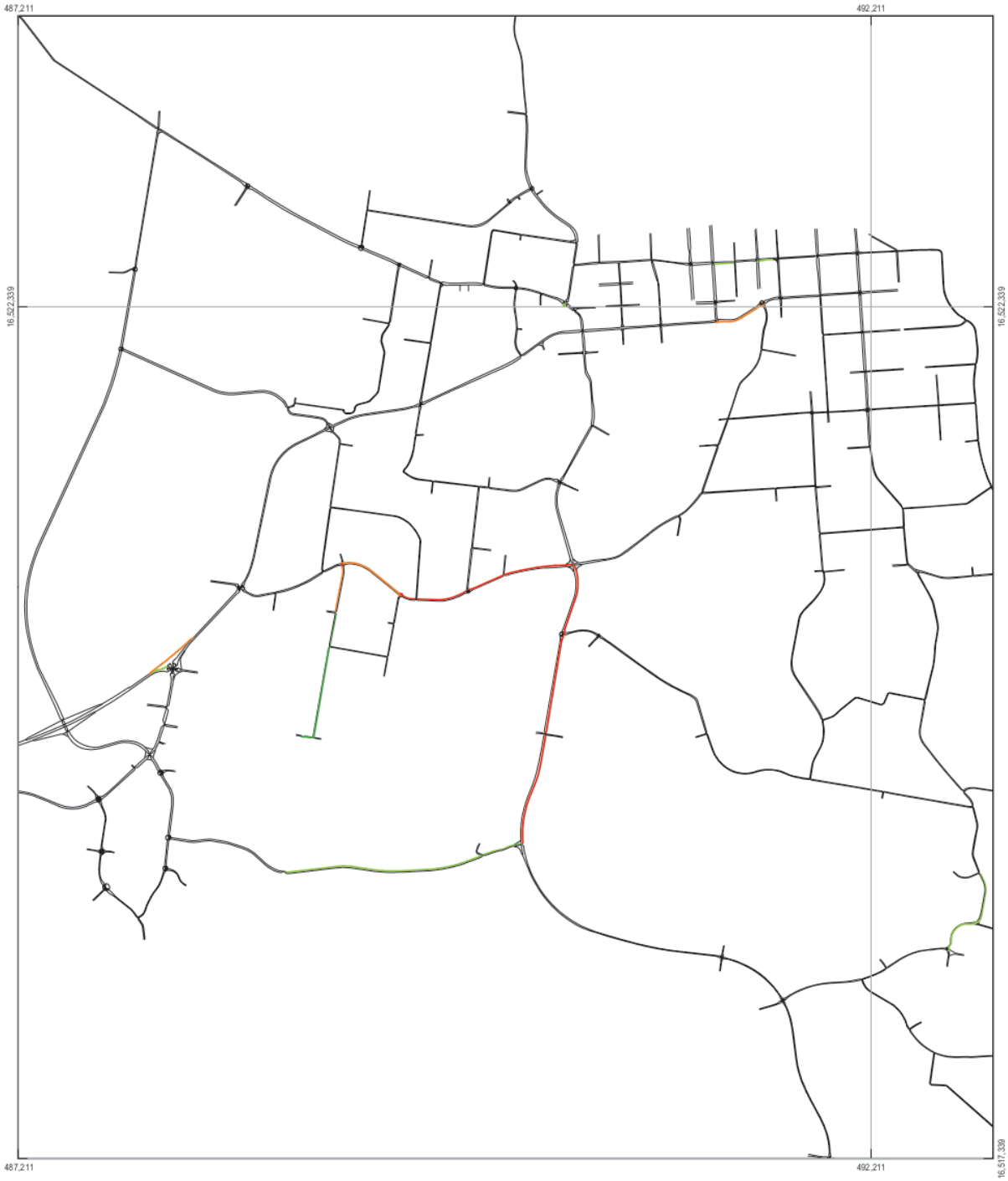

LEGEND
Traffic Volume Difference (veh/hr)

-500 - -250 | -100 - 100 | 250 - 500

-250 - -100 | 100 - 250

Paper Size A4
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Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 06 Sep 2017

Traffic Volume Change - Option 1 v Option 2
2036 PM Peak (1500-1600) Figure E.4

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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Data source: GHD, 2017 Created by:MBrooks

LEGEND
Traffic Volume Difference (veh/hr)

-1000 - -500 | -250 - -100 | 100 - 250 | 500 - 1000

-500 - -250 | -100 - 100 | 250 - 500

Paper Size A4
0 70 140 280 420 560
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 07 Sep 2017

Traffic Volume Change - Lake Road Upgrade
2036 AM Peak (0800-0900)

Figure E.5

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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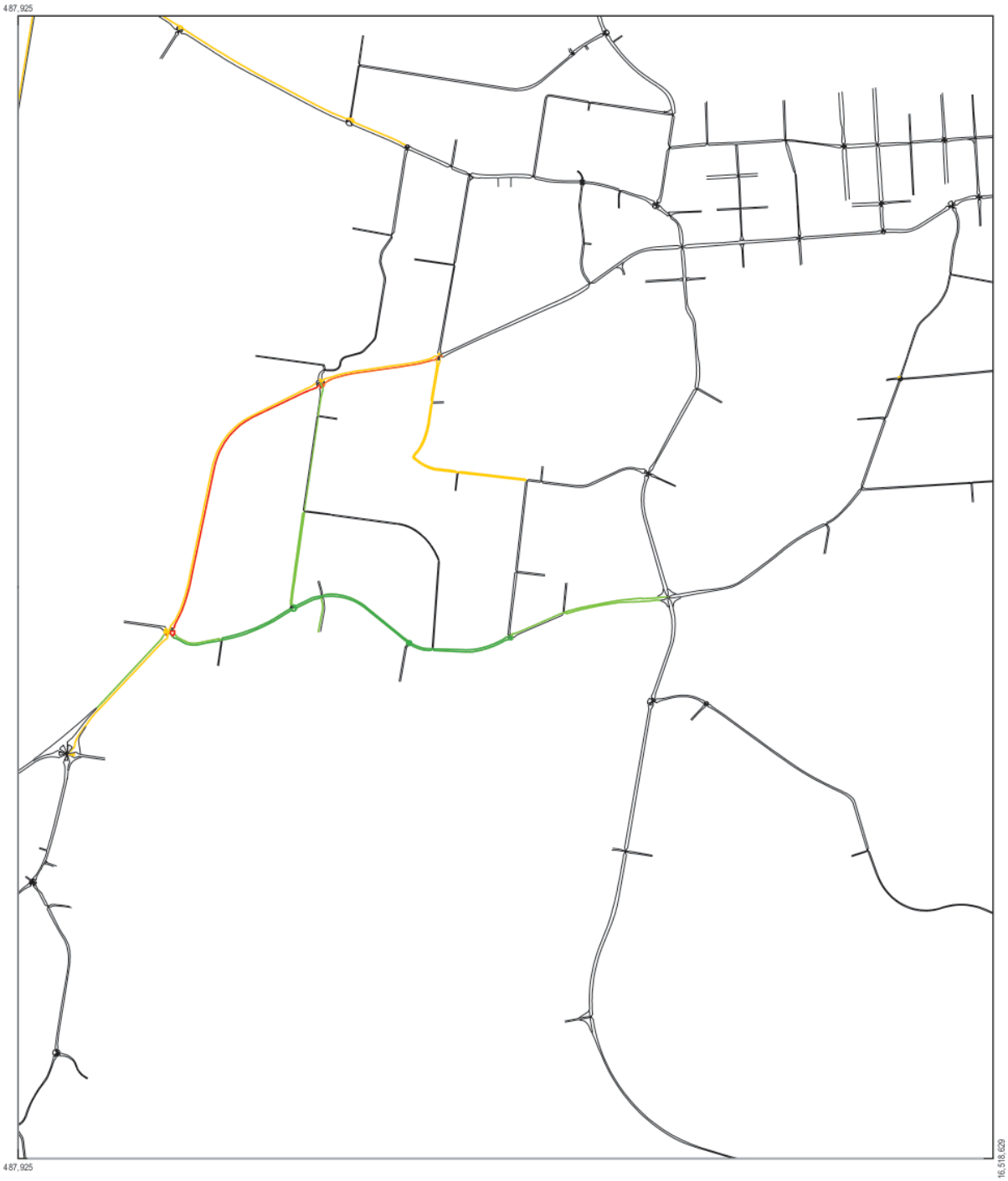

LEGEND
Traffic Volume Difference (veh/hr)

-500 - -250 | -100 - 100 | 250 - 500

-250 - -100 | 100 - 250 | 500 - 1000

Paper Size A4
0 70 140 280 420 560
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 07 Sep 2017

Traffic Volume Change - Lake Road Upgrade
2036 PM Peak (1500-1600)

Figure E.6

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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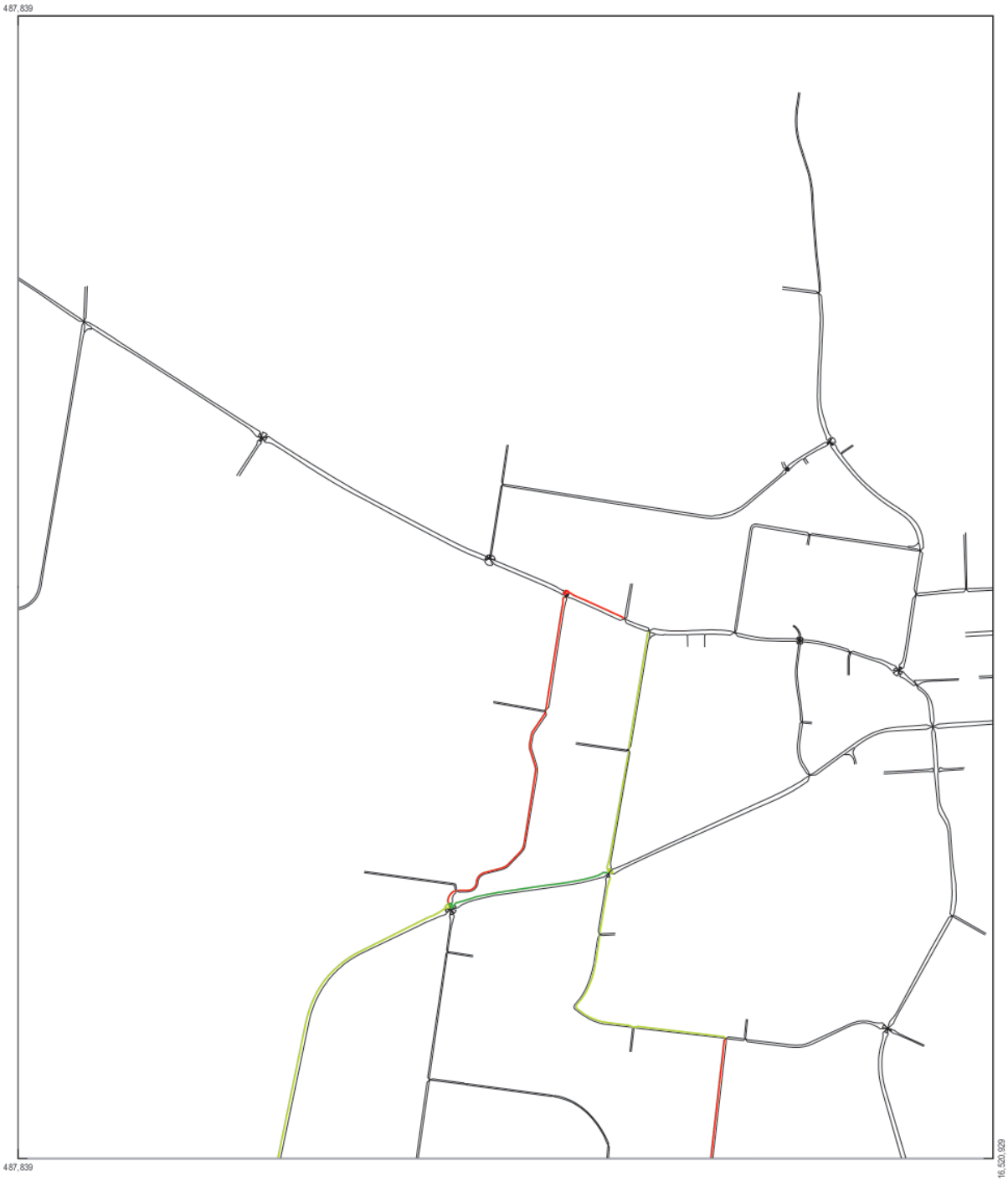
Data source: GHD, 2017 Created by:mbrooks



LEGEND
Traffic Volume Difference (veh/hr)

-500 - -250
-100 - 100
-250 - -100
100 - 250

Paper Size A4
0 55 110 220 330 440
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 07 Sep 2017

Traffic Volume Change - Hastings River Dr
2036 AM Peak (0800-0900)

Figure E.7

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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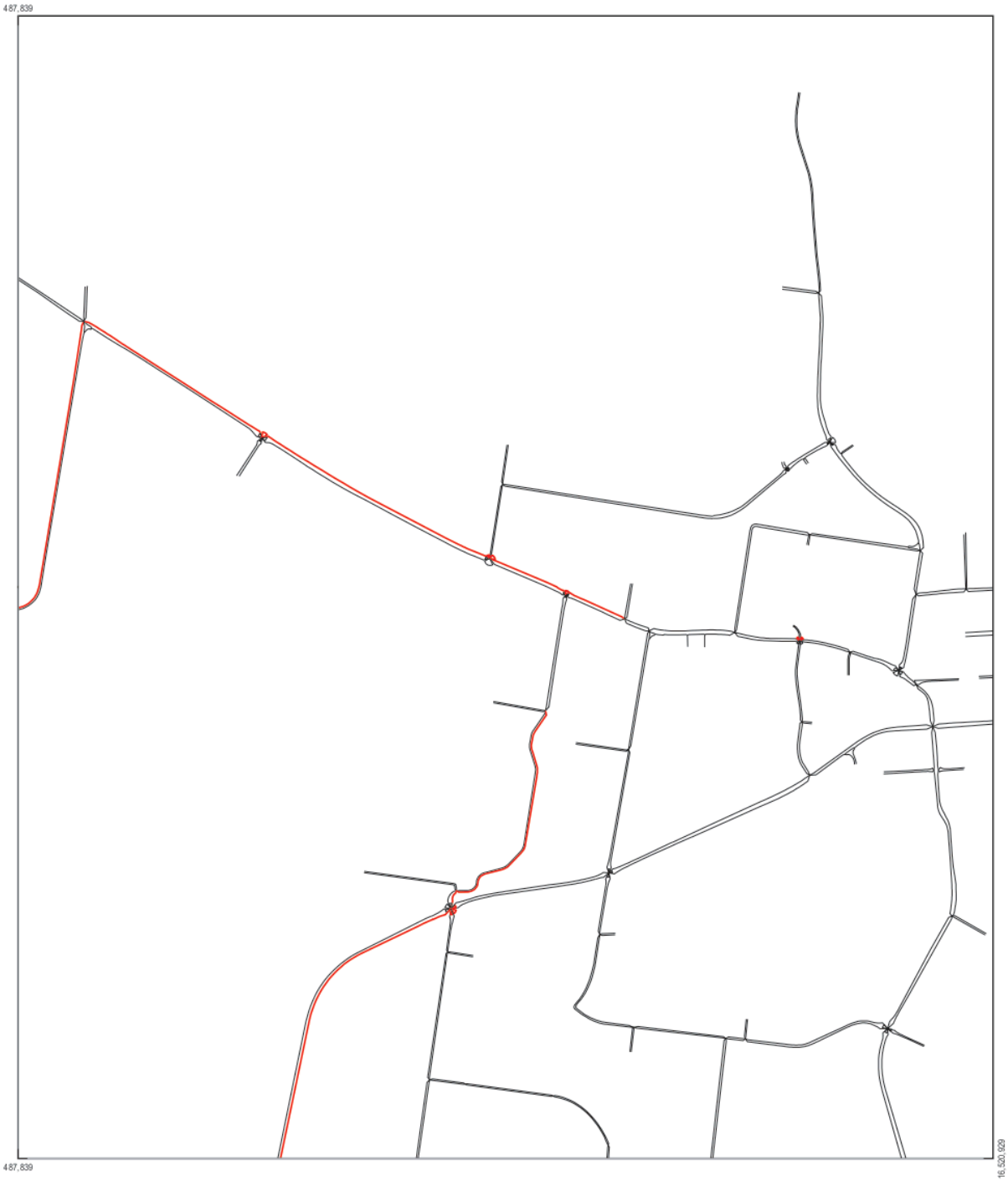

LEGEND
Traffic Volume Difference (veh/hr)

-250 - -100 100 - 250

-100 - 100

Paper Size A4
0 55 110 220 330 440
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 07 Sep 2017

Traffic Volume Change - Hastings River Dr
2036 PM Peak (1500-1600)

Figure E.8

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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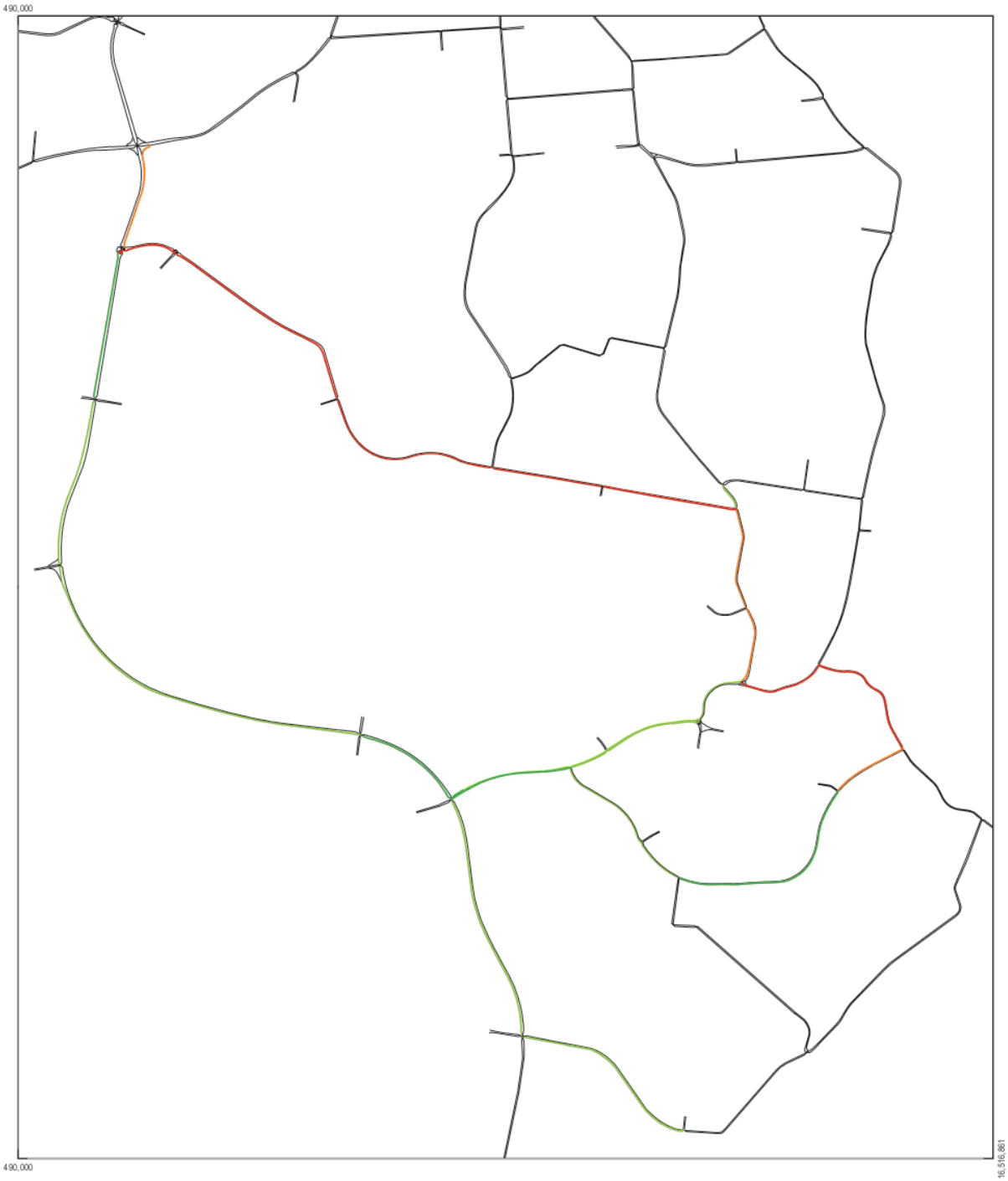

LEGEND
Traffic Volume Difference (veh/hr)

-500 - -250 | -100 - 100 | 250 - 500

-250 - -100 | 100 - 250

Paper Size A4
0 70 140 280 420 560
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 07 Sep 2017

Traffic Volume Change - Ocean Dr Upgrade
2036 AM Peak (0800-0900) Figure E.9

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

G:\22\18116\GIS\Maps\Final Maps\Volume_Compare_OceanDr_AM_2036_001_20170906.mxd

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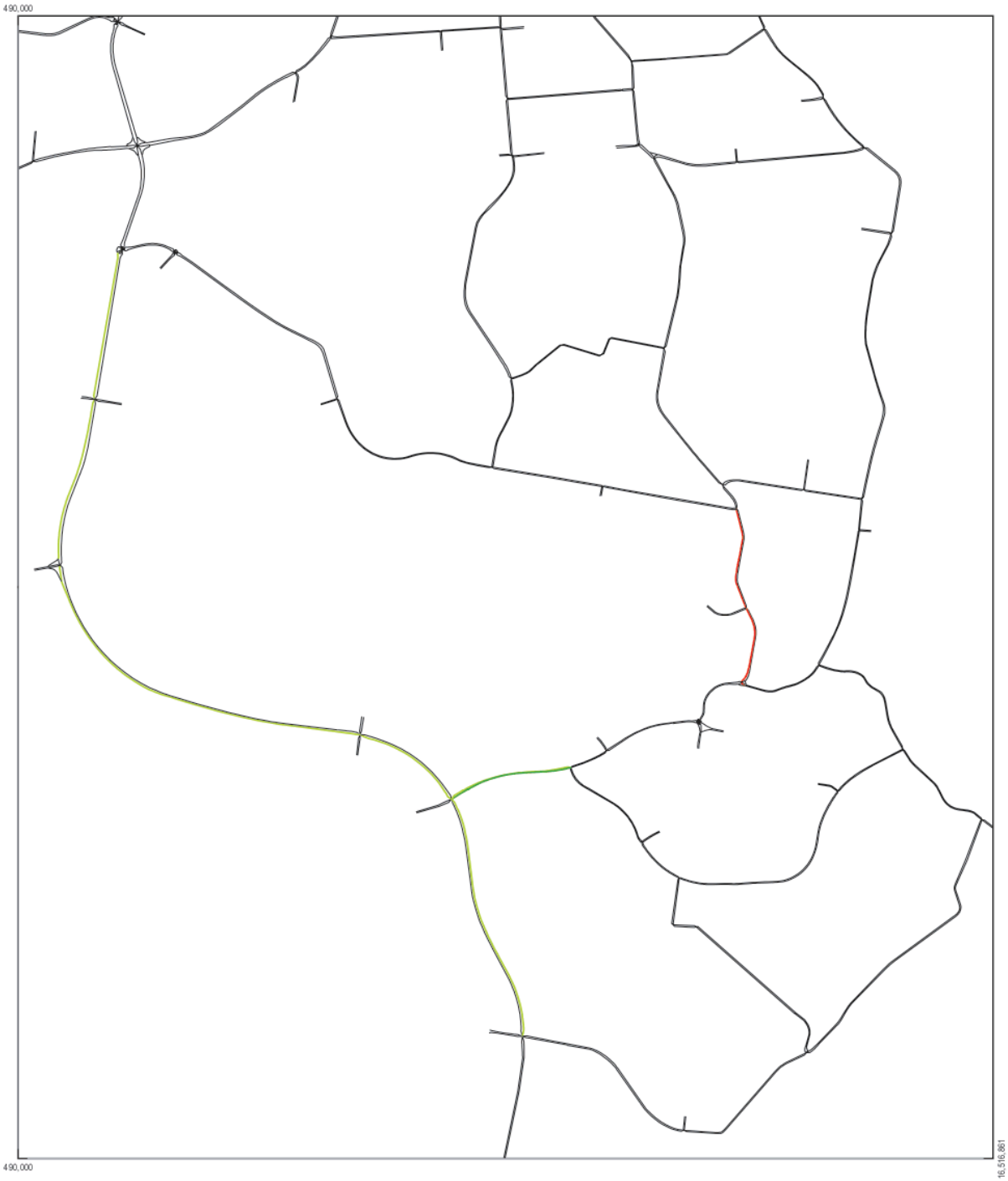
Data source: GHD, 2017 Created by:mbrooks



LEGEND
Traffic Volume Difference (veh/hr)

-500 - -250
-250 - -100
-100 - 100
100 - 250

Paper Size A4
0 70 140 280 420 560
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 07 Sep 2017

Traffic Volume Change - Ocean Dr Upgrade
2036 PM Peak (1500-1600)

Figure E.10

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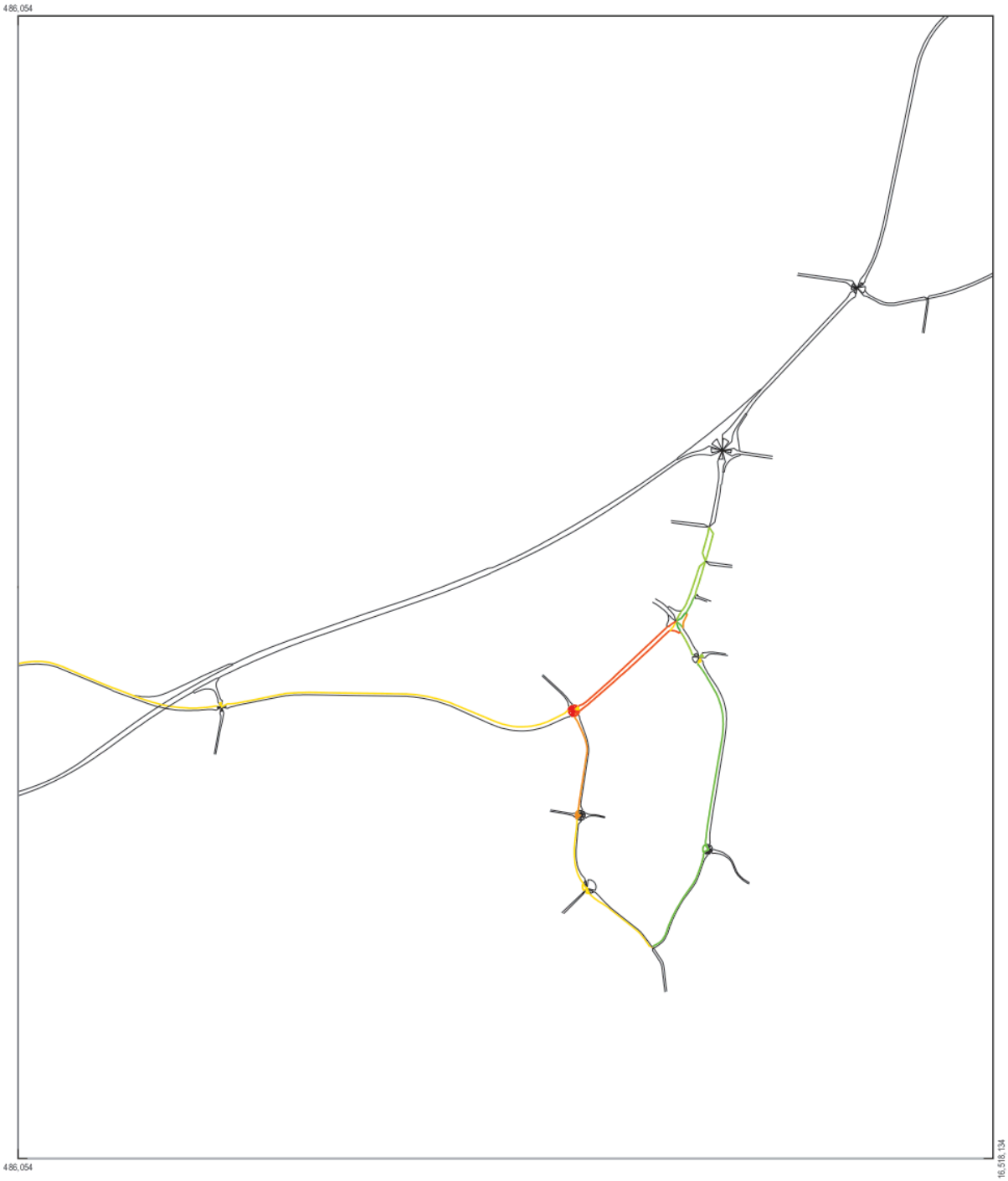
Data source: GHD, 2017 Created by:mbrooks



LEGEND
Traffic Volume Difference (veh/hr)

-1000 - -500 | -250 - -100 | 100 - 250 | 500 - 1000
-500 - -250 | -100 - 100 | 250 - 500 | 1000 - 2000

Paper Size A4
0 55 110 220 330 440
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 07 Sep 2017

Traffic Volume Change - John Oxley Dr
2036 AM Peak (0800-0900)

Figure E.11

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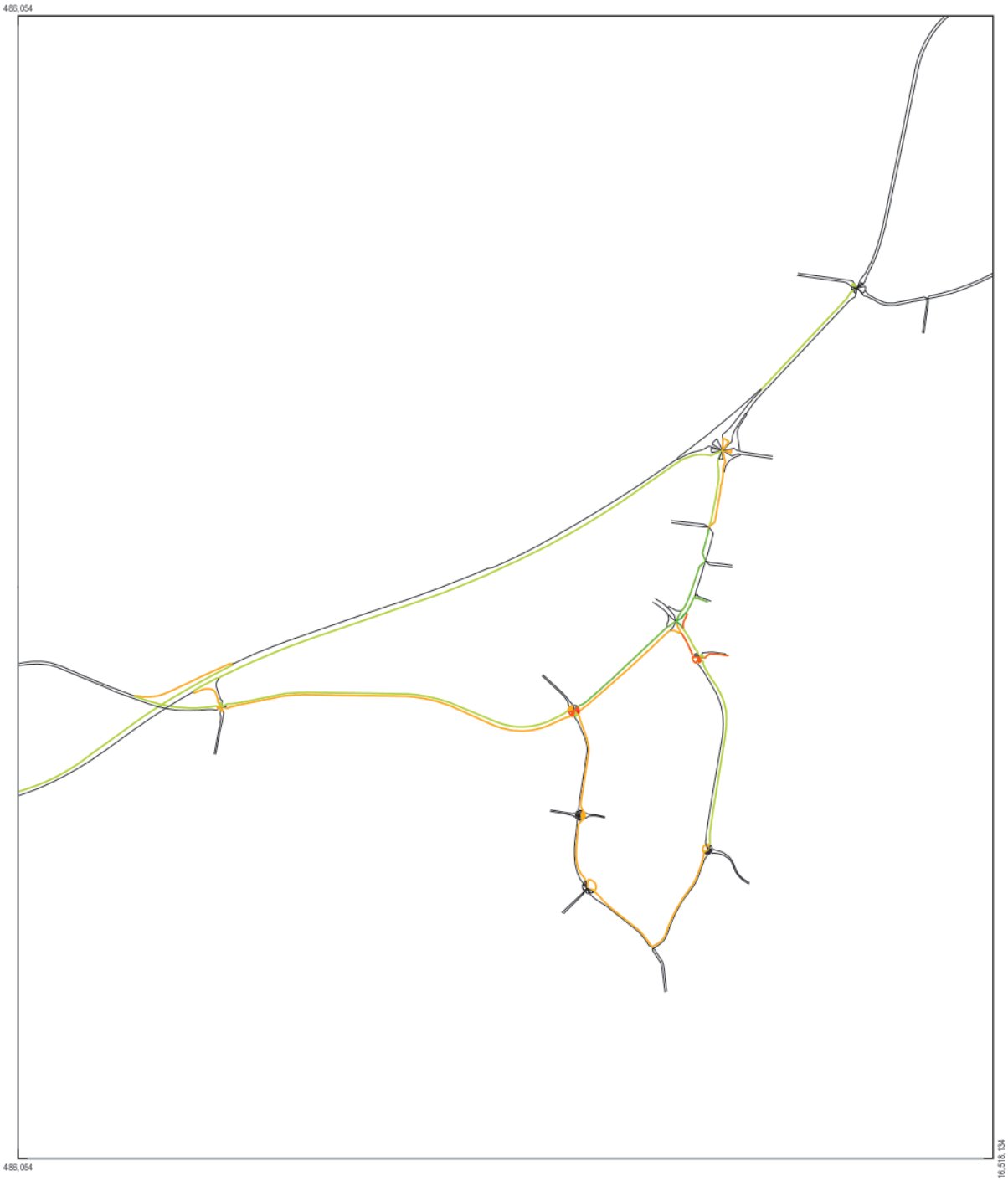
Data source: GHD, 2017 Created by:mbrooks



LEGEND
Traffic Volume Difference (veh/hr)

-1000 - -500 | -250 - -100 | 100 - 250 | 500 - 1000

-500 - -250 | -100 - 100 | 250 - 500

Paper Size A4
0 55 110 220 330 440
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 07 Sep 2017

Traffic Volume Change - John Oxley Dr
2036 AM Peak (0800-0900)

Figure E.12

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Data source: GHD, 2017 Created by:mbrooks

LEGEND
Traffic Volume Difference (veh/hr)

-500 - -250 | -100 - 100 | 250 - 500
-250 - -100 | 100 - 250 | 500 - 1000

Paper Size A4
0 55 110 220 330 440
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 07 Sep 2017

Traffic Volume Change - Wauchope Bypass
2036 AM Peak (0800-0900)

Figure E.13

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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Data source: GHD, 2017 Created by:mbrooks

LEGEND
Traffic Volume Difference (veh/hr)

-500 - -250 | -100 - 100 | 250 - 500
-250 - -100 | 100 - 250 | 500 - 1000

Paper Size A4
0 55 110 220 330 440
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 07 Sep 2017

Traffic Volume Change - Wauchope Bypass
2036 PM Peak (1500-1600)

Figure E.14

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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Data source: GHD, 2017 Created by:mbrooks

LEGEND
Traffic Volume Difference (veh/hr)

-500 - -250 | -100 - 100 | 250 - 500

-250 - -100 | 100 - 250

Paper Size A4
0 55 110 220 330 440
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 07 Sep 2017

Traffic Volume Change - Bonny Hills Bypass
2036 AM Peak (0800-0900)

Figure E.15

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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Data source: GHD, 2017 Created by:mbrooks

LEGEND
Traffic Volume Difference (veh/hr)

-500 - -250 | -100 - 100 | 250 - 500

-250 - -100 | 100 - 250

Paper Size A4
0 55 110 220 330 440
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 07 Sep 2017

Traffic Volume Change - Bonny Hills Bypass
2036 PM Peak (1500-1600)

Figure E.16

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	T. Bickerstaff	E. Jackson		S. Keevil-Jones		22/06/18

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Port Macquarie-Hastings Council and Roads and Maritime Services

Port Macquarie - Hastings Local Government Area

Traffic Study

VOLUME 3 – Traffic Model Inputs

June 2018

WATER | ENERGY & RESOURCES | ENVIRONMENT | PROPERTY & BUILDINGS | TRANSPORTATION

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Appendices

Appendix A Base Case Volume Plots

Appendix B Base Case Lane Density Plots

Appendix C Base Case Speed Plots

Appendix D Base Case Volume Profile Graphs

Appendix E Scenario Volume Comparison Plots

Appendix F Base Model Trip Generation and Attraction

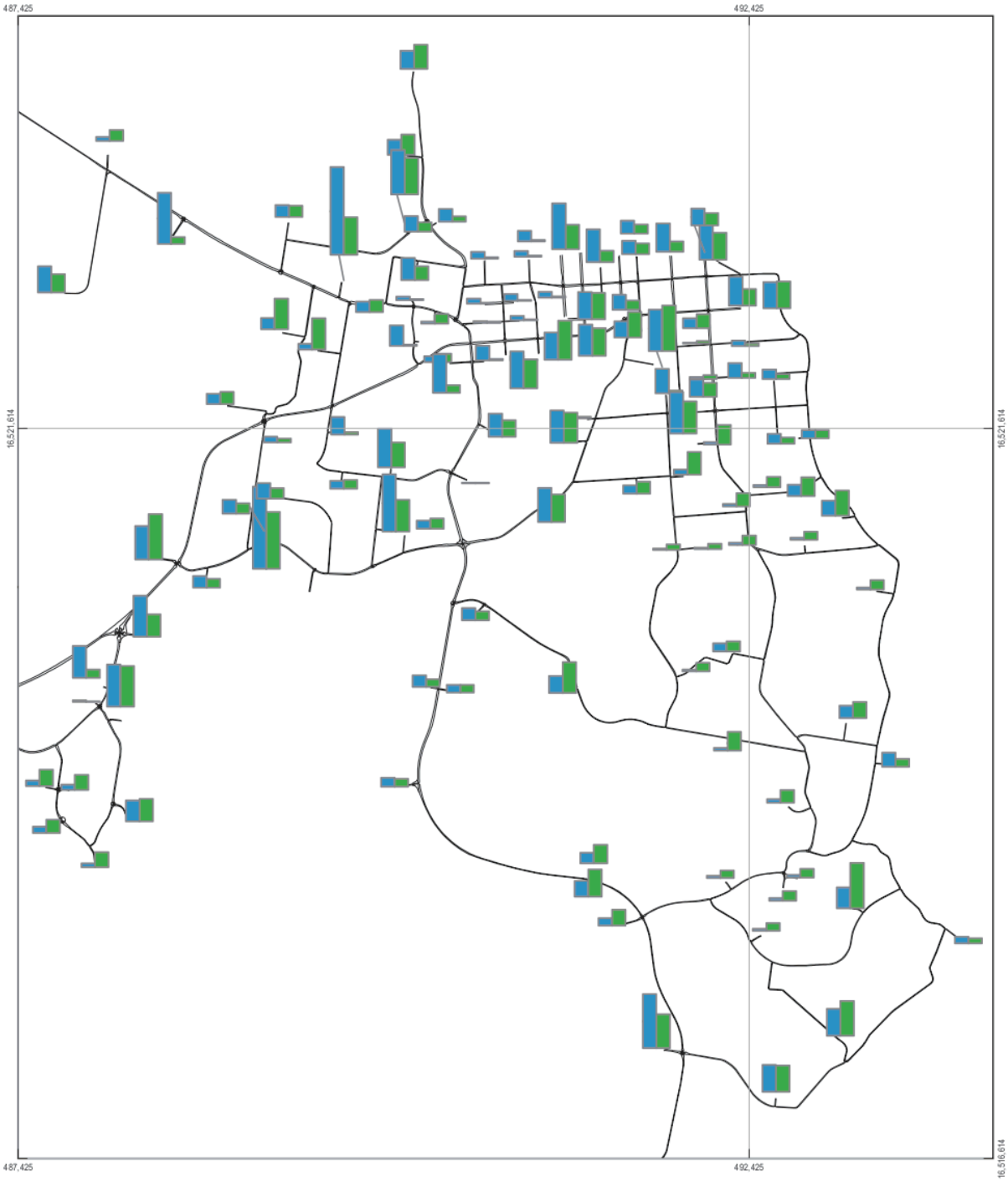
Appendix G Model – Land Use Alignment

Appendix H Model Zone Growth Rates

Appendix I Traffic Data Summary

Appendices

Appendix F Base Model Trip Generation and Attraction



LEGEND

2016 AM Attraction

2016 AM Generation

Paper Size A4

0 125 250 500 750 1,000

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 07 Sep 2017

Centroid Attraction and Generation
2016 AM Peak (0700-1000)

Figure F.1

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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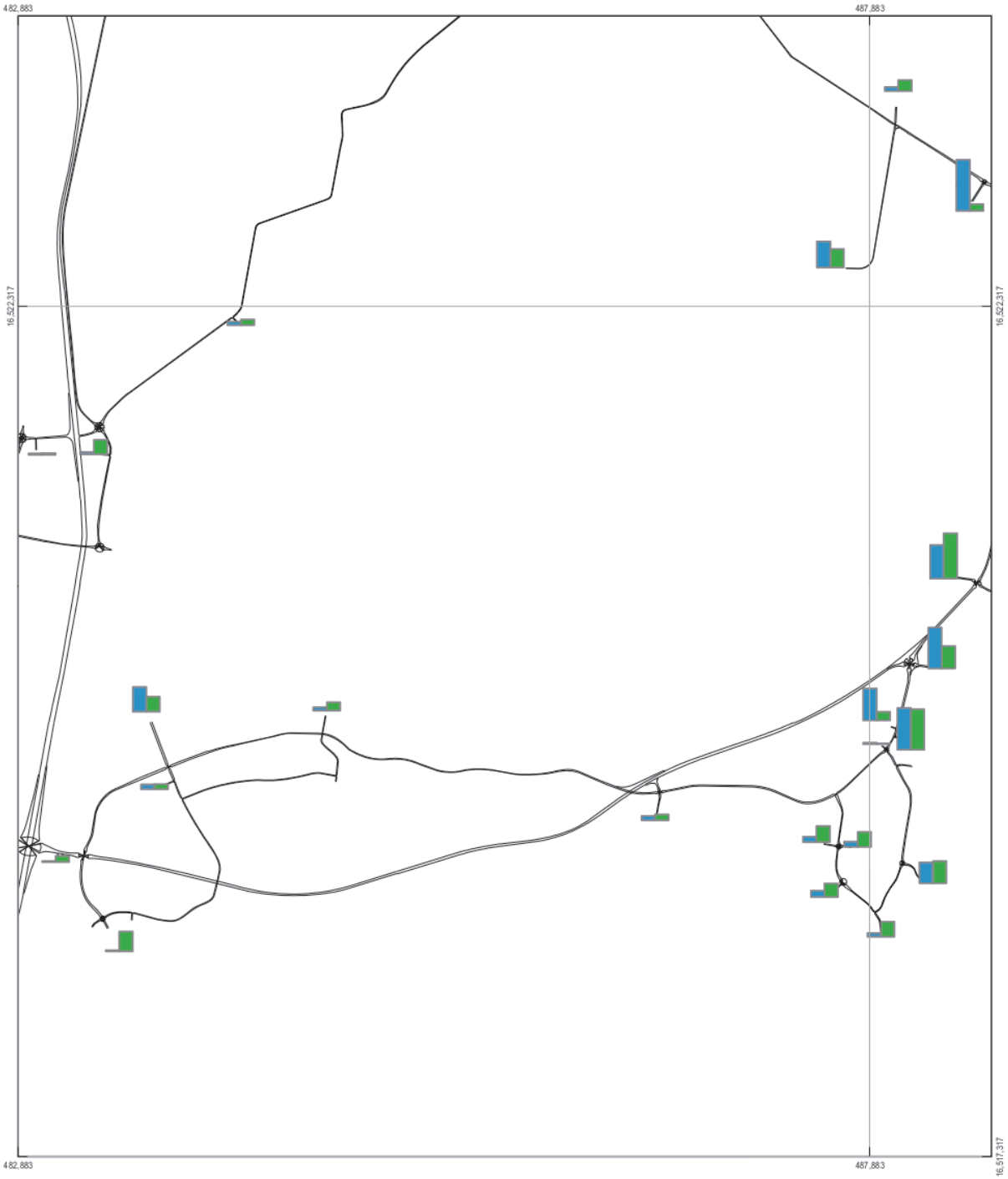

LEGEND

2016 AM Attraction

2016 AM Generation

Paper Size A4

0 110 220 440 660 880

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
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Revision A
Date 07 Sep 2017

Centroid Attraction and Generation
2016 AM Peak (0700-1000)

Figure F.2

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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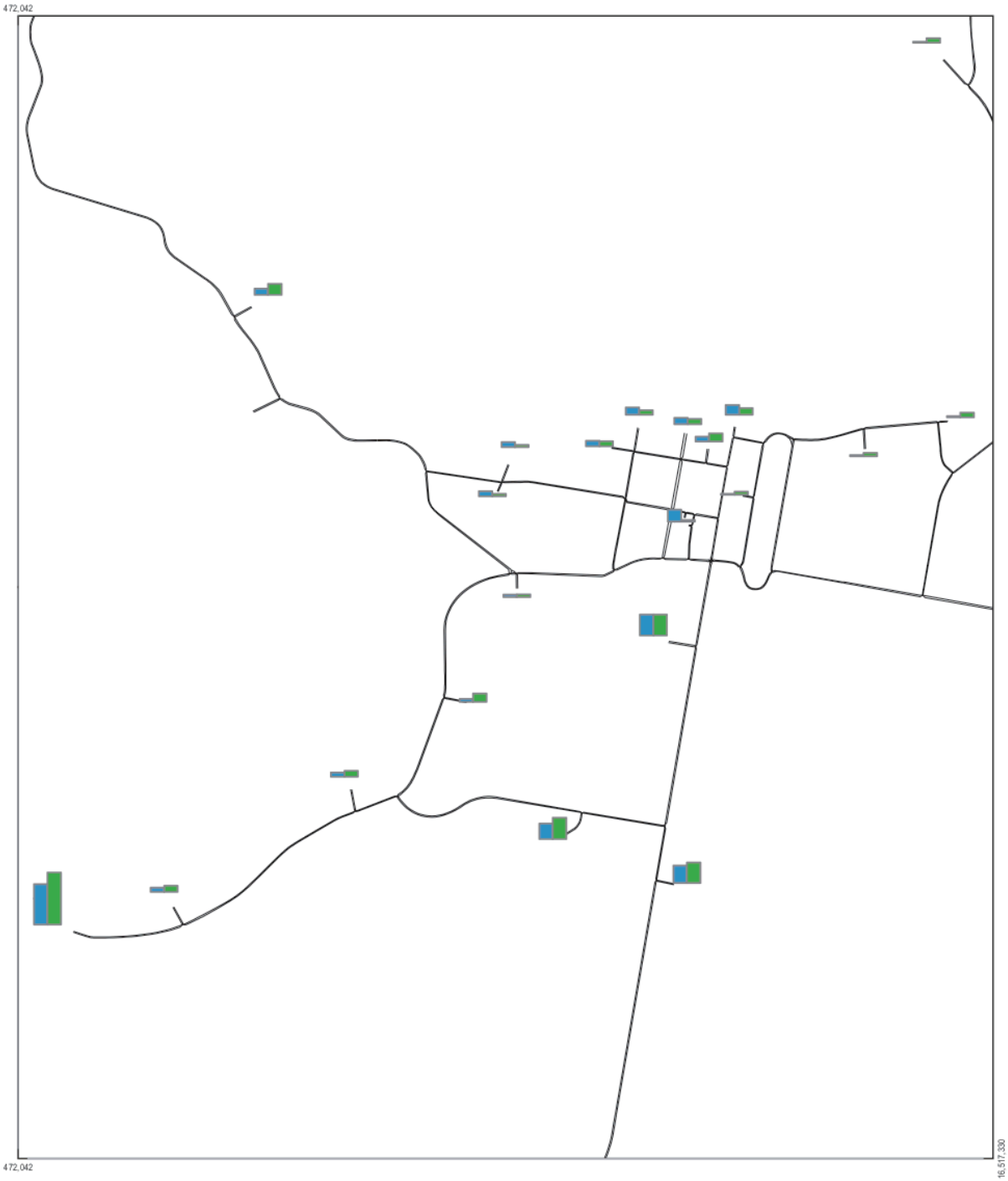

LEGEND

2016 AM Attraction

2016 AM Generation

Paper Size A4
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Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

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Revision A
Date 07 Sep 2017

Centroid Attraction and Generation
2016 AM Peak (0700-1000)

Figure F.3

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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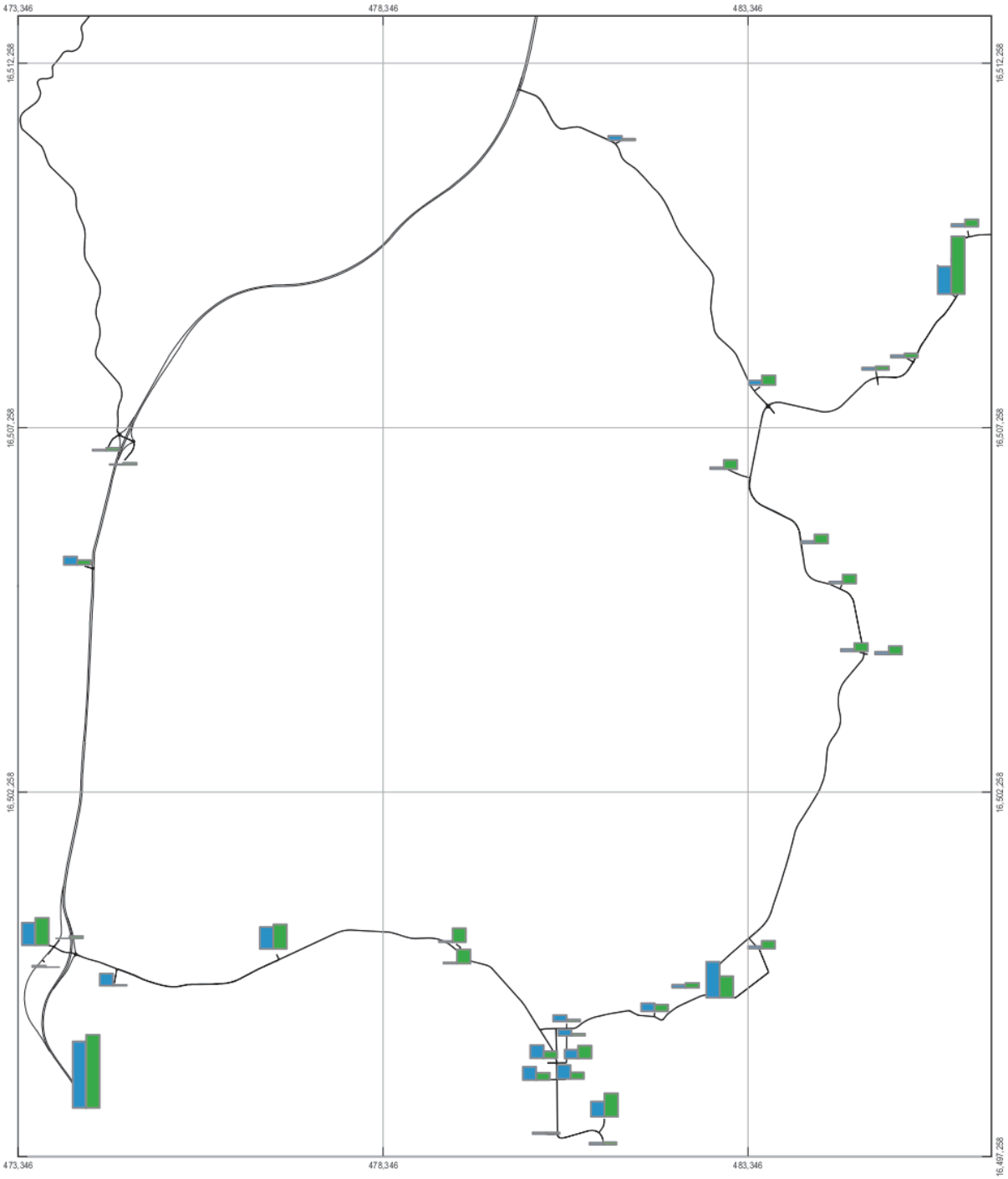
Data source: GHD, 2017 Created by:mbrooks



LEGEND

2016 AM Attraction

2016 AM Generation

Paper Size A4
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Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 07 Sep 2017

Centroid Attraction and Generation
2016 AM Peak (0700-1000)

Figure F.4

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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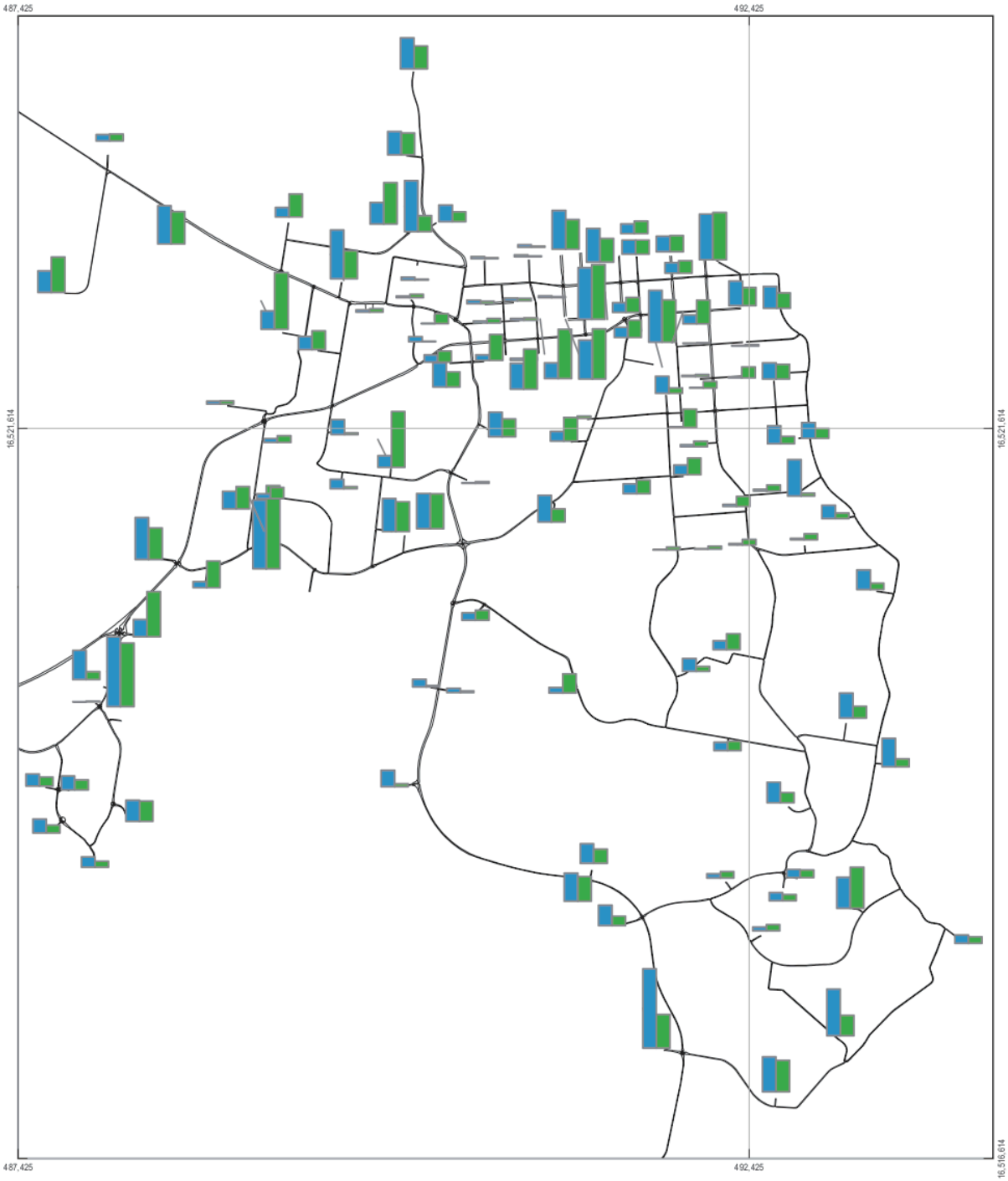
Data source: GHD, 2017 Created by:mbrooks



LEGEND

2016 PM Attraction

2016 PM Generation

Paper Size A4

0 125 250 500 750 1,000

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 07 Sep 2017

Centroid Attraction and Generation
2016 PM Peak (1400-1800)

Figure F.5

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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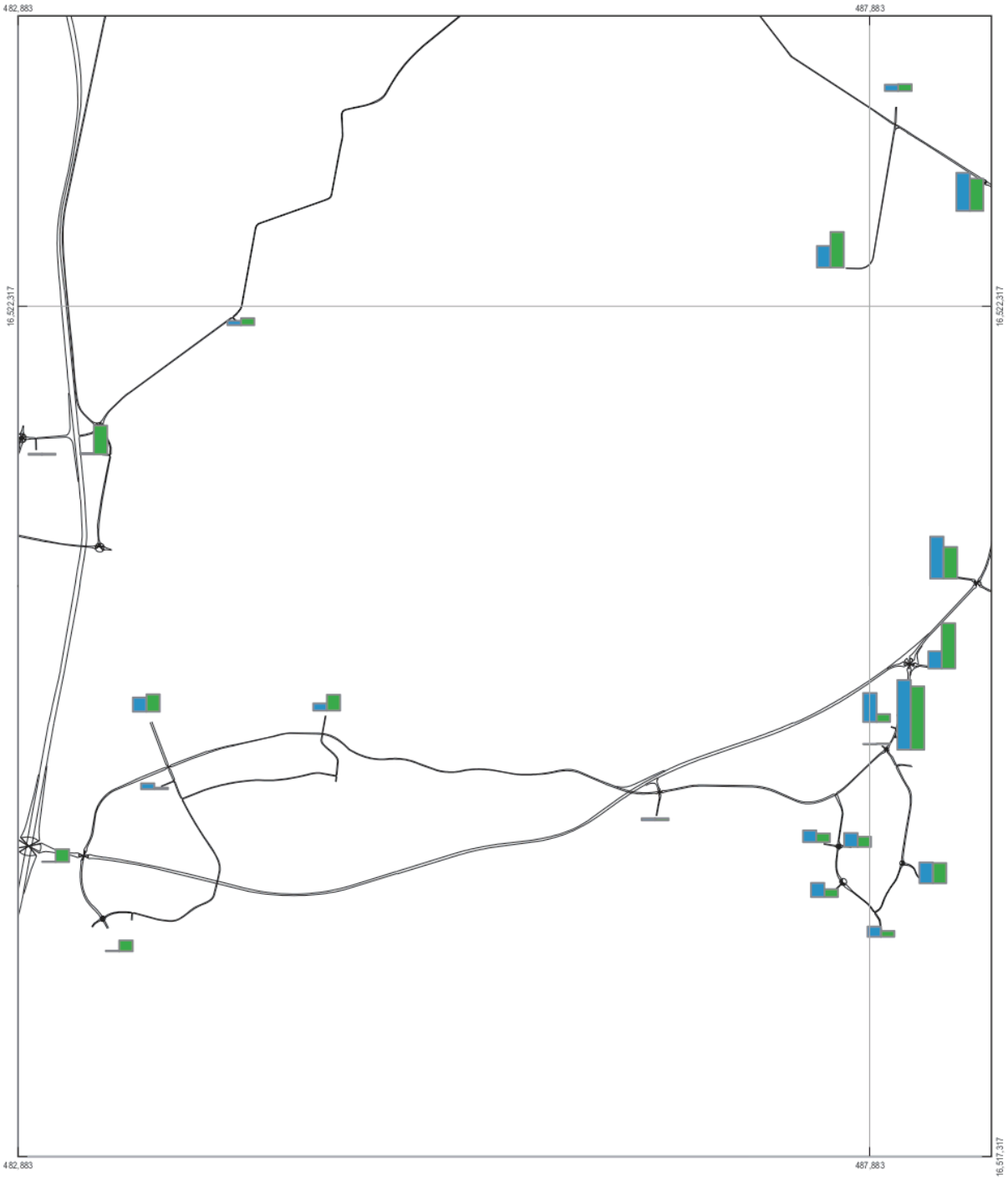

LEGEND

2016 PM Attraction

2016 PM Generation

Paper Size A4
0 110 220 440 660 880
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

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Job Number 22-18116
Revision A
Date 07 Sep 2017

Centroid Attraction and Generation
2016 PM Peak (1400-1800)

Figure F.6

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LEGEND

2016 PM Attraction

2016 PM Generation

Paper Size A4
0 70 140 280 420 560
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

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Centroid Attraction and Generation
2016 PM Peak (1400-1800)

Figure F.7

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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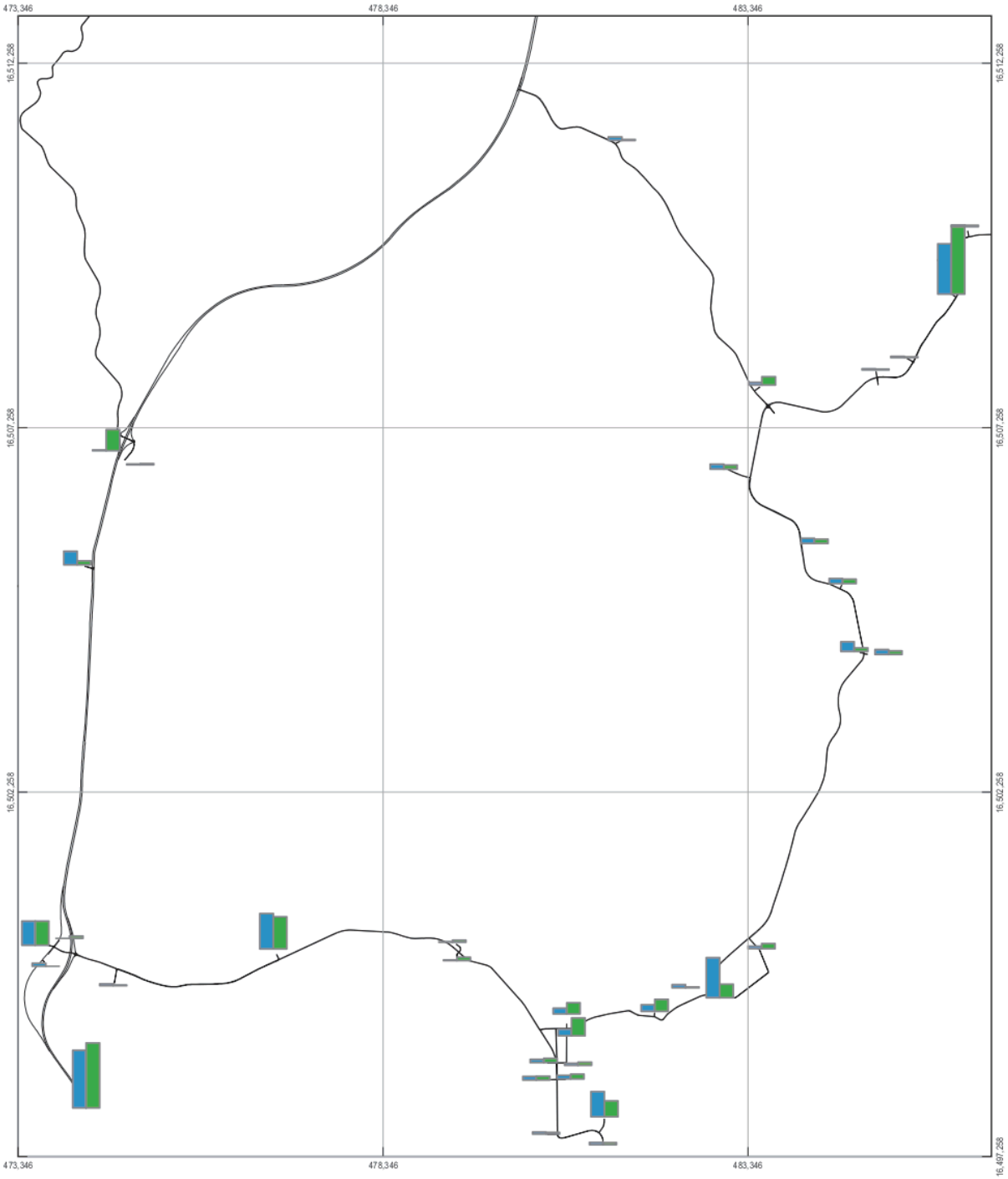
Data source: GHD, 2017 Created by:mbrooks



LEGEND

2016 PM Attraction

2016 PM Generation

Paper Size A4

0 250 500 1,000 1,500 2,000

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

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Centroid Attraction and Generation
2016 PM Peak (1400-1800)

Figure F.8

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Appendix G Model – Land Use Alignment

Allocation of Centroids to Subareas

		Subareas			
Centroid	Location	Population	Retail	Office	Industrial
6231	Park Street	Hastings River Canals	Port Macquarie Remainder	Port Macquarie Remainder	Port Macquarie Remainder
6234	River Park Road	Hastings River Canals	Port Macquarie Remainder	Port Macquarie Remainder	Port Macquarie Remainder
6235	Newport Island road	Hastings River Canals	Port Macquarie Remainder	Port Macquarie Remainder	Port Macquarie Remainder
6237	Bellbowrie Street	Hastings River Canals	Port Macquarie Remainder	Port Macquarie Remainder	Port Macquarie Remainder
6271	Widderson Street	Westport	Port Macquarie Remainder	Port Macquarie Remainder	Port Macquarie Remainder
6272	Clifton Drive	Westport	Port Macquarie Remainder	Port Macquarie Remainder	Port Macquarie Remainder
6273	Lady Nelson Drive	Westport	Port Macquarie Remainder	Port Macquarie Remainder	Port Macquarie Remainder
6274	Widderson Street - TAFE	Westport	Port Macquarie Remainder	Port Macquarie Remainder	Port Macquarie Remainder
6275	Slade Crescent	Westport	Port Macquarie Remainder	Port Macquarie Remainder	Port Macquarie Remainder
6309	Barton Crescent	Westport	Port Macquarie Remainder	Port Macquarie Remainder	Port Macquarie Remainder
6310	Acacia Avenue		Port Macquarie Remainder	Port Macquarie Remainder	Port Macquarie Remainder
6311	Bunnings Port Macquarie		Port Macquarie Remainder	Port Macquarie Remainder	Port Macquarie Remainder
6314	Sherwood Road	Westport	Port Macquarie Remainder	Port Macquarie Remainder	Port Macquarie Remainder
6403	Boundary Street	Hastings River Canals	Port Macquarie Remainder	Port Macquarie Remainder	Port Macquarie Remainder
6404	Boundary Street - Airport		Port Macquarie Remainder	Port Macquarie Remainder	Port Macquarie Remainder
6405	Hughes Place		Port Macquarie Remainder	Port Macquarie Remainder	Port Macquarie Remainder
24422	Toyota Dealership Port Macquarie		Port Macquarie Remainder	Port Macquarie Remainder	Port Macquarie Remainder
25309	Fern Valley Parade	Westport	Port Macquarie Remainder	Port Macquarie Remainder	Port Macquarie Remainder
24376	Barton Crescent		Port Macquarie Remainder	Port Macquarie Remainder	Port Macquarie Remainder
6442	Edith Street	Camden Haven East	North Haven	North Haven	Camden Haven East
6443	Alma Street	Camden Haven East	North Haven	North Haven	Camden Haven East
6444	The Parade	Camden Haven East	North Haven	North Haven	Camden Haven East
6445	Adeline Street	Camden Haven East	North Haven	North Haven	Camden Haven East
6446	Lake Street	Camden Haven East	Laurieton	Laurieton	Camden Haven East
6447	Lake Street	Camden Haven East	Laurieton	Laurieton	Camden Haven East
6448	Tunis Street	Camden Haven East	Laurieton	Laurieton	Camden Haven East
6449	Tunis Street	Camden Haven East	Laurieton	Laurieton	Camden Haven East
6450	Seymour Street	Camden Haven East	Laurieton	Laurieton	Camden Haven East
6451	Seymour Street	Camden Haven East	Laurieton	Laurieton	Camden Haven East
6452	Hanley Street	Camden Haven East	Laurieton	Laurieton	Camden Haven East
6453	Diamond Head Road	Camden Haven East	Laurieton	Laurieton	Camden Haven East
6454	The Boulevarde	Camden Haven East	Laurieton	Laurieton	Camden Haven East
6462	Captain Cook Bicentennial Drive	Camden Haven East	Laurieton	Laurieton	Camden Haven East
6463	St Albans Way	Camden Haven East	Laurieton	Laurieton	Camden Haven East
6464	Sirius Drive	Camden Haven West	Lakewood	Lakewood	Kew
6465	Glen Haven Drive	Camden Haven West	Kew	Kew	Kew
6466	Pacific Highway - Kew	Camden Haven West	Kew	Kew	Kew
6467	Tathra Road	Camden Haven West	Kew	Kew	Kew
6468	Nancy Bird Walton Drive	Camden Haven West	Kew	Kew	Kew
6469	Kendall Road	Camden Haven West	Kendall	Kendall	Kew
6281	Mallawa Crescent	Lord Street	Flynns Beach	Flynns Beach	Flynns Beach
6282	Home Street	Lord Street	Flynns Beach	Flynns Beach	Flynns Beach
6283	Cross Street	Lord Street	Flynns Beach	Flynns Beach	Flynns Beach
6284	Everard Street	Flynns Beach	Flynns Beach	Flynns Beach	Flynns Beach
6285	Cross Street	Flynns Beach	Flynns Beach	Flynns Beach	Flynns Beach
6292	Flynn Street	Flynns Beach	Flynns Beach	Flynns Beach	Flynns Beach
6293	Flynn Street	Flynns Beach	Flynns Beach	Flynns Beach	Flynns Beach
6294	Herschell Street	Flynns Beach	Flynns Beach	Flynns Beach	Flynns Beach
6295	Ocean Street	Flynns Beach	Flynns Beach	Flynns Beach	Flynns Beach
6296	John Street	Flynns Beach	Flynns Beach	Flynns Beach	Flynns Beach
6297	Yarranabee Road	Flynns Beach	Flynns Beach	Flynns Beach	Flynns Beach
6236	Bay Street - Settlement City	Westport	Westport	Westport	Westport
6268	Ackroyd Street	Inner West Port	Westport	Westport	Westport
6269	Ackroyd Street	Inner West Port	Westport	Westport	Westport
6267	Gore Street	Inner West Port	Westport	Westport	Westport
6242	Buller Street - Westport Park	Inner West Port	Westport	Westport	Westport
6243	Hollingsworth Street - Waters Edge	Inner West Port	Westport	Westport	Westport
6261	Hollingsworth Street	Inner West Port	Westport	Westport	Westport
6262	Hollingsworth Street	Inner West Port	Westport	Westport	Westport
6244	Hollingsworth Street	Inner West Port	Westport	Westport	Westport
6239	Blueberry Lane	Inner West Port	Westport	Westport	Westport
6240	Findlay Avenue - Garden Village	Inner West Port	Westport	Westport	Westport
6241	Hastings Avenue	Inner West Port	Westport	Westport	Westport
6263	Waugh Street	Inner West Port	Westport	Westport	Westport
6264	Bridge Street	Inner West Port	Westport	Westport	Westport
6265	Waugh Street	Inner West Port	Westport	Westport	Westport
6266	Bridge Street	Inner West Port	Westport	Westport	Westport
6276	Koolooinbung Close	Westport	Westport	Westport	Westport
6277	Platt Street	Westport	Westport	Westport	Westport
23276	Morton Street	Inner West Port	Westport	Westport	Westport
23683	Sails Resort	Inner West Port	Westport	Westport	Westport
23693	McDonalds Port Macquarie	Inner West Port	Westport	Westport	Westport
29636	Boronia Street	Westport	Westport	Westport	Westport
24443	Westerweller Way	Inner West Port	Westport	Westport	Westport
6312	Jindalee Road	Innes Peninsula	Innes Peninsula	Innes Peninsula	Innes Peninsula
6313	Toorak Court	Innes Peninsula	Innes Peninsula	Innes Peninsula	Innes Peninsula
6315	Wrights Road	Innes Peninsula	Innes Peninsula	Innes Peninsula	Innes Peninsula
6332	Braeroy Drive	Innes Peninsula	Innes Peninsula	Innes Peninsula	Innes Peninsula
6333	Currawong Drive	Innes Peninsula	Innes Peninsula	Innes Peninsula	Innes Peninsula
6334	Annabella Drive	Innes Peninsula	Innes Peninsula	Innes Peninsula	Innes Peninsula
6363	The Point Drive	Innes Peninsula	Innes Peninsula	Innes Peninsula	Innes Peninsula
6364	The Ruins Way	Innes Peninsula	Innes Peninsula	Innes Peninsula	Innes Peninsula
6365	Philip Charley Drive	Innes Peninsula	Innes Peninsula	Innes Peninsula	Innes Peninsula
16356	John Oxley Drive - Sienna Grange	Innes Peninsula	Innes Peninsula	Innes Peninsula	Innes Peninsula
23590	Major Innes Road / John Oxley Drive	Innes Peninsula	Innes Peninsula	Innes Peninsula	Innes Peninsula
23598	Lake Innes Village	Innes Peninsula	Innes Peninsula	Innes Peninsula	Innes Peninsula
6406	Evans Street	Lake Cathie - Bonny Hills	Lake Cathie - Bonny Hills	Lake Cathie - Bonny Hills	Lake Cathie - Bonny Hills
6407	Woolworths Lake Cathie	Lake Cathie - Bonny Hills	Lake Cathie - Bonny Hills	Lake Cathie - Bonny Hills	Lake Cathie - Bonny Hills
6408	Miala Street	Lake Cathie - Bonny Hills	Lake Cathie - Bonny Hills	Lake Cathie - Bonny Hills	Lake Cathie - Bonny Hills
6409	Abel Tasman Drive	Lake Cathie - Bonny Hills	Lake Cathie - Bonny Hills	Lake Cathie - Bonny Hills	Lake Cathie - Bonny Hills
6427	Bonny View Drive	Lake Cathie - Bonny Hills	Lake Cathie - Bonny Hills	Lake Cathie - Bonny Hills	Lake Cathie - Bonny Hills
6431	Beach Street	Lake Cathie - Bonny Hills	Lake Cathie - Bonny Hills	Lake Cathie - Bonny Hills	Lake Cathie - Bonny Hills
6432	Beach Street	Lake Cathie - Bonny Hills	Lake Cathie - Bonny Hills	Lake Cathie - Bonny Hills	Lake Cathie - Bonny Hills
6433	Third Avenue	Lake Cathie - Bonny Hills	Lake Cathie - Bonny Hills	Lake Cathie - Bonny Hills	Lake Cathie - Bonny Hills
6434	Panorama Drive	Lake Cathie - Bonny Hills	Lake Cathie - Bonny Hills	Lake Cathie - Bonny Hills	Lake Cathie - Bonny Hills
24228	Forest Parkway	Lake Cathie - Bonny Hills	Lake Cathie - Bonny Hills	Lake Cathie - Bonny Hills	Lake Cathie - Bonny Hills
6316	Greenmeadows Drive	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows
6317	Lochinvar Place	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows
6318	Greenmeadows Drive	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows
6319	Crestwood Drive	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows
6320	Dahlsford Drive	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows
6321	Jonas Absalom Drive	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows
6322	Livingstone Road	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows
6323	Waterview Close	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows
6324	Timber Ridge	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows
6325	Ashdown Drive	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows
6326	Montague Street	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows
6327	Lighthouse Road	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows
6328	Watonga Street	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows
6329	Pettitt Street	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows
6330	Emerald Drive	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows
6331	Port Macquarie Golf Course	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows
6307	Emily Avenue	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows

Allocation of Centroids to Subareas

		Subareas			
Centroid	Location	Population	Retail	Office	Industrial
6308	Hockey Place	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows
6305	Oleander Avenue	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows	Lighthouse Beach - Greenmeadows
6401	Fernbank Creek Road	Port Macquarie Rural Fringe	Kings Creek - Sancrox - Lake Innes	Kings Creek - Sancrox - Lake Innes	Kings Creek - Sancrox - Lake Innes
24276	Oakes Crescent	Port Macquarie Rural Fringe	Kings Creek - Sancrox - Lake Innes	Kings Creek - Sancrox - Lake Innes	Kings Creek - Sancrox - Lake Innes
24244	Long Point Drive	Port Macquarie Rural Fringe	Kings Creek - Sancrox - Lake Innes	Kings Creek - Sancrox - Lake Innes	Kings Creek - Sancrox - Lake Innes
6371	Sancrox Road - Expressway Spares	Port Macquarie Rural Fringe	Kings Creek - Sancrox - Lake Innes	Kings Creek - Sancrox - Lake Innes	Kings Creek - Sancrox - Lake Innes
6372	Billabong Drive	Port Macquarie Rural Fringe	Kings Creek - Sancrox - Lake Innes	Kings Creek - Sancrox - Lake Innes	Kings Creek - Sancrox - Lake Innes
6373	Burrawan Forest Drive	Port Macquarie Rural Fringe	Kings Creek - Sancrox - Lake Innes	Kings Creek - Sancrox - Lake Innes	Kings Creek - Sancrox - Lake Innes
6374	Rawdon Island Road	Port Macquarie Rural Fringe	Kings Creek - Sancrox - Lake Innes	Kings Creek - Sancrox - Lake Innes	Kings Creek - Sancrox - Lake Innes
6375	Sancrox Road	Port Macquarie Rural Fringe	Kings Creek - Sancrox - Lake Innes	Kings Creek - Sancrox - Lake Innes	Kings Creek - Sancrox - Lake Innes
6376	King Creek Road	Port Macquarie Rural Fringe	Kings Creek - Sancrox - Lake Innes	Kings Creek - Sancrox - Lake Innes	Kings Creek - Sancrox - Lake Innes
24260	Wambuyn Drive	Port Macquarie Rural Fringe	Kings Creek - Sancrox - Lake Innes	Kings Creek - Sancrox - Lake Innes	Kings Creek - Sancrox - Lake Innes
6857	Fernbank Creek Road	Port Macquarie Rural Fringe	Kings Creek - Sancrox - Lake Innes	Kings Creek - Sancrox - Lake Innes	Kings Creek - Sancrox - Lake Innes
6428	Bobs Creek Road	Rural			Rural West - South
6429	Ron Banks Road	Rural			Rural West - South
6430	Herons Creek Road	Rural			Rural West - South
6397	Beechwood Road	Rural	Rural North	Rural North	Rural North
6398	Redbank Road	Rural	Rural North	Rural North	Rural North
6399	Redbank Road	Rural	Rural North	Rural North	Rural North
6400	Pacific Highway - Telegraph Point	Rural	Rural North	Rural North	Rural North
23260	Rollands Plains Road	Rural	Rural North	Rural North	Rural North
6278	Wyandra Crescent	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill
6279	Hill Street	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill
6280	Gray Street	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill
6286	Crisp Street	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill
6287	Grant Street	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill
6288	Grant Street	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill
6289	Granite Street	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill
6290	Bellevue Drive	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill
6291	Savoy Street	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill
6298	Moruya Drive	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill
6299	Bellevue Drive	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill
6300	Leanda Street	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill
6301	Hillcrest Avenue	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill
6302	Braemar Drive	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill
6303	Calwalla Crescent	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill
24405	Banksia Avenue	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill
6306	O'Briens Road	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill
6304	Pacific Drive - Sea Acres Rainforest	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill	Shelly Beach - Bellevue Hill
6366	Capital Drive	Thrumster	Thrumster	Thrumster	Thrumster
6367	Main Street	Thrumster	Thrumster	Thrumster	Thrumster
6368	Oxley Highway Service Centre	Thrumster	Thrumster	Thrumster	Thrumster
6369	Oxley Highway Service Centre	Thrumster	Thrumster	Thrumster	Thrumster
25293	Thrumster Street	Thrumster	Thrumster	Thrumster	Thrumster
6245	Short Street	Town Beach - CBD	Town Beach - CBD	Town Beach - CBD	Town Beach - CBD
6246	Short Street / Hayward Street	Town Beach - CBD	Town Beach - CBD	Town Beach - CBD	Town Beach - CBD
6247	Horton Street	Town Beach - CBD	Town Beach - CBD	Town Beach - CBD	Town Beach - CBD
6248	Hay Street	Town Beach - CBD	Town Beach - CBD	Town Beach - CBD	Town Beach - CBD
6249	Hay Street / Hayward Street	Town Beach - CBD	Town Beach - CBD	Town Beach - CBD	Town Beach - CBD
6250	Murray Street	Town Beach - CBD	Town Beach - CBD	Town Beach - CBD	Town Beach - CBD
6251	Murray Street	Town Beach - CBD	Town Beach - CBD	Town Beach - CBD	Town Beach - CBD
6252	Munster Street	Town Beach - CBD	Town Beach - CBD	Town Beach - CBD	Town Beach - CBD
6253	Grant Street	Town Beach - CBD	Town Beach - CBD	Town Beach - CBD	Town Beach - CBD
6254	Lord Street	Town Beach - CBD	Town Beach - CBD	Town Beach - CBD	Town Beach - CBD
6255	Stewart Street	Town Beach - CBD	Town Beach - CBD	Town Beach - CBD	Town Beach - CBD
6256	Church Street - Bowls Club	Town Beach - CBD	Town Beach - CBD	Town Beach - CBD	Town Beach - CBD
6257	Burrawan Street - Hastings Secondary College	Lord Street	Town Beach - CBD	Town Beach - CBD	Town Beach - CBD
6258	Burrawan Street / Grant Street	Town Beach - CBD	Town Beach - CBD	Town Beach - CBD	Town Beach - CBD
6259	Grant Street / Burrawan Street	Town Beach - CBD	Town Beach - CBD	Town Beach - CBD	Town Beach - CBD
6260	Munster Street - City Church	Town Beach - CBD	Town Beach - CBD	Town Beach - CBD	Town Beach - CBD
6537	Owen Street	Lord Street	Town Beach - CBD	Town Beach - CBD	Town Beach - CBD
6388	Allan Road	Wauchope	Wauchope	Wauchope	Wauchope
6389	King Street	Wauchope	Wauchope	Wauchope	Wauchope
6390	Christy Street	Wauchope	Wauchope	Wauchope	Wauchope
6391	Pead Street	Wauchope	Wauchope	Wauchope	Wauchope
6392	Mahogany Way	Wauchope	Wauchope	Wauchope	Wauchope
6393	Azalea Avenue	Wauchope	Wauchope	Wauchope	Wauchope
6394	Forest Way	Wauchope	Wauchope	Wauchope	Wauchope
6395	Oxley Highway - Wauchope west	Wauchope	Wauchope	Wauchope	Wauchope
6470	Commerce Street	Wauchope	Wauchope	Wauchope	Wauchope
6377	Rocks Ferry Road	Wauchope	Wauchope	Wauchope	Wauchope
6378	Princess Avenue	Wauchope	Wauchope	Wauchope	Wauchope
6379	Webb Street	Wauchope	Wauchope	Wauchope	Wauchope
6380	Cameron Street / River Street	Wauchope	Wauchope	Wauchope	Wauchope
6381	Park Street	Wauchope	Wauchope	Wauchope	Wauchope
6382	Waucope IGA	Wauchope	Wauchope	Wauchope	Wauchope
6383	Hastings Street	Wauchope	Wauchope	Wauchope	Wauchope
6384	Campbell Street	Wauchope	Wauchope	Wauchope	Wauchope
6385	Bain Street	Wauchope	Wauchope	Wauchope	Wauchope
6386	James Street	Wauchope	Wauchope	Wauchope	Wauchope
6387	James Street	Wauchope	Wauchope	Wauchope	Wauchope
6396	Riverbreeze Drive	Wauchope	Wauchope	Wauchope	Wauchope

Appendix H Model Zone Growth Rates

		2016 - Total Traffic Volumes								2021 - Total Traffic Volumes								Absolute Difference								% Difference							
		Generation				Attraction				Generation				Attraction				Generation				Attraction				Generation				Attraction			
		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 3-6		AM 7-10		PM 2-6	
Location	Zone	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV
Park Street	6231	436	37	578	27	341	16	818	8	480	39	609	33	356	17	855	10	44	3	31	6	15	1	37	2	10%	8%	5%	24%	4%	5%	5%	28%
River Park Road	6234	360	36	550	27	281	12	613	4	384	38	569	34	291	12	655	6	24	3	18	6	10	1	42	2	7%	8%	3%	24%	3%	5%	7%	45%
Newport Island road	6235	203	17	589	18	224	9	243	8	215	19	639	19	235	10	254	10	12	2	50	1	11	0	11	2	6%	9%	9%	7%	5%	5%	5%	21%
Bay Street - Settlement City	6236	696	18	1084	18	854	14	558	13	781	21	1247	20	1019	16	649	18	84	3	162	2	164	2	91	5	12%	17%	19%	8%	19%	19%	16%	39%
Bellbowrie Street	6237	733	5	742	2	1714	8	1262	36	778	5	784	3	1897	8	1416	38	44	0	42	1	183	0	154	3	6%	7%	6%	25%	11%	4%	12%	8%
Blueberry Lane	6239	22	4	89	2	66	4	41	2	25	4	96	3	69	4	43	3	3	0	7	1	3	0	2	0	14%	9%	8%	24%	5%	6%	4%	20%
Findlay Avenue - Garden Village	6240	25	4	18	2	403	0	143	0	29	4	20	3	426	0	153	0	3	0	2	1	23	0	10	0	14%	9%	9%	29%	6%	0%	7%	0%
Hastings Avenue	6241	265	4	27	2	424	12	71	8	282	4	28	2	455	12	78	10	17	0	1	0	30	1	7	1	7%	8%	3%	24%	7%	7%	9%	15%
Buller Street - Westport Park	6242	22	4	24	2	132	4	53	3	75	5	103	3	159	5	72	4	53	1	79	1	27	1	18	1	239%	20%	328%	25%	21%	19%	34%	19%
Hollingsworth Street - Waters Edge	6243	22	4	24	2	112	4	52	3	68	4	97	3	133	4	67	3	46	1	74	1	21	0	15	0	205%	16%	310%	25%	19%	11%	30%	12%
Hollingsworth Street	6244	22	4	24	2	110	4	47	3	69	4	100	3	140	4	67	4	48	1	75	1	30	1	20	1	219%	23%	310%	25%	27%	19%	41%	26%
Short Street	6245	27	4	28	2	202	4	66	3	33	4	31	3	231	5	76	4	5	1	4	1	29	1	11	1	19%	17%	14%	25%	14%	14%	16%	32%
Short Street / Hayward Street	6246	534	12	1326	9	605	12	1021	11	612	14	1519	11	712	14	1189	14	78	2	194	2	107	2	168	4	15%	18%	15%	25%	18%	14%	16%	34%
Horton Street	6247	475	7	787	0	889	9	1029	2	552	8	913	0	1030	10	1183	2	77	1	126	0	142	1	155	0	16%	18%	16%	0%	16%	14%	15%	6%
Hay Street	6248	217	6	630	2	639	6	891	1	253	7	726	2	745	7	1033	1	35	1	96	1	106	1	141	0	16%	18%	15%	31%	17%	14%	16%	51%
Hay Street / Hayward Street	6249	504	12	1444	9	523	12	1364	11	571	13	1568	11	567	13	1480	13	67	1	124	2	44	1	116	2	13%	12%	9%	25%	8%	8%	8%	22%
Murray Street	6250	173	5	331	2	252	6	258	1	201	6	380	2	291	7	301	1	28	1	49	0	39	1	43	0	16%	17%	15%	31%	16%	14%	16%	50%
Murray Street	6251	176	5	398	2	293	6	260	1	184	6	409	2	299	6	267	1	7	0	11	0	6	0	7	0	4%	5%	3%	31%	2%	2%	3%	16%
Munster Street	6252	208	5	371	2	255	6	370	1	244	6	417	2	290	7	437	1	36	1	46	0	35	1	67	0	17%	16%	12%	31%	14%	13%	18%	47%
Grant Street	6253	195	5	429	2	548	6	409	1	202	6	436	2	559	6	432	1	7	0	7	0	12	0	23	0	4%	5%	2%	31%	2%	2%	6%	16%
Lord Street	6254	234	5	333	2	323	6	286	1	241	6	341	2	334	6	297	1	7	0	7	0	11	0	11	0	3%	5%	2%	31%	3%	2%	4%	16%
Stewart Street	6255	524	5	1256	2	726	6	1206	1	537	6	1270	2	737	6	1268	1	13	0	14	0	11	0	62	0	2%	5%	1%	31%	2%	2%	5%	16%
Church Street - Bowls Club	6256	511	15	406	2	494	20	579	1	528	16	416	3	507	21	595	1	16	1	10	0	12	0	16	0	3%	6%	2%	25%	2%	2%	3%	23%
Burrawan Street - Hastings Secondary College	6257	52	3	38	1	107	4	23	0	54	4	39	1	109	4	23	0	2	0	1	0	3	0	1	0	4%	5%	2%	9%	2%	2%	3%	16%
Burrawan Street / Grant Street	6258	47	3	23	1	13	4	12	0	52	4	25	1	15	4	14	0	5	0	2	0	1	0	1	0	11%	10%	8%	9%	9%	8%	11%	32%
Grant Street / Burrawan Street	6259	262	11	628	8	192	0	239	0	290	12	677	10	207	0	268	0	28	1	49	3	15	0	30	0	11%	11%	8%	34%	8%	0%	12%	0%
Munster Street - City Church	6260	485	11	447	8	316	0	267	0	496	12	459	10	332	0	274	0	11	1	12	2	16	0	7	0	2%	5%	3%	27%	5%	0%	3%	0%
Hollingsworth Street	6261	552	13	1062	0	717	9	681	5	570	13	1085	0	728	9	702	6	18	1	23	0	11	0	21	0	3%	6%	2%	0%	1%	5%	3%	8%
Hollingsworth Street	6262	759	8	1303	10	525	7	417	2	827	8	1393	13	561	8	451	5	68	1	90	3	36	1	34	3	9%	8%	7%	27%	7%	8%	8%	168%
Waugh Street	6263	20	1	69	0	135	1	74	0	23	1	77	0	145	1	79	0	3	0	8	0	10	0	5	0	16%	12%	12%	0%	7%	7%	7%	9%
Bridge Street	6264	20	1	68	0	87	1	48	0	22	1	74	0	93	1	51	0	2	0	6	0	5	0	3	0	11%	10%	9%	0%	6%	6%	5%	9%
Waugh Street	6265	20	1	67	0	101	1	94	0	22	1	72	0	107	1	100	0	2	0	5	0	6	0	7	0	11%	10%	8%	0%	6%	6%	7%	9%
Bridge Street	6266	27	3	122	4	37	1	60	0	30	3	130	5	39	1	64	1	3	0	8	1	2	0	4	0	10%	9%	6%	33%	5%	5%	6%	57%
Gore Street	6267	21	1	81	0	83	1	55	0	28	1	107	0	110	2	72	0	7	0	26	0	27	0	18	0	34%	35%	32%	0%	32%	30%	33%	9%
Ackroyd Street	6268	20	13	678	14	273	18	139	15	30	15	748	16	339	21	187	21	10	2	70	2	66	3	48	6	50%	15%	10%	11%	24%	13%	34%	39%
Ackroyd Street	6269	143	13	384	17	738	24	622	20	159	14	424	18	797	26	682	23	15	2	40	1	60	2	61	3	11%	13%	10%	8%	8%	8%	10%	18%
Widderson Street	6271	613	0	498	0	100	11	342	6	647	0	540	0	106	12	356	7	34	0	42	0	5	0	14	1	6%	0%	8%	0%	5%	3%	4%	9%
Clifton Drive	6272	592	9	1501	5	212	8	486	2	636	10	1564	6	225	9	524	3	44	1	63	1	13	0	38	1	7%	8%	4%	30%	6%	5%	8%	23%
Lady Nelson Drive	6273	238	3	85	1	200	4	79	1	254	3	91	2	210	5	84	1	16	0	6	0	9	0	5	0	7%	8%	7%	29%	5%	5%	6%	24%
Widderson Street - TAFE	6274	43	4	46	2	346	0	403	0	45	5	49	3	356	0	416	0	2	0	2	1	10	0	13	0	4%	6%	5%	24%	3%	0%	3%	0%
Slade Crescent	6275	169	5	53	2	155	0	251	0	182	5	57	3	161	0	262	0	13	0	4	1	6	0	11	0	8%	8%	8%	26%	4%	0%	5%	0%
Kooloonbung Close	6276	11	0	49	0	10	2	15	0	19	1	77	0	60	3	53	3	8	1	29	0	50	2	38	3	75%	0%	58%	0%	499%	88%	255%	0%
Platt Street	6277	320	2	471	4	448	5	650	1	407	3	511	5	520	7	738	4	87	1	40	1	73	2	88	3	27%	36%	8%	36%	16%	37%	14%	265%
Wyandra Crescent	6278	589	4	634	0	636	0	257	0	617	4	649	0	661	0	285	0	28	0	14	0	25	0	28	0	5%	6%	2%	0%	4%	0%	11%	0%
Hill Street	6279	34	1	63	0	25	2	23	0	36	2	65	0	26	2	24	0	3	0	2	0	1	0	2	0	8%	6%	4%	0%	4%	5%	7%	0%
Gray Street	6280	892	0	1127	0	783	31	1366	14	928	0	1158	0	811	31	1436	15	36	0	31	0	28	1	70	1	4%	0%	3%	0%	4%	2%	5%	7%
Mailawa Crescent	6281	72	4	53	0	36	4	34	0	76	4	56	0	39	4	36	0	5	0	3	0	2	0	2	0	6%	7%	6%	0%	7%	5%	7%	22%
Home Street	6282	98	4	291	0	288	4	35	0	107	4	307	0	302	4	38	0	9	0	16	0	13	0	2	0	10%	7%	6%	0%	5%	5%	7%	22%
Cross Street	6283	92	5	385	4	183	4	432	2	101	6	411	5	193	4	471	2	9	0	26	1	10	0	40	1	10%	8%	7%	32%	5%	6%	9%	31%
Everard Street	6284	160	1	262	0	159	3	417	0	167	1	270	0	165	3	437	0	6	0	8	0	6	0	21	0	4%	6%	3%	0%	4%	4%	5%	0%
Cross Street	6285	118	5	194	4	191	4	475	2	126	6	241	5	197	4	494	2	8	0	47	1	6	0	18	0	7%	7%	24%	32%	3%	4%	4%	24%
Crisp Street	6286	383	5	146	2	46	4	53	2	396	5	154	2	47	5	55	2	14	0	7	1	2	0	2	0	4%	6%	5%	31%	5%	4%	5%	15%
Grant Street	6287	626	5	486	3	807	5	17	2	649	5	500	4	837	5	19	2	24	0	14	0	30	0	2	0	4%	7%	3%	14%	4%	4%	9%	23%
Grant Street	6288	270	5	175	3	335	4	13	2	283	5	181	4	345	4	14	2	13	0	6	0	10	0	1	0	5%	6%	3%	0%	3%	3%	5%	23%
Granite Street	6289	54	0	143	0	477	2	454	1	59	0	153	0	490	2	471	1	5	0	10	0	13	0	17	0	9%	0%	7%	0%	3%	4%	4%	5%
Bellevue Drive	6290	229	4	360	0	165	0	263	0	240	4	369	0	170	0	285	0	10	0	9	0	5	0	23	0	5%	7%	3%	0%	3%	0%	9%	0%
Savoy Street	6291	442	4	447	0	105	0	258	0	468	4	460	0	107	0	274	0	26	0	13	0	2	0	16	0	6%	7%	3%	0%	2%	0%	6%	0%
Flynn Street	6292	199	6	163	2	41	5	49	2	221	6	172	2	43	5	50	2	22	0	9	1	2	0	1	0	11%	6%	5%	31%	4%	5%	3%	15%
Flynn Street	6293	369	2	84	0	222	3	972	0	397	2	88	0	245	4	1071	0	28	0	4	0	23	0	99	0	8%	10%	5%	0%	10%	8%	10%	0%
Herschell Street	6294	257	5	265	2	45	4	53	2	268	5	277	2	47	5	55	2	10	0	12	1	2	0	3	0	4%	6%	4%	31%	4%	4%	5%	16%
Ocean Street	6295	494	2	151	0	292	3	357	0	504	2	157	0	303	4	371	0	11	0	5	0	11	0	14	0	2%	6%	4%	0%	4%	4%	4%	0%
John Street	6296	156	6	159	2	38	5	36	2	162	6	166	2	39	5	38	2	7	0	6	1	1	0	2	0	4%	6%	4%	31%	4%	4%	6%	15%
Yarranabee Road	6297	180	6	147	2	41	5	39	2	188	6	153	2	42	5	41	2	7	0	6	0	2	0	2	0	4%	6%	4%	31%	4%	4%	5%	15%
Moruya Drive	6298	107	0	82	0	26	5	12	2	117	0	86	0	27	5	12	2	11	0	4	0	1	0	1	0	10%	0%	5%	0%	3%	3%	5%	6%
Bellevue Drive	6299	109	0	80	0	26	5	12	2	121	0	83	0	27	5	12	2	12	0	4	0	1	0	1	0	11%	0%	5%	0%	3%	3%	5%	6%
Leanda Street	6300	188	2	174	0	42	3	526	0	194	2	182	0	45	4	549	0	6	0	7	0	3	0	23	0	3%	6%	4%	0%	7%	4%	4%	0%
Hillcrest Avenue	6301	193	6	422	2	158	5	241	2	284	6	434	2	163	5	255	2	91	0	12	1	5	0	14	0	47%	6%	3%	31%	3%	4%	6%	14%
Braemar Drive	6302	171	0	132	0	34	5	343	2	185	0	143	0	36	5	371	2	14	0	11	0	3	0	28	0	8%	0%	9%	0%	9%	3%	8%	6%
Calwalla Crescent	6303	314	2	315	0	239	4	663	0	330	2	328	0	246	4	692	0	15	0	14	0	7	0	29	0	5%	6%	4%	0%	3%	4%	4%	0%
Pacific Drive - Sea Acres Rainforest	6304	158	2	213	0	277	4	763	0	164	2	219	0	282	4	785	0	7	0	6	0	5	0	22	0	4%	5%	3%	0%	2%	3%	3%	0%
Oleander Avenue	6305	242	5	267	2	70	2	545	1	264	6	282	3	74	2	581	2	22	0	15	1	4	0	37	0	9%	8%	5%	26%	6%	6%	7%	26%
O'Briens Road	6306	368	0	249	0	48	5	220	2	398	0	261	0	50	5	229	2	30	0	12	0	2	0	8	0	8%	0%	5%	0%	4%	3%	4%	6%
Emily Avenue	6307	597	10	509	4	329	5	152	2	631	11	540	5	356	6	159	2	33	1	31	1	27	0	8	1	6%	8%	6%	28%	8%	7%	5%	33%
Hockey Place	6308	165	10	264	4	234	5	198	2	170	11	272	5	242	5	201	2	5	0	8	1	8	0	4	0	3%	5%	3%	28%	3%	4%	2%	20%
Barton Crescent	6309	191	12	918	8	148	13	580	6	200	13	932	8	151	13	993	6	9	1	14	0	4	0	63	1	5%	5%	2%	6%	2%	3%	7%	12%
Acacia Avenue	6310	196	9	295	2	298	7	120	12	207	10	301	3	305	7	126	13	11	1	5	0	7	0	7	1	6%	6%	2%	16%	2%	4%	5%	7%
Bunnings Port Macquarie	6311	192	9	587	3	259	11	460	2	250	9	598	3	264	12	476	2	58	0	11	0	6	0	16	0	30%	4%	2%	12%	2%	4%	4%	15%
Jindalee Road	6312	902	211	2130	84	1444	165	1531	298	928	226	2157	111	1488	170	1649	305	26	15	27	27	45	5	118	7	3%	7%	1%	31%	3%	3%	8%	2%
Toorak Court	6313	163	9	703	2	223	7	149	12	172	9	710	3	227	7	153	12	9	0	7	0	4	0	4	0	5%	4%	1%	17%	2%	2%	3%	2%
Sherwood Road	6314	872	18	831	13	626	35	1094	24	917	20	879	17	651	36	1156	27	46	2	47	4	25	2	63	3	5%	9%	6%	31%	4%	5%	6%	12%
Wrights Road	6315	417	23	1185	20	776	30	445	16	450	25	1249	24	803	31	475	19	33	2	64	4	26	2	30	3	8%	9%	5%	18%	3%	6%	7%	17%
Greenmeadows Drive	6316	150	5	42	2	228	3	207	1	165	5	47	3	239	3	217	2	16	0	5	1	11	0	10	0	11%	8%	11%	27%	5%	6%	5%	22%

		2016 - Total Traffic Volumes								2021 - Total Traffic Volumes								Absolute Difference								% Difference							
		Generation				Attraction				Generation				Attraction				Generation				Attraction				Generation				Attraction			
		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 3-6		AM 7-10		PM 2-6	
Location	Zone	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV
Lochinvar Place	6317	146	5	42	2	150	3	109	1	159	5	45	3	157	3	114	2	12	0	3	1	7	0	5	0	9%	7%	6%	27%	5%	5%	4%	19%
Greenmeadows Drive	6318	150	5	78	2	172	3	431	1	164	5	90	3	183	3	451	2	15	0	11	1	11	0	19	0	10%	9%	13%	27%	6%	6%	4%	24%
Crestwood Drive	6319	514	22	636	18	292	17	730	18	552	24	678	23	307	18	781	21	37	2	42	5	15	1	52	4	7%	9%	7%	28%	5%	6%	7%	20%
Dalkeith Drive	6320	355	11	369	12	195	13	515	12	374	12	408	16	211	14	532	15	19	1	39	4	16	1	18	2	5%	8%	11%	35%	8%	7%	3%	20%
Jonas Absalom Drive	6321	305	11	249	2	134	13	535	11	326	12	276	3	143	13	557	12	21	1	28	1	9	1	23	1	7%	9%	11%	23%	7%	6%	4%	13%
Livingstone Road	6322	144	3	169	2	42	5	110	1	154	3	183	3	44	5	114	2	11	0	15	1	3	0	4	0	8%	8%	9%	34%	6%	6%	4%	23%
Waterview Close	6323	186	3	165	2	50	5	217	2	208	3	180	2	53	5	228	2	22	0	15	1	3	0	11	0	12%	8%	9%	34%	6%	6%	5%	21%
Timber Ridge	6324	169	3	205	2	50	5	216	2	187	3	223	2	53	5	226	2	18	0	17	1	3	0	10	0	11%	8%	8%	34%	6%	6%	5%	21%
Ashdown Drive	6325	893	0	1093	0	413	0	828	0	968	0	1168	0	422	0	871	0	74	0	75	0	9	0	43	0	8%	0%	7%	0%	2%	0%	5%	0%
Montague Street	6326	147	3	164	2	38	5	102	1	158	3	178	3	41	5	106	2	10	0	14	1	3	0	4	0	7%	8%	9%	34%	7%	6%	4%	23%
Lighthouse Road	6327	103	0	182	0	132	0	227	0	109	0	190	0	135	0	235	0	6	0	8	0	3	0	8	0	6%	0%	4%	0%	3%	0%	4%	12%
Watonga Street	6328	669	15	536	12	519	12	1233	11	701	16	578	15	570	13	1298	13	32	1	42	3	52	1	65	2	5%	10%	8%	28%	10%	6%	5%	22%
Pettit Street	6329	502	14	827	12	518	12	919	11	537	15	901	15	546	13	961	13	35	1	74	3	28	1	42	2	7%	9%	9%	27%	5%	6%	5%	20%
Emerald Drive	6330	645	20	876	19	1038	22	2098	12	712	23	1009	26	1129	24	2256	15	67	2	134	7	91	2	158	4	10%	11%	15%	37%	9%	9%	8%	31%
Port Macquarie Golf Course	6331	378	5	59	0	49	4	57	0	390	5	62	0	50	4	59	0	12	0	3	0	2	0	1	0	3%	5%	5%	0%	3%	3%	2%	0%
Braxey Drive	6332	431	9	534	5	400	11	555	6	550	11	579	8	520	14	850	9	120	3	45	2	119	3	294	4	28%	29%	8%	41%	30%	28%	53%	59%
Currawong Drive	6333	289	9	265	7	96	9	365	8	375	12	356	9	123	12	457	13	87	3	91	2	26	3	92	5	30%	30%	34%	21%	28%	27%	25%	59%
Annabella Drive	6334	309	9	230	7	99	9	310	8	409	12	288	9	119	12	409	13	100	3	57	2	19	3	99	5	32%	30%	23%	21%	20%	27%	32%	59%
The Point Drive	6363	259	6	208	5	117	9	368	8	342	8	267	6	144	12	476	12	83	2	59	1	27	3	108	4	32%	29%	28%	32%	23%	28%	29%	50%
The Ruins Way	6364	289	6	158	4	68	9	268	8	377	8	203	6	85	11	346	12	88	2	46	1	17	2	78	4	30%	29%	29%	32%	25%	28%	29%	51%
Philip Charley Drive	6365	114	3	58	0	86	4	55	0	130	4	66	0	101	4	65	0	16	1	8	0	16	1	10	0	14%	17%	14%	0%	18%	19%	17%	0%
Capital Drive	6366	91	8	46	1	86	10	156	5	288	23	452	2	249	24	418	35	197	15	406	1	162	15	262	30	216%	184%	888%	120%	188%	148%	168%	671%
Main Street	6367	272	23	442	24	460	28	346	33	396	39	850	42	749	41	602	62	125	15	407	16	289	13	257	29	46%	66%	92%	70%	63%	48%	74%	89%
Oxley Highway Service Centre	6368	113	11	223	121	15	4	13	2	115	11	224	177	16	4	14	2	3	0	2	56	1	0	0	0	3%	2%	1%	46%	4%	3%	3%	7%
Oxley Highway Service Centre	6369	375	12	197	92	15	4	13	2	1212	47	807	733	91	16	53	24	837	35	610	642	76	12	40	22	223%	299%	310%	698%	507%	282%	310%	967%
Sancrox Road - Expressway Spares	6371	27	9	31	3	24	4	34	2	63	11	106	4	42	7	62	5	36	2	75	1	18	3	28	3	135%	20%	242%	35%	78%	58%	81%	154%
Billabong Drive	6372	47	0	32	0	21	7	27	2	49	0	33	0	22	7	29	2	2	0	1	0	1	0	2	0	5%	0%	4%	0%	5%	5%	8%	5%
Burrawan Forest Drive	6373	43	0	30	0	196	47	366	14	45	0	31	0	220	49	410	15	2	0	1	0	25	3	44	1	4%	0%	3%	0%	13%	6%	12%	6%
Rawdon Island Road	6374	40	9	76	3	35	5	85	2	43	10	81	4	38	5	93	3	3	1	5	1	3	0	8	1	8%	10%	7%	29%	9%	8%	9%	27%
Sancrox Road	6375	55	9	58	3	35	5	54	2	60	10	63	4	40	5	61	3	5	1	5	1	5	0	7	1	9%	12%	9%	29%	14%	10%	14%	33%
King Creek Road	6376	50	5	2	1	13	2	34	5	56	6	2	1	14	3	38	6	6	1	0	0	2	0	4	1	12%	12%	6%	28%	12%	11%	12%	16%
Rocks Ferry Road	6377	83	6	5	2	20	3	48	6	89	7	5	2	21	3	52	6	6	0	0	0	1	0	4	1	7%	8%	4%	30%	8%	7%	8%	13%
Princess Avenue	6378	63	6	5	2	25	3	51	6	69	7	5	2	27	3	56	6	6	1	0	0	2	0	5	1	9%	9%	4%	30%	6%	8%	9%	14%
Webb Street	6379	57	6	3	1	19	3	45	6	62	7	3	2	20	3	49	7	5	1	0	0	1	0	4	1	9%	9%	4%	29%	7%	7%	9%	14%
Cameron Street / River Street	6380	126	6	248	5	183	6	229	5	137	6	264	7	192	6	245	6	11	0	16	2	9	0	16	1	9%	8%	6%	34%	5%	7%	7%	21%
Park Street	6381	154	6	288	5	92	5	115	5	167	6	308	7	100	6	127	6	12	0	20	2	7	0	12	1	8%	9%	7%	34%	8%	8%	10%	23%
Waucope IGA	6382	35	0	102	0	229	8	174	6	37	0	104	0	235	8	182	6	2	0	2	0	6	0	8	0	4%	0%	2%	0%	2%	4%	5%	6%
Hastings Street	6383	97	6	213	5	120	5	133	5	106	6	228	7	129	6	145	6	9	0	16	2	9	0	12	1	9%	9%	7%	34%	7%	8%	9%	23%
Campbell Street	6384	82	6	190	5	138	5	133	5	86	6	196	7	143	6	140	5	4	0	6	2	4	0	7	1	5%	6%	3%	34%	3%	5%	6%	14%
Bain Street	6385	97	6	219	5	106	5	110	5	106	6	235	7	114	6	121	6	9	0	16	2	8	0	10	1	9%	9%	7%	34%	7%	8%	9%	23%
James Street	6386	47	0	97	0	94	8	30	5	51	0	103	0	102	8	33	6	4	0	7	0	8	0	3	0	8%	0%	7%	0%	8%	4%	11%	6%
James Street	6387	48	0	90	0	92	8	30	5	52	0	96	0	100	8	33	6	4	0	6	0	8	0	3	0	7%	0%	7%	0%	8%	4%	10%	6%
Allan Road	6388	54	0	105	0	48	1	60	9	58	0	111	0	52	1	67	10	4	0	6	0	4	0	7	1	7%	0%	6%	0%	9%	5%	12%	6%
King Street	6389	386	23	591	14	394	17	467	23	402	24	607	19	410	18	499	26	16	1	16	4	16	1	32	3	4%	6%	3%	30%	4%	5%	7%	12%
Christy Street	6390	153	10	163	20	60	0	196	0	166	11	173	30	65	0	216	0	13	1	10	10	5	0	20	0	8%	9%	6%	52%	9%	0%	10%	0%
Pead Street	6391	114	8	113	6	79	8	144	5	125	8	121	8	86	8	160	6	11	1	8	2	7	1	17	1	10%	10%	7%	30%	9%	8%	11%	26%
Mahogany Way	6392	399	21	453	14	286	18	534	24	429	23	479	19	312	19	587	28	30	2	26	4	26	1	53	4	8%	8%	6%	31%	9%	8%	10%	18%
Azalea Avenue	6393	373	28	524	15	324	18	513	24	404	31	553	20	349	19	568	28	31	3	29	4	25	1	54	4	8%	9%	5%	29%	8%	7%	11%	18%
Forest Way	6394	116	8	114	6	78	8	142	5	127	8	122	8	84	8	157	6	11	1	8	2	6	1	15	1	9%	9%	7%	30%	8%	7%	11%	25%
Oxley Highway - Wauchope west	6395	979	41	1011	48	743	48	1424	42	1003	45	1134	62	917	52	1583	52	24	4	123	15	174	3	159	10	2%	9%	12%	30%	23%	7%	11%	23%
Riverbreeze Drive	6396	204	10	224	13	112	10	340	8	221	11	236	17	121	10	374	11	18	1	12	4	9	1	34	2	9%	9%	6%	29%	8%	7%	10%	28%
Beechwood Road	6397	211	10	216	13	125	10	323	8	222	11	224	17	131	10	346	10	11	1	8	4	6	0	23	2	5%	7%	4%	29%	5%	5%	7%	21%
Redbank Road	6398	284	10	201	13	132	10	302	8	297	11	208	17	139	10	323	10	14	1	7	4	7	0	22	2	5%	7%	4%	29%	5%	5%	7%	21%
Redbank Road	6399	82	6	5	2	20	3	46	6	86	7	5	2	23	3	49	6	4	0	0	0	1	0	3	1	5%	6%	2%	30%	5%	5%	6%	11%
Pacific Highway - Telegraph Point	6400	987	306	1838	490	1783	335	2502	371	1169	350	2169	626	2039	382	2817	461	181	43	331	137	236	47	315	90	18%	14%	18%	28%	13%	14%	13%	24%
Fernbank Creek Road	6401	1112	21	1808	9	498	33	1297	56	1133	22	1826	13	545	36	1433	64	22	1	18	3	48	3	136	8	2%	5%	1%	35%	10%	8%	10%	14%
Boundary Street	6403	209	7	188	0	75	7	174	0	227	8	205	0	79	8	185	0	19	1	17	0	3	0	11	0	9%	8%	9%	0%	4%	5%	7%	0%
Boundary Street - Airport	6404	338	24	924	21	489	24	556	19	512	33	2095	82	1227	58	739	29	174	9	1172	62	737	34	182	10	52%	36%	127%	297%	151%	143%	33%	54%
Hughes Place	6405	115	21	846	17	953	51	966	51	120	22	873	18	977	52	1014	56	5	1	27	1	24	1	48	5	4%	6%	3%	5%	2%	3%	5%	10%
Evans Street	6406	137	5	42	0	30	4	45	0	155	6	47	0	56	4	51	0	19	1	6	0	6	0	6	0	14%	13%	13%	0%	12%	12%	13%	0%
Woolworths Lake Cathie	6407	1123	13	1825	2	534	11	1336	3	1142	13	1839	3	540	11	1373	3	19	0	14	0	6	0	37	0	2%	1%	1%	20%	1%	2%	3%	2%
Miala Street	6408	78	4	21	0	47	3	35	0	91	5	24	0	54	4	41	0	13	1	3	0	7	1	6	0	17%	16%	13%	0%	16%	15%	17%	0%
Abel Tasman Drive	6409	67	4	20	0	46	3	34	0	78	5	22	0	53	3	40	0	11	1	3	0	7	0	6	0	16%	16%	14%	0%	16%	15%	17%	0%
Bonny View Drive	6427	177	4	110	0	38	3	136	0	206	5	120	0	46	3	169	0	28	1	9	0	8	0	33	0	16%	16%	8%	0%	21%	15%	24%	0%
Bobs Creek Road	6428	31	9	30	4	7	5	16	6	33	9	32	4	8	5	17	7	2	1	1	0	0	0	1	1	6%	6%	4%	0%	6%	6%	9%	16%
Ron Banks Road	6429	49	12	550	11	20	5	25	0	51	12	566	15	21	5	27	0	2	1	16	5	1	0	2	0	4%	5%	3%	43%	5%	5%	7%	0%
Herons Creek Road	6430	63	31	85	24	165	0	363	0	65	33	87	25	171	0	385	0	2	2	2	1	7	0	22	0	4%	5%	2%	5%	4%	0%	6%	0%
Beach Street	6431	177	4	115	0	51	3	138	0	199	5	122	0	61	3	166	0	22	1	7	0	10	0	28	0	13%	13%	6%	0%	19%	12%	21%	0%
Beach Street	6432	171	4	119	0	40	3	136	0	185	4	124	0	44	3	153	0	14	0	5	0	4	0	17	0	8%	8%	4%	0%	11%	8%	12%	0%
Third Avenue	6433	161	4	96	0	50	3	132	0	186	5	100	0	61	3	166	0	25	1	4	0	11	0	35	0	15%	16%	4%	0%	21%	15%	26%	0%
Panorama Drive	6434	159	4	98	0	48	3	256	0	183	5	101	0	59	3	313	0	23	1	4	0	12	0	57	0	15%	16%	4%	0%	24%	15%	22%	0%
Edith Street	6442	142	15	126	10	47	3	66	0	148	16	129	10	49	3	70	0	5	1	3	0	2	0	4	0	4%	5%	3%	4%	4%	5%	6%	0%
Alma Street	6443	90	4	23	0	60	3	82	0	94	4	23	0	63	3	86	0	3	0	1	0	2	0	4	0	4%	5%	4%	0%	4%	4%	5%	0%
The Parade	6444	417	5	353	9	695	12	1060	12	432	6	362	12	719	13	1114	14	15	0	9	3	24	0	54	2	4%	5%	3%	28%	3%	4%	5%	13%
Adeline Street	6445	136	0	322	0	155	7	177	2	141	0	336	0	161	7	186	2	5	0	14	0	6	0	9	0	4%	0%	4%	0%	4%	3%	5%	8%
Lake Street	6446	43	0	299	0	121	7	154	2	46	0	320	0	131	7	170	2	3	0	21	0	9	0	15	0	7%	0%	7%	0%	8%	3%	10%	8%
Lake Street	6447	42	0	477	0	117	7	176	2	44	0	502	0	121	7	183	2	2	0	25	0	4	0	7	0	4%	0%	5%	0%	4%	3%	4%	8%
Tunis Street	6448	243	10	81	8	163	9	54	5	249	10	83	10	174	9	57	6	6	0	2	3	11	0	4	1	2%	4%	3%	33%	7%	4%	7%	18%
Tunis Street	6449	130	9	105	7	249	9	79	5	135	10	108	10	257	9	83	6	5	0	3	2	8	0	4	1	4%	4%	3%	33%	3%	4%	5%	17%
Seymour Street	6450	136	9	99	7	255	9	91	5	141	10	102	10	265	9	96	6	6	0	3	2	9	0	5	1	4%	5%	3%	33%	4%	4%	5%	18%
Seymour Street	6451	123	9	126	7	265	9	90	5	128	10	130	10	272	9	95	6	5	0	4	2	7	0	4	1	4%	4%	3%	33%	3%	4%	5%	17%
Hanley Street	6452	29	2	44	2	27	5	58	0	30	2	46	4	28	5	61	0	1	0	2	1	1	0	3	0	4%	4%	4%	45%	4%	4%	5%	0%

		2016 - Total Traffic Volumes								2021 - Total Traffic Volumes								Absolute Difference								% Difference							
		Generation				Attraction				Generation				Attraction				Generation				Attraction				Generation				Attraction			
		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 3-6		AM 7-10		PM 2-6	
Location	Zone	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV
Diamond Head Road	6453	49	3	55	2	39	4	64	2	51	4	57	2	40	4	67	2	2	0	1	0	1	0	4	0	4%	4%	3%	21%	3%	4%	6%	15%
The Boulevarde	6454	448	14	413	14	281	20	660	16	466	15	424	17	291	20	692	18	18	1	12	3	10	1	32	2	4%	4%	3%	23%	4%	4%	5%	14%
Captain Cook Bicentennial Drive	6462	270	10	84	9	22	4	16	3	280	11	87	11	24	4	17	4	10	0	3	2	2	0	1	1	4%	4%	4%	20%	7%	5%	5%	28%
St Albans Way	6463	267	10	51	9	22	4	16	3	277	11	54	11	24	4	17	4	10	0	3	2	1	0	1	1	4%	4%	5%	20%	7%	5%	4%	28%
Sirius Drive	6464	467	12	838	15	413	19	913	26	515	14	949	19	458	21	994	32	49	1	111	4	46	2	81	6	10%	11%	13%	26%	11%	10%	9%	22%
Glen Haven Drive	6465	14	4	14	2	240	0	55	0	16	4	14	3	256	0	60	0	1	0	1	1	16	0	4	0	10%	8%	6%	27%	7%	0%	8%	0%
Pacific Highway - Kew	6466	1279	159	1531	199	1108	196	1337	196	1409	180	1687	221	1258	219	1539	249	130	21	156	22	150	24	203	53	10%	13%	10%	11%	14%	12%	15%	27%
Tathra Road	6467	0	0	0	0	27	6	69	6	0	0	0	0	28	7	72	7	0	0	0	0	1	0	3	0	0%	0%	0%	0%	3%	4%	4%	7%
Nancy Bird Walton Drive	6468	39	5	61	1	0	0	0	0	40	5	63	1	0	0	0	0	1	0	1	0	0	0	0	0	3%	4%	2%	44%	0%	0%	0%	0%
Kendall Road	6469	519	21	613	32	423	23	623	23	578	24	664	43	466	25	702	31	59	3	52	11	43	2	79	7	11%	13%	8%	35%	10%	9%	13%	31%
Commerce Street	6470	391	25	440	15	299	18	652	55	434	28	481	20	339	20	739	66	43	3	41	5	40	2	88	11	11%	12%	9%	31%	13%	12%	13%	21%
Owen Street	6537	321	5	480	2	561	6	651	1	332	6	486	2	570	6	685	1	11	0	6	0	9	0	34	0	3%	5%	1%	31%	2%	2%	5%	16%
Fernbank Creek Road	6857	109	6	190	2	64	10	109	13	119	7	202	2	69	11	121	15	10	1	12	0	5	1	12	2	9%	9%	6%	29%	8%	8%	11%	14%
John Oxley Drive - Sienna Grange	16356	153	13	212	2	612	14	774	2	158	14	214	2	629	14	848	2	5	0	2	0	17	0	74	0	3%	3%	1%	17%	3%	2%	10%	3%
Rollands Plains Road	23260	272	20	212	12	147	22	389	14	290	21	221	14	151	23	414	17	18	1	9	2	4	1	25	2	7%	6%	4%	17%	3%	6%	6%	17%
Morton Street	23276	166	0	296	1	117	2	192	1	213	0	315	2	124	2	210	1	47	0	18	1	7	0	18	0	28%	0%	6%	43%	6%	4%	9%	19%
Major Innes Road/ John Oxley Drive	23590	13	0	13	7	31	0	6	0	14	0	14	7	32	0	6	0	1	0	1	0	1	0	0	0	7%	0%	6%	5%	3%	0%	6%	0%
Lake Innes Village	23598	762	36	1669	19	804	20	1841	15	838	42	1850	25	982	25	2121	18	77	6	182	6	178	5	280	3	10%	18%	11%	33%	22%	23%	15%	20%
Sails Resort	23683	103	0	262	2	249	1	437	1	108	0	271	2	254	1	451	1	5	0	9	0	5	0	14	0	5%	0%	3%	31%	2%	3%	3%	14%
McDonalds Port Macquarie	23693	154	24	395	26	278	25	1386	20	174	29	457	38	328	29	1550	28	20	4	63	12	50	4	214	8	13%	17%	16%	47%	18%	19%	16%	40%
Forest Parkway	24228	184	6	218	5	77	15	67	6	215	7	247	6	88	17	82	8	30	1	29	1	11	2	14	2	17%	15%	13%	22%	14%	19%	21%	33%
Long Point Drive	24244	29	9	30	0	81	11	93	6	32	10	32	0	90	12	105	7	2	1	2	0	9	1	12	0	9%	11%	7%	0%	11%	11%	13%	6%
Wambuyn Drive	24260	257	34	745	28	35	23	20	21	296	36	826	34	42	26	45	24	39	2	80	6	17	3	25	3	15%	7%	11%	21%	68%	11%	127%	16%
Oakes Crescent	24276	10	7	7	0	132	7	570	0	11	8	8	0	146	8	639	0	1	1	0	0	14	1	69	0	8%	12%	5%	0%	11%	11%	12%	0%
Barton Crescent	24376	568	52	775	15	1086	34	862	18	589	55	790	19	1109	35	910	20	20	4	15	3	23	1	48	2	4%	7%	2%	22%	2%	3%	6%	11%
Banksia Avenue	24405	530	10	347	2	658	10	711	0	561	11	365	2	678	11	745	0	31	1	18	0	21	0	35	0	6%	8%	5%	24%	3%	4%	5%	0%
Toyota Dealership Port Macquarie	24422	200	40	63	29	189	18	41	24	207	43	67	36	195	19	42	27	7	3	4	7	6	0	1	3	3%	7%	6%	23%	3%	2%	3%	12%
Westerweller Way	24443	190	0	267	0	7	34	6	0	209	0	285	0	8	35	6	0	20	0	19	0	0	1	0	0	10%	0%	7%	0%	6%	3%	7%	0%
Thrumster Street	25293	161	4	419	4	67	0	192	6	359	19	827	6	239	14	466	37	198	15	408	2	172	14	275	30	123%	349%	97%	50%	259%	0%	143%	508%
Fern Valley Parade	25309	69	8	169	10	110	4	92	11	74	8	177	12	116	4	99	13	4	1	8	2	5	0	7	2	6%	8%	5%	23%	5%	5%	7%	15%
Boronia Street	29636	453	31	1448	33	725	32	277	30	484	34	1523	41	781	33	317	33	31	2	75	8	56	2	41	3	7%	8%	5%	24%	8%	5%	15%	11%
New Developments																																	
Thrumster Street (South)	33190									221	15	407	1	198	15	273	30																
Blackbutt Road	33339									48	2	185	0	59	2	46	4																
New Bonny Hills Development	34002									310	3	364	0	158	3	524	2																
Yippin Creek	34022									299	0	101	0	75	0	403	700																
Total		49898	2317	70801	2067	50623	2348	71077	2067	56537	2652	79911	3300	56537	2652	79911	3300	5761	314	8054	1232	5424	284	7589	496								

		2016 - Total Traffic Volumes								2026 - Total Traffic Volumes								Absolute Difference								% Difference							
		Generation				Attraction				Generation				Attraction				Generation				Attraction				Generation				Attraction			
		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 3-6		AM 7-10		PM 2-6	
Location	Zone	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV
Park Street	6231	436	37	578	27	341	16	818	8	484	40	618	28	361	17	867	10	48	3	39	1	20	1	48	2	11%	8%	7%	3%	6%	5%	6%	30%
River Park Road	6234	360	36	550	27	281	12	613	4	390	39	575	28	294	12	665	6	30	3	24	1	12	1	52	2	8%	9%	4%	3%	4%	5%	8%	47%
Newport Island road	6235	203	17	589	18	224	9	243	8	216	19	649	18	238	10	259	10	13	2	60	1	14	1	16	2	7%	10%	10%	4%	6%	6%	7%	23%
Bay Street - Settlement City	6236	696	18	1084	18	854	14	558	13	844	24	1396	20	1182	18	742	22	148	6	311	2	328	4	184	9	21%	32%	29%	10%	38%	30%	33%	66%
Bellbowrie Street	6237	733	5	742	2	1714	8	1262	36	782	5	788	2	1909	8	1435	39	49	0	46	0	196	0	174	3	7%	8%	6%	1%	11%	5%	14%	9%
Blueberry Lane	6239	22	4	89	2	66	4	41	2	29	5	105	2	73	4	44	3	6	1	16	0	7	1	4	1	29%	17%	18%	1%	11%	14%	9%	33%
Findlay Avenue - Garden Village	6240	25	4	18	2	403	0	143	0	32	5	21	2	457	0	164	0	7	1	3	0	53	0	21	0	27%	18%	19%	13%	13%	0%	15%	0%
Hastings Avenue	6241	265	4	27	2	424	12	71	8	300	5	29	2	492	13	85	11	35	1	2	0	67	2	14	2	13%	15%	6%	1%	16%	15%	19%	24%
Buller Street - Westport Park	6242	22	4	24	2	132	4	53	3	130	5	185	2	184	5	89	4	108	1	161	0	52	1	35	1	488%	38%	669%	1%	40%	29%	66%	28%
Hollingsworth Street - Waters Edge	6243	22	4	24	2	112	4	52	3	114	5	173	2	151	5	82	3	92	1	149	0	39	1	30	0	413%	26%	628%	1%	35%	20%	57%	13%
Hollingsworth Street	6244	22	4	24	2	110	4	47	3	118	5	177	2	169	5	87	4	96	2	153	0	59	1	39	1	442%	45%	630%	1%	53%	39%	83%	43%
Short Street	6245	27	4	28	2	202	4	66	3	37	5	35	2	260	5	87	5	10	1	7	0	58	1	21	2	36%	32%	27%	1%	29%	28%	31%	54%
Short Street / Hayward Street	6246	534	12	1326	9	605	12	1021	11	672	16	1706	9	822	15	1354	17	138	4	380	0	217	3	334	6	26%	34%	29%	1%	36%	28%	33%	59%
Horton Street	6247	475	7	787	0	889	9	1029	2	613	9	1032	0	1172	11	1337	2	138	2	245	0	283	2	308	0	29%	34%	31%	0%	32%	27%	30%	6%
Hay Street	6248	217	6	630	2	639	6	891	1	276	8	823	2	849	8	1163	2	59	2	193	0	211	2	271	1	27%	34%	31%	2%	33%	28%	30%	87%
Hay Street / Hayward Street	6249	504	12	1444	9	523	12	1364	11	611	14	1698	9	610	14	1575	14	107	2	254	0	87	2	211	4	21%	20%	18%	1%	17%	15%	15%	34%
Murray Street	6250	173	5	331	2	252	6	258	1	226	7	430	2	329	8	338	2	53	2	99	0	77	2	80	1	31%	33%	30%	2%	31%	27%	31%	86%
Murray Street	6251	176	5	398	2	293	6	260	1	185	6	414	2	303	6	269	1	9	0	16	0	9	0	8	0	5%	6%	4%	2%	3%	3%	3%	17%
Munster Street	6252	208	5	371	2	255	6	370	1	275	7	459	2	325	8	502	2	67	2	87	0	70	2	132	1	32%	32%	24%	2%	28%	26%	36%	80%
Grant Street	6253	195	5	429	2	548	6	409	1	204	6	440	2	567	6	438	1	9	0	10	0	19	0	29	0	4%	6%	2%	2%	3%	3%	7%	17%
Lord Street	6254	234	5	333	2	323	6	286	1	243	6	342	2	339	6	302	1	8	0	9	0	16	0	16	0	4%	6%	3%	2%	5%	3%	6%	17%
Stewart Street	6255	524	5	1256	2	726	6	1206	1	542	6	1276	2	742	6	1295	1	18	0	20	0	16	0	89	0	3%	6%	2%	2%	2%	3%	7%	17%
Church Street - Bowls Club	6256	511	15	406	2	494	20	579	1	532	17	419	2	514	21	603	1	21	1	13	0	20	0	24	0	4%	7%	3%	1%	4%	2%	4%	24%
Burrawan Street - Hastings Secondary College	6257	52	3	38	1	107	4	23	0	55	4	39	1	111	4	23	0	2	0	1	0	4	0	1	0	5%	6%	3%	1%	4%	3%	4%	18%
Burrawan Street / Grant Street	6258	47	3	23	1	13	4	12	0	56	4	27	1	16	4	15	1	9	1	4	0	3	1	3	0	20%	20%	18%	1%	19%	18%	22%	53%
Grant Street / Burrawan Street	6259	262	11	628	8	192	0	239	0	315	14	726	9	224	0	299	0	53	2	98	1	32	0	61	0	20%	20%	16%	16%	17%	0%	25%	0%
Munster Street - City Church	6260	485	11	447	8	316	0	267	0	500	12	463	8	336	0	276	0	14	1	16	0	20	0	9	0	3%	6%	4%	2%	6%	0%	3%	0%
Hollingsworth Street	6261	552	13	1062	0	717	9	681	5	575	13	1092	0	733	9	707	6	23	1	30	0	16	0	26	0	4%	6%	3%	0%	2%	4%	4%	9%
Hollingsworth Street	6262	759	8	1303	10	525	7	417	2	886	9	1480	11	600	8	482	8	127	1	177	0	75	1	65	6	17%	14%	14%	1%	14%	18%	16%	308%
Waugh Street	6263	20	1	69	0	135	1	74	0	26	1	84	0	154	1	83	0	6	0	15	0	19	0	9	0	28%	21%	22%	0%	14%	14%	12%	11%
Bridge Street	6264	20	1	68	0	87	1	48	0	24	1	81	0	99	1	53	0	4	0	12	0	12	0	5	0	20%	19%	18%	0%	14%	13%	11%	11%
Waugh Street	6265	20	1	67	0	101	1	94	0	24	1	78	0	114	1	107	0	4	0	11	0	14	0	14	0	21%	19%	16%	0%	13%	13%	14%	11%
Bridge Street	6266	27	3	122	4	37	1	60	0	32	3	138	4	41	1	67	1	5	0	16	0	4	0	7	0	17%	15%	13%	2%	11%	11%	12%	102%
Gore Street	6267	21	1	81	0	83	1	55	0	35	2	134	0	139	2	91	0	14	1	54	0	56	1	36	0	66%	70%	67%	0%	67%	63%	66%	11%
Ackroyd Street	6268	20	13	678	14	273	18	139	15	38	16	825	15	413	24	242	25	18	4	146	1	141	6	103	10	88%	29%	22%	4%	51%	31%	74%	69%
Ackroyd Street	6269	143	13	384	17	738	24	622	20	170	16	462	17	860	28	752	26	26	3	79	0	123	4	130	6	18%	26%	21%	2%	17%	17%	21%	32%
Widderson Street	6271	613	0	498	0	100	11	342	6	665	0	560	0	110	12	362	7	52	0	62	0	10	0	20	1	9%	0%	12%	0%	10%	3%	6%	10%
Clifton Drive	6272	592	9	1501	5	212	8	486	2	653	10	1602	5	235	9	551	3	61	1	101	0	23	1	64	1	10%	11%	7%	2%	11%	8%	13%	28%
Lady Nelson Drive	6273	238	3	85	1	200	4	79	1	261	4	94	1	216	5	86	1	24	0	9	0	16	0	7	0	10%	11%	10%	2%	8%	8%	9%	30%
Widderson Street - TAFE	6274	43	4	46	2	346	0	403	0	45	5	50	2	361	0	421	0	2	0	3	0	15	0	18	0	5%	7%	7%	2%	4%	0%	4%	0%
Slade Crescent	6275	169	5	53	2	155	0	251	0	189	5	61	2	166	0	270	0	19	1	7	0	10	0	19	0	11%	11%	14%	6%	7%	0%	7%	0%
Kooloonbung Close	6276	11	0	49	0	10	2	15	0	25	2	102	0	114	5	97	5	14	2	53	0	104	3	82	5	128%	0%	108%	0%	1040%	177%	547%	0%
Platt Street	6277	320	2	471	4	448	5	650	1	420	4	540	4	592	8	809	7	100	2	69	0	145	4	159	6	31%	66%	15%	6%	32%	73%	24%	488%
Wyandra Crescent	6278	589	4	634	0	636	0	257	0	628	4	653	0	679	0	301	0	39	0	19	0	43	0	44	0	7%	8%	3%	0%	7%	0%	17%	0%
Hill Street	6279	34	1	63	0	25	2	23	0	37	2	66	0	27	2	25	0	3	0	3	0	2	0	2	0	9%	8%	5%	0%	7%	7%	10%	0%
Gray Street	6280	892	0	1127	0	783	31	1366	14	949	0	1175	0	829	31	1480	15	57	0	48	0	46	1	113	1	6%	0%	4%	0%	6%	3%	8%	7%
Mallawa Crescent	6281	72	4	53	0	36	4	34	0	82	4	60	0	43	4	39	1	10	1	7	0	6	1	5	0	14%	16%	14%	1%	17%	13%	16%	40%
Home Street	6282	98	4	291	0	288	4	35	0	120	4	332	0	322	4	41	1	22	1	41	0	34	1	6	0	23%	16%	14%	1%	12%	13%	17%	40%
Cross Street	6283	92	5	385	4	183	4	432	2	110	6	429	4	208	4	525	3	18	1	44	0	24	1	94	1	20%	16%	11%	2%	13%	19%	22%	54%
Everard Street	6284	160	1	262	0	159	3	417	0	170	1	274	0	171	3	452	0	10	0	12	0	12	0	35	0	6%	8%	4%	0%	7%	7%	8%	0%
Cross Street	6285	118	5	194	4	191	4	475	2	129	6	249	4	202	4	505	2	11	0	55	0	11	0	30	0	10%	9%	29%	2%	6%	7%	6%	30%
Crisp Street	6286	383	5	146	2	46	4	53	2	404	5	157	2	48	5	57	2	21	0	11	0	4	0	3	0	6%	8%	7%	2%	8%	6%	7%	18%
Grant Street	6287	626	5	486	3	807	5	17	2	662	6	511	4	860	5	20	2	36	0	25	0	53	0	3	0	6%	9%	5%	1%	7%	7%	17%	27%
Grant Street	6288	270	5	175	3	335	4	13	2	289	5	185	3	353	4	15	2	19	0	10	0	18	0	1	0	7%	8%	6%	1%	5%	6%	8%	27%
Granite Street	6289	54	0	143	0	477	2	454	1	62	0	158	0	500	2	482	1	7	0	15	0	23	0	28	0	13%	0%	10%	0%	5%	4%	6%	5%
Bellevue Drive	6290	229	4	360	0	165	0	263	0	245	4	372	0	173	0	298	0	16	0	12	0	9	0	35	0	7%	8%	3%	0%	5%	0%	13%	0%
Savoy Street	6291	442	4	447	0	105	0	258	0	479	4	467	0	108	0	285	0	38	0	20	0	3	0	27	0	9%	8%	4%	0%	3%	0%	11%	0%
Flynn Street	6292	199	6	163	2	41	5	49	2	226	6	177	2	44	5	51	2	27	0	14	0	3	0	2	0	14%	8%	8%	2%	7%	7%	4%	19%
Flynn Street	6293	369	2	84	0	222	3	972	0	417	2	91	0	269	4	1151	0	48	0	7	0	46	1	179	0	13%	17%	8%	0%	21%	16%	18%	0%
Herschell Street	6294	257	5	265	2	45	4	53	2	274	5	284	2	48	5	57	2	17	0	19	0	3	0	4	0	7%	9%	7%	2%	7%	8%	8%	19%
Ocean Street	6295	494	2	151	0	292	3	357	0	509	2	159	0	312	4	377	0	16	0	8	0	19	0	20	0	3%	7%	5%	0%	7%	5%	6%	0%
John Street	6296	156	6	159	2	38	5	36	2	166	7	169	2	40	5	40	2	10	1	10	0	3	0	3	0	7%	8%	6%	2%	7%	7%	9%	18%
Yarranabee Road	6297	180	6	147	2	41	5	39	2	192	7	157	2	44	5	42	2	11	0	9	0	3	0	3	0	6%	8%	6%	2%	7%	7%	8%	18%
Moruya Drive	6298	107	0	82	0	26	5	12	2	120	0	88	0	27	5	13	2	13	0	5	0	2	0	1	0	12%	0%	7%	0%	6%	4%	8%	7%
Bellevue Drive	6299	109	0	80	0	26	5	12	2	123	0	85	0	27	5	13	2	15	0	5	0	2	0	1	0	13%	0%	7%	0%	6%	4%	8%	7%
Leanda Street	6300	188	2	174	0	42	3	526	0	197	2	186	0	47	4	562	0	9	0	11	0	6	0	36	0	5%	8%	6%	0%	14%	6%	7%	0%
Hillcrest Avenue	6301	193	6	422	2	158	5	241	2	289	7	439	2	167	5	263	2	96	0	17	0	9	0	22	0	50%	7%	4%	2%	6%	6%	9%	16%
Braemar Drive	6302	171	0	132	0	34	5	343	2	195	0	152	0	39	5	393	2	23	0	20	0	6	0	50	0	14%	0%	15%	0%	17%	4%	15%	7%
Calwalla Crescent	6303	314	2	315	0	239	4	663	0	338	2	332	0	251	4	710	0	23	0	17	0	12	0	47	0	7%	8%	6%	0%	5%	6%	7%	0%
Pacific Drive - Sea Acres Rainforest	6304	158	2	213	0	277	4	763	0	166	2	221	0	285	4	793	0	8	0	8	0	9	0	30	0	5%	6%	4%	0%	3%	4%	4%	0%
Oleander Avenue	6305	242	5	267	2	70	2	545	1	276	6	293	2	78	2	612	2	33	1	26	0	8	0	68	0	14%	12%	10%	1%	12%	11%	12%	35%
O'Briens Road	6306	368	0	249	0	48	5	220	2	405	0	266	0	52	6	233	2	38	0	17	0	3	0	12	0	10%	0%	7%	0%	7%	4%	6%	7%
Emily Avenue	6307	597	10	509	4	329	5	152	2	652	11	567	4	381	6	165	2	55	1	58	0	52	1	13	1	9%	12%	11%	1%	16%	12%	9%	46%
Hockey Place	6308	165	10	264	4	234	5	198	2	172	11	275	4	246	5	203	2	6	1	11	0	12	0	5	0	4%	6%	4%	1%	5%	4%	3%	21%
Barton Crescent	6309	191	12	918	8	148	13	580	6	202	13	935	8	154	13	1018	6	11	1	17	0	6	1	88	1	6%	6%	2%	1%	4%	4%	9%	12%
Acacia Avenue	6310	196	9	295	2	298	7	120	12	209	10	303	2	309	7	129	13	13	1	8	0	11	0	9	1	7%	7%	3%	1%	4%	5%	8%	7%
Bunnings Port Macquarie	6311	192	9	587	3	259	11	460	2	252	9	603	3	267	12	484	2	61	0	16	0	9	1	24	0	32%	5%	3%	1%	3%	5%	5%	16%
Jindalee Road	6312	902	211	2130	84	1444	165	1531	298	935	227	2171	86	1509	171	1683	306	33	16	41	1	65	6	152	8	4%	8%	2%	2%	5%	4%	10%	3%
Toorak Court	6313	163	9	703	2	223	7	149	12	173	9	714	2	231	7	157	12	10	0	11	0	7	0	7	0	6%	5%	2%	1%	3%	4%	5%	2%
Sherwood Road	6314	872	18	831	13	626	35	1094	24	943	20	907	13	671	37	1188	28	71	2	76	0	45	3	94	4	8%	11%	9%	2%	7%	7%	9%	15%
Wrights Road	6315	417	23	1185	20	776	30	445	16	471	26	1286	21	823	32	494	19	54	3	101	0	47	3	49	4	13%	11%	9%	2%	6%	9%	11%	22%
Greenmeadows Drive	6316	150	5	42	2	228	3	207	1	172	5	51	2	249	3	224	2	22	1	8	0	21	0	17	0	15%	12%	20%	1%	9%	9%	8%	29%

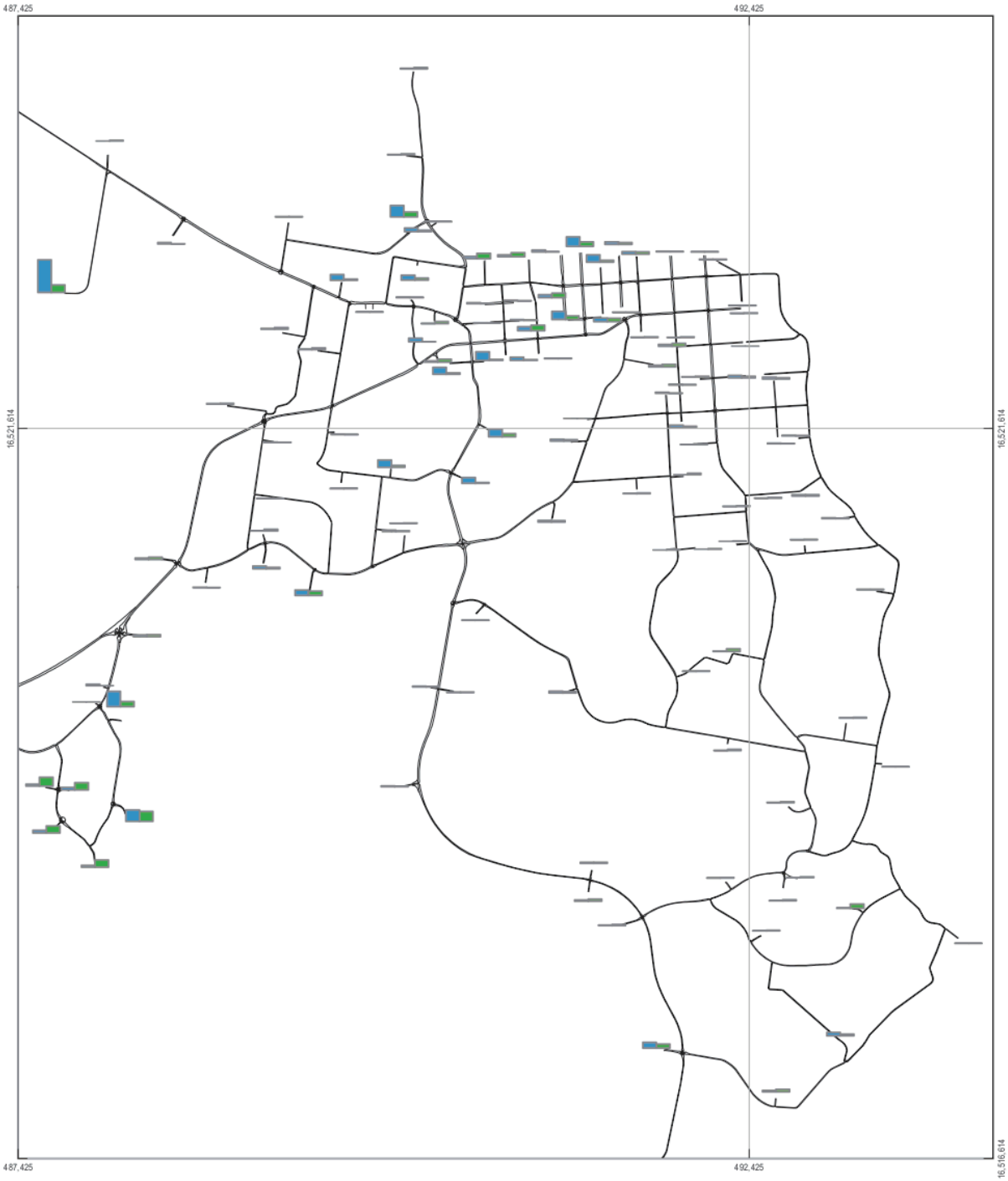
		2016 - Total Traffic Volumes								2026 - Total Traffic Volumes								Absolute Difference								% Difference							
		Generation				Attraction				Generation				Attraction				Generation				Attraction				Generation				Attraction			
		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 3-6		AM 7-10		PM 2-6	
Location	Zone	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV
Lochinvar Place	6317	146	5	42	2	150	3	109	1	162	5	46	2	163	3	117	2	16	0	4	0	13	0	8	0	11%	10%	10%	1%	9%	7%	7%	23%
Greenmeadows Drive	6318	150	5	78	2	172	3	431	1	171	5	101	2	193	3	466	2	22	1	22	0	21	0	35	0	15%	14%	29%	1%	12%	11%	8%	33%
Crestwood Drive	6319	514	22	636	18	292	17	730	18	578	25	710	18	320	19	819	23	64	3	73	0	29	2	89	5	12%	15%	12%	1%	10%	10%	12%	27%
Dalkisford Drive	6320	355	11	369	12	195	13	515	12	388	12	445	12	226	15	542	16	32	1	76	0	31	2	27	3	9%	13%	21%	2%	16%	12%	5%	27%
Jonas Absalom Drive	6321	305	11	249	2	134	13	535	11	341	12	303	3	151	14	572	13	36	2	54	0	17	1	38	2	12%	14%	22%	1%	12%	10%	7%	18%
Livingstone Road	6322	144	3	169	2	42	5	110	1	161	4	195	2	47	5	117	2	18	0	26	0	5	0	7	0	12%	13%	13%	2%	12%	10%	6%	31%
Waterview Close	6323	186	3	165	2	50	5	217	2	217	4	192	2	56	5	235	2	31	0	27	0	6	1	18	0	16%	13%	16%	2%	11%	11%	8%	29%
Timber Ridge	6324	169	3	205	2	50	5	216	2	196	4	237	2	56	5	233	2	26	0	32	0	6	1	17	0	16%	13%	15%	2%	12%	11%	8%	29%
Ashdown Drive	6325	893	0	1093	0	413	0	828	0	1026	0	1233	0	430	0	904	0	132	0	140	0	16	0	76	0	15%	0%	13%	0%	4%	0%	9%	0%
Montague Street	6326	147	3	164	2	38	5	102	1	164	4	190	2	43	5	108	2	17	0	26	0	5	0	6	0	12%	13%	16%	2%	14%	11%	6%	31%
Lighthouse Road	6327	103	0	182	0	132	0	227	0	111	0	194	0	137	0	238	0	8	0	12	0	6	0	10	0	8%	0%	6%	0%	4%	0%	5%	13%
Watonga Street	6328	669	15	536	12	519	12	1233	11	724	17	613	12	618	13	1348	14	55	2	77	0	99	1	115	3	8%	16%	14%	1%	19%	12%	9%	31%
Pettit Street	6329	502	14	827	12	518	12	919	11	565	16	968	12	569	13	981	14	63	2	142	0	51	1	62	3	12%	14%	17%	1%	10%	10%	7%	28%
Emerald Drive	6330	645	20	876	19	1038	22	2098	12	770	25	1141	20	1234	26	2381	17	126	4	265	1	175	4	283	6	20%	20%	30%	4%	17%	17%	14%	48%
Port Macquarie Golf Course	6331	378	5	59	0	49	4	57	0	394	5	63	0	51	4	59	0	16	0	4	0	3	0	2	0	4%	6%	6%	0%	5%	4%	3%	0%
Braeroy Drive	6332	431	9	534	5	400	11	555	6	663	14	607	6	639	17	1139	12	233	5	73	0	239	6	583	6	54%	57%	14%	6%	60%	57%	105%	106%
Currawong Drive	6333	289	9	265	7	96	9	365	8	457	14	462	8	149	14	532	17	168	5	196	0	53	5	167	9	58%	60%	74%	3%	55%	54%	46%	109%
Annabella Drive	6334	309	9	230	7	99	9	310	8	506	14	343	8	138	14	508	17	196	5	112	0	38	5	198	9	63%	60%	49%	3%	39%	54%	64%	109%
The Point Drive	6363	259	6	208	5	117	9	368	8	421	9	326	5	170	15	580	16	163	3	118	0	53	5	212	8	63%	57%	57%	2%	46%	56%	58%	92%
The Ruins Way	6364	289	6	158	4	68	9	268	8	459	9	250	5	102	13	422	15	170	3	92	0	35	5	153	7	59%	56%	58%	2%	51%	57%	57%	93%
Philip Charley Drive	6365	114	3	58	0	86	4	55	0	143	4	74	0	118	5	74	0	29	1	16	0	32	1	19	0	25%	31%	28%	0%	37%	29%	34%	0%
Capital Drive	6366	91	8	46	1	86	10	156	5	481	37	862	3	413	40	696	64	389	29	816	2	326	31	540	60	427%	360%	1771%	182%	378%	308%	347%	1311%
Main Street	6367	272	23	442	24	460	28	346	33	500	53	1256	34	1098	55	865	90	228	30	814	11	598	27	520	57	84%	129%	184%	46%	130%	98%	150%	175%
Oxley Highway Service Centre	6368	113	11	223	121	15	4	13	2	116	11	225	124	17	5	15	3	3	0	3	2	2	0	2	0	3%	0%	1%	2%	10%	3%	1%	16%
Oxley Highway Service Centre	6369	375	12	197	92	15	4	13	2	2046	82	1427	858	196	28	98	36	1671	70	1230	766	181	23	85	34	446%	594%	624%	834%	1211%	556%	653%	1326%
Sancrox Road - Expressway Spares	6371	27	9	31	3	24	4	34	2	98	12	169	3	60	8	88	7	71	3	138	0	36	3	54	4	266%	31%	443%	9%	153%	78%	156%	210%
Billabong Drive	6372	47	0	32	0	21	7	27	2	50	0	33	0	23	7	29	2	3	0	2	0	2	0	3	0	6%	0%	5%	0%	7%	5%	10%	5%
Burrawan Forest Drive	6373	43	0	30	0	196	47	366	14	46	0	32	0	243	49	449	15	2	0	2	0	47	3	83	1	5%	0%	6%	0%	24%	6%	23%	6%
Rawdon Island Road	6374	40	9	76	3	35	5	85	2	46	11	86	3	41	6	101	3	5	2	10	0	6	1	16	1	13%	17%	13%	2%	19%	19%	18%	41%
Sancrox Road	6375	55	9	58	3	35	5	54	2	64	11	68	3	45	6	69	3	9	2	10	0	10	1	15	1	17%	23%	17%	2%	29%	20%	28%	55%
King Creek Road	6376	50	5	2	1	13	2	34	5	61	6	2	1	16	3	42	6	11	1	0	0	3	1	8	1	21%	22%	1%	1%	26%	21%	23%	27%
Rocks Ferry Road	6377	83	6	5	2	20	3	48	6	93	7	5	2	23	3	55	7	10	1	0	0	3	0	7	1	12%	14%	6%	2%	15%	13%	15%	19%
Princess Avenue	6378	63	6	5	2	25	3	51	6	73	7	5	2	28	3	59	7	10	1	0	0	3	0	8	1	16%	15%	7%	2%	12%	14%	16%	21%
Webb Street	6379	57	6	3	1	19	3	45	6	65	7	4	2	22	3	52	7	9	1	0	0	3	0	7	1	15%	15%	7%	2%	15%	14%	16%	21%
Cameron Street / River Street	6380	126	6	248	5	183	6	229	5	146	6	277	5	201	6	258	6	20	1	29	0	18	1	30	1	16%	13%	12%	2%	10%	12%	13%	29%
Park Street	6381	154	6	288	5	92	5	115	5	176	6	325	5	107	6	137	6	21	1	37	0	15	1	23	2	14%	16%	13%	2%	16%	14%	20%	33%
Wauchope IGA	6382	35	0	102	0	229	8	174	6	37	0	105	0	238	8	186	6	2	0	4	0	9	0	12	0	6%	0%	4%	0%	4%	3%	7%	6%
Hastings Street	6383	97	6	213	5	120	5	133	5	112	6	242	5	138	6	155	6	15	1	29	0	17	1	22	2	15%	16%	14%	2%	14%	14%	17%	34%
Campbell Street	6384	82	6	190	5	138	5	133	5	88	6	200	5	146	6	145	6	6	0	9	0	8	0	12	1	7%	7%	5%	2%	6%	6%	9%	16%
Bain Street	6385	97	6	219	5	106	5	110	5	112	6	248	5	122	6	130	6	15	1	29	0	16	1	19	2	15%	16%	13%	2%	15%	14%	17%	33%
James Street	6386	47	0	97	0	94	8	30	5	53	0	109	0	109	8	35	6	6	0	12	0	15	0	6	0	13%	0%	13%	0%	16%	5%	20%	6%
James Street	6387	48	0	90	0	92	8	30	5	54	0	101	0	107	8	35	6	6	0	12	0	15	0	6	0	12%	0%	13%	0%	16%	5%	20%	6%
Allan Road	6388	54	0	105	0	48	1	60	9	60	0	115	0	56	1	74	10	7	0	11	0	8	0	14	1	13%	0%	10%	0%	18%	5%	23%	6%
King Street	6389	386	23	591	14	394	17	467	23	410	25	618	15	424	18	521	27	24	2	28	0	30	1	54	3	6%	8%	5%	2%	8%	7%	12%	14%
Christy Street	6390	153	10	163	20	60	0	196	0	176	12	181	23	70	0	233	0	22	2	18	3	10	0	37	0	15%	16%	12%	16%	17%	0%	19%	0%
Pead Street	6391	114	8	113	6	79	8	144	5	133	9	127	6	93	9	174	7	19	1	15	0	14	1	30	2	16%	17%	13%	2%	18%	15%	21%	40%
Mahogany Way	6392	399	21	453	14	286	18	534	24	451	24	500	15	337	20	633	30	52	3	48	0	51	3	99	6	13%	14%	11%	3%	18%	13%	19%	26%
Azalea Avenue	6393	373	28	524	15	324	18	513	24	428	33	576	16	373	20	616	30	55	5	51	0	49	2	103	6	15%	16%	10%	3%	15%	13%	20%	26%
Forest Way	6394	116	8	114	6	78	8	142	5	134	9	128	6	91	9	169	7	18	1	13	0	13	1	28	2	15%	16%	12%	2%	16%	14%	20%	36%
Oxley Highway - Wauchope west	6395	979	41	1011	48	743	48	1424	42	1010	48	1210	49	1029	55	1665	56	31	7	399	2	286	6	241	14	3%	17%	20%	3%	39%	13%	17%	34%
Riverbreeze Drive	6396	204	10	224	13	112	10	340	8	234	12	246	13	130	11	402	12	30	2	23	0	18	1	62	4	15%	17%	10%	2%	16%	13%	18%	41%
Beechwood Road	6397	211	10	216	13	125	10	323	8	229	11	229	13	137	11	362	10	17	1	13	0	12	1	39	2	8%	10%	6%	2%	10%	8%	12%	27%
Redbank Road	6398	284	10	201	13	132	10	302	8	306	11	214	13	146	11	339	10	22	1	12	0	14	1	37	2	8%	10%	6%	2%	10%	8%	12%	27%
Redbank Road	6399	82	6	5	2	20	3	46	6	89	7	5	2	22	3	51	6	7	1	0	0	2	0	5	1	8%	10%	3%	2%	10%	8%	11%	13%
Pacific Highway - Telegraph Point	6400	987	306	1838	490	1783	335	2502	371	1338	393	2516	499	2250	434	3110	529	350	87	678	9	467	98	607	158	35%	28%	37%	2%	26%	29%	24%	43%
Fernbank Creek Road	6401	1112	21	1808	9	498	33	1297	56	1142	22	1839	10	592	39	1546	68	31	1	31	0	94	5	249	12	3%	6%	2%	2%	19%	16%	19%	21%
Boundary Street	6403	209	7	188	0	75	7	174	0	230	8	206	0	80	8	189	0	21	1	19	0	5	0	15	0	10%	9%	10%	0%	6%	6%	9%	0%
Boundary Street - Airport	6404	338	24	924	21	489	24	556	19	588	37	2635	94	1568	74	823	63	251	12	1711	74	1079	50	267	44	74%	51%	183%	356%	220%	208%	48%	237%
Hughes Place	6405	115	21	846	17	953	51	966	51	121	22	880	17	984	52	1035	57	6	2	34	0	31	2	69	5	5%	7%	4%	1%	3%	3%	7%	11%
Evans Street	6406	137	5	42	0	30	4	45	0	172	7	52	0	62	5	56	0	35	1	10	0	12	1	12	0	25%	25%	25%	0%	25%	24%	26%	0%
Woolworths Lake Cathie	6407	1123	13	1825	2	534	11	1336	3	1151	13	1849	2	544	12	1403	3	28	1	24	0	10	0	67	0	2%	5%	1%	1%	2%	4%	5%	2%
Miala Street	6408	78	4	21	0	47	3	35	0	102	6	26	0	62	4	47	0	24	1	5	0	15	1	12	0	31%	30%	26%	0%	32%	29%	34%	0%
Abel Tasman Drive	6409	67	4	20	0	46	3	34	0	87	6	25	0	60	4	46	0	20	1	5	0	15	1	11	0	30%	30%	27%	0%	32%	30%	33%	0%
Bonny View Drive	6427	177	4	110	0	38	3	136	0	230	5	128	0	54	4	197	0	53	1	17	0	16	1	61	0	30%	30%	16%	0%	41%	30%	45%	0%
Bobs Creek Road	6428	31	9	30	4	7	5	16	6	34	10	32	4	8	6	18	7	3	1	2	0	1	0	2	1	9%	9%	7%	1%	12%	10%	15%	20%
Ron Banks Road	6429	49	12	550	11	20	5	25	0	52	12	572	12	22	5	28	0	3	1	22	1	2	0	3	0	6%	6%	4%	7%	8%	7%	12%	0%
Herons Creek Road	6430	63	31	85	24	165	0	363	0	66	33	88	26	175	0	392	0	3	2	3	1	11	0	29	0	5%	7%	3%	6%	6%	0%	8%	0%
Beach Street	6431	177	4	115	0	51	3	138	0	218	5	129	0	70	4	190	0	41	1	14	0	19	1	52	0	23%	25%	12%	0%	37%	24%	38%	0%
Beach Street	6432	171	4	119	0	40	3	136	0	195	5	127	0	47	3	165	0	24	1	9	0	8	0	29	0	14%	14%	7%	0%	19%	14%	21%	0%
Third Avenue	6433	161	4	96	0	50	3	132	0	208	5	103	0	71	4	197	0	47	1	7	0	21	1	66	0	29%	30%	7%	0%	41%	30%	50%	0%
Panorama Drive	6434	159	4	98	0	48	3	256	0	203	5	105	0	70	4	363	0	44	1	7	0	22	1	106	0	27%	30%	7%	0%	47%	30%	42%	0%
Edith Street	6442	142	15	126	10	47	3	66	0	151	16	130	11	51	3	73	0	9	1	4	1	3	0	7	0	6%	7%	3%	7%	7%	7%	10%	0%
Alma Street	6443	90	4	23	0	60	3	82	0	95	4	24	0	65	3	89	0	5	0	1	0	4	0	7	0	6%	8%	6%	0%	7%	7%	9%	0%
The Parade	6444	417	5	353	9	695	12	1060	12	439	6	369	9	739	13	1149	14	23	0	16	0	44	1	89	2	5%	7%	5%	1%	6%	6%	8%	16%
Adeline Street	6445	136	0	322	0	155	7	177	2	144	0	345	0	166	7	191	2	8	0	23	0	10	0	13	0	6%	0%	7%	0%	7%	4%	8%	8%
Lake Street	6446	43	0	299	0	121	7	154	2	49	0	336	0	139	7	183	2	6	0	38	0	18	0	29	0	13%	0%	13%	0%	15%	4%	19%	8%
Lake Street	6447	42	0	477	0	117	7	176	2	45	0	515	0	124	7	187	2	3	0	38	0	7	0	11	0	6%	0%	8%	0%	6%	4%	6%	8%
Tunis Street	6448	243	10	81	8	163	9	54	5	252	10	84	8	182	9	59	7	9	1	3	0	19	1	6	1	4%	6%	4%	2%	12%	6%	11%	21%
Tunis Street	6449	130	9	105	7	249	9	79	5	138	10	110	8	263	9	86	6	8	1	5	0	14	1	7	1	6%	6%	5%	2%	6%	6%	9%	21%
Seymour Street	6450	136	9	99	7	255	9	91	5	145	10	105	8	272	9	99	7	9	1	6	0	16	1	8	1	6%	7%	6%	2%	6%	7%	9%	22%
Seymour Street	6451	123	9	126	7	265	9	90	5	130	10	133	8	277	9	97	6	7	1	7	0	13	1	7	1	6%	6%	5%	2%	5%	6%	7%	19%
Hanley Street	6452	29	2	44	2	27	5	58	0	31	2	47	3	29	5	63	0	2	0	3	0	2	0	5	0	6%	6%	6%	5%	7%	7%	9%	0%

		2016 - Total Traffic Volumes								2026 - Total Traffic Volumes								Absolute Difference								% Difference							
		Generation				Attraction				Generation				Attraction				Generation				Attraction				Generation				Attraction			
		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 3-6		AM 7-10		PM 2-6	
Location	Zone	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV
Diamond Head Road	6453	49	3	55	2	39	4	64	2	52	4	58	2	41	4	69	2	3	0	2	0	2	0	5	0	6%	6%	4%	1%	5%	6%	9%	17%
The Boulevarde	6454	448	14	413	14	281	20	660	16	475	15	433	14	299	21	713	19	27	1	20	0	18	1	53	3	6%	6%	5%	1%	6%	6%	8%	17%
Captain Cook Bicentennial Drive	6462	270	10	84	9	22	4	16	3	286	11	90	9	25	5	17	4	16	1	6	0	3	0	1	1	6%	7%	7%	1%	13%	9%	8%	35%
St Albans Way	6463	267	10	51	9	22	4	16	3	283	11	55	9	25	5	17	4	16	1	4	0	3	0	1	1	6%	7%	8%	1%	13%	9%	5%	35%
Sirius Drive	6464	467	12	838	15	413	19	913	26	557	15	1067	15	504	23	1057	35	91	3	229	0	92	4	143	9	19%	20%	27%	3%	22%	20%	16%	35%
Glen Haven Drive	6465	14	4	14	2	240	0	55	0	17	4	15	2	271	0	64	0	3	1	2	0	32	0	8	0	19%	15%	12%	12%	13%	0%	15%	0%
Pacific Highway - Kew	6466	1279	159	1531	199	1108	196	1337	196	1515	195	1815	209	1409	239	1719	282	236	36	284	10	301	43	383	85	18%	23%	19%	5%	27%	22%	29%	43%
Tathra Road	6467	0	0	0	0	27	6	69	6	0	0	0	0	28	7	73	7	0	0	0	0	1	0	4	0	4%	4%	4%	0%	4%	5%	6%	8%
Nancy Bird Walton Drive	6468	39	5	61	1	0	0	0	0	40	5	64	1	0	0	0	0	2	0	2	0	0	0	0	0	4%	5%	4%	2%	0%	0%	0%	0%
Kendall Road	6469	519	21	613	32	423	23	623	23	631	26	714	33	508	27	779	35	112	5	101	1	85	4	156	12	22%	25%	16%	4%	20%	16%	25%	50%
Commerce Street	6470	391	25	440	15	299	18	652	55	469	31	519	16	379	22	823	73	78	6	79	1	80	4	172	18	20%	23%	18%	5%	27%	22%	26%	33%
Owen Street	6537	321	5	480	2	561	6	651	1	336	6	490	2	575	6	688	1	15	0	9	0	14	0	37	0	5%	6%	2%	2%	2%	3%	6%	17%
Fernbank Creek Road	6857	109	6	190	2	64	10	109	13	126	7	213	2	74	12	132	15	17	1	23	0	11	2	23	3	16%	16%	12%	2%	17%	19%	21%	21%
John Oxley Drive - Sienna Grange	16356	153	13	212	2	612	14	774	2	159	14	215	2	645	15	916	2	6	0	3	0	33	1	142	0	4%	3%	2%	1%	5%	5%	18%	3%
Rollands Plains Road	23260	272	20	212	12	147	22	389	14	301	21	228	12	155	24	430	17	29	2	16	0	8	2	41	3	11%	9%	7%	1%	5%	8%	11%	21%
Morton Street	23276	166	0	296	1	117	2	192	1	229	0	334	1	133	2	230	2	63	0	38	0	16	0	38	0	38%	0%	13%	2%	14%	4%	20%	32%
Major Innes Road / John Oxley Drive	23590	13	0	13	7	31	0	6	0	14	0	14	7	32	0	6	0	1	0	1	0	1	0	0	0	8%	0%	7%	5%	4%	0%	7%	0%
Lake Innes Village	23598	762	36	1669	19	804	20	1841	15	883	46	1866	19	1150	29	2337	19	122	10	397	0	346	8	495	4	16%	29%	12%	2%	43%	41%	27%	26%
Sails Resort	23683	103	0	262	2	249	1	437	1	109	0	274	2	257	1	456	1	6	0	13	0	8	0	19	0	6%	0%	5%	2%	3%	4%	4%	15%
McDonalds Port Macquarie	23693	154	24	395	26	278	25	1386	20	190	32	517	27	377	32	1751	33	36	8	122	1	98	7	415	14	23%	32%	31%	6%	35%	30%	31%	69%
Forest Parkway	24228	184	6	218	5	77	15	67	6	243	8	274	5	98	19	97	10	58	2	55	0	21	4	30	4	32%	29%	23%	1%	28%	29%	44%	56%
Long Point Drive	24244	29	9	30	0	81	11	93	6	33	11	34	0	100	13	116	7	4	2	4	0	19	2	23	0	15%	21%	13%	0%	23%	21%	25%	7%
Wambuyn Drive	24260	257	34	745	28	35	23	20	21	332	37	893	29	59	27	69	25	75	4	147	1	34	4	49	4	29%	11%	20%	2%	134%	19%	250%	21%
Oakes Crescent	24276	10	7	7	0	132	7	570	0	11	8	8	0	160	9	699	0	1	2	1	0	28	2	129	0	13%	22%	8%	0%	21%	21%	23%	0%
Barton Crescent	24376	568	52	775	15	1086	34	862	18	594	56	797	15	1122	35	931	20	25	4	22	0	35	1	68	2	4%	8%	3%	1%	3%	4%	8%	11%
Banksia Avenue	24405	530	10	347	2	658	10	711	0	573	11	373	2	694	11	766	0	43	1	26	0	36	1	55	0	8%	10%	7%	5%	6%	6%	8%	0%
Toyota Dealership Port Macquarie	24422	200	40	63	29	189	18	41	24	209	43	68	30	198	19	43	27	9	3	5	1	9	1	2	3	4%	8%	8%	2%	5%	3%	5%	13%
Westerweller Way	24443	190	0	267	0	7	34	6	0	225	0	307	0	8	35	7	0	36	0	40	0	1	1	1	0	19%	0%	13%	0%	13%	3%	15%	0%
Thrumster Street	25293	161	4	419	4	67	0	192	6	551	33	1239	6	403	28	741	66	390	29	820	2	337	28	550	60	243%	685%	198%	46%	506%	0%	287%	985%
Fern Valley Parade	25309	69	8	169	10	110	4	92	11	75	8	182	10	120	4	103	13	6	1	13	0	9	0	11	2	9%	11%	8%	2%	8%	7%	11%	19%
Boronia Street	29636	453	31	1448	33	725	32	277	30	500	35	1577	34	838	35	361	36	47	4	128	1	113	3	84	6	10%	12%	9%	3%	16%	10%	31%	20%
New Developments																																	
Thrumster Street (South)	33190									444	30	825	2	394	29	548	59																
Blackbutt Road	33339									96	5	369	0	117	4	94	8																
New Bonny Hills Development	34002									628	7	658	0	318	6	1138	3																
Yippin Creek	34022									590	0	200	0	147	0	802	0																
Total		49898	2317	70801	2067	50623	2348	71077	2067	61611	2905	87337	2979	61611	2905	87337	2979	9955	547	14484	910	10011	517	13677	841								

		2016 - Total Traffic Volumes								2036 - Total Traffic Volumes								Absolute Difference								% Difference							
		Generation				Attraction				Generation				Attraction				Generation				Attraction				Generation				Attraction			
		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 3-6		AM 7-10		PM 2-6	
Location	Zone	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV
Park Street	6231	486	37	578	27	341	16	818	8	485	40	616	28	363	17	870	10	49	3	38	1	23	1	52	1	11%	8%	7%	4%	7%	6%	6%	18%
River Park Road	6234	360	36	550	27	281	12	613	4	391	39	579	28	295	12	666	5	31	3	29	1	14	1	53	1	8%	9%	5%	5%	5%	8%	9%	24%
Newport Island road	6235	203	17	589	18	224	9	243	8	217	19	652	18	238	10	260	10	14	2	63	1	14	1	17	1	7%	10%	11%	4%	6%	7%	7%	16%
Bay Street - Settlement City	6236	696	18	1084	18	854	14	558	13	860	25	1446	22	1248	19	797	21	163	7	361	4	394	5	239	8	23%	37%	33%	22%	46%	37%	43%	58%
Bellbowrie Street	6237	733	5	742	2	1714	8	1262	36	782	5	793	2	1917	8	1432	39	49	0	51	0	203	0	170	3	7%	9%	7%	1%	12%	8%	13%	8%
Blueberry Lane	6239	22	4	89	2	66	4	41	2	37	6	128	2	83	5	49	3	14	2	38	0	17	1	9	1	65%	38%	43%	15%	26%	34%	21%	58%
Findlay Avenue - Garden Village	6240	25	4	18	2	403	0	143	0	38	5	26	3	538	0	193	0	13	1	8	1	134	0	50	0	52%	39%	46%	34%	33%	0%	35%	0%
Hastings Avenue	6241	265	4	27	2	424	12	71	8	341	5	30	2	591	16	104	12	76	1	3	0	167	4	32	4	29%	33%	12%	10%	39%	36%	45%	46%
Buller Street - Westport Park	6242	22	4	24	2	132	4	53	3	203	6	307	3	213	6	117	4	181	2	283	1	81	2	64	1	819%	57%	1179%	69%	62%	43%	119%	37%
Hollingsworth Street - Waters Edge	6243	22	4	24	2	112	4	52	3	168	5	281	3	179	5	110	4	146	1	257	1	67	1	58	1	656%	40%	1082%	38%	60%	34%	111%	20%
Hollingsworth Street	6244	22	4	24	2	110	4	47	3	175	6	288	3	209	6	121	5	153	3	263	1	98	2	74	2	705%	72%	1084%	46%	89%	69%	155%	68%
Short Street	6245	27	4	28	2	202	4	66	3	39	5	36	2	269	5	91	5	12	1	9	0	67	1	25	2	44%	38%	32%	10%	33%	34%	38%	56%
Short Street / Hayward Street	6246	534	12	1326	9	605	12	1021	11	665	16	1798	10	888	16	1413	16	131	5	472	1	283	4	392	6	24%	40%	36%	14%	47%	34%	38%	56%
Horton Street	6247	475	7	787	0	889	9	1029	2	629	10	1084	0	1223	12	1402	2	154	3	297	0	334	3	373	0	33%	41%	38%	0%	38%	33%	36%	0%
Hay Street	6248	217	6	630	2	639	6	891	1	280	8	862	2	890	8	1221	2	63	2	232	0	251	2	329	1	29%	40%	37%	16%	39%	33%	37%	74%
Hay Street / Hayward Street	6249	504	12	1444	9	523	12	1364	11	624	15	1809	10	654	15	1656	14	121	3	365	1	131	3	292	4	24%	26%	25%	8%	25%	21%	21%	37%
Murray Street	6250	173	5	331	2	252	6	258	1	236	7	463	2	339	8	343	2	63	2	132	0	88	2	84	1	37%	39%	40%	17%	35%	33%	33%	72%
Murray Street	6251	176	5	398	2	293	6	260	1	186	6	421	2	305	6	268	1	10	0	23	0	11	0	8	0	6%	6%	6%	2%	4%	3%	3%	14%
Munster Street	6252	208	5	371	2	255	6	370	1	287	8	500	2	341	8	517	2	79	2	128	0	87	2	147	1	38%	39%	33%	22%	34%	34%	40%	61%
Grant Street	6253	195	5	429	2	548	6	409	1	206	6	449	2	566	6	422	1	10	0	20	0	18	0	14	0	5%	6%	5%	2%	3%	3%	3%	12%
Lord Street	6254	234	5	333	2	323	6	286	1	246	6	349	2	334	6	295	1	11	0	16	0	11	0	10	0	5%	6%	5%	2%	4%	3%	3%	12%
Stewart Street	6255	524	5	1256	2	726	6	1206	1	543	6	1290	2	744	6	1265	1	19	0	34	0	18	0	59	0	4%	6%	3%	2%	2%	3%	5%	12%
Church Street - Bowls Club	6256	511	15	406	2	494	20	579	1	538	17	426	2	511	21	600	1	26	1	20	0	17	1	20	0	5%	7%	5%	2%	3%	3%	4%	16%
Burrawan Street - Hastings Secondary College	6257	52	3	38	1	107	4	23	0	55	4	39	1	110	4	24	0	3	0	2	0	4	0	1	0	6%	6%	4%	2%	3%	3%	4%	10%
Burrawan Street / Grant Street	6258	47	3	23	1	13	4	12	0	65	5	31	1	18	5	18	1	18	1	8	0	5	1	6	0	40%	40%	33%	30%	35%	36%	45%	54%
Grant Street / Burrawan Street	6259	262	11	628	8	192	0	239	0	366	16	844	10	260	0	358	0	104	5	216	3	68	0	120	0	40%	41%	34%	37%	36%	0%	50%	0%
Munster Street - City Church	6260	485	11	447	8	316	0	267	0	506	12	469	8	324	0	275	0	20	1	22	0	9	0	8	0	4%	6%	5%	4%	3%	0%	3%	0%
Hollingsworth Street	6261	552	13	1062	0	717	9	681	5	572	13	1104	0	738	9	714	6	20	1	41	0	21	0	33	0	4%	6%	4%	0%	3%	4%	5%	7%
Hollingsworth Street	6262	759	8	1303	10	525	7	417	2	959	9	1612	12	673	10	530	7	200	2	308	1	148	3	113	4	26%	22%	24%	14%	28%	37%	27%	217%
Waugh Street	6263	20	1	69	0	135	1	74	0	26	1	86	0	157	1	85	0	6	0	16	0	22	0	11	0	31%	24%	24%	0%	17%	16%	15%	10%
Bridge Street	6264	20	1	68	0	87	1	48	0	29	1	97	0	117	2	62	0	9	0	28	0	29	0	14	0	44%	41%	41%	0%	34%	33%	29%	10%
Waugh Street	6265	20	1	67	0	101	1	94	0	29	1	93	0	134	2	125	0	9	0	26	0	33	0	32	0	46%	42%	39%	0%	33%	32%	34%	10%
Bridge Street	6266	27	3	122	4	37	1	60	0	37	4	159	5	47	2	77	1	10	1	38	1	10	0	16	0	35%	32%	31%	26%	26%	29%	27%	45%
Gore Street	6267	21	1	81	0	88	1	55	0	49	3	195	0	198	3	128	0	28	2	114	0	114	2	74	0	137%	145%	142%	0%	137%	131%	135%	10%
Ackroyd Street	6268	20	13	678	14	273	18	139	15	53	20	1002	20	564	31	360	30	33	8	324	6	291	12	221	15	164%	59%	48%	38%	107%	68%	159%	102%
Ackroyd Street	6269	143	13	384	17	738	24	622	20	191	19	535	23	975	32	896	29	48	7	151	6	237	8	275	9	33%	52%	39%	36%	32%	36%	44%	47%
Widderson Street	6271	613	0	498	0	100	11	342	6	672	0	575	0	115	12	368	7	59	0	77	0	15	0	26	1	10%	0%	15%	0%	14%	4%	8%	9%
Clifton Drive	6272	592	9	1501	5	212	8	486	2	656	10	1621	5	243	9	573	3	63	1	120	0	31	1	86	1	11%	12%	8%	4%	14%	10%	18%	24%
Lady Nelson Drive	6273	238	3	85	1	200	4	79	1	265	4	96	1	221	5	88	1	27	0	11	0	21	0	9	0	11%	11%	13%	7%	10%	10%	11%	14%
Widderson Street - TAFE	6274	43	4	46	2	346	0	403	0	45	5	50	2	366	0	424	0	2	0	4	0	20	0	21	0	5%	8%	9%	4%	6%	0%	5%	0%
Slade Crescent	6275	169	5	53	2	155	0	251	0	192	5	63	2	168	0	273	0	23	1	9	0	13	0	21	0	13%	13%	18%	9%	8%	0%	9%	0%
Kooloonbung Close	6276	11	0	49	0	10	2	15	0	36	3	137	2	210	8	184	7	25	3	88	2	200	6	169	7	228%	0%	180%	0%	1996%	347%	1123%	0%
Platt Street	6277	320	2	471	4	448	5	650	1	429	5	574	6	702	12	917	9	109	3	103	2	254	7	267	8	34%	112%	22%	57%	57%	138%	41%	674%
Wyandra Crescent	6278	589	4	634	0	636	0	257	0	638	4	662	0	701	0	325	0	49	0	27	0	65	0	68	0	8%	10%	4%	0%	10%	0%	26%	0%
Hill Street	6279	34	1	63	0	25	2	23	0	37	2	67	0	28	2	26	0	4	0	4	0	3	0	3	0	12%	9%	7%	0%	11%	11%	15%	0%
Gray Street	6280	892	0	1127	0	783	31	1366	14	980	0	1208	0	842	32	1517	15	88	0	81	0	59	1	151	1	10%	0%	7%	0%	8%	3%	11%	7%
Mallawa Crescent	6281	72	4	53	0	36	4	34	0	99	5	72	1	51	5	49	1	27	1	19	0	15	1	16	0	38%	40%	36%	36%	42%	38%	46%	49%
Home Street	6282	98	4	291	0	288	4	35	0	157	5	404	1	380	5	53	1	59	1	113	0	92	2	18	0	61%	40%	39%	36%	32%	38%	50%	50%
Cross Street	6283	92	5	385	4	183	4	432	2	135	8	488	5	250	5	673	3	43	2	102	1	67	2	242	1	47%	38%	27%	21%	37%	44%	56%	73%
Everard Street	6284	160	1	262	0	159	3	417	0	172	1	285	0	179	3	467	0	12	0	23	0	20	0	51	0	7%	10%	9%	0%	13%	11%	12%	0%
Cross Street	6285	118	5	194	4	191	4	475	2	132	6	262	4	210	4	518	2	14	1	68	0	19	0	43	0	12%	11%	35%	4%	10%	12%	9%	25%
Crisp Street	6286	383	5	146	2	46	4	53	2	412	5	161	2	50	5	58	2	30	0	14	0	5	0	5	0	8%	10%	10%	3%	12%	9%	9%	19%
Grant Street	6287	626	5	486	3	807	5	17	2	673	6	526	4	888	5	21	2	47	1	40	0	81	0	4	0	8%	10%	8%	3%	10%	10%	24%	24%
Grant Street	6288	270	5	175	3	335	4	13	2	295	5	190	3	364	4	15	2	26	0	15	0	29	0	2	0	9%	10%	9%	3%	9%	8%	12%	22%
Granite Street	6289	54	0	143	0	477	2	454	1	64	0	163	0	514	2	492	1	10	0	20	0	37	0	38	0	18%	0%	14%	0%	8%	5%	8%	5%
Bellevue Drive	6290	229	4	360	0	165	0	263	0	252	4	377	0	178	0	314	0	22	0	18	0	13	0	52	0	10%	10%	5%	0%	8%	0%	20%	0%
Savoy Street	6291	442	4	447	0	105	0	258	0	493	5	473	0	109	0	298	0	52	0	27	0	4	0	41	0	12%	10%	6%	0%	4%	0%	16%	0%
Flynn Street	6292	199	6	163	2	41	5	49	2	232	7	181	2	45	6	54	2	33	1	18	0	4	1	5	0	17%	11%	11%	3%	11%	10%	10%	21%
Flynn Street	6293	369	2	84	0	222	3	972	0	424	2	91	0	277	4	1180	0	55	0	7	0	55	1	209	0	15%	18%	9%	0%	25%	19%	21%	0%
Herschell Street	6294	257	5	265	2	45	4	53	2	282	5	291	2	50	5	60	2	25	1	26	0	5	0	8	0	10%	11%	10%	3%	10%	11%	14%	21%
Ocean Street	6295	494	2	151	0	292	3	357	0	512	2	161	0	320	4	384	0	18	0	9	0	27	0	27	0	4%	8%	6%	0%	9%	8%	8%	0%
John Street	6296	156	6	159	2	38	5	36	2	171	7	174	2	41	6	41	2	15	1	15	0	4	1	5	0	10%	11%	9%	2%	10%	10%	14%	21%
Yarranabee Road	6297	180	6	147	2	41	5	39	2	197	7	161	2	45	6	43	2	16	1	14	0	4	1	5	0	9%	11%	10%	2%	11%	10%	12%	21%
Moruya Drive	6298	107	0	82	0	26	5	12	2	122	0	89	0	28	5	13	2	15	0	7	0	2	0	2	0	14%	0%	9%	0%	9%	5%	13%	7%
Bellevue Drive	6299	109	0	80	0	26	5	12	2	126	0	87	0	28	5	13	2	17	0	7	0	2	0	2	0	16%	0%	9%	0%	9%	5%	13%	7%
Leanda Street	6300	188	2	174	0	42	3	526	0	199	2	189	0	51	4	579	0	11	0	15	0	9	0	53	0	6%	9%	9%	0%	22%	9%	10%	0%
Hillcrest Avenue	6301	193	6	422	2	158	5	241	2	294	7	445	2	170	5	271	2	101	1	23	0	13	0	30	0	52%	9%	5%	2%	8%	8%	13%	17%
Braemar Drive	6302	171	0	132	0	34	5	343	2	196	0	148	0	40	5	404	2	25	0	16	0	6	0	62	0	15%	0%	12%	0%	18%	5%	18%	7%
Calwalla Crescent	6303	314	2	315	0	239	4	663	0	346	2	339	0	257	4	730	0	32	0	25	0	18	0	68	0	10%	9%	8%	0%	7%	9%	10%	0%
Pacific Drive - Sea Acres Rainforest	6304	158	2	213	0	277	4	763	0	167	2	223	0	288	4	796	0	10	0	10	0	11	0	33	0	6%	6%	5%	0%	4%	5%	4%	0%
Oleander Avenue	6305	242	5	267	2	70	2	545	1	280	6	295	2	80	2	634	2	38	1	27	0	9	0	90	0	16%	13%	10%	3%	14%	13%	16%	35%
O'Briens Road	6306	368	0	249	0	48	5	220	2	412	0	273	0	53	6	237	2	44	0	24	0	5	0	17	0	12%	0%	9%	0%	10%	5%	8%	7%
Emily Avenue	6307	597	10	509	4	329	5	152	2	655	12	582	4	397	6	168	2	58	1	74	0	68	1	17	1	10%	13%	14%	5%	21%	19%	11%	36%
Hockey Place	6308	165	10	264	4	234	5	198	2	172	11	276	4	250	6	203	2	7	1	13	0	16	0	5	0	4%	6%	5%	2%	7%	6%	3%	15%
Barton Crescent	6309	191	12	918	8	148	13	930	6	202	13	940	8	156	13	1037	6	11	1	22	0	8	1	106	1	6%	6%	2%	1%	5%	5%	11%	11%
Acacia Avenue	6310	396	9	295	2	298	7	120	12	209	10	305	2	313	8	132	13	14	1	10	0	15	0	12	1	7%	7%	3%	1%	5%	6%	10%	7%
Bunnings Port Macquarie	6311	192	9	587	3	259	11	460	2	254	9	607	3	270	12	489	2	63	0	20	0	11	1	29	0	33%	5%	3%	1%	4%	6%	6%	10%
Jindalee Road	6312	902	211	2130	84	1444	165	1531	298	936	228	2189	85	1530	173	1685	323	35	17	59	1	86	7	154	25	4%	8%	3%	1%	6%	5%	10%	8%
Toorak Court	6313	363	9	703	2	223	7	149	12	174	9	719	2	234	7	161	12	10	0	16	0	11	0	11	0	6%	5%	2%	1%	5%	7%	8%	4%
Sherwood Road	6314	872	18	831	13	626	35	1094	24	953	20	932	13	681	38	1207	28	82	2	101	0	55	3	113	4	9%	12%	12%	3%	9%	9%	10%	16%
Wrights Road	6315	417	23	1185	20	776	30	445	16	488	26	1304	21	843	33	529	20	71	3	120	1	67	3	85	4	17%	14%	10%	4%	9%	12%	19%	25%
Greenmeadows Drive	6316	150	5	42	2	228	3	207	1	172	5	53	2	256	3	228	2	23	1	11	0	29	0	20	0	15%	14%	23%	5%	13%	11%	10%	25%

		2016 - Total Traffic Volumes								2036 - Total Traffic Volumes								Absolute Difference								% Difference							
		Generation				Attraction				Generation				Attraction				Generation				Attraction				Generation				Attraction			
		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 3-6		AM 7-10		PM 2-6	
Location	Zone	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV
Lochinvar Place	6317	146	5	42	2	150	3	109	1	163	5	47	2	167	3	118	2	16	1	5	0	17	0	9	0	11%	11%	12%	4%	12%	8%	8%	20%
Greenmeadows Drive	6318	150	5	78	2	172	3	431	1	172	6	110	2	200	3	473	2	23	1	32	0	28	0	42	0	15%	16%	40%	6%	16%	13%	10%	28%
Crestwood Drive	6319	514	22	636	18	292	17	730	18	581	26	718	19	335	19	855	23	67	4	81	1	43	2	125	5	13%	17%	13%	5%	15%	12%	17%	26%
Dalkeith Drive	6320	355	11	369	12	195	13	515	12	391	12	464	13	236	15	549	15	36	2	95	1	41	2	35	3	10%	15%	26%	5%	21%	13%	7%	26%
Jonas Absalom Drive	6321	305	11	249	2	134	13	535	11	348	12	317	3	154	14	581	13	43	2	69	0	20	2	46	2	14%	17%	28%	4%	15%	13%	9%	20%
Livingstone Road	6322	144	3	169	2	42	5	110	1	162	4	201	2	49	5	118	2	19	0	33	0	8	1	9	0	13%	16%	20%	6%	18%	13%	8%	28%
Waterview Close	6323	186	3	165	2	50	5	217	2	221	4	199	2	56	5	240	2	35	0	33	0	6	1	23	0	19%	15%	20%	5%	13%	13%	10%	29%
Timber Ridge	6324	169	3	205	2	50	5	216	2	199	4	243	2	57	5	239	2	29	0	38	0	7	1	23	0	17%	15%	18%	5%	14%	13%	11%	29%
Ashdown Drive	6325	893	0	1093	0	413	0	828	0	1044	0	1262	0	436	0	939	0	151	0	169	0	23	0	111	0	17%	0%	16%	0%	5%	0%	13%	0%
Montague Street	6326	147	3	164	2	38	5	102	1	166	4	196	2	45	5	110	2	19	0	32	0	7	1	7	0	13%	16%	20%	6%	19%	13%	7%	28%
Lighthouse Road	6327	103	0	182	0	132	0	227	0	112	0	199	0	139	0	238	0	9	0	17	0	7	0	11	0	9%	0%	9%	0%	6%	0%	5%	11%
Watonga Street	6328	669	15	536	12	519	12	1233	11	732	17	626	13	639	14	1378	14	63	3	90	1	121	2	145	3	9%	18%	17%	8%	23%	19%	12%	27%
Pettit Street	6329	502	14	827	12	518	12	919	11	589	16	993	12	567	14	1007	14	87	2	166	1	50	2	88	3	17%	16%	20%	7%	10%	13%	10%	24%
Emerald Drive	6330	645	20	876	19	1038	22	2098	12	784	25	1157	22	1239	27	2444	16	140	5	282	2	201	5	346	4	22%	22%	32%	12%	19%	20%	16%	37%
Port Macquarie Golf Course	6331	378	5	59	0	49	4	57	0	395	5	64	0	52	4	59	0	18	0	5	0	4	0	2	0	5%	7%	8%	0%	7%	5%	3%	0%
Braeroy Drive	6332	431	9	534	5	400	11	555	6	763	16	615	7	787	20	1477	14	333	8	81	2	386	10	922	8	77%	87%	15%	33%	96%	90%	166%	142%
Currawong Drive	6333	289	9	265	7	96	9	365	8	542	17	610	10	179	17	589	20	254	8	344	2	83	8	224	12	88%	92%	130%	33%	86%	83%	61%	140%
Annabella Drive	6334	309	9	230	7	99	9	310	8	605	17	405	10	160	17	621	20	296	8	174	2	60	8	310	12	96%	92%	76%	33%	61%	83%	100%	140%
The Point Drive	6363	259	6	208	5	117	9	368	8	500	11	400	6	204	18	691	19	241	5	192	1	87	8	324	10	93%	87%	93%	27%	74%	89%	88%	126%
The Ruins Way	6364	289	6	158	4	68	9	268	8	540	11	312	6	126	16	497	18	251	5	154	1	58	8	228	10	87%	86%	98%	27%	86%	90%	85%	126%
Philip Charley Drive	6365	114	3	58	0	86	4	55	0	152	5	83	0	139	6	84	0	38	1	25	0	53	2	28	0	33%	46%	43%	0%	62%	43%	51%	0%
Capital Drive	6366	91	8	46	1	86	10	156	5	886	68	1708	23	757	77	1386	102	795	60	1662	22	670	67	1231	97	871%	735%	3608%	2142%	775%	673%	790%	2146%
Main Street	6367	272	23	442	24	460	28	346	33	690	84	2075	54	1746	84	1519	129	418	61	1633	30	1286	57	1173	96	154%	261%	369%	128%	280%	203%	339%	295%
Oxley Highway Service Centre	6368	113	11	223	121	15	4	13	2	116	11	227	123	19	5	18	3	3	0	4	2	4	1	5	1	3%	0%	2%	1%	24%	25%	25%	25%
Oxley Highway Service Centre	6369	375	12	197	92	15	4	13	2	3998	161	2845	1300	443	53	205	39	3624	150	2648	1208	428	49	192	37	967%	1265%	1343%	1315%	2857%	1169%	1474%	1652%
Sancrox Road - Expressway Spares	6371	27	9	31	3	24	4	34	2	202	14	319	4	117	11	173	9	176	5	288	1	93	6	139	7	658%	62%	926%	29%	394%	138%	404%	334%
Billabong Drive	6372	47	0	32	0	21	7	27	2	50	0	33	0	24	7	29	2	3	0	2	0	2	0	3	0	6%	0%	6%	0%	11%	6%	11%	5%
Burrawan Forest Drive	6373	43	0	30	0	196	47	366	14	46	0	33	0	319	49	579	15	3	0	3	0	124	3	212	1	6%	0%	11%	0%	63%	5%	58%	6%
Rawdon Island Road	6374	40	9	76	3	35	5	85	2	52	13	100	4	50	6	122	4	11	3	24	0	15	2	37	2	28%	37%	31%	10%	45%	35%	44%	77%
Sancrox Road	6375	55	9	58	3	35	5	54	2	77	15	83	4	62	7	94	5	22	5	25	1	27	3	40	2	41%	57%	44%	18%	79%	54%	74%	116%
King Creek Road	6376	50	5	2	1	13	2	34	5	77	8	2	1	23	4	54	8	26	3	0	0	10	1	20	3	52%	56%	27%	7%	76%	58%	59%	68%
Rocks Ferry Road	6377	83	6	5	2	20	3	48	6	100	8	5	2	26	3	60	7	17	1	0	0	6	1	12	2	21%	23%	9%	3%	30%	23%	26%	31%
Princess Avenue	6378	63	6	5	2	25	3	51	6	80	8	5	2	31	3	66	8	17	2	1	0	6	1	15	2	27%	27%	11%	3%	24%	27%	29%	36%
Webb Street	6379	57	6	3	1	19	3	45	6	71	8	4	2	24	3	58	8	15	2	0	0	6	1	13	2	26%	27%	10%	3%	30%	27%	29%	35%
Cameron Street / River Street	6380	126	6	248	5	183	6	229	5	159	7	302	5	216	7	282	7	33	1	54	0	33	1	53	2	26%	22%	22%	5%	18%	22%	23%	44%
Park Street	6381	154	6	288	5	92	5	115	5	190	7	356	5	121	7	158	7	36	2	68	0	29	1	43	3	23%	27%	24%	5%	32%	26%	38%	52%
Waucope IGA	6382	35	0	102	0	229	8	174	6	38	0	106	0	242	8	188	6	2	0	5	0	13	0	14	0	6%	0%	5%	0%	6%	5%	8%	6%
Hastings Street	6383	97	6	213	5	120	5	133	5	122	7	266	5	153	7	174	7	25	2	53	0	33	1	41	2	25%	27%	25%	6%	27%	26%	31%	52%
Campbell Street	6384	82	6	190	5	138	5	133	5	89	6	204	5	151	6	151	6	7	1	14	0	13	0	18	1	9%	9%	7%	2%	9%	9%	13%	19%
Bain Street	6385	97	6	219	5	106	5	110	5	121	7	273	5	136	7	147	7	24	2	54	0	30	1	37	2	25%	27%	24%	6%	28%	26%	33%	52%
James Street	6386	47	0	97	0	94	8	30	5	57	0	120	0	122	8	41	6	9	0	23	0	28	0	12	0	20%	0%	24%	0%	30%	5%	39%	6%
James Street	6387	48	0	90	0	92	8	30	5	58	0	111	0	120	8	41	6	9	0	22	0	28	0	11	0	19%	0%	24%	0%	31%	5%	38%	6%
Allan Road	6388	54	0	105	0	48	1	60	9	64	0	124	0	64	1	86	10	11	0	19	0	16	0	26	1	20%	0%	18%	0%	34%	6%	44%	6%
King Street	6389	386	23	591	14	394	17	467	23	418	25	632	15	444	19	551	28	32	2	42	0	50	2	84	4	8%	10%	7%	1%	13%	11%	18%	18%
Christy Street	6390	153	10	163	20	60	0	196	0	190	13	195	25	80	0	265	0	37	3	32	5	20	0	69	0	24%	28%	20%	26%	34%	0%	35%	0%
Pead Street	6391	114	8	113	6	79	8	144	5	145	10	138	6	107	10	200	8	31	2	25	0	28	2	56	3	27%	30%	22%	8%	36%	29%	39%	59%
Mahogany Way	6392	399	21	453	14	286	18	534	24	483	27	542	16	384	23	718	33	85	5	89	1	97	5	184	10	21%	25%	20%	8%	34%	29%	34%	41%
Azalea Avenue	6393	373	28	524	15	324	18	513	24	464	36	620	17	418	22	705	34	91	8	96	1	94	4	192	10	24%	28%	18%	8%	29%	24%	37%	42%
Forest Way	6394	116	8	114	6	78	8	142	5	145	10	137	6	103	10	191	8	29	2	22	0	25	2	50	3	25%	27%	20%	7%	32%	26%	35%	54%
Oxley Highway - Wauchope west	6395	979	41	1011	48	743	48	1424	42	1014	54	1373	53	1225	60	1794	64	35	12	363	5	482	12	370	21	4%	30%	36%	10%	65%	25%	26%	51%
Riverbreeze Drive	6396	204	10	224	13	112	10	340	8	253	13	264	14	147	12	454	13	50	3	40	1	35	2	115	5	24%	29%	18%	9%	31%	24%	34%	55%
Beechwood Road	6397	211	10	216	13	125	10	323	8	236	12	236	14	146	11	386	11	25	2	20	1	22	1	63	3	12%	15%	9%	5%	17%	13%	20%	33%
Redbank Road	6398	284	10	201	13	132	10	302	8	316	12	220	14	157	11	362	11	32	2	19	1	25	1	60	3	11%	15%	9%	5%	19%	13%	20%	33%
Redbank Road	6399	82	6	5	2	20	3	46	6	92	7	5	2	24	3	54	7	10	1	0	0	4	0	8	1	12%	14%	4%	2%	19%	14%	17%	20%
Pacific Highway - Telegraph Point	6400	987	306	1838	490	1783	335	2502	371	1577	471	3184	511	2753	533	3695	865	590	165	1346	22	970	198	1193	494	60%	54%	73%	4%	54%	59%	48%	133%
Fernbank Creek Road	6401	1112	21	1808	9	498	33	1297	56	1147	22	1857	10	715	46	1925	80	36	1	50	0	217	13	628	24	3%	7%	3%	2%	44%	38%	48%	43%
Boundary Street	6403	209	7	188	0	75	7	174	0	231	8	209	0	81	8	191	0	22	1	21	0	6	0	18	0	11%	9%	11%	0%	7%	6%	10%	0%
Boundary Street - Airport	6404	338	24	924	21	489	24	556	19	591	37	2654	95	1585	74	843	61	253	13	1730	74	1095	50	286	43	75%	52%	187%	358%	224%	207%	51%	230%
Hughes Place	6405	115	21	846	17	953	51	966	51	123	22	888	17	1002	53	1051	56	8	2	42	0	49	2	85	4	7%	8%	5%	2%	5%	4%	9%	9%
Evans Street	6406	137	5	42	0	90	4	45	0	199	8	60	0	75	6	68	0	62	3	18	0	25	2	24	0	45%	47%	43%	0%	50%	47%	53%	0%
Woolworths Lake Cathie	6407	1123	13	1825	2	534	11	1386	3	1152	13	1863	2	548	12	1416	3	29	1	38	0	14	1	81	0	3%	6%	2%	2%	3%	4%	6%	4%
Miala Street	6408	78	4	21	0	47	3	35	0	121	7	30	0	77	5	59	0	43	3	9	0	30	2	24	0	55%	58%	42%	0%	64%	58%	69%	0%
Abel Tasman Drive	6409	67	4	20	0	46	3	34	0	103	7	28	0	75	5	58	0	36	2	9	0	29	2	23	0	53%	58%	44%	0%	64%	58%	68%	0%
Bonny View Drive	6427	177	4	110	0	38	3	136	0	274	6	150	0	66	5	242	0	97	2	40	0	28	2	106	0	55%	58%	36%	0%	73%	58%	78%	0%
Bobs Creek Road	6428	31	9	30	4	7	5	16	6	35	10	33	4	9	6	20	7	4	1	3	0	2	1	4	2	13%	13%	10%	2%	21%	16%	25%	27%
Ron Banks Road	6429	49	12	550	11	20	5	25	0	52	12	581	12	22	5	30	0	3	1	31	1	2	0	5	0	7%	7%	6%	7%	12%	10%	19%	0%
Herons Creek Road	6430	63	31	85	24	165	0	363	0	67	34	89	25	179	0	402	0	4	3	4	1	15	0	39	0	6%	8%	5%	5%	9%	0%	11%	0%
Beach Street	6431	177	4	115	0	51	3	138	0	251	6	147	0	83	4	227	0	74	2	32	0	32	1	89	0	42%	47%	27%	0%	64%	47%	65%	0%
Beach Street	6432	171	4	119	0	40	3	136	0	210	5	136	0	53	4	184	0	39	1	17	0	13	1	48	0	23%	24%	14%	0%	33%	25%	35%	0%
Third Avenue	6433	161	4	96	0	50	3	132	0	247	6	122	0	87	5	240	0	86	2	26	0	37	2	109	0	53%	58%	27%	0%	73%	58%	83%	0%
Panorama Drive	6434	159	4	98	0	48	3	256	0	242	6	120	0	85	5	443	0	83	2	23	0	37	2	187	0	52%	58%	24%	0%	77%	58%	73%	0%
Edith Street	6442	142	15	126	10	47	3	66	0	154	17	137	11	53	3	74	0	12	2	11	1	6	0	9	0	8%	10%	8%	8%	12%	11%	13%	0%
Alma Street	6443	90	4	23	0	60	3	82	0	98	5	24	0	67	3	92	0	7	0	1	0	7	0	10	0	8%	10%	5%	0%	11%	10%	13%	0%
The Parade	6444	417	5	353	9	695	12	1060	12	454	6	368	9	754	13	1185	14	38	0	16	0	59	1	125	2	9%	9%	4%	2%	8%	9%	12%	19%
Adeline Street	6445	136	0	322	0	155	7	177	2	147	0	349	0	170	7	199	2	11	0	27	0	14	0	21	0	8%	0%	8%	0%	9%	5%	12%	8%
Lake Street	6446	43	0	299	0	121	7	154	2	54	0	371	0	153	7	204	2	11	0	72	0	32	0	49	0	25%	0%	24%	0%	26%	5%	32%	8%
Lake Street	6447	42	0	477	0	117	7	176	2	46	0	522	0	128	7	197	2	4	0	45	0	11	0	21	0	9%	0%	10%	0%	10%	5%	12%	8%
Tunis Street	6448	243	10	81	8	163	9	54	5	257	10	86	8	182	10	60	7	14	1	5	0	19	1	7	1	6%	8%	7%	3%	12%	10%	12%	21%
Tunis Street	6449	130	9	105	7	249	9	79	5	141	10	112	8	269	10	89	6	11	1	7	0	20	1	10	1	8%	8%	6%	3%	8%	10%	12%	20%
Seymour Street	6450	136	9	99	7	255	9	91	5	149	10	107	8	279	10	102	7	13	1	8	0	23	1	12	1	10%	9%	8%	3%	9%	11%	13%	22%
Seymour Street	6451	123	9	126	7	265	9	90	5	132	10	133	8	282	9	100	6	9	1	7	0	17	1	9	1	8%	7%	6%	3%	6%	8%	10%	18%
Hanley Street	6452	29	2	44	2	27	5	58	0	32	2	48	3	30	5	65	0	3	0	4	0	3	0	7	0	9%	8%	9%	9%	11%	11%	11%	0%

		2016 - Total Traffic Volumes								2036 - Total Traffic Volumes								Absolute Difference								% Difference							
		Generation				Attraction				Generation				Attraction				Generation				Attraction				Generation				Attraction			
		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 2-6		AM 7-10		PM 3-6		AM 7-10		PM 2-6	
Location	Zone	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV
Diamond Head Road	6453	49	3	55	2	39	4	64	2	52	4	58	2	41	4	70	2	3	0	3	0	3	0	6	0	6%	7%	5%	2%	7%	8%	10%	16%
The Boulevarde	6454	448	14	413	14	281	20	660	16	483	15	442	14	307	21	735	19	35	1	29	0	25	2	75	3	8%	8%	7%	2%	9%	9%	11%	19%
Captain Cook Bicentennial Drive	6462	270	10	84	9	22	4	16	3	293	11	92	10	26	5	19	3	23	1	8	1	4	1	3	1	9%	9%	9%	6%	18%	14%	16%	21%
St Albans Way	6463	267	10	51	9	22	4	16	3	290	11	56	10	26	5	18	3	23	1	5	1	4	1	2	1	9%	9%	10%	6%	17%	14%	11%	21%
Sirius Drive	6464	467	12	838	15	413	19	913	26	631	17	1201	17	586	27	1250	40	164	5	363	2	174	7	337	14	35%	38%	43%	16%	42%	39%	37%	53%
Glen Haven Drive	6465	14	4	14	2	240	0	55	0	19	4	16	3	298	0	71	0	5	1	3	1	58	0	15	0	33%	26%	20%	24%	24%	0%	28%	0%
Pacific Highway - Kew	6466	1279	159	1531	199	1108	196	1337	196	1689	225	2047	240	1693	278	2062	324	410	66	516	41	585	82	725	128	32%	42%	34%	21%	53%	42%	54%	65%
Tathra Road	6467	0	0	0	0	27	6	69	6	0	0	0	0	29	7	74	7	0	0	0	0	2	0	5	1	0%	0%	0%	0%	6%	5%	7%	8%
Nancy Bird Walton Drive	6468	39	5	61	1	0	0	0	0	40	5	64	1	0	0	0	0	2	0	3	0	0	0	0	0	5%	6%	5%	4%	0%	0%	0%	0%
Kendall Road	6469	519	21	613	32	423	23	623	23	718	31	806	37	590	31	926	40	199	10	193	5	166	7	304	17	38%	46%	31%	17%	39%	32%	49%	71%
Commerce Street	6470	391	25	440	15	299	18	652	55	528	36	585	20	456	26	987	83	137	11	145	4	157	8	336	28	35%	42%	33%	27%	52%	44%	52%	51%
Owen Street	6537	321	5	480	2	561	6	651	1	338	6	498	2	578	6	672	1	17	0	18	0	17	0	20	0	5%	6%	4%	2%	3%	3%	3%	12%
Fernbank Creek Road	6857	109	6	190	2	64	10	109	13	145	8	245	2	90	14	164	18	36	2	55	0	26	4	55	5	33%	35%	29%	7%	41%	35%	50%	42%
John Oxley Drive - Sienna Grange	16356	153	13	212	2	612	14	774	2	159	14	216	2	670	16	999	2	6	0	5	0	57	1	225	0	4%	3%	2%	1%	9%	10%	29%	6%
Rollands Plains Road	23260	272	20	212	12	147	22	389	14	315	22	237	13	162	25	454	18	43	3	25	1	15	3	65	4	16%	13%	12%	4%	10%	14%	17%	25%
Morton Street	23276	166	0	296	1	117	2	192	1	268	0	392	1	157	2	276	2	103	0	96	0	40	0	84	1	62%	0%	32%	6%	34%	5%	44%	69%
Major Innes Road / John Oxley Drive	23590	13	0	13	7	31	0	6	0	14	0	14	7	32	0	6	0	1	0	1	0	2	0	0	0	8%	0%	8%	4%	5%	0%	7%	0%
Lake Innes Village	23598	762	36	1669	19	804	20	1841	15	926	50	1861	19	1325	33	2562	19	165	14	192	1	522	12	721	5	22%	40%	12%	4%	65%	61%	39%	30%
Sails Resort	23683	103	0	262	2	249	1	437	1	110	0	281	2	260	1	459	1	7	0	19	0	11	0	22	0	6%	0%	7%	1%	4%	5%	5%	13%
McDonalds Port Macquarie	23693	154	24	395	26	278	25	1386	20	198	34	545	31	392	34	1828	32	44	9	150	5	113	9	492	12	28%	39%	38%	19%	41%	38%	37%	61%
Forest Parkway	24228	184	6	218	5	77	15	67	6	291	9	326	5	121	24	128	12	106	3	107	1	44	9	61	6	58%	56%	49%	14%	57%	58%	90%	94%
Long Point Drive	24244	29	9	30	0	81	11	93	6	42	15	40	0	129	17	153	7	13	5	10	0	48	6	60	0	43%	55%	34%	0%	59%	58%	64%	7%
Wambuyn Drive	24260	257	34	745	28	35	23	20	21	437	40	1047	30	114	29	151	27	180	7	302	1	89	6	132	7	70%	19%	41%	5%	352%	26%	666%	33%
Oakes Crescent	24276	10	7	7	0	132	7	570	0	13	11	9	0	207	11	898	0	3	4	1	0	76	4	328	0	29%	55%	18%	0%	57%	58%	58%	0%
Barton Crescent	24376	568	52	775	15	1086	34	862	18	596	56	805	15	1140	36	946	20	28	4	30	0	53	2	83	2	5%	8%	4%	1%	5%	5%	10%	10%
Banksia Avenue	24405	530	10	347	2	658	10	711	0	582	11	380	2	719	11	792	0	52	1	33	0	62	1	82	0	10%	12%	10%	9%	9%	9%	12%	0%
Toyota Dealership Port Macquarie	24422	200	40	63	29	189	18	41	24	210	44	69	30	201	19	43	27	9	3	6	1	12	1	2	2	5%	9%	10%	2%	7%	3%	5%	10%
Westerweller Way	24443	190	0	267	0	7	34	6	0	263	0	364	0	10	35	8	0	74	0	97	0	3	1	2	0	39%	0%	37%	0%	38%	4%	35%	0%
Thrumster Street	25293	161	4	419	4	67	0	192	6	957	64	2088	26	738	58	1417	101	796	60	1669	22	672	58	1225	95	495%	1401%	398%	530%	1003%	0%	640%	1576%
Fern Valley Parade	25309	69	8	169	10	110	4	92	11	76	8	186	10	122	4	105	13	7	1	17	0	12	0	13	2	10%	12%	10%	4%	11%	9%	14%	19%
Boronia Street	29636	453	31	1448	33	725	32	277	30	512	37	1631	37	975	38	458	38	59	6	183	4	250	6	181	8	13%	18%	13%	11%	35%	20%	66%	26%
New Developments																																	
Thrumster Street (South)	33190									925	62	1704	24	806	61	1223	96																
Blackbutt Road	33339									145	8	587	0	182	6	146	12																
New Bonny Hills Development	34002									533	7	695	0	403	6	1115	3																
Yippin Creek	34022									1156	0	399	0	289	0	1595	0																
Total		49898	2317	70801	2067	50623	2348	71077	2067	68626	3339	97689	3620	68626	3339	97689	3620	15969	946	23504	1529	16323	918	22533	1442								



LEGEND

2036 AM Attraction Growth

2036 AM Generation Growth

Paper Size A4
0 125 250 500 750 1,000
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 07 Sep 2017

Centroid Attraction and Generation Growth
2036 AM Peak (0700-1000) Figure H.1

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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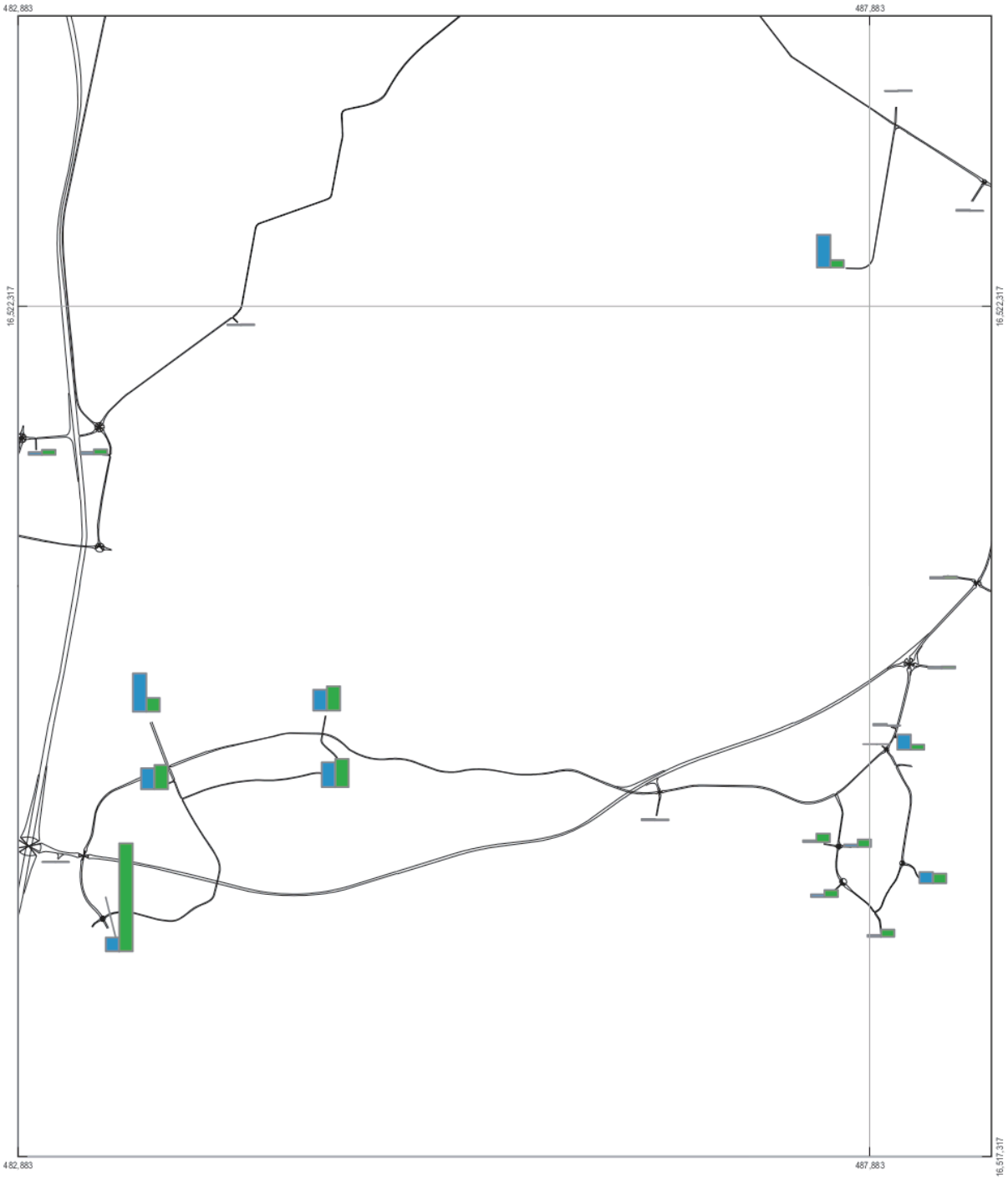

LEGEND

1,900

2036 AM Attraction Growth

2036 AM Generation Growth

Paper Size A4

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Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 07 Sep 2017

Centroid Attraction and Generation Growth
2036 AM Peak (0700-1000)

Figure H.2

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LEGEND

2036 AM Attraction Growth

2036 AM Generation Growth

Paper Size A4
0 70 140 280 420 560
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number	22-18116
Revision	A
Date	07 Sep 2017

Centroid Attraction and Generation Growth
2036 AM Peak (0700-1000) Figure H.3

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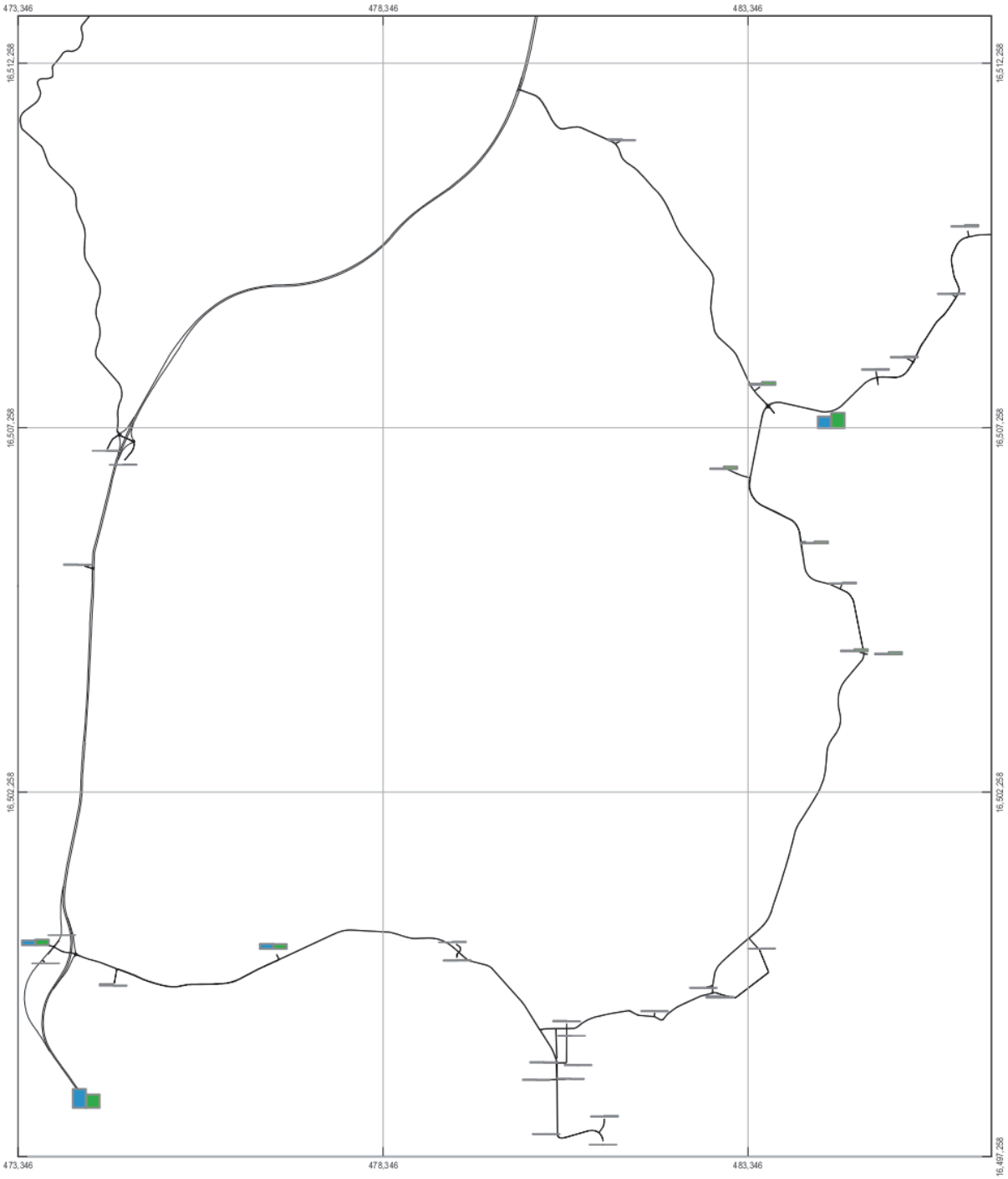

LEGEND

2036 AM Attraction Growth

2036 AM Generation Growth

Paper Size A4

0 250 500 1,000 1,500 2,000

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 07 Sep 2017

Centroid Attraction and Generation Growth
2036 AM Peak (0700-1000) Figure H.4

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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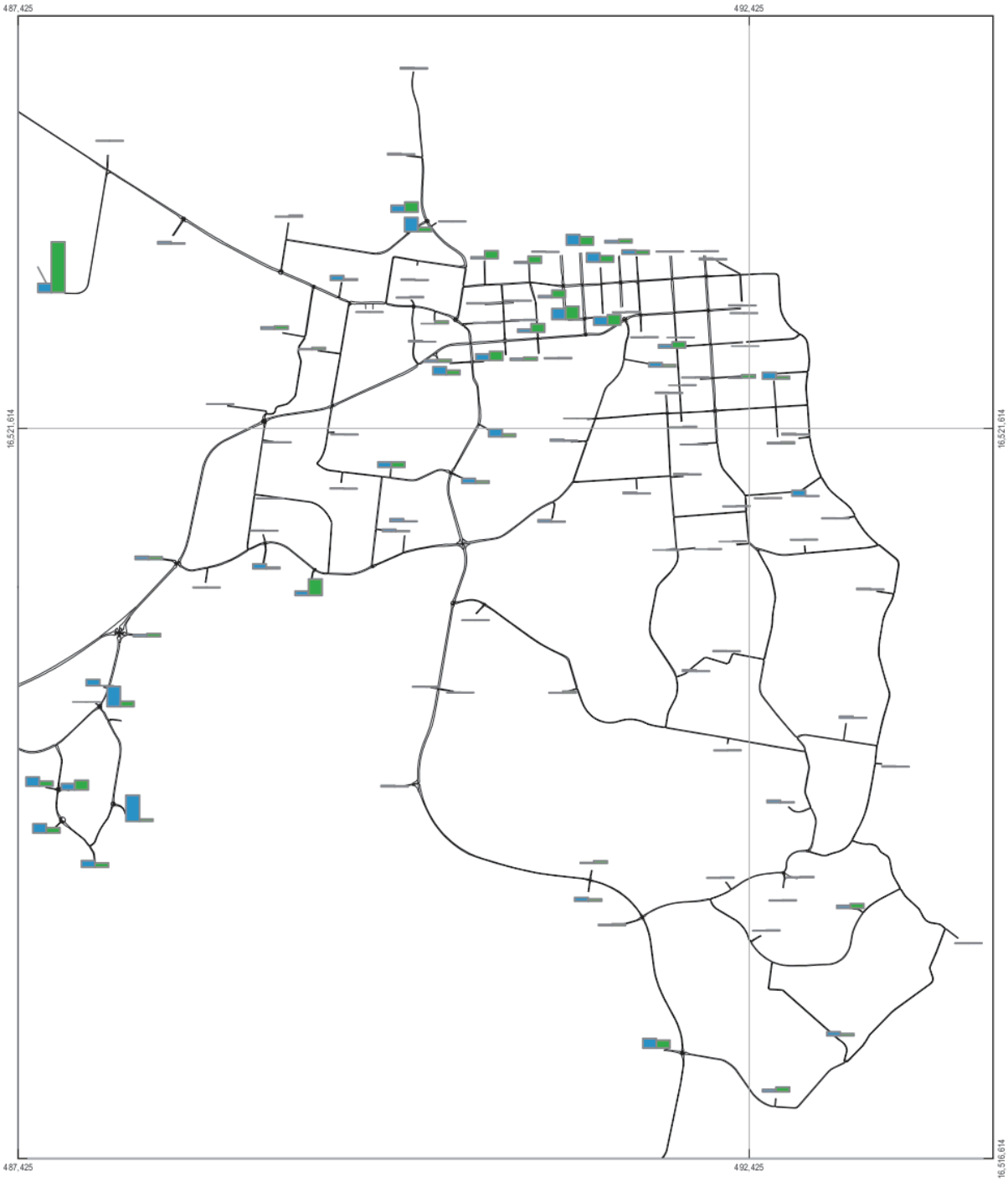
Data source: GHD, 2017 Created by:mbrooks



LEGEND

2036 PM Attraction Growth

2036 PM Generation Growth

Paper Size A4

0 125 250 500 750 1,000

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 07 Sep 2017

Centroid Attraction and Generation Growth
2036 PM Peak (1400-1800) Figure H.5

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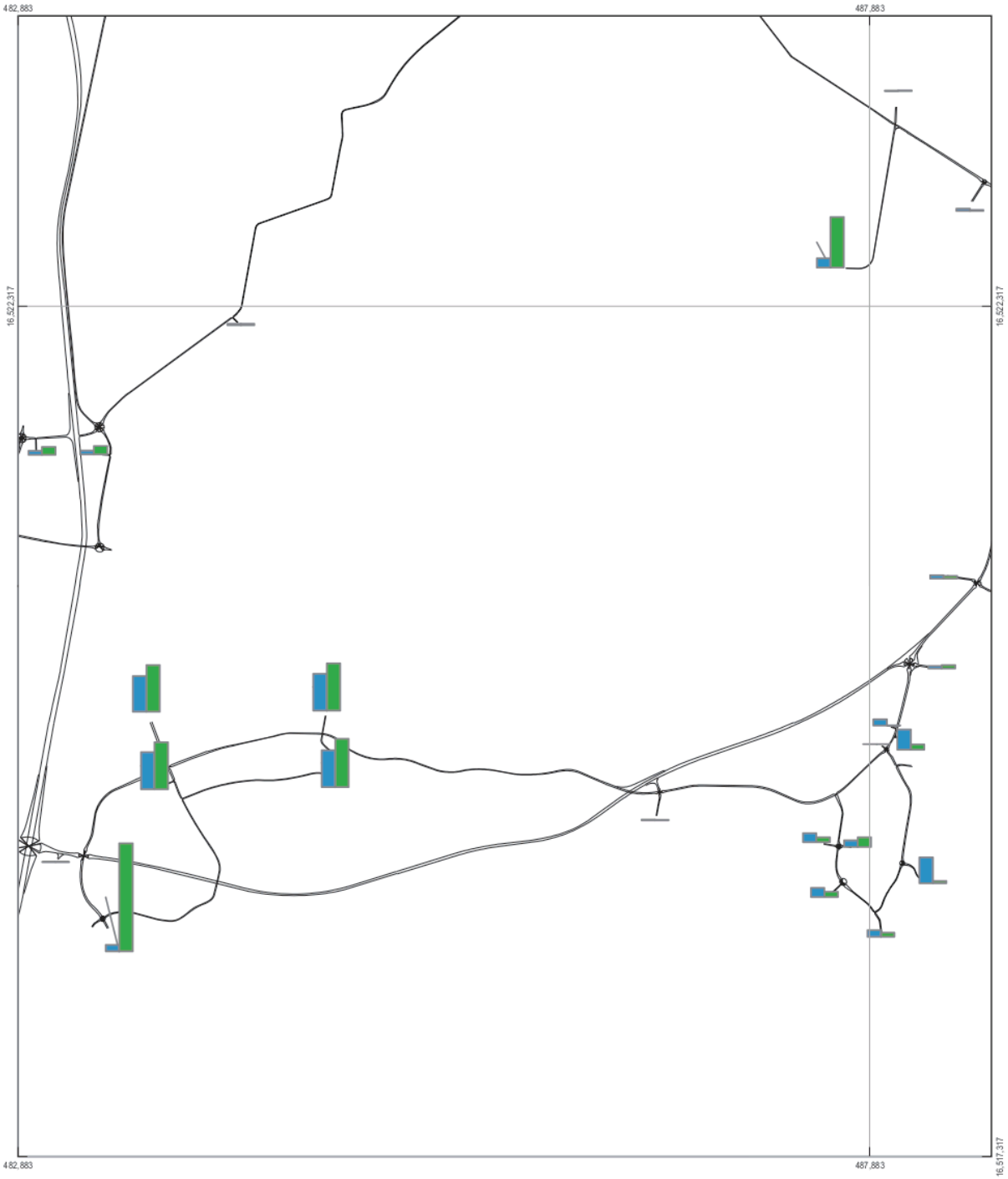
Data source: GHD, 2017 Created by:mbrooks



LEGEND

2036 PM Attraction Growth

2036 PM Generation Growth

Paper Size A4

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Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 07 Sep 2017

Centroid Attraction and Generation Growth
2036 PM Peak (1400-1800)

Figure H.6

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Data source: GHD, 2017 Created by:mbrooks

LEGEND

2036 PM Attraction Growth

2036 PM Generation Growth

Paper Size A4
0 70 140 280 420 560
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number	22-18116
Revision	A
Date	07 Sep 2017

Centroid Attraction and Generation Growth
2036 PM Peak (1400-1800)

Figure H.7

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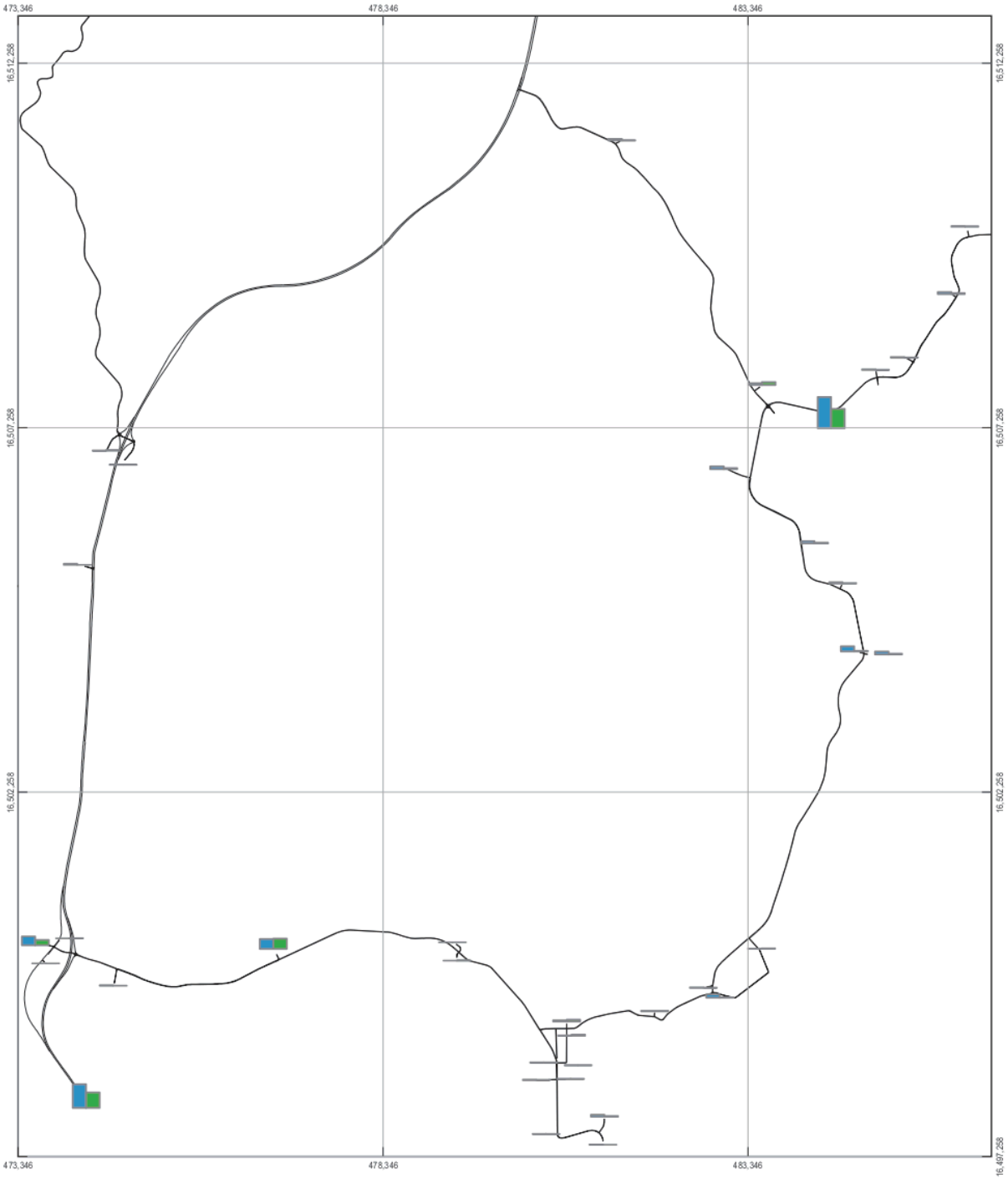
Data source: GHD, 2017 Created by:mbrooks



LEGEND

2036 PM Attraction Growth

2036 PM Generation Growth

Paper Size A4

0 250 500 1,000 1,500 2,000

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Port Macquarie-Hastings Council
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 07 Sep 2017

Centroid Attraction and Generation Growth
2036 PM Peak (1400-1800) Figure H.8

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	T. Bickerstaff	E. Jackson		S. Keevil-Jones		22/06/18

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Port Macquarie-Hastings Council and Roads and Maritime Services

Port Macquarie - Hastings Local Government Area

Traffic Study

VOLUME 4 – Traffic Data Summary

June 2018

WATER | ENERGY & RESOURCES | ENVIRONMENT | PROPERTY & BUILDINGS | TRANSPORTATION

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Appendices

Appendix A Base Case Volume Plots

Appendix B Base Case Lane Density Plots

Appendix C Base Case Speed Plots

Appendix D Base Case Volume Profile Graphs

Appendix E Scenario Volume Comparison Plots

Appendix F Base Model Trip Generation and Attraction

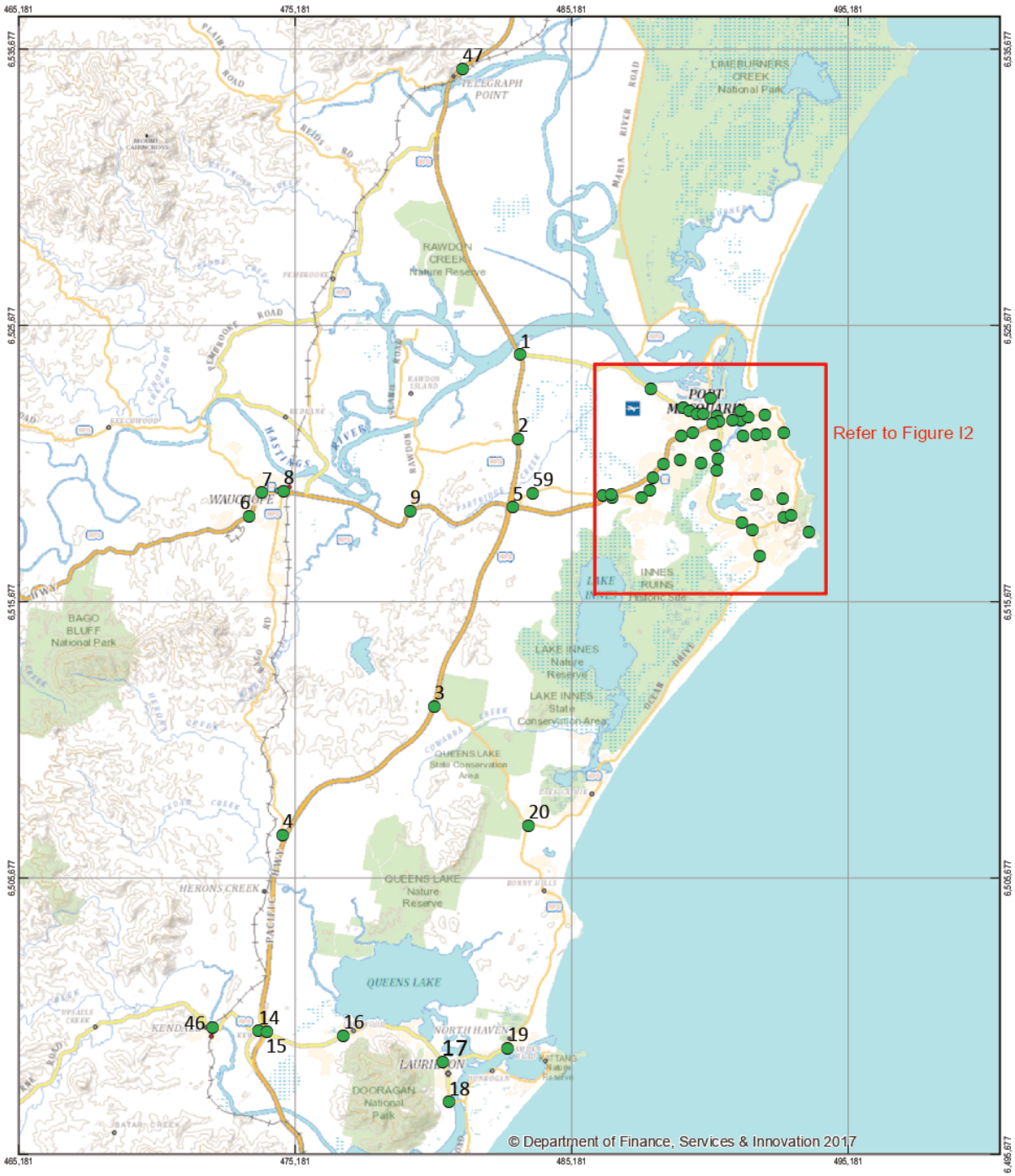
Appendix G Model – Land Use Alignment

Appendix H Model Zone Growth Rates

Appendix I Traffic Data Summary

Appendices

Appendix I Traffic Data Summary



Legend

- Intersection Counts

Paper Size A4

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Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

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Port Macquarie – Hastings Council and Roads and Maritime Services
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 24 Oct 2017

Road Network Improvement Strategy
Survey Locations

Figure I1

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

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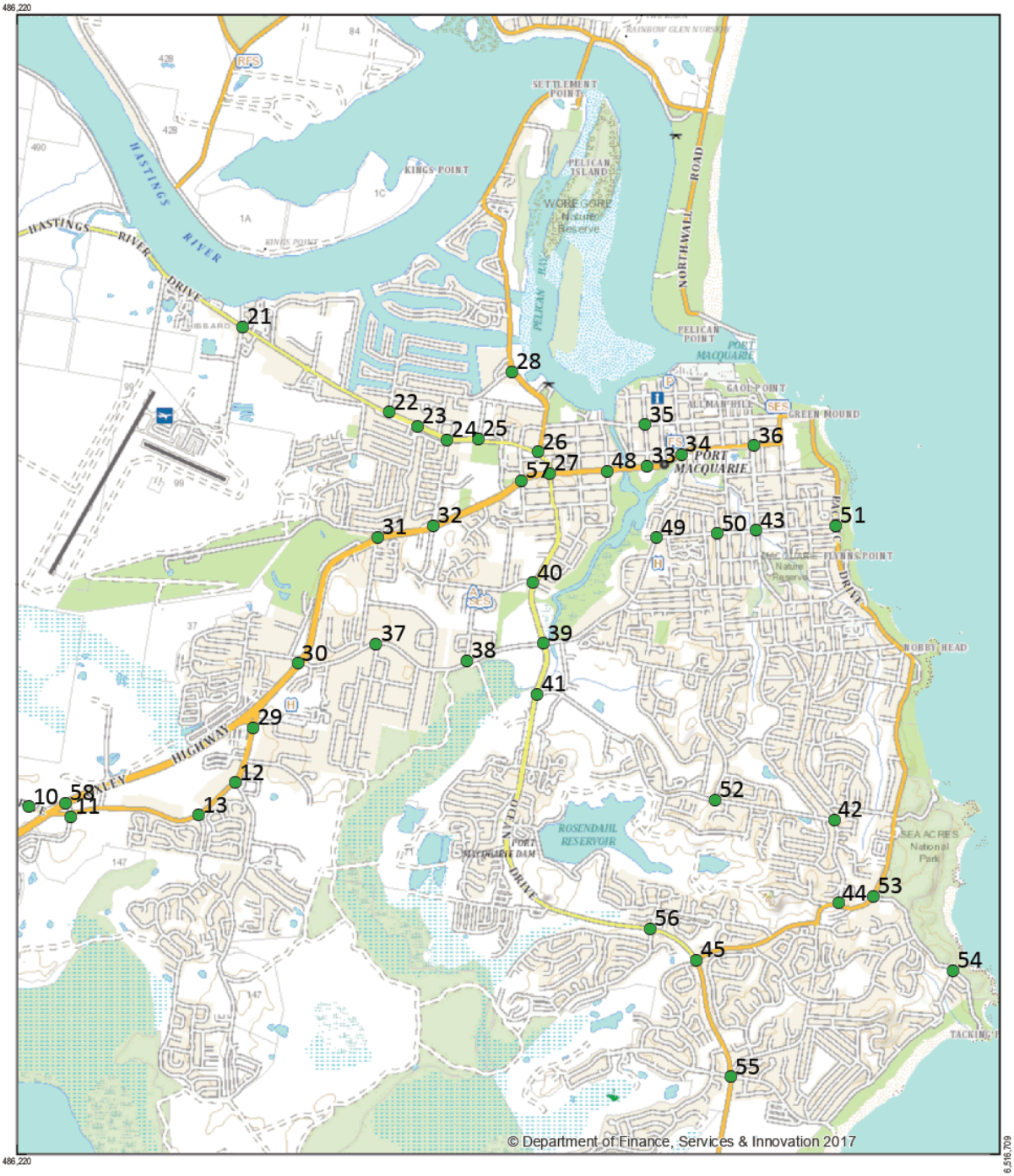
Data source: Department of Finance, Services and Innovation, NSW Base Map, 2017. Created by:aandrews



Priority Level

- Intersection Counts

Paper Size A4

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Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

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Port Macquarie – Hastings Council and Roads and Maritime Services
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 22 Jun 2018

Road Network Improvement Strategy
Survey Locations Inset

Figure I2

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Data source: Department of Finance, Services and Innovation, NSW Base Map, 2017. Created by:aandrews

Total Intersection Volumes (vehicles per hour) **9th February 2016**

Intersection	AM Peak Period			PM Peak Period		
	7-8am	8-9am	9-10am	3-4pm	4-5pm	5-6pm
1. Park St / Bay St	679	1,257	1,408	1,625	1,364	1,253
2. William St / Horton St	642	1,142	1,264	1,438	1,306	1,185
3. Boundary Dr / Hastings River Dr	773	1,074	990	1,112	1,139	1,058
4. Hastings River Drive / Newport Is. Rd	1,082	1,739	1,676	1,896	1,888	1,781
5. Hastings River Drive / Clifton Dr	1,195	1,978	1,832	2,091	2,025	1,769
6. Hastings River Drive / Widderson Dr	895	1,586	1,312	1,546	1,569	1,388
7. Hastings River Drive / Aston Dr	248	600	474	604	552	509
8. Hastings River Drive / Park St	365	711	791	805	647	552
9. Oxley Hwy / Clifton Dr	1,709	2,826	2,298	2,942	2,498	2,095
10. Oxley Hwy / Widderson St	1,820	3,024	2,168	2,718	2,570	2,187
11. Oxley Hwy / Hastings River Drive	1,584	2,951	2,634	2,879	2,689	2,383
12. Horton St / Gordon St	1,248	2,547	2,471	2,817	2,901	2,879
13. Lake Rd / Gordon St	1,202	2,232	2,030	2,291	2,366	2,144
14. Lord St / Gordon St	919	1,608	1,375	1,442	1,524	1,474
15. Hindman St / Ocean Dr	953	1,876	1,310	1,736	1,510	1,320
16. Lord St / Hill St	1,009	1,615	1,183	1,338	1,395	1,343
17. Oxley Hwy / Lake Rd	2,830	3,885	2,966	3,847	3,514	3,038
18. Jindalee Rd / Lake Rd	1,992	2,647	2,421	2,680	2,547	2,167
19. Central Rd / Lake Rd	1,843	2,585	2,199	2,617	2,394	2,043
20. Ocean Dr / Lake Rd	2,435	4,158	3,053	3,916	3,598	3,334
21. Oxley Hwy / John Oxley Dr / Wrights Rd	1,901	2,653	1,924	2,794	2,620	2,412
22. Koala St / Ocean Dr	1,923	3,222	2,078	3,000	2,640	2,532
23. Koala St / Kennedy St	633	1,164	677	893	890	917
24. John Oxley Dr / Phillip Charley Dr	262	379	195	409	301	292
25. Ocean Dr / Pacific Dr	1,401	2,015	1,461	1,919	1,874	1,888
26. Kennedy Dr / Pacific Dr	531	916	576	720	759	810
27. Pacific Hwy / Rollands Plains Rd	982	1,130	1,250	1,398	1,430	1,336
28. Pacific Hwy / Hastings River Dr	1,060	1,362	1,406	1,601	1,594	1,647
29. Pacific Hwy / Sancrox Rd	754	1,014	1,156	1,385	1,293	1,163
30. Oxley Hwy / Beechwood	710	1,136	911	1,116	1,047	914
31. Oxley Hwy / Cameron	1,064	1,627	1,501	1,716	1,668	1,476
32. Oxley Hwy / Rawdon Island Rd	1,057	1,312	1,060	1,276	1,270	1,131
33. Oxley Hwy / Pacific Hwy	2,947	3,659	2,305	2,986	2,740	2,468
34. Oxley Hwy / John Oxley Dr on ramp EB	207	435	167	394	207	180
35. Oxley Hwy / Blackbutt Rd	552	899	749	903	837	684
36. Pacific Hwy / Houston Mitchell Dr	1,061	1,380	1,282	1,559	1,511	1,272
37. Ocean Dr / Houston Mitchell Dr	674	921	688	832	835	790
38. Bago Rd / Pacific Hwy	159	210	134	221	177	163
39. Oxley Highway / Morton Street	1,223	2,168	1,794	1,979	2,045	1,780
40. Ocean Dr / The Parade	360	683	677	719	622	578
41. Nancy Bird Walton Dr / Ocean Dr	520	784	627	779	675	571
42. Pacific Hwy / Ocean Dr	506	812	605	840	771	685
43. Sirius Dr / Ocean Dr	576	993	862	1,043	933	887
44. Kew Rd / Ocean Dr	530	969	988	974	861	673
45.Hollingworth St / Gordon St	1,363	2,475	2,315	2,538	2,548	2,196
46. Lake Dr / Hill St	661	1,288	1,219	1,341	1,206	1,119
47. Hill St / Granite St	544	929	737	814	756	707
48. Pacific Dr / Hill St	500	840	718	743	732	849
49. Koala St / Granite St	514	1,043	437	839	664	663
50. Crestwood Dr / Ocean Dr	1,445	2,020	1,408	1,898	1,803	1,800
51. The Ruins Way / John Oxley Dr	492	741	490	767	673	683
52. Major Innes Rd / John Oxley Dr	948	1,684	924	1,544	1,337	1,359

Total Intersection Volumes (vehicles per hour) 9th February 2016

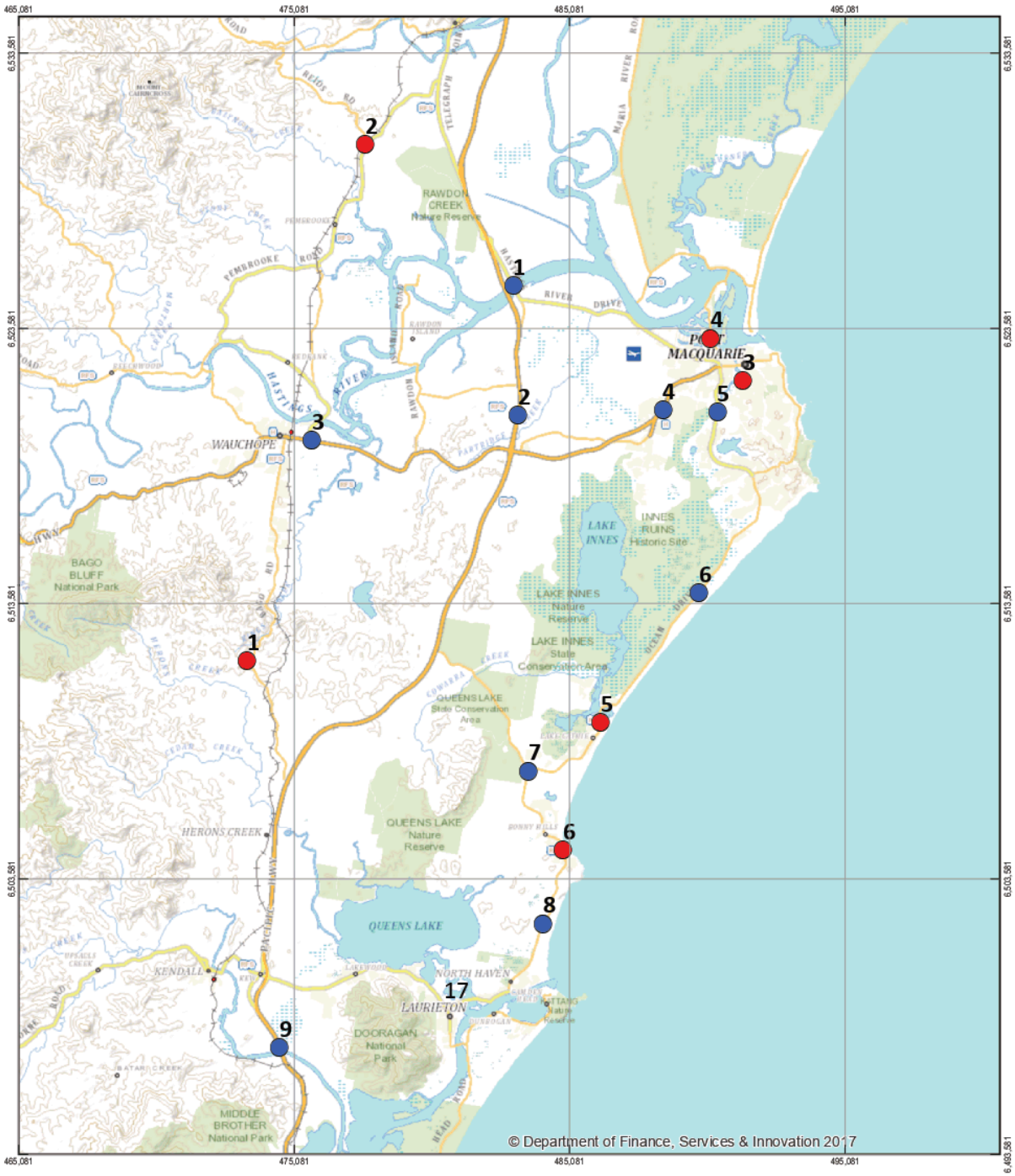
Intersection	AM Peak Period			PM Peak Period		
	7-8am	8-9am	9-10am	3-4pm	4-5pm	5-6pm
53. Pacific Dr / Lighthouse Dr	410	761	491	657	558	668
54. Mathew Flinders Dr / Ocean Dr	1,032	1,398	1,173	1,384	1,445	1,379
55. Mathew Flinders Dr / Lighthouse Dr	169	337	261	331	274	306
56. Bold Street / Hanley Street	244	324	316	355	358	286
57. Comboyne St / Graham St	189	346	256	380	332	284
58. John Oxley Dr / Main Street	330	705	159	630	240	192
59. Oxley Hwy on ramp EB	1,656	2,115	1,392	1,892	1,754	1,567

Classified Tube Counts

1. Bago Road, north of Milligans Road
2. Pembrooke Road, south of Reids Road
3. Lake Road, south of Hill Street
4. Park Street, north of Bay Street
5. Ocean Drive, north of Ernest Street
6. Ocean Drive, north of Jordan Street

Origin Destination Surveys

1. Pacific Hwy / Hastings River
2. Pacific Hwy (between Sancrox Road and Oxley Highway)
3. Oxley Hwy (east of Stoney Creek Road)
4. Oxley Hwy (south of Lake Road)
5. Ocean Drive (north of Koala Street)
6. Ocean Drive (between Matthew Flinders Drive and Lake Cathie)
7. Ocean Drive (south of Houston Mitchell Drive)
8. Ocean Drive (2km north of Edith Street)
9. Pacific Hwy (north of Camden Haven)



Priority Level

- Origin Destination Surveys
- Automatic Traffic Count (ATC)

Paper Size A4
0 1,350 2,700 5,400
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

Port Macquarie – Hastings Council and Roads and Maritime Services
Local Government Area Traffic Study

Job Number 22-18116
Revision A
Date 22 Jun 2018

Road Network Improvement Strategy
Survey Locations

Figure I3

2 Salamanca Square Hobart TAS 7000 Australia T 61 3 6210 0600 F 61 3 6210 0601 E hbamail@ghd.com W www.ghd.com

G:\22\18116\GIS\Maps\Working\Road Network Improvement Strategy\Road Strategy 20171127.mxd

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Data source: Department of Finance, Services and Innovation, NSW Base Map, 2017. Created by:aandrews

Bago Road, North of Milligans Road, February 2016

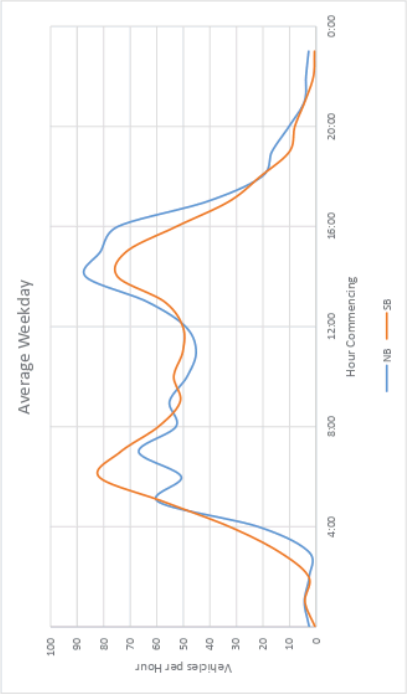
Northbound

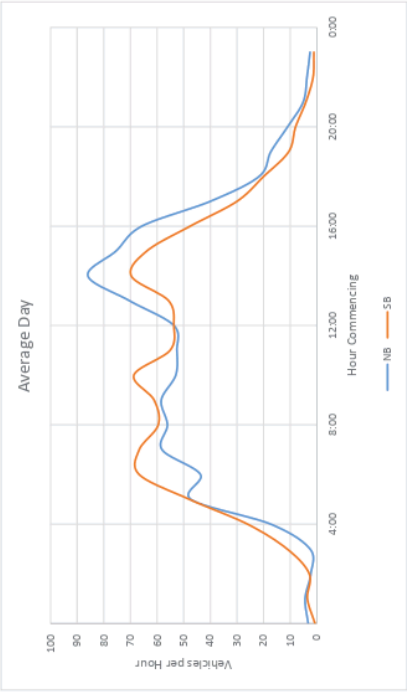
Time	Day of Week							Ave W'day	7 Day Ave
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	8-Feb	9-Feb	10-Feb	11-Feb	12-Feb	13-Feb	14-Feb		
AM Peak	73	65	74	70	72	80	72		
PM Peak	85	86	85	101	92	59	118		
0:00	0	4	1	5	3	4	6	3	3
1:00	5	3	4	7	3	6	3	4	4
2:00	0	4	1	4	4	2	1	3	2
3:00	2	3	4	1	4	3	1	3	3
4:00	19	21	19	28	22	8	4	22	17
5:00	54	61	62	64	56	25	9	59	47
6:00	52	58	52	45	47	31	21	51	44
7:00	73	65	65	70	61	46	27	67	58
8:00	41	52	74	46	51	80	49	53	56
9:00	51	59	41	53	72	68	65	55	58
10:00	44	54	41	52	52	62	66	49	53
11:00	49	38	41	45	53	70	72	45	53
12:00	54	50	48	51	43	47	83	49	54
13:00	56	60	53	63	87	56	118	64	70
14:00	76	80	85	101	92	59	109	87	86
15:00	84	86	85	76	75	39	83	81	75
16:00	85	72	82	80	54	36	51	75	66
17:00	32	49	39	39	46	29	46	41	40
18:00	20	17	19	22	24	21	29	20	22
19:00	10	14	17	13	29	18	20	17	17
20:00	10	6	5	10	20	12	14	10	11
21:00	3	5	1	5	8	9	5	4	5
22:00	2	5	3	3	6	4	3	4	4
23:00	3	3	2	1	5	3	1	3	3
Total	825	869	844	884	917	738	886	868	852

Southbound

Time	Day of Week							Ave W'day	7 Day Ave
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	8-Feb	9-Feb	10-Feb	11-Feb	12-Feb	13-Feb	14-Feb		
AM Peak	94	87	87	88	79	79	134		
PM Peak	65	80	71	71	89	53	76		
0:00	0	1	1	0	0	1	2	0	1
1:00	5	4	3	6	3	2	2	4	4
2:00	1	3	1	4	5	4	2	3	3
3:00	17	9	15	18	11	4	4	14	11
4:00	36	34	25	32	36	12	7	33	26
5:00	51	49	70	62	55	30	18	57	48
6:00	75	87	87	88	72	34	24	82	67
7:00	94	69	57	69	79	65	34	74	67
8:00	63	44	55	74	61	59	61	59	60
9:00	48	53	46	55	54	71	101	51	61
10:00	47	48	55	56	62	79	134	54	69
11:00	50	51	47	52	51	58	77	50	55
12:00	51	48	44	61	47	49	76	50	54
13:00	51	55	62	54	64	49	55	57	56
14:00	65	79	71	70	89	53	61	75	70
15:00	60	80	66	71	80	41	49	71	64
16:00	62	52	45	49	55	32	38	53	48
17:00	29	33	35	19	48	19	27	33	30
18:00	21	25	17	21	21	18	17	21	20
19:00	4	10	9	13	14	10	14	10	11
20:00	3	9	9	10	9	6	10	8	8
21:00	4	3	4	3	7	5	3	4	4
22:00	1	1	1	1	1	2	3	1	1
23:00	1	0	0	0	2	1	4	1	1
Total	839	847	825	888	926	704	823	865	836

Bago Road, North of Milligans Road, February 2016





Pembrooke Road, south of Reids Road, February 2016

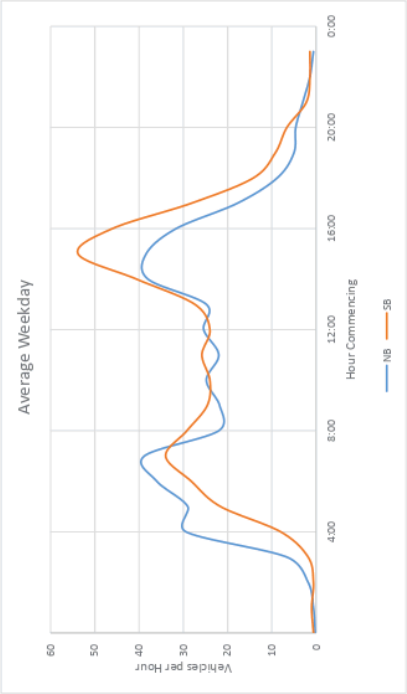
Northbound

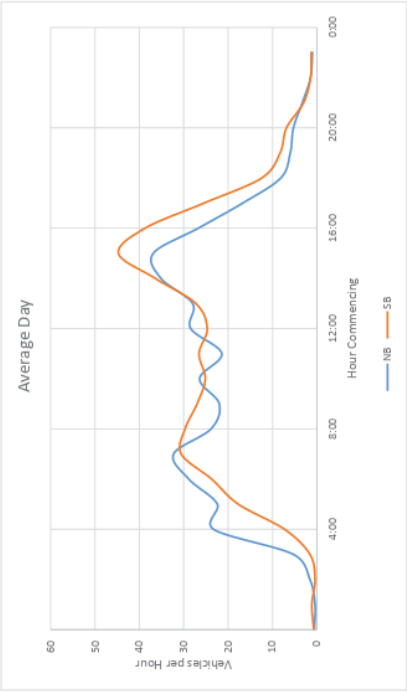
Time	Day of Week							Ave W'day	7 Day Ave
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	8-Feb	9-Feb	10-Feb	11-Feb	12-Feb	13-Feb	14-Feb		
AM Peak	39	43	41	44	42	31	30		
PM Peak	36	48	38	43	50	34	40		
0:00	0	1	0	0	0	2	1	0	1
1:00	0	0	1	2	0	0	0	1	0
2:00	1	2	1	2	3	2	0	2	2
3:00	6	6	6	7	8	1	3	7	5
4:00	32	30	33	30	22	10	6	29	23
5:00	27	27	28	35	28	7	5	29	22
6:00	32	36	41	29	42	17	5	36	29
7:00	39	43	40	44	28	19	13	39	32
8:00	17	15	27	30	21	30	27	22	24
9:00	16	15	33	24	21	31	14	22	22
10:00	32	14	20	38	20	31	30	25	26
11:00	22	18	25	26	19	21	19	22	21
12:00	23	22	20	34	28	34	38	25	28
13:00	32	22	24	20	26	32	40	25	28
14:00	24	48	38	30	50	25	31	38	35
15:00	36	38	29	43	46	30	36	38	37
16:00	32	35	33	29	29	14	15	32	27
17:00	26	12	18	10	23	14	14	18	17
18:00	8	10	4	11	11	6	7	9	8
19:00	1	6	6	8	4	8	9	5	6
20:00	4	5	4	5	5	4	10	5	5
21:00	2	3	1	5	4	7	1	3	3
22:00	0	1	3	2	1	3	0	1	1
23:00	1	0	1	1	0	4	0	1	1
Total	413	409	436	465	439	352	324	432	405

Southbound

Time	Day of Week							Ave W'day	7 Day Ave
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	8-Feb	9-Feb	10-Feb	11-Feb	12-Feb	13-Feb	14-Feb		
AM Peak	35	30	44	38	31	40	34		
PM Peak	46	53	67	60	51	29	31		
0:00	0	1	0	2	0	0	2	1	1
1:00	1	1	0	1	2	1	2	1	1
2:00	0	0	2	0	1	0	0	1	0
3:00	0	3	3	1	2	1	1	2	2
4:00	10	8	7	11	4	8	3	8	7
5:00	20	16	27	18	27	11	5	22	18
6:00	26	27	29	34	25	14	11	28	24
7:00	35	30	37	38	30	25	19	34	31
8:00	17	29	44	30	26	40	22	29	30
9:00	18	25	31	18	31	36	30	25	27
10:00	21	14	33	29	23	27	29	24	25
11:00	18	27	28	35	21	23	34	26	27
12:00	24	25	25	25	21	22	31	24	25
13:00	29	23	24	22	39	27	27	27	27
14:00	32	46	37	42	46	29	23	41	36
15:00	45	46	67	60	51	19	25	54	45
16:00	46	53	47	44	40	21	20	46	39
17:00	26	27	29	26	33	18	19	28	25
18:00	9	15	10	19	18	8	8	14	12
19:00	8	7	9	10	12	6	6	9	8
20:00	8	4	6	7	8	10	5	7	7
21:00	3	2	2	2	2	3	7	2	3
22:00	1	1	0	0	5	3	0	1	1
23:00	1	0	0	2	4	1	1	1	1
Total	398	430	497	476	471	353	330	454	422

Pembrooke Road, south of Reids Road, February 2016





Lake Road, south of Hill Street, February 2016

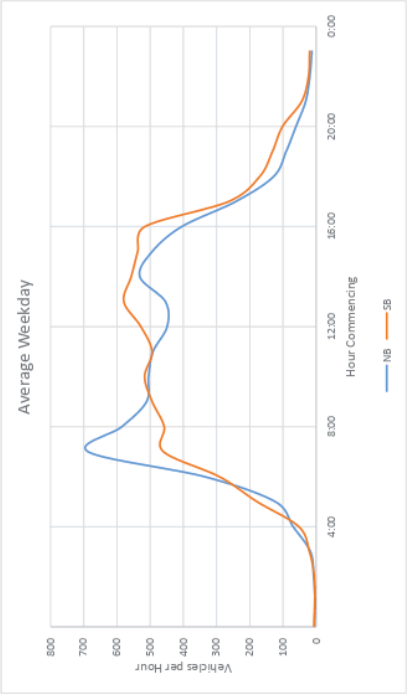
Northbound

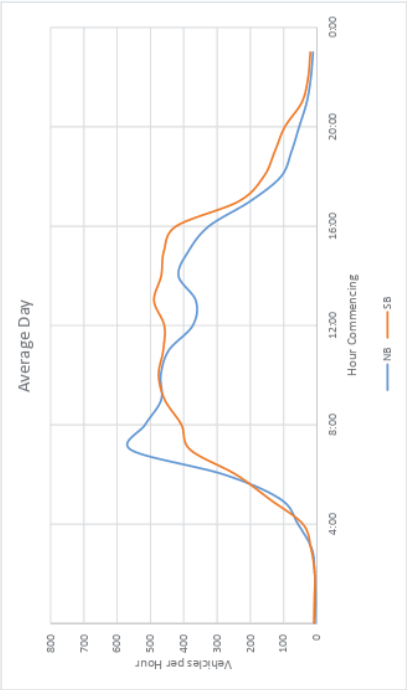
Time	Day of Week							Ave W'day	7 Day Ave
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	8-Feb	9-Feb	10-Feb	11-Feb	12-Feb	13-Feb	14-Feb		
AM Peak	692	686	686	700	671	430	343		
PM Peak	550	570	529	531	498	318	48		
0:00	2	6	7	6	5	7	9	5	6
1:00	4	6	2	1	4	5	8	3	4
2:00	6	5	7	7	12	7	3	7	7
3:00	18	15	16	18	18	12	8	17	15
4:00	70	81	72	59	63	26	25	69	57
5:00	111	129	131	132	112	103	42	123	109
6:00	337	348	349	332	313	151	123	336	279
7:00	692	686	686	700	671	306	173	687	559
8:00	636	588	566	541	594	399	291	585	516
9:00	516	550	472	507	509	430	292	511	468
10:00	542	507	500	491	484	417	343	505	469
11:00	463	473	495	515	511	408	250	491	445
12:00	468	467	432	428	449	318	48	449	373
13:00	469	447	465	441	449	266	8	454	364
14:00	550	570	507	531	498	243	11	531	416
15:00	501	480	529	510	449	222	7	494	385
16:00	390	401	411	443	376	242	7	404	324
17:00	205	221	297	239	247	187	9	242	201
18:00	109	118	128	151	133	109	6	128	108
19:00	89	81	84	98	99	83	1	90	76
20:00	47	61	52	63	80	70	0	61	53
21:00	28	29	24	32	44	55	0	31	30
22:00	18	13	21	13	30	31	0	19	18
23:00	10	14	9	13	17	18	0	13	12
Total	6281	6296	6262	6271	6167	4115	1664	6255	5294

Southbound

Time	Day of Week							Ave W'day	7 Day Ave
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	8-Feb	9-Feb	10-Feb	11-Feb	12-Feb	13-Feb	14-Feb		
AM Peak	541	520	517	528	505	438	344		
PM Peak	576	562	574	585	611	329	243		
0:00	5	5	10	8	5	16	16	7	9
1:00	2	2	5	6	6	8	23	4	7
2:00	3	7	3	8	6	9	8	5	6
3:00	25	19	19	21	16	10	13	20	18
4:00	47	49	53	52	58	19	15	52	42
5:00	159	200	184	183	163	67	32	178	141
6:00	278	289	302	301	287	155	91	291	243
7:00	462	461	436	462	479	228	136	460	381
8:00	464	464	448	460	453	340	219	458	407
9:00	489	499	478	498	505	411	317	494	457
10:00	541	520	517	528	477	438	308	517	476
11:00	490	501	480	507	494	416	344	494	462
12:00	482	519	563	522	554	326	243	528	458
13:00	576	551	574	585	611	321	207	579	489
14:00	572	562	538	568	545	288	201	557	468
15:00	568	521	529	551	518	329	201	537	460
16:00	481	538	558	556	444	220	160	515	422
17:00	246	250	317	270	233	184	143	263	235
18:00	137	164	178	193	177	140	128	170	160
19:00	83	125	141	128	180	121	109	131	127
20:00	83	88	99	112	123	90	78	101	96
21:00	34	24	43	58	58	58	38	43	45
22:00	12	16	13	32	41	51	18	23	26
23:00	15	20	22	18	22	31	10	19	20
Total	6254	6394	6510	6627	6455	4276	3058	6448	5653

Lake Road, south of Hill Street, February 2016





Park Street, north of Bay Street, February 2016

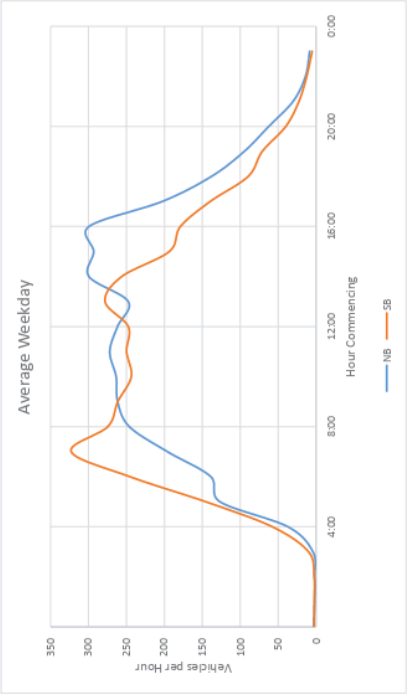
Northbound

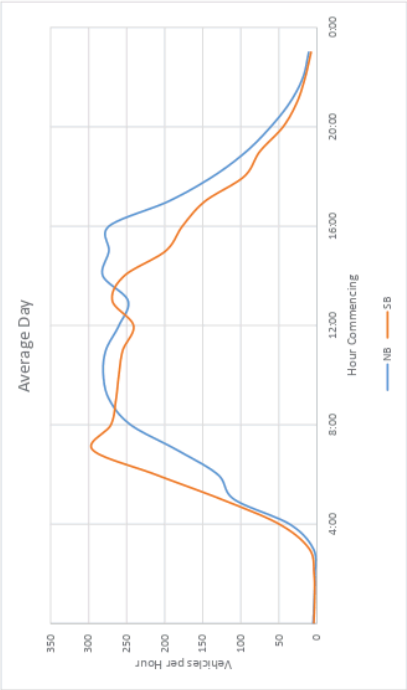
Time	Day of Week							Ave W'day	7 Day Ave
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	8-Feb	9-Feb	10-Feb	11-Feb	12-Feb	13-Feb	14-Feb		
AM Peak	255	268	319	289	261	315	332		
PM Peak	298	326	310	298	318	271	247		
0:00	5	5	2	2	3	10	8	3	5
1:00	2	3	1	4	0	6	8	2	3
2:00	1	5	1	1	1	4	4	2	2
3:00	3	3	6	5	4	7	4	4	5
4:00	25	34	40	47	40	39	25	37	36
5:00	124	111	131	129	139	67	60	127	109
6:00	121	139	155	140	139	116	102	139	130
7:00	183	196	204	203	194	170	142	196	185
8:00	224	224	263	260	260	248	234	246	245
9:00	252	243	289	282	242	291	309	262	273
10:00	252	230	286	289	261	315	332	264	281
11:00	255	268	319	257	261	291	291	272	277
12:00	252	244	265	280	268	265	247	262	260
13:00	232	235	272	231	268	271	229	248	248
14:00	279	326	281	293	318	270	202	299	281
15:00	295	279	301	296	295	248	200	293	273
16:00	298	293	310	298	298	216	199	299	273
17:00	168	217	226	185	218	192	159	203	195
18:00	134	137	124	137	158	137	130	138	137
19:00	74	89	100	93	118	94	83	95	93
20:00	37	66	67	56	86	69	44	62	61
21:00	21	24	33	30	44	57	36	30	35
22:00	15	5	13	10	27	43	14	14	18
23:00	3	9	7	7	16	28	5	8	11
Total	3255	3385	3696	3535	3658	3454	3067	3506	3436

Southbound

Time	Day of Week							Ave W'day	7 Day Ave
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	8-Feb	9-Feb	10-Feb	11-Feb	12-Feb	13-Feb	14-Feb		
AM Peak	317	342	358	328	293	324	286		
PM Peak	274	249	297	272	299	257	244		
0:00	3	2	3	3	3	6	8	3	4
1:00	0	5	2	4	1	3	6	2	3
2:00	2	4	2	4	1	6	7	3	4
3:00	10	10	10	9	11	11	8	10	10
4:00	51	57	57	59	65	29	27	58	49
5:00	122	157	146	148	155	109	40	146	125
6:00	265	252	242	252	216	142	116	245	212
7:00	317	342	358	328	269	236	214	323	295
8:00	272	269	276	263	293	268	254	275	271
9:00	263	231	273	287	253	273	269	261	264
10:00	235	226	253	264	240	324	280	244	260
11:00	236	231	291	241	250	251	286	250	255
12:00	238	211	275	255	259	211	238	248	241
13:00	274	249	297	272	299	257	234	278	269
14:00	250	245	268	263	255	247	244	256	253
15:00	186	173	173	232	204	203	221	194	199
16:00	161	161	199	199	174	186	157	179	177
17:00	131	134	158	110	165	200	132	140	147
18:00	80	93	86	89	100	121	100	90	96
19:00	43	69	84	57	102	96	75	71	75
20:00	21	44	29	40	66	67	44	40	44
21:00	19	12	25	27	30	47	22	23	26
22:00	13	8	13	9	19	34	11	12	15
23:00	3	4	6	3	10	24	4	5	8
Total	3195	3189	3526	3418	3440	3351	2997	3354	3302

Park Street, north of Bay Street, February 2016





Ocean Drive, north of Ernest Street (Lake Cathie), February 2016

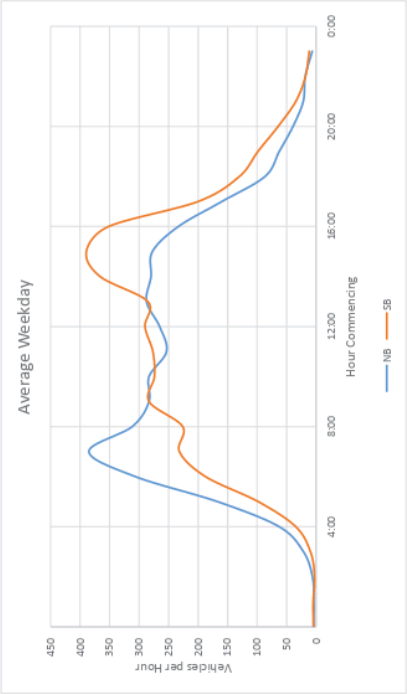
Northbound

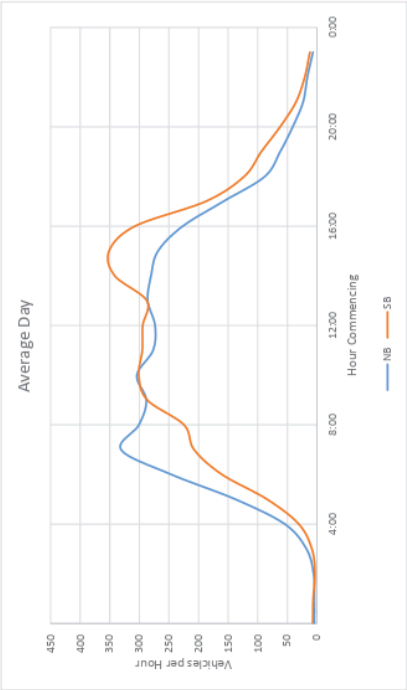
Time	Day of Week							Ave W'day	7 Day Ave
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	8-Feb	9-Feb	10-Feb	11-Feb	12-Feb	13-Feb	14-Feb		
AM Peak	390	374	372	400	389	374	339		
PM Peak	298	283	304	306	302	289	302		
0:00	2	6	7	2	4	5	5	4	4
1:00	2	6	5	2	4	6	5	4	4
2:00	10	4	6	2	9	2	6	6	6
3:00	13	21	24	24	25	8	8	21	18
4:00	55	61	59	78	59	38	28	62	54
5:00	165	157	174	172	165	74	54	167	137
6:00	320	310	311	309	279	130	61	306	246
7:00	390	374	372	400	389	242	148	385	331
8:00	285	310	334	307	323	294	252	312	301
9:00	268	280	250	300	318	312	290	283	288
10:00	252	277	288	279	320	374	339	283	304
11:00	238	239	251	246	294	345	325	254	277
12:00	273	267	272	238	276	289	299	265	273
13:00	298	283	277	277	302	268	296	287	286
14:00	268	237	304	295	295	261	302	280	280
15:00	268	273	280	306	260	233	259	277	268
16:00	212	236	244	237	238	213	206	233	227
17:00	106	146	178	180	188	154	152	160	158
18:00	89	64	83	97	100	93	90	87	88
19:00	53	55	48	68	88	63	59	62	62
20:00	30	28	40	34	64	52	38	39	41
21:00	10	16	18	16	49	38	16	22	23
22:00	17	17	12	9	37	15	6	18	16
23:00	3	5	6	9	10	10	4	7	7
Total	3627	3672	3843	3887	4096	3519	3248	3825	3699

Southbound

Time	Day of Week							Ave W'day	7 Day Ave
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	8-Feb	9-Feb	10-Feb	11-Feb	12-Feb	13-Feb	14-Feb		
AM Peak	279	278	302	283	306	360	377		
PM Peak	387	390	387	406	399	303	321		
0:00	5	4	5	5	4	12	14	5	7
1:00	6	5	3	4	7	5	14	5	6
2:00	2	0	4	2	5	3	7	3	3
3:00	5	11	13	12	7	7	4	10	8
4:00	40	33	34	35	30	27	14	34	30
5:00	86	114	102	90	97	56	42	98	84
6:00	175	177	205	196	183	91	95	187	160
7:00	239	202	220	242	255	169	125	232	207
8:00	268	220	197	197	248	224	218	226	225
9:00	277	260	302	270	306	290	301	283	287
10:00	275	254	284	274	283	360	377	274	301
11:00	279	278	268	283	275	342	340	277	295
12:00	252	296	287	300	315	289	321	290	294
13:00	247	272	296	290	321	303	283	285	287
14:00	387	342	346	376	379	269	291	366	341
15:00	365	390	387	406	399	284	227	389	351
16:00	336	330	358	364	370	209	184	352	307
17:00	180	171	218	211	219	163	151	200	188
18:00	113	107	129	160	141	117	93	130	123
19:00	68	81	113	105	126	77	87	99	94
20:00	50	66	63	67	76	69	44	64	62
21:00	26	27	38	39	42	52	23	34	35
22:00	14	16	8	18	34	36	18	18	21
23:00	10	9	5	17	17	21	4	12	12
Total	3705	3665	3885	3963	4139	3475	3277	3871	3730

Ocean Drive, north of Ernest Street (Lake Cathie), February 2016





Ocean Drive, north of Jordan Street (Bonny Hills), February 2016

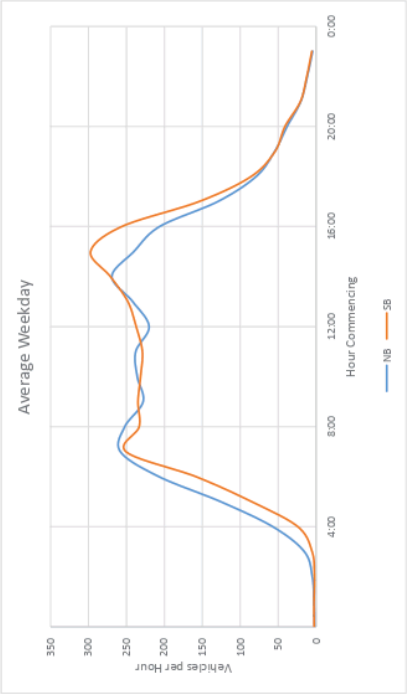
Northbound

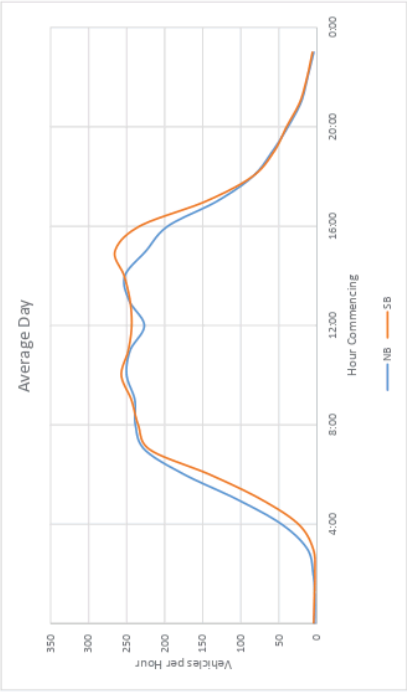
Time	Day of Week							Ave W'day	7 Day Ave
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	8-Feb	9-Feb	10-Feb	11-Feb	12-Feb	13-Feb	14-Feb		
AM Peak	264	261	276	271	280	301	270		
PM Peak	247	252	317	273	285	248	270		
0:00	2	2	5	2	0	7	2	2	3
1:00	2	3	4	2	3	3	1	3	3
2:00	6	5	4	5	5	4	5	5	5
3:00	12	17	16	15	17	5	6	15	13
4:00	63	52	60	52	58	25	15	57	46
5:00	119	130	136	126	117	61	45	126	105
6:00	224	195	207	204	205	112	72	207	174
7:00	264	237	253	271	265	161	133	258	226
8:00	228	261	273	259	240	224	185	252	239
9:00	236	209	242	223	230	279	256	228	239
10:00	219	216	217	247	280	301	270	236	250
11:00	214	229	276	211	259	271	258	238	245
12:00	226	227	228	188	232	229	258	220	227
13:00	214	252	237	241	265	248	270	242	247
14:00	247	224	317	273	285	192	229	269	252
15:00	218	245	241	241	256	165	207	240	225
16:00	206	187	211	201	226	158	182	206	196
17:00	110	101	143	137	156	132	141	129	131
18:00	70	63	84	82	96	98	97	79	84
19:00	45	70	40	58	60	81	57	55	59
20:00	29	33	41	31	57	45	30	38	38
21:00	13	13	24	15	36	26	18	20	21
22:00	10	6	3	6	33	18	9	12	12
23:00	4	2	3	6	8	4	2	5	4
Total	2981	2979	3265	3096	3389	2849	2748	3142	3044

Southbound

Time	Day of Week							Ave W'day	7 Day Ave
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	8-Feb	9-Feb	10-Feb	11-Feb	12-Feb	13-Feb	14-Feb		
AM Peak	259	243	266	248	283	319	323		
PM Peak	293	326	288	292	289	258	260		
0:00	2	2	3	2	4	12	5	3	4
1:00	3	2	3	3	3	3	7	3	3
2:00	3	2	2	3	1	2	5	2	3
3:00	6	4	5	5	6	4	4	5	5
4:00	27	28	26	21	18	34	16	24	24
5:00	80	85	84	80	95	51	38	85	73
6:00	157	160	178	141	155	106	89	158	141
7:00	259	243	251	248	252	158	125	251	219
8:00	244	209	223	244	246	222	256	233	235
9:00	234	214	228	215	283	253	279	235	244
10:00	231	198	243	232	253	319	323	231	257
11:00	220	221	266	199	239	267	323	229	248
12:00	230	241	214	246	255	258	260	237	243
13:00	242	248	250	249	252	235	243	248	246
14:00	270	260	283	254	289	178	239	271	253
15:00	293	326	288	292	287	176	195	297	265
16:00	236	226	263	278	277	176	174	256	233
17:00	158	133	174	138	167	119	133	154	146
18:00	65	82	88	87	106	98	67	86	85
19:00	33	46	67	54	71	62	62	54	56
20:00	34	29	41	37	64	37	37	41	40
21:00	8	19	17	27	32	36	17	21	22
22:00	9	16	6	13	17	19	10	12	13
23:00	3	5	3	9	8	11	2	6	6
Total	3047	2999	3206	3077	3380	2836	2909	3142	3065

Ocean Drive, north of Jordan Street (Bonny Hills), February 2016





Port Macquarie Origin Destination Survey

Wednesday, 10 Feb 2016

Frequency count expanded for missed plates and survey start and finish

No travel time cutoff

Hour commencing: 7:00
Vehicle Class: All veh

From		Vol	1NB	1SB	2NB	2SB	3EB	3WB	4NB	4SB	5NB	5SB	6NB	6SB	7NB	7SB	8NB	8SB	9NB	9SB	Total
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
		Vol	493	474	345	227	573	300	1,348	1,115	1,406	562	346	173	370	149	153	168	322	353	
1NB	1	493	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1SB	2	474	0	0	37	145	0	19	56	0	0	25	0	11	0	3	0	2	0	77	374
2NB	3	345	180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	180
2SB	4	227	18	0	0	0	0	25	46	0	0	5	0	2	0	3	0	2	0	62	162
3EB	5	573	23	0	33	0	0	0	461	0	0	66	0	11	0	11	1	10	0	8	625
3WB	6	300	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4NB	7	1,348	0	0	0	0	0	0	0	0	0	175	0	27	0	14	0	13	0	0	229
4SB	8	1,115	35	0	74	0	0	197	0	0	0	0	0	0	0	5	0	3	0	131	446
5NB	9	1,406	74	0	26	0	0	98	0	403	0	0	0	0	0	12	0	0	0	49	660
5SB	10	562	0	0	0	0	0	0	0	0	0	0	0	74	0	38	0	44	0	0	155
6NB	11	346	4	0	2	0	0	2	0	45	221	0	0	0	0	0	0	0	0	0	274
6SB	12	173	0	0	0	0	0	0	0	0	0	0	0	0	0	82	0	91	0	24	197
7NB	13	370	9	0	22	0	0	31	75	27	118	0	173	0	0	0	0	0	0	6	460
7SB	14	149	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86	0	0	86
8NB	15	153	2	0	5	0	0	2	12	19	55	0	82	0	99	0	0	0	0	0	275
8SB	16	168	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	4	6
9NB	17	322	112	0	159	0	0	2	148	11	0	0	3	0	2	1	3	0	0	0	441
9SB	18	353	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total			458	0	359	145	0	375	800	505	393	272	258	124	100	169	4	250	0	360	

Frequency count expanded for missed plates and survey start and finish

No travel time cutoff

Hour commencing: 7:00
Vehicle Class: Car

From		Vol	1NB	1SB	2NB	2SB	3EB	3WB	4NB	4SB	5NB	5SB	6NB	6SB	7NB	7SB	8NB	8SB	9NB	9SB	Total
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
		Vol	395	399	250	155	542	273	1,286	1,030	1,373	511	338	154	351	139	139	162	264	297	
1NB	1	395	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1SB	2	399	0	0	16	103	0	13	41	0	0	19	0	7	0	1	0	2	0	58	260
2NB	3	250	128	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	128
2SB	4	155	8	0	0	0	0	19	35	0	0	4	0	0	0	1	0	2	0	48	117
3EB	5	542	19	0	27	0	0	0	442	0	0	61	0	11	0	10	1	8	0	6	585
3WB	6	273	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4NB	7	1,286	0	0	0	0	0	0	0	0	0	165	0	23	0	14	0	13	0	0	214
4SB	8	1,030	28	0	51	0	0	186	0	0	0	0	0	0	0	4	0	3	0	120	393
5NB	9	1,373	72	0	26	0	0	97	0	398	0	0	0	0	0	12	0	0	0	47	651
5SB	10	511	0	0	0	0	0	0	0	0	0	0	0	58	0	31	0	39	0	0	127
6NB	11	338	4	0	2	0	0	2	0	40	213	0	0	0	0	0	0	0	0	0	261
6SB	12	154	0	0	0	0	0	0	0	0	0	0	0	0	0	74	0	85	0	24	183
7NB	13	351	9	0	22	0	0	27	69	16	108	0	163	0	0	0	0	0	0	6	419
7SB	14	139	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	0	0	81
8NB	15	139	2	0	5	0	0	0	10	12	49	0	74	0	84	0	0	0	0	0	236
8SB	16	162	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	4	6
9NB	17	264	87	0	114	0	0	2	139	9	0	0	3	0	2	1	3	0	0	0	360
9SB	18	297	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total			358	0	262	103	0	346	738	476	370	248	240	100	85	148	4	232	0	313	

Frequency count expanded for missed plates and survey start and finish

No travel time cutoff

Hour commencing: 7:00
Vehicle Class: Heavy Vehicle

From		Vol	To: 1NB	1SB	2NB	2SB	3EB	3WB	4NB	4SB	5NB	5SB	6NB	6SB	7NB	7SB	8NB	8SB	9NB	9SB	Total
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
		Vol	94	74	95	70	29	25	55	78	31	33	5	18	6	7	2	6	58	56	
1NB	1	94	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1SB	2	74	0	0	22	41	0	6	15	0	0	5	0	3	0	1	0	0	0	18	113
2NB	3	95	52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	52
2SB	4	70	10	0	0	0	0	5	11	0	0	1	0	2	0	1	0	0	0	14	45
3EB	5	29	5	0	6	0	0	0	16	0	0	6	0	0	0	1	0	2	0	2	38
3WB	6	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4NB	7	55	0	0	0	0	0	0	0	0	0	9	0	4	0	0	0	0	0	0	13
4SB	8	78	7	0	23	0	0	8	0	0	0	0	0	0	0	1	0	0	0	10	50
5NB	9	31	2	0	0	0	0	1	0	5	0	0	0	0	0	0	0	0	0	2	9
5SB	10	33	0	0	0	0	0	0	0	0	0	0	0	14	0	7	0	5	0	0	26
6NB	11	5	0	0	0	0	0	0	0	3	5	0	0	0	0	0	0	0	0	0	8
6SB	12	18	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	6	0	0	15
7NB	13	6	0	0	0	0	0	2	0	2	2	0	1	0	0	0	0	0	0	0	7
7SB	14	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3
8NB	15	2	0	0	0	0	0	0	0	2	2	0	1	0	1	0	0	0	0	0	6
8SB	16	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9NB	17	58	25	0	46	0	0	0	9	2	0	0	0	0	0	0	0	0	0	0	82
9SB	18	56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total			100	0	97	41	0	23	51	12	9	21	3	23	1	21	0	16	0	47	

Frequency count expanded for missed plates and survey start and finish

No travel time cutoff

Hour commencing: 7:00
Vehicle Class: Bus

From		Vol	To: 1NB	1SB	2NB	2SB	3EB	3WB	4NB	4SB	5NB	5SB	6NB	6SB	7NB	7SB	8NB	8SB	9NB	9SB	Total
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
		Vol	4	1	0	2	2	2	7	7	2	18	3	1	13	3	12	0	0	0	
1NB	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1SB	2	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
2NB	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2SB	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3EB	5	2	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	3
3WB	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4NB	7	7	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
4SB	8	7	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	4
5NB	9	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5SB	10	18	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
6NB	11	3	0	0	0	0	0	0	0	3	2	0	0	0	0	0	0	0	0	0	5
6SB	12	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7NB	13	13	0	0	0	0	0	1	6	10	8	0	9	0	0	0	0	0	0	0	33
7SB	14	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
8NB	15	12	0	0	0	0	0	2	2	5	4	0	6	0	14	0	0	0	0	0	33
8SB	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9NB	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9SB	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total			0	0	0	0	0	7	11	17	14	3	15	1	14	0	0	2	0	0	

Port Macquarie Origin Destination Survey

Wednesday, 10 Feb 2016

Frequency count expanded for missed plates and survey start and finish

No travel time cutoff

Hour commencing: 8:00
Vehicle Class: All veh

From		Vol	To 1NB 1	1SB 2	2NB 3	2SB 4	3EB 5	3WB 6	4NB 7	4SB 8	5NB 9	5SB 10	6NB 11	6SB 12	7NB 13	7SB 14	8NB 15	8SB 16	9NB 17	9SB 18	Total
			510	591	433	314	629	458	2,116	1,413	2,102	976	477	211	427	234	194	282	429	384	
1NB	1	510	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1SB	2	591	0	0	18	176	0	20	50	0	0	18	0	0	0	1	0	0	0	83	365
2NB	3	433	182	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	182
2SB	4	314	16	0	0	0	0	28	58	0	0	10	0	0	0	1	0	0	0	95	209
3EB	5	629	7	0	43	0	0	0	361	0	0	39	0	1	0	5	1	2	0	13	472
3WB	6	458	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4NB	7	2,116	0	0	0	0	0	0	0	0	0	233	0	19	0	11	0	4	0	0	267
4SB	8	1,413	52	0	80	0	0	172	0	0	0	0	0	0	0	5	1	1	0	92	403
5NB	9	2,102	23	0	16	0	0	61	0	343	0	0	0	0	0	8	0	0	0	13	464
5SB	10	976	0	0	0	0	0	0	0	0	0	0	0	89	0	33	0	23	0	4	149
6NB	11	477	2	0	3	0	0	2	0	29	224	0	0	0	0	0	0	0	0	0	260
6SB	12	211	0	0	0	0	0	0	0	0	0	0	0	0	0	74	0	62	0	12	148
7NB	13	427	6	0	16	0	0	20	38	10	80	0	112	0	0	0	0	0	0	3	285
7SB	14	234	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	95	0	1	96
8NB	15	194	2	0	3	0	0	2	9	7	53	0	71	0	109	0	0	0	0	0	257
8SB	16	282	0	0	1	0	0	1	2	0	0	0	0	0	0	0	0	0	0	6	11
9NB	17	429	101	0	172	0	0	5	97	8	0	0	8	1	7	4	9	0	0	0	413
9SB	18	384	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total			390	0	353	176	0	311	615	398	358	300	191	110	116	142	11	188	0	322	

Frequency count expanded for missed plates and survey start and finish

No travel time cutoff

Hour commencing: 8:00
Vehicle Class: Car

From		Vol	To 1NB 1	1SB 2	2NB 3	2SB 4	3EB 5	3WB 6	4NB 7	4SB 8	5NB 9	5SB 10	6NB 11	6SB 12	7NB 13	7SB 14	8NB 15	8SB 16	9NB 17	9SB 18	Total
			418	499	351	237	591	427	2,006	1,298	2,057	928	463	198	415	221	183	265	380	323	
1NB	1	418	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1SB	2	499	0	0	11	135	0	15	35	0	0	16	0	0	0	1	0	0	0	64	276
2NB	3	351	144	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	144
2SB	4	237	6	0	0	0	0	22	44	0	0	8	0	0	0	1	0	0	0	74	156
3EB	5	591	2	0	36	0	0	0	350	0	0	38	0	1	0	4	1	2	0	7	442
3WB	6	427	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4NB	7	2,006	0	0	0	0	0	0	0	0	0	220	0	14	0	8	0	2	0	0	244
4SB	8	1,298	35	0	57	0	0	159	0	0	0	0	0	0	0	3	1	0	0	84	340
5NB	9	2,057	23	0	12	0	0	60	0	332	0	0	0	0	0	7	0	0	0	13	447
5SB	10	928	0	0	0	0	0	0	0	0	0	0	0	77	0	30	0	20	0	3	130
6NB	11	463	2	0	2	0	0	2	0	23	212	0	0	0	0	0	0	0	0	0	241
6SB	12	198	0	0	0	0	0	0	0	0	0	0	0	0	0	70	0	58	0	11	139
7NB	13	415	5	0	16	0	0	19	35	8	78	0	110	0	0	0	0	0	0	3	274
7SB	14	221	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	85	0	1	86
8NB	15	183	1	0	3	0	0	2	7	5	51	0	69	0	102	0	0	0	0	0	241
8SB	16	265	0	0	1	0	0	1	2	0	0	0	0	0	0	0	0	0	0	6	11
9NB	17	380	86	0	144	0	0	5	89	7	0	0	7	1	5	4	7	0	0	0	355
9SB	18	323	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total			304	0	282	135	0	284	562	375	342	282	186	93	107	128	9	167	0	268	

Frequency count expanded for missed plates and survey start and finish

No travel time cutoff

Hour commencing: 8:00
Vehicle Class: Heavy Vehicle

From		Vol	To 1NB 1	1SB 2	2NB 3	2SB 4	3EB 5	3WB 6	4NB 7	4SB 8	5NB 9	5SB 10	6NB 11	6SB 12	7NB 13	7SB 14	8NB 15	8SB 16	9NB 17	9SB 18	Total
		Vol	92	87	81	76	31	23	85	89	33	38	8	11	9	9	8	9	47	59	
1NB	1	92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1SB	2	87	0	0	7	41	0	5	14	0	0	1	0	0	0	0	0	0	0	19	87
2NB	3	81	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	38
2SB	4	76	10	0	0	0	0	6	14	0	0	2	0	0	0	0	0	0	0	21	53
3EB	5	31	5	0	6	0	0	0	6	0	0	0	0	0	0	1	0	0	0	5	23
3WB	6	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4NB	7	85	0	0	0	0	0	0	0	0	0	10	0	4	0	2	0	1	0	0	18
4SB	8	89	16	0	24	0	0	9	0	0	0	0	0	0	0	1	0	0	0	7	57
5NB	9	33	0	0	3	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	10
5SB	10	38	0	0	0	0	0	0	0	0	0	0	0	10	0	2	0	2	0	1	15
6NB	11	8	0	0	1	0	0	0	0	3	8	0	0	0	0	0	0	0	0	0	12
6SB	12	11	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	1	5
7NB	13	9	1	0	0	0	0	1	2	2	2	0	2	0	0	0	0	0	0	0	10
7SB	14	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	7
8NB	15	8	1	0	0	0	0	0	2	2	2	0	2	0	6	0	0	0	0	0	15
8SB	16	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9NB	17	47	15	0	29	0	0	0	7	1	0	0	1	0	2	0	2	0	0	0	58
9SB	18	59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total			86	0	70	41	0	21	46	15	12	14	5	14	8	8	2	12	0	54	

Frequency count expanded for missed plates and survey start and finish

No travel time cutoff

Hour commencing: 8:00
Vehicle Class: Bus

From		Vol	To 1NB 1	1SB 2	2NB 3	2SB 4	3EB 5	3WB 6	4NB 7	4SB 8	5NB 9	5SB 10	6NB 11	6SB 12	7NB 13	7SB 14	8NB 15	8SB 16	9NB 17	9SB 18	Total
		Vol	0	5	1	1	7	8	25	26	12	10	6	2	3	4	3	8	2	2	
1NB	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1SB	2	5	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	2
2NB	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2SB	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3EB	5	7	0	0	1	0	0	0	5	0	0	1	0	0	0	0	0	0	0	0	7
3WB	6	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4NB	7	25	0	0	0	0	0	0	0	0	0	3	0	1	0	1	0	1	0	0	6
4SB	8	26	0	0	0	0	0	4	0	0	0	0	0	0	0	1	0	1	0	0	6
5NB	9	12	0	0	0	0	0	1	0	5	0	0	0	0	0	1	0	0	0	0	7
5SB	10	10	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	3
6NB	11	6	0	0	0	0	0	0	0	3	4	0	0	0	0	0	0	0	0	0	7
6SB	12	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	4
7NB	13	3	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
7SB	14	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4
8NB	15	3	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
8SB	16	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9NB	17	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9SB	18	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total			0	0	1	0	0	5	7	8	4	5	0	2	1	6	0	9	0	0	

Port Macquarie Origin Destination Survey

Wednesday, 10 Feb 2016

Frequency count expanded for missed plates and survey start and finish

No travel time cutoff

Hour commencing: 9:00
Vehicle Class: All veh

From		Vol	1NB	1SB	2NB	2SB	3EB	3WB	4NB	4SB	5NB	5SB	6NB	6SB	7NB	7SB	8NB	8SB	9NB	9SB	Total
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
			527	463	419	315	478	358	1,320	1,107	1,279	854	328	181	325	214	247	229	437	435	
1NB	1	527	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1SB	2	463	0	0	7	191	0	12	32	0	0	10	0	0	0	3	0	0	0	84	339
2NB	3	419	181	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	181
2SB	4	315	9	0	0	0	0	28	35	0	0	1	0	0	0	0	0	0	0	83	157
3EB	5	478	12	0	56	0	0	0	264	0	0	26	0	0	0	3	0	0	0	3	365
3WB	6	358	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4NB	7	1,320	0	0	0	0	0	0	0	0	0	135	0	10	0	5	0	2	0	0	152
4SB	8	1,107	22	0	33	0	0	156	0	0	0	0	0	0	0	4	0	0	0	92	307
5NB	9	1,279	15	0	8	0	0	34	0	170	0	0	0	0	0	3	0	0	0	16	246
5SB	10	854	0	0	0	0	0	0	0	0	0	0	0	90	0	44	0	20	0	1	155
6NB	11	328	2	0	0	0	0	3	0	13	171	0	0	0	0	0	0	0	0	0	189
6SB	12	181	0	0	0	0	0	0	0	0	0	0	0	0	0	67	0	36	0	15	118
7NB	13	325	3	0	13	0	0	7	6	3	81	0	123	0	0	0	0	0	0	3	239
7SB	14	214	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	85	0	7	92
8NB	15	247	2	0	10	0	0	2	1	0	54	0	79	0	142	0	0	0	0	0	290
8SB	16	229	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	12	14
9NB	17	437	102	0	160	0	0	5	91	2	0	0	7	0	7	0	11	0	0	0	384
9SB	18	435	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total			349	0	288	191	0	247	430	188	305	173	209	100	148	128	11	143	0	317	

Frequency count expanded for missed plates and survey start and finish

No travel time cutoff

Hour commencing: 9:00
Vehicle Class: Car

From		Vol	1NB	1SB	2NB	2SB	3EB	3WB	4NB	4SB	5NB	5SB	6NB	6SB	7NB	7SB	8NB	8SB	9NB	9SB	Total
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
			437	382	330	253	440	332	1,246	1,027	1,252	825	314	171	315	205	238	216	377	376	
1NB	1	437	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1SB	2	382	0	0	3	155	0	9	23	0	0	9	0	0	0	3	0	0	0	66	267
2NB	3	330	136	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	136
2SB	4	253	4	0	0	0	0	25	26	0	0	1	0	0	0	0	0	0	0	65	122
3EB	5	440	8	0	45	0	0	0	255	0	0	26	0	0	0	1	0	0	0	3	339
3WB	6	332	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4NB	7	1,246	0	0	0	0	0	0	0	0	0	132	0	10	0	3	0	2	0	0	147
4SB	8	1,027	16	0	24	0	0	147	0	0	0	0	0	0	0	3	0	0	0	92	282
5NB	9	1,252	14	0	8	0	0	32	0	166	0	0	0	0	0	3	0	0	0	16	239
5SB	10	825	0	0	0	0	0	0	0	0	0	0	0	81	0	41	0	18	0	1	141
6NB	11	314	2	0	0	0	0	3	0	13	166	0	0	0	0	0	0	0	0	0	184
6SB	12	171	0	0	0	0	0	0	0	0	0	0	0	0	0	65	0	34	0	15	113
7NB	13	315	3	0	13	0	0	7	6	2	78	0	119	0	0	0	0	0	0	3	231
7SB	14	205	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	81	0	7	88
8NB	15	238	2	0	10	0	0	2	1	0	49	0	74	0	136	0	0	0	0	0	275
8SB	16	216	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	12	14
9NB	17	377	82	0	135	0	0	5	82	0	0	0	7	0	7	0	11	0	0	0	328
9SB	18	376	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total			267	0	239	155	0	230	393	181	293	168	201	91	143	118	11	135	0	280	

Frequency count expanded for missed plates and survey start and finish

No travel time cutoff

Hour commencing: 9:00
Vehicle Class: Heavy Vehicle

From		Val	To: 1NB (1)	1SB (2)	2NB (3)	2SB (4)	3EB (5)	3WB (6)	4NB (7)	4SB (8)	5NB (9)	5SB (10)	6NB (11)	6SB (12)	7NB (13)	7SB (14)	8NB (15)	8SB (16)	9NB (17)	9SB (18)	Total
			90	77	89	62	36	24	67	72	25	28	13	10	9	7	8	12	59	58	
1NB	1	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1SB	2	77	0	0	4	36	0	4	10	0	0	0	0	0	0	0	0	0	0	18	71
2NB	3	89	45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45
2SB	4	62	5	0	0	0	0	3	9	0	0	0	0	0	0	0	0	0	0	18	35
3EB	5	36	5	0	11	0	0	0	7	0	0	0	0	0	0	1	0	0	0	0	25
3WB	6	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4NB	7	67	0	0	0	0	0	0	0	0	0	3	0	0	0	2	0	0	0	0	5
4SB	8	72	6	0	9	0	0	6	0	0	0	0	0	0	0	1	0	0	0	0	23
5NB	9	25	2	0	0	0	0	1	0	3	0	0	0	0	0	0	0	0	0	0	6
5SB	10	28	0	0	0	0	0	0	0	0	0	0	0	9	0	3	0	2	0	0	14
6NB	11	13	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	5
6SB	12	10	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	4
7NB	13	9	0	0	0	0	0	0	0	2	3	0	4	0	0	0	0	0	0	0	8
7SB	14	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3
8NB	15	8	0	0	0	0	0	0	0	0	4	0	3	0	5	0	0	0	0	0	13
8SB	16	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9NB	17	59	20	0	25	0	0	0	10	2	0	0	0	0	0	0	0	0	0	0	56
9SB	18	58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total			82	0	49	36	0	14	36	7	12	3	7	9	5	9	0	7	0	36	

Frequency count expanded for missed plates and survey start and finish

No travel time cutoff

Hour commencing: 9:00
Vehicle Class: Bus

From		Val	To: 1NB (1)	1SB (2)	2NB (3)	2SB (4)	3EB (5)	3WB (6)	4NB (7)	4SB (8)	5NB (9)	5SB (10)	6NB (11)	6SB (12)	7NB (13)	7SB (14)	8NB (15)	8SB (16)	9NB (17)	9SB (18)	Total
			0	4	0	0	2	2	7	8	2	1	1	0	1	2	1	1	1	1	
1NB	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1SB	2	4	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
2NB	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2SB	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3EB	5	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
3WB	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4NB	7	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4SB	8	8	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
5NB	9	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5SB	10	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6NB	11	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6SB	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7NB	13	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7SB	14	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
8NB	15	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
8SB	16	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9NB	17	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9SB	18	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total			0	0	0	0	0	2	1	0	0	1	1	0	0	0	0	1	0	0	

Port Macquarie Origin Destination Survey

Tuesday, 9 Feb 2016

Frequency count expanded for missed plates and survey start and finish

No travel time cutoff

Hour commencing: 15:00
Vehicle Class: All veh

From		Vol	To 1NB 1	1SB 2	2NB 3	2SB 4	3EB 5	3WB 6	4NB 7	4SB 8	5NB 9	5SB 10	6NB 11	6SB 12	7NB 13	7SB 14	8NB 15	8SB 16	9NB 17	9SB 18	Total
			546	579	380	451	524	609	1,603	1,659	1,287	1,513	231	372	226	371	214	203	420	423	
1NB	1	546	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1SB	2	579	0	0	28	168	0	18	69	0	0	42	0	10	0	19	2	11	0	173	540
2NB	3	380	229	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	229
2SB	4	451	16	0	0	0	0	45	48	0	0	9	0	2	0	19	3	9	0	93	244
3EB	5	524	22	0	50	0	0	0	325	0	0	109	0	16	0	27	4	12	0	6	571
3WB	6	609	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4NB	7	1,603	0	0	0	0	0	0	0	0	0	324	0	45	0	54	0	34	0	0	457
4SB	8	1,659	54	0	58	0	0	294	0	0	0	0	0	0	0	55	2	33	0	97	594
5NB	9	1,287	32	0	10	0	0	68	0	296	0	0	0	0	0	34	2	0	0	18	461
5SB	10	1,513	0	0	0	0	0	0	0	0	0	0	0	234	0	141	0	102	0	7	484
6NB	11	231	11	0	2	0	0	2	0	32	111	0	0	0	0	0	0	0	0	0	158
6SB	12	372	0	0	0	0	0	0	0	0	0	0	0	0	0	194	0	134	0	14	341
7NB	13	226	4	0	4	0	0	12	15	17	56	0	89	0	0	0	0	0	0	0	198
7SB	14	371	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	153	0	9	162
8NB	15	214	4	0	0	0	0	6	5	8	39	0	63	0	84	0	0	0	0	0	208
8SB	16	203	0	0	0	0	0	3	2	0	0	4	0	1	0	0	0	0	0	8	19
9NB	17	420	195	0	212	0	0	12	168	40	0	0	27	3	15	8	16	0	0	0	696
9SB	18	423	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total			568	0	364	168	0	461	631	394	206	488	179	312	99	551	29	487	0	425	

Frequency count expanded for missed plates and survey start and finish

No travel time cutoff

Hour commencing: 15:00
Vehicle Class: Car

From		Vol	To 1NB 1	1SB 2	2NB 3	2SB 4	3EB 5	3WB 6	4NB 7	4SB 8	5NB 9	5SB 10	6NB 11	6SB 12	7NB 13	7SB 14	8NB 15	8SB 16	9NB 17	9SB 18	Total
			472	480	293	357	501	572	1,531	1,609	1,234	1,466	222	360	217	358	202	193	347	362	
1NB	1	472	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1SB	2	480	0	0	21	140	0	14	45	0	0	41	0	10	0	19	2	11	0	140	444
2NB	3	293	184	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	184
2SB	4	357	15	0	0	0	0	33	33	0	0	9	0	2	0	19	3	9	0	88	210
3EB	5	501	22	0	40	0	0	0	317	0	0	105	0	14	0	26	3	10	0	6	544
3WB	6	572	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4NB	7	1,531	0	0	0	0	0	0	0	0	0	315	0	42	0	51	0	30	0	0	439
4SB	8	1,609	51	0	53	0	0	283	0	0	0	0	0	0	0	52	0	30	0	92	560
5NB	9	1,234	28	0	9	0	0	62	0	284	0	0	0	0	0	33	2	0	0	18	435
5SB	10	1,466	0	0	0	0	0	0	0	0	0	0	0	227	0	137	0	97	0	7	468
6NB	11	222	10	0	2	0	0	2	0	32	105	0	0	0	0	0	0	0	0	0	150
6SB	12	360	0	0	0	0	0	0	0	0	0	0	0	0	0	185	0	127	0	14	326
7NB	13	217	4	0	4	0	0	12	13	17	54	0	86	0	0	0	0	0	0	0	192
7SB	14	358	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	147	0	9	155
8NB	15	202	4	0	0	0	0	6	2	6	37	0	61	0	78	0	0	0	0	0	195
8SB	16	193	0	0	0	0	0	3	1	0	0	4	0	0	0	0	0	0	0	8	17
9NB	17	347	142	0	140	0	0	12	158	31	0	0	27	3	15	8	16	0	0	0	551
9SB	18	362	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total			459	0	269	140	0	427	570	370	196	474	175	298	93	530	26	461	0	382	

Frequency count expanded for missed plates and survey start and finish

No travel time cutoff

Hour commencing: 15:00
Vehicle Class: Heavy Vehicle

From		Val	1NB	1SB	2NB	2SB	3EB	3WB	4NB	4SB	5NB	5SB	6NB	6SB	7NB	7SB	8NB	8SB	9NB	9SB	Total
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
		Val	74	96	86	92	16	33	63	36	33	28	9	7	6	9	7	4	73	58	
1NB	1	74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1SB	2	96	0	0	7	28	0	4	24	0	0	1	0	0	0	0	0	0	0	32	96
2NB	3	86	45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45
2SB	4	92	2	0	0	0	0	4	14	0	0	0	0	0	0	0	0	0	0	5	25
3EB	5	16	0	0	10	0	0	0	6	0	0	4	0	0	0	0	1	0	0	0	20
3WB	6	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4NB	7	63	0	0	0	0	0	0	0	0	0	6	0	2	0	0	0	0	0	0	7
4SB	8	36	4	0	6	0	0	10	0	0	0	0	0	0	0	0	0	0	0	5	24
5NB	9	33	3	0	1	0	0	5	0	4	0	0	0	0	0	0	0	0	0	0	13
5SB	10	28	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	3
6NB	11	9	2	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	8
6SB	12	7	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2
7NB	13	6	0	0	0	0	0	0	0	0	2	0	3	0	0	0	0	0	0	0	4
7SB	14	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
8NB	15	7	0	0	0	0	0	0	1	2	2	0	1	0	3	0	0	0	0	0	9
8SB	16	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9NB	17	73	53	0	72	0	0	0	10	10	0	0	0	0	0	0	0	0	0	0	145
9SB	18	58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total			107	0	96	28	0	23	55	15	9	11	4	5	3	2	1	2	0	43	

Frequency count expanded for missed plates and survey start and finish

No travel time cutoff

Hour commencing: 15:00
Vehicle Class: Bus

From		Val	1NB	1SB	2NB	2SB	3EB	3WB	4NB	4SB	5NB	5SB	6NB	6SB	7NB	7SB	8NB	8SB	9NB	9SB	Total
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
		Val	0	3	1	2	7	4	9	14	20	19	0	5	3	4	5	6	0	3	
1NB	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1SB	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2NB	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2SB	4	2	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	9
3EB	5	7	0	0	0	0	0	0	2	0	0	0	0	2	0	1	0	2	0	0	7
3WB	6	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4NB	7	9	0	0	0	0	0	0	0	0	0	3	0	1	0	3	0	3	0	0	11
4SB	8	14	0	0	0	0	0	1	0	0	0	0	0	0	0	3	2	3	0	0	9
5NB	9	20	1	0	0	0	0	1	0	8	0	0	0	0	0	1	0	0	0	0	12
5SB	10	19	0	0	0	0	0	0	0	0	0	0	0	4	0	4	0	5	0	0	13
6NB	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6SB	12	5	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	7	0	0	13
7NB	13	3	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
7SB	14	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4
8NB	15	5	0	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0	0	0	5
8SB	16	6	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	2
9NB	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9SB	18	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total			1	0	0	0	0	12	6	8	0	3	0	8	4	19	2	24	0	0	

Port Macquarie Origin Destination Survey

Tuesday, 9 Feb 2016

Frequency count expanded for missed plates and survey start and finish

No travel time cutoff

Hour commencing: 16:00
Vehicle Class: All veh

From		Vol	1NB	1SB	2NB	2SB	3EB	3WB	4NB	4SB	5NB	5SB	6NB	6SB	7NB	7SB	8NB	8SB	9NB	9SB	Total
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
		Vol	599	687	366	462	391	603	1,416	1,647	867	1,659	233	419	242	449	240	264	515	440	
1NB	1	599	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1SB	2	687	0	0	11	163	0	18	52	0	0	58	0	7	0	16	0	2	0	116	442
2NB	3	366	196	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	196
2SB	4	462	5	0	0	0	0	26	41	0	0	13	0	3	0	14	0	4	0	54	161
3EB	5	391	12	0	26	0	0	0	166	0	0	46	0	6	0	8	0	2	0	1	268
3WB	6	603	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4NB	7	1,416	0	0	0	0	0	0	0	0	0	302	0	30	0	19	0	14	0	0	364
4SB	8	1,647	44	0	50	0	0	309	0	0	0	0	0	0	0	32	4	9	0	70	518
5NB	9	867	16	0	6	0	0	26	0	156	0	0	0	0	0	12	1	0	0	4	221
5SB	10	1,659	0	0	0	0	0	0	0	0	0	0	0	223	0	110	0	53	0	4	389
6NB	11	233	1	0	0	0	0	4	0	16	73	0	0	0	0	0	0	0	0	0	93
6SB	12	419	0	0	0	0	0	0	0	0	0	0	0	0	0	182	0	94	0	8	285
7NB	13	242	4	0	4	0	0	6	10	9	35	0	78	0	0	0	0	0	0	0	147
7SB	14	449	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	155	0	6	161
8NB	15	240	1	0	2	0	0	5	7	9	19	0	51	0	100	0	0	0	0	0	194
8SB	16	264	1	0	1	0	0	1	2	0	0	0	0	0	0	0	0	0	0	8	14
9NB	17	515	124	0	151	0	0	6	102	7	0	0	18	0	8	8	13	0	0	0	439
9SB	18	440	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total			406	0	251	163	0	402	380	197	128	419	147	268	108	403	19	334	0	271	

Frequency count expanded for missed plates and survey start and finish

No travel time cutoff

Hour commencing: 16:00
Vehicle Class: Car

From		Vol	1NB	1SB	2NB	2SB	3EB	3WB	4NB	4SB	5NB	5SB	6NB	6SB	7NB	7SB	8NB	8SB	9NB	9SB	Total
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
		Vol	502	586	278	380	375	590	1,356	1,608	846	1,644	223	414	239	436	235	240	427	387	
1NB	1	502	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1SB	2	586	0	0	9	155	0	16	41	0	0	58	0	7	0	16	0	2	0	88	392
2NB	3	278	154	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	154
2SB	4	380	4	0	0	0	0	26	37	0	0	13	0	3	0	14	0	4	0	51	152
3EB	5	375	11	0	24	0	0	0	163	0	0	46	0	6	0	8	0	2	0	0	261
3WB	6	590	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4NB	7	1,356	0	0	0	0	0	0	0	0	0	298	0	28	0	18	0	13	0	0	357
4SB	8	1,608	41	0	44	0	0	304	0	0	0	0	0	0	0	32	4	9	0	67	500
5NB	9	846	15	0	6	0	0	26	0	155	0	0	0	0	0	12	1	0	0	4	219
5SB	10	1,644	0	0	0	0	0	0	0	0	0	0	0	221	0	110	0	53	0	4	387
6NB	11	223	1	0	0	0	0	4	0	14	70	0	0	0	0	0	0	0	0	0	89
6SB	12	414	0	0	0	0	0	0	0	0	0	0	0	0	0	180	0	92	0	8	281
7NB	13	239	4	0	4	0	0	6	10	8	35	0	77	0	0	0	0	0	0	0	145
7SB	14	436	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	146	0	6	152
8NB	15	235	1	0	2	0	0	5	7	6	18	0	49	0	99	0	0	0	0	0	188
8SB	16	240	1	0	1	0	0	1	2	0	0	0	0	0	0	0	0	0	0	8	14
9NB	17	427	84	0	101	0	0	6	95	7	0	0	17	0	8	7	13	0	0	0	340
9SB	18	387	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total			317	0	191	155	0	394	355	190	124	416	143	264	107	399	19	322	0	236	

Frequency count expanded for missed plates and survey start and finish

No travel time cutoff

Hour commencing: 16:00
Vehicle Class: Heavy Vehicle

From		Vol	To: 1NB	1SB	2NB	2SB	3EB	3WB	4NB	4SB	5NB	5SB	6NB	6SB	7NB	7SB	8NB	8SB	9NB	9SB	Total
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
		Vol	93	94	87	81	13	12	45	32	11	11	8	2	2	4	3	13	86	52	
1NB	1	93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1SB	2	94	0	0	2	8	0	2	11	0	0	0	0	0	0	0	0	0	0	28	51
2NB	3	87	43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	43
2SB	4	81	1	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	3	8
3EB	5	13	1	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	5
3WB	6	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4NB	7	45	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
4SB	8	32	3	0	6	0	0	5	0	0	0	0	0	0	0	0	0	0	0	3	18
5NB	9	11	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
5SB	10	11	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
6NB	11	8	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2
6SB	12	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7NB	13	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7SB	14	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8NB	15	3	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	3
8SB	16	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9NB	17	86	40	0	50	0	0	0	6	0	0	0	1	0	0	1	0	0	0	0	99
9SB	18	52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total			89	0	59	8	0	7	23	2	3	1	2	2	0	1	0	0	0	35	

Frequency count expanded for missed plates and survey start and finish

No travel time cutoff

Hour commencing: 16:00
Vehicle Class: Bus

From		Vol	To: 1NB	1SB	2NB	2SB	3EB	3WB	4NB	4SB	5NB	5SB	6NB	6SB	7NB	7SB	8NB	8SB	9NB	9SB	Total
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
		Vol	4	7	1	1	3	1	15	7	10	4	2	3	1	9	2	11	2	1	
1NB	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1SB	2	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2NB	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2SB	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3EB	5	3	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2
3WB	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4NB	7	15	0	0	0	0	0	0	0	0	0	2	0	2	0	1	0	1	0	0	6
4SB	8	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5NB	9	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5SB	10	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6NB	11	2	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	3
6SB	12	3	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	4
7NB	13	1	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	3
7SB	14	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	9
8NB	15	2	0	0	0	0	0	0	0	2	0	0	1	0	1	0	0	0	0	0	4
8SB	16	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9NB	17	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9SB	18	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total			0	0	1	0	0	0	1	5	1	2	2	2	1	3	0	12	0	0	

Port Macquarie Origin Destination Survey

Tuesday, 9 Feb 2016

Frequency count expanded for missed plates and survey start and finish

No travel time cutoff

Hour commencing: 17:00
Vehicle Class: All veh

From		Vol	To: 1NB	1SB	2NB	2SB	3EB	3WB	4NB	4SB	5NB	5SB	6NB	6SB	7NB	7SB	8NB	8SB	9NB	9SB	Total
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
		Vol	569	759	290	563	338	634	1,094	1,630	693	1,711	196	353	179	379	183	178	431	439	
1NB	1	569	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1SB	2	759	0	0	4	200	0	26	48	0	0	64	0	3	0	18	0	5	0	118	485
2NB	3	290	177	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	177
2SB	4	563	3	0	0	0	0	40	45	0	0	19	0	0	0	23	0	5	0	73	208
3EB	5	338	3	0	9	0	0	0	103	0	0	27	0	0	0	26	0	0	0	0	169
3WB	6	634	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4NB	7	1,094	0	0	0	0	0	0	0	0	0	261	0	12	0	2	0	2	0	0	277
4SB	8	1,630	22	0	26	0	0	307	0	0	0	0	0	0	0	34	0	3	0	54	446
5NB	9	693	5	0	0	0	0	39	0	156	0	0	0	0	0	3	0	0	0	5	208
5SB	10	1,711	0	0	0	0	0	0	0	0	0	0	0	191	0	80	0	38	0	0	309
6NB	11	196	0	0	0	0	0	2	0	9	62	0	0	0	0	0	0	0	0	0	74
6SB	12	353	0	0	0	0	0	0	0	0	0	0	0	0	0	150	0	64	0	2	215
7NB	13	179	1	0	1	0	0	7	9	2	28	0	70	0	0	0	0	0	0	2	120
7SB	14	379	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	104	0	7	111
8NB	15	183	2	0	2	0	0	0	2	0	19	0	52	0	80	0	0	0	0	0	156
8SB	16	178	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6
9NB	17	431	103	0	107	0	0	6	83	0	0	0	15	0	3	4	8	0	0	0	329
9SB	18	439	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total			318	0	149	200	0	427	290	167	109	371	137	206	83	340	8	221	0	267	

Frequency count expanded for missed plates and survey start and finish

No travel time cutoff

Hour commencing: 17:00
Vehicle Class: Car

From		Vol	To: 1NB	1SB	2NB	2SB	3EB	3WB	4NB	4SB	5NB	5SB	6NB	6SB	7NB	7SB	8NB	8SB	9NB	9SB	Total
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
		Vol	501	657	222	463	330	619	1,070	1,614	689	1,704	193	351	176	373	178	175	353	365	
1NB	1	501	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1SB	2	657	0	0	3	183	0	19	41	0	0	63	0	3	0	17	0	3	0	78	411
2NB	3	222	144	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	144
2SB	4	463	3	0	0	0	0	36	39	0	0	19	0	0	0	23	0	5	0	66	191
3EB	5	330	3	0	9	0	0	0	100	0	0	27	0	0	0	24	0	0	0	0	164
3WB	6	619	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4NB	7	1,070	0	0	0	0	0	0	0	0	0	260	0	12	0	2	0	2	0	0	276
4SB	8	1,614	21	0	23	0	0	304	0	0	0	0	0	0	0	34	0	3	0	52	437
5NB	9	689	5	0	0	0	0	36	0	154	0	0	0	0	0	3	0	0	0	5	204
5SB	10	1,704	0	0	0	0	0	0	0	0	0	0	0	191	0	80	0	38	0	0	309
6NB	11	193	0	0	0	0	0	2	0	9	62	0	0	0	0	0	0	0	0	0	74
6SB	12	351	0	0	0	0	0	0	0	0	0	0	0	0	0	149	0	62	0	2	213
7NB	13	176	1	0	1	0	0	7	9	2	28	0	67	0	0	0	0	0	0	2	118
7SB	14	373	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	102	0	7	109
8NB	15	178	2	0	2	0	0	0	2	0	19	0	49	0	76	0	0	0	0	0	150
8SB	16	175	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6
9NB	17	353	68	0	76	0	0	6	83	0	0	0	15	0	3	4	8	0	0	0	264
9SB	18	365	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total			248	0	114	183	0	410	274	165	109	368	132	206	79	336	8	216	0	219	

Frequency count expanded for missed plates and survey start and finish

No travel time cutoff

Hour commencing: 17:00
Vehicle Class: Heavy Vehicle

From		Val	To 1NB 1	1SB 2	2NB 3	2SB 4	3EB 5	3WB 6	4NB 7	4SB 8	5NB 9	5SB 10	6NB 11	6SB 12	7NB 13	7SB 14	8NB 15	8SB 16	9NB 17	9SB 18	Total
		Val	67	101	67	99	7	15	21	13	3	6	2	0	2	5	4	1	78	74	
1NB	1	67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1SB	2	101	0	0	1	16	0	7	7	0	0	1	0	0	0	1	0	1	0	40	75
2NB	3	67	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33
2SB	4	99	0	0	0	0	0	4	5	0	0	0	0	0	0	0	0	0	0	7	16
3EB	5	7	0	0	0	0	0	0	2	0	0	0	0	0	0	2	0	0	0	0	4
3WB	6	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4NB	7	21	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
4SB	8	13	1	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0	2	10
5NB	9	3	0	0	0	0	0	3	0	2	0	0	0	0	0	0	0	0	0	0	4
5SB	10	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6NB	11	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6SB	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7NB	13	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
7SB	14	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
8NB	15	4	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	4
8SB	16	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9NB	17	78	35	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66
9SB	18	74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total			70	0	35	16	0	16	14	2	0	2	3	0	2	3	0	3	0	48	

Frequency count expanded for missed plates and survey start and finish

No travel time cutoff

Hour commencing: 17:00
Vehicle Class: Bus

From		Val	To 1NB 1	1SB 2	2NB 3	2SB 4	3EB 5	3WB 6	4NB 7	4SB 8	5NB 9	5SB 10	6NB 11	6SB 12	7NB 13	7SB 14	8NB 15	8SB 16	9NB 17	9SB 18	Total
		Val	1	1	1	1	1	0	3	3	1	1	1	2	1	1	1	2	0	0	
1NB	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1SB	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2NB	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2SB	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3EB	5	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
3WB	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4NB	7	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4SB	8	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5NB	9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5SB	10	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6NB	11	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6SB	12	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	3
7NB	13	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
7SB	14	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
8NB	15	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	3
8SB	16	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9NB	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9SB	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total			0	0	0	0	0	0	1	0	0	0	3	0	1	1	0	3	0	0	

DRAFT

Table 2 - Interstation travel time distributions (minutes)

travel time cut-off range for a 'trip'

unmatched or infeasible inter-station pair

Travel time distributions (mins)

From	To	Min	Max	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
OD1SB	OD2SB	2	9			1	167	607	5	1	1	20	1		1				1	4	3	1			1		2	1		2					
OD1SB	OD3WB	9	17										1	18	10	1	1	5	17	3	2	1		1				1						1	3
OD1SB	OD4NB	8	20									35	31	18	6	9	34	12	9	7	6	3	6	4	2	3	4	3	1	3	1		3	3	1
OD1SB	OD5SB	10	21											7	15	24	13	11	5	7	6	7	7	8	7	1	2	3	4	1	3	2		1	5
OD1SB	OD6SB	21	26																						1		1		1	1		1	1		1
OD1SB	OD7SB	12	19													2	18	10	2		2	1	1									1			
OD1SB	OD8NB	0	0																																
OD1SB	OD8SB	18	21																			3	3	1	1					1					
OD1SB	OD9SB	15	27																1	5	59	76	61	8	40	61	44	15	4	5	3		6	2	6
OD2NB	OD1NB	4	10					967	13				1	1		1		1			1	2	1								1	1			
OD2SB	OD3WB	6	14							13	34	1		4	39	10		2	1	3	2			1								1			
OD2SB	OD4NB	4	16					7	50	10	5	1	38	18	6	11	10	2	6	3	2		4	1		1	1	1	1	2	2	1	2		
OD2SB	OD5SB	8	16									6	8	4			2	2	2	4		1		1		1	1					1			
OD2SB	OD6SB	21	22																						1	1									
OD2SB	OD7SB	9	15										7	16	10			2	1		1							1							1
OD2SB	OD8NB	0	0																																
OD2SB	OD8SB	15	21																2	2	6			1	1										
OD2SB	OD9SB	13	28														25	50	19	10	10	65	54	24	5	4	3	1	4	3	2	6		1	3
OD3EB	OD1NB	13	22														6	23	6		2	1	4	1	1	1		1						1	
OD3EB	OD2NB	9	18										32	75	12	5	11	3	18	3	2	2		2		1			2					1	
OD3EB	OD4NB	10	26											36	428	216	128	90	64	31	33	41	53	42	43	21	5	12	8	3	6	4	4	5	2
OD3EB	OD5SB	13	26														2	16	32	25	18	19	12	14	4	3	7	6	6	5	2	4	1	2	
OD3EB	OD6SB	0	0																										1						
OD3EB	OD7SB	16	19																	10	9	5	3			1	1			1		1			
OD3EB	OD8NB	0	0																																
OD3EB	OD8SB	22	25																							1			2						
OD3EB	OD9SB	20	32																					4		2	3	2	1		1	2	2	1	2
OD4NB	OD5SB	3	11				57	488	270	60	42	18	14	10	12	20	13	11	9	4	9	9	6	9	7	6	4	6	5	4	6	5	5	4	1
OD4NB	OD6SB	10	22											9	9	3	1		5	2	5	3	1	2	4	1	2	2		1	2				1
OD4NB	OD7SB	20	28																					1	3		2			1	1	3	1	1	3
OD4NB	OD8SB	25	33																										1		2	1		1	
OD4SB	OD1NB	10	23											1	10	67	21	2	5	7	4	5	3	4	2	5	1	4	1	1	1	3	1	3	1
OD4SB	OD2NB	7	21								25	112	21	8	8	7	6	6	5	6	6	7	5	6	1	2	2	1	2	2	1	3		1	2
OD4SB	OD3WB	9	23		1								20	457	276	23	19	12	10	14	13	8	6	4	4	4	4	3	4	6	3	4	6	6	
OD4SB	OD7SB	13	25														15	34	7	5	1	1	2		3	1	2	2	1	1	3		1		1
OD4SB	OD8NB	0	0																																1
OD4SB	OD8SB	19	22																				2	6	1	2								1			1
OD4SB	OD9SB	15	28																1	3	42	126	67	33	15	11	10	9	6	2	2	4	5	3	3
OD5NB	OD1NB	13	25														7	17	16	7	15	5	2		7	5	2	3	5		1		1	2	
OD5NB	OD2NB	10	19											1	7	3	7	5	2		5	3	2		1	2		1	1	1		1			
OD5NB	OD3WB	12	26													1	14	27	33	36	27	13	3	6	2	4	7	2	4	2		2		1	
OD5NB	OD4SB	3	14				91	307	266	274	116	12	18	18	11	11	16	6	8	9	9	7	4	4	6	6	5	4	5	6	4	5	5	4	4
OD5NB	OD7SB	17	25																		1							2	1	1	1	1	2		
OD5NB	OD8NB	0	0																																
OD5NB	OD9SB	19	34																				2	4	6	8	8	6	3	2	4	2	1	1	1
OD5SB	OD6SB	5	15						2	278	380	20	6	8	8	7	7	2	7	7		4	3	2	3	2	3	1		4	3	1	1	3	2
OD5SB	OD7SB	10	27											1					3	37	139	59	7	6	7	3	3	4	4	6	2	3	5	5	1
OD5SB	OD8SB	16	29																	1				1	3	18	51	36	14	2	6	3	1	4	4
OD5SB	OD9SB	33	43																																
OD6NB	OD1NB	27	40																												1			1	
OD6NB	OD2NB	26	40																											1					
OD6NB	OD3WB	22	32																							1									
OD6NB	OD4SB	11	23												8	11	6	12	2	3	6	1	3	4	8	2	1	2	2	1			1	1	
OD6NB	OD5NB	7	21								39	306	197	40	26	37	20	13	11	11	6	4	2	2	1	2	1	3			2	2		3	1
OD6SB	OD7SB	9	23										1	272	219	14	11	7	3	10	7	10	6	11	6	5	7	3	3	4	4	4	1	2	2
OD6SB	OD8SB	15	28																6	94	117	42	11	6	3	6	5	4	6	11	2	1	3	4	3
OD6SB	OD9SB	22	32																							1	2	7	8	6	2	2	1	4	2
OD7NB	OD1NB	16	25																	1	2	6	3						1				1		1
OD7NB	OD2NB	12	16													2	11	16	7	1			1		1			1	1	1	1	1			
OD7NB	OD3WB	15	19																3	13	14	11	1					2	1						
OD7NB	OD4NB	13	23														1	7	27	17	11	6	4	4	4	3	3		4		2		1		3
OD7NB	OD4SB	20	26						1															2	1	1			4	1			1	1	3
OD7NB	OD5NB	16	30																	11	63	64	43	14	22	8	13	5	3	5	7	3	2	3	2
OD7NB	OD6NB	8	21									11	226	175	27	10	11	13	10	8		11	5	4	2	1	2	1	1	2		1		2	4
OD7NB	OD9SB	14	23															1	6	1	1						1								
OD7SB	OD8SB	5	16						10	413	73	11	12	5	7	8	3	5	5	1	2	2	1	1	2	3	1		1	1	3	1	1	1	
OD7SB	OD9SB	20	26																					1	3	1	2		2	1					2
OD8NB	OD1NB	27	34																												1		1		
OD8NB	OD2NB	23	30																								4	3	2				1	1	
OD8NB	OD3WB	25	26																										1	1					
OD8NB	OD4NB	23	30																								3	5	3	2		4		3	
OD8NB	OD4SB	20	34																					1									1	1	1
OD8NB	OD5NB	26	43																											18	28	31	10	8	13
OD8NB	OD6NB	17	29																		5	54	118	34	14	9	7	3	4	2	4	3	4		3
OD8NB	OD7NB	8	20									4	243	184	12	8	6	5	6	3	3	3	5	1	1	1		1	2			1	2		
OD8SB	OD1NB	0	0																																
OD8SB	OD2NB	39	40																																
OD8SB	OD3WB	41	42																																
OD8SB	OD4NB	34	45																																
OD8SB	OD5SB	35	36																																
OD8SB	OD6SB	0	0																																
OD8SB	OD9SB	14	25															1	8	4	4		3	6					2					1	
OD9NB	OD1NB	20	30																					3	49	130	166	58	24	3	2	5	4	1	1
OD9NB	OD2NB	16	31																	10	152	402	504	150	74	10	12	18	12	2	8	2	12	8	4
OD9NB	OD3WB	21	29																						2	3	1	1			1		1		
OD9NB	OD4NB	17	28																		1	17	86	118	83	61	35	21	12	10	6	1	3	3	2
OD9NB	OD4SB	28	40																													1			1
OD9NB	OD6NB	23	33																								7	9	4	2	1	1		1	1
OD9NB	OD6SB	54	66																																
OD9NB	OD7NB	22	32																							4	1	1	3		1	2			
OD9NB	OD7SB	15	18																2	8	1	3													
OD9NB	OD8NB	11	19												1	2	9	1	4	3	3	2	1			4					2	2	1	1	1
OD1SB	OD2NB	12	18	1												1		2				2				2	1	3	2	1	1	1	3	2	1
OD2SB	OD1NB	12	16	1												1	3	2	2	1							1		2	1					
OD1NB	OD9SB	0	0																			1					1								1
OD9NB	OD1SB	0	0																																

From	To	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66
OD1SB	OD2SB										1													2					1							
OD1SB	OD3WB	1					1	2		1					1												1		1							1
OD1SB	OD4NB	1			3	2	2				2		3			1	1			2		1	1		1		1	1	1				2	2		
OD1SB	OD5SB		1		1	3	3			1		1				1		1			2			1		1	2	1	1	2	1	1	1			1
OD1SB	OD6SB		1	1		2			1							1		1																1	1	
OD1SB	OD7SB		1	1													2												1							
OD1SB	OD8NB																																			
OD1SB	OD8SB										1												1												1	
OD1SB	OD9SB	2		3	3	3	1	1	4	1	3	3	2	4	1	1	2	1		1	3			1	1		1	1	1	1					1	
OD2NB	OD1NB																															1				
OD2SB	OD3WB			1							1												1									1				
OD2SB	OD4NB	1	1		1		1	1		1					1		3	2	1										1	2				1		
OD2SB	OD5SB	1	1				1														1	1														
OD2SB	OD6SB												1																							
OD2SB	OD7SB						1	1																												
OD2SB	OD8NB																																			
OD2SB	OD8SB																																			
OD2SB	OD9SB	2	2	1	2	2	1	3			1	2	1	2			2	1						1		1					1					
OD3EB	OD1NB			1		1											1				1							1								
OD3EB	OD2NB		1												1	1								1			1								1	
OD3EB	OD4NB	2	5		6	5	1	1	1	2	2	1			2	1		2		1			1	1	1	1		1				1				
OD3EB	OD5SB		1	3	3	1			2			3	1	1	1	2	1	1				1	1		3			1		1		2		2		
OD3EB	OD6SB					1															1			1		1			1			2		1		
OD3EB	OD7SB	1			1							1	1	1										1											1	
OD3EB	OD8NB																																		1	
OD3EB	OD8SB	1						1										1	1						1											
OD3EB	OD9SB	2				1																						2					2			
OD4NB	OD5SB	3	6	8	5	6	2	2	5	2	3	2	2	10	5	3	2	2	5	3	4	2	1	1	2	3	1	2	1	2	2	4	4		2	4
OD4NB	OD6SB	2	1	1	3			1	1	2	2	4	4	2		1	1	1	1	2	2			2		1	2	1					3	3	1	2
OD4NB	OD7SB	2	2		2	1	2	1			1				1	1						2	1	1	2	1	3	3		2	2				3	1
OD4NB	OD8SB	1	1			1	1		1		1	1	1			1	2			1					1		1				1		2		1	
OD4SB	OD1NB		1		2				1	1	2			2			1								1	1				1	1	1				
OD4SB	OD2NB				2		3			3	1	1	2	1							1	1		1				2			1		1			
OD4SB	OD3WB	1	3		2			1	2		1	2	2	3	1		1				1							2	3	1	1	1	1			
OD4SB	OD7SB	1	3	1	1	1		1					2		1		1			2		1						1			1				2	
OD4SB	OD8NB											1																								1
OD4SB	OD8SB	2	1			1			3						1		1				1					1			1		1			1		
OD4SB	OD9SB	2	1	2	2	5	3	1	2	1	1		2	4	1		2	1				1							1	1			1			
OD5NB	OD1NB	2	1	2			1		1			1			1		2										1					1	1		1	
OD5NB	OD2NB		1		1		1	1			1												1				1		1	1						
OD5NB	OD3WB	2	2	1	2	1	1		2	1				1	1	1	1		1	1		1	1				2	1					1	2	1	2
OD5NB	OD4SB	1	4	3	5	4	4	2	2	3	4	6	1	5	1	3	3	4	1	1	3	2	1	3	2		1	1	2	1		4		3	1	6
OD5NB	OD7SB	1	1				4	1	1		1	1	1	1				1		1	1		1	1	1	2					1	1	1	1	2	
OD5NB	OD8NB																							1												
OD5NB	OD9SB	2	1	1		1				1							1			1		1	1						2					1	1	1
OD5SB	OD6SB	1	1		1		2	1	1				1	2		1		1	1	1	4	1			1	1		2	2	1	2	1		2		1
OD5SB	OD7SB	4	5	2	1	1	3	1	1	2	1	2	2		3	1		1	1	1	1	1	2	2		2	1	1	1	1	1					
OD5SB	OD8SB	3	6		2	1	2	3	3	2			2			1	1	1				1	1				1	1	2	2		1	1		1	3
OD5SB	OD9SB		2		1	1			1		1		1				1										2									
OD6NB	OD1NB		1							1				1			1						1				1									
OD6NB	OD2NB									1																								1		
OD6NB	OD3WB	1															1		1																	
OD6NB	OD4SB	2	2	1	1	4	1		1	2					1			2		1	1		2		1	1		2			1			1		
OD6NB	OD5NB		3					1	2		2				1	1					1							1	1	1					2	
OD6SB	OD7SB	4			2	4	1	2	3	1		1	1	1		1	1			1	1		1		1									1	1	1
OD6SB	OD8SB	2	2	2	1	1		3			1	1	1		3			1		1	1	2		2	1	1			1	1					1	
OD6SB	OD9SB	1	2	2	1	1	1				1				1					1					1											
OD7NB	OD1NB					1	2					1																								
OD7NB	OD2NB	1	1																1																	
OD7NB	OD3WB	1			1							2					1			1							1		1							
OD7NB	OD4NB		2	1		1		2													2					1			1				1	1		1
OD7NB	OD4SB	2		1						2		1		1	2				2					1	1	2	3			1						1
OD7NB	OD5NB	2			1		1		2	3		1	1					2	1	3			1		1						1	3			1	
OD7NB	OD6NB	2	1	1		2			1	2		1		1				2		1				1	1									1	1	
OD7NB	OD9SB																																			
OD7SB	OD8SB	1		3			1	1	1					2			1							1	1	1					3				2	1
OD7SB	OD9SB						1									1			1	1													1			
OD8NB	OD1NB			1												2					1															
OD8NB	OD2NB											1				1																				
OD8NB	OD3WB								1		1				1																	1				1
OD8NB	OD4NB				1	2			1				1	1		1	1			1											1					
OD8NB	OD4SB			1							1			1						1		1	1	2				1	3						2	2
OD8NB	OD5NB	6	5	1	4	2	1	3	1		1	1	2		2				1		1						3	1		1						
OD8NB	OD6NB	2	1	1	2	2	1		1	1	2	1			1		1		4		1				1								1	1		
OD8NB	OD7NB	2			1								1			1	1									1		1								
OD8SB	OD1NB																																			
OD8SB	OD2NB								2																											
OD8SB	OD3WB										1																									1
OD8SB	OD4NB			1	1							1			1									1						1						
OD8SB	OD5SB				2																															
OD8SB	OD6SB																																			
OD8SB	OD9SB		1	1	1	1																														
OD9NB	OD1NB		3	2	1	1	1	4	2	2	1	3	2	1			2	1	3	1	1		2					1	1	3		1		1	2	
OD9NB	OD2NB	2	4	6	4	4	4	6	2	2		2	4	4	6	6	2		6		4		2	2	6	4	2		2						2	
OD9NB	OD3WB										1		1		1				2								1					1				
OD9NB	OD4NB	3	3		3	2		2	1			2	2	2		2	1	2	1			1		1						1		1	1	1	1	
OD9NB	OD4SB					1			1	1							2	1					1		2					2			2	1		
OD9NB	OD6NB	3			1	1	1	1	1		2	2	1	1		3	1	2	1								1		1	1						1
OD9NB	OD6SB																						1													1
OD9NB	OD7NB	4					4	1	1			1								2			1				1			1						1
OD9NB	OD7SB			1				1																												
OD9NB	OD8NB					1	1			1	1	1								1							2							1		
OD1SB	OD2NB		1			2		2			1		1	1	1	1				1		1	1		1	1			1	1				1		1
OD2SB	OD1NB				1		1		1			2		1			1		1					1	1		1	1		1						
OD1NB	OD9SB		1				1																													
OD9NB	OD1SB				1																															

Travel Time Surveys

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MATRIX

Node No Distance (Metres)	Route 1(NtoS)	7:00-10:00	Average all Runs		Run 1			Run 2		
			Speed	Section Time	Node Time	Section Time	Speed	Node Time	Section Time	Speed
START	Park St	Bay St(Site 28)			7:14:06			7:38:12		
790	Park St	Hastings River Dr(Site 26)	37	0:01:16	7:15:10	0:01:04	44	7:39:39	0:01:27	33
207	Hastings River Dr	Gordon St(Site 27)	30	0:00:24	7:15:57	0:00:47	16	7:40:10	0:00:31	24
249	Ocean Dr	Table St	20	0:00:46	7:16:16	0:00:19	47	7:40:28	0:00:18	50
284	Ocean Dr	Platt St	50	0:00:21	7:16:36	0:00:20	51	7:40:49	0:00:21	49
381	Ocean Dr	Kooloonbung Cl(Site 40)	55	0:00:25	7:17:05	0:00:29	47	7:41:12	0:00:23	60
524	Ocean Dr	Lake Rd(Site 39)	56	0:00:33	7:17:40	0:00:35	54	7:41:53	0:00:41	46
428	Ocean Dr	Koala St(Site 41)	36	0:00:42	7:18:09	0:00:29	53	7:43:31	0:01:38	16
601	Ocean Dr	Lochinval Pl	61	0:00:35	7:18:50	0:00:41	53	7:44:17	0:00:46	47
2,201	Ocean Dr	Dahlsford Dr(Site 56)	63	0:02:05	7:20:47	0:01:57	68	7:46:32	0:02:15	59
495	Ocean Dr	Pacific Dr(Site 45)	48	0:00:37	7:21:26	0:00:39	46	7:47:08	0:00:36	50
1,048	Ocean Dr	Matthew Flinders Dr(Site 55)	56	0:01:07	7:22:26	0:01:00	63	7:48:15	0:01:07	56
7,208			**49**	**0:08:53**		0:08:20	52		0:10:03	43

Node No Distance (Metres)	Route 1(StoN)	7:00-10:00	Average all Runs		Run 1			Run 2		
			Speed	Section Time	Node Time	Section Time	Speed	Node Time	Section Time	Speed
START	Ocean Dr	Emerald Dr(Site 55)			7:02:39			7:22:28		
982	Ocean Dr	Jonas Abaslom Dr(Site 45)	41	0:01:26	7:04:30	0:01:51	32	7:26:38	0:04:10	14
474	Ocean Dr	Crestwwod Dr(Site 56)	41	0:00:42	7:05:16	0:00:46	37	7:27:59	0:01:21	21
2,156	Ocean Dr	Lochinval Pl	61	0:02:07	7:07:21	0:02:05	62	7:30:55	0:02:56	44
610	Ocean Dr	Koala St(Site 41)	44	0:00:50	7:08:34	0:01:13	30	7:31:56	0:01:01	36
426	Ocean Dr	Lake Rd(Site 39)	26	0:00:59	7:10:05	0:01:31	17	7:33:05	0:01:09	22
517	Ocean Dr	Hindman St(Site 40)	28	0:01:06	7:10:40	0:00:35	53	7:33:40	0:00:35	53
394	Ocean Dr	Platt St	52	0:00:27	7:11:07	0:00:27	53	7:34:08	0:00:28	51
285	Ocean Dr	Table St	52	0:00:20	7:11:27	0:00:20	51	7:34:28	0:00:20	51
254	Hastings River Dr	Gordon St(Site 27)	34	0:00:27	7:12:33	0:01:06	14	7:34:55	0:00:27	34
206	Park St	Hastings River Dr(Site 26)	15	0:00:48	7:12:56	0:00:23	32	7:36:27	0:01:32	8
830	Park St	Bay St(Site 28)	42	0:01:12	7:14:00	0:01:04	47	7:38:05	0:01:38	30
7,134			**41**	**0:10:24**		0:11:21	38		0:15:37	27

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MATRIX

Node No Distance (Metres)	Route 1(NtoS)	7:00-10:00	Run 3			Run 4			Run 5		
			Node Time	Section Time	Speed	Node Time	Section Time	Speed	Node Time	Section Time	Speed
START	Park St	Bay St(Site 28)	8:01:31			8:20:09			8:39:05		
790	Park St	Hastings River Dr(Site 26)	8:02:39	0:01:08	42	8:21:47	0:01:38	29	8:39:58	0:00:53	54
207	Hastings River Dr	Gordon St(Site 27)	8:03:08	0:00:29	26	8:22:06	0:00:19	39	8:40:16	0:00:18	41
249	Ocean Dr	Table St	8:04:22	0:01:14	12	8:22:43	0:00:37	24	8:41:18	0:01:02	14
284	Ocean Dr	Platt St	8:04:41	0:00:19	54	8:23:02	0:00:19	54	8:41:36	0:00:18	57
381	Ocean Dr	Kooloonbung Cl(Site 40)	8:05:07	0:00:26	53	8:23:26	0:00:24	57	8:42:01	0:00:25	55
524	Ocean Dr	Lake Rd(Site 39)	8:05:41	0:00:34	55	8:23:59	0:00:33	57	8:42:28	0:00:27	70
428	Ocean Dr	Koala St(Site 41)	8:06:08	0:00:27	57	8:25:40	0:01:41	15	8:42:52	0:00:24	64
601	Ocean Dr	Lochinval Pl	8:06:41	0:00:33	66	8:26:17	0:00:37	58	8:43:27	0:00:35	62
2,201	Ocean Dr	Dahlsford Dr(Site 56)	8:08:30	0:01:49	73	8:28:26	0:02:09	61	8:45:38	0:02:11	60
495	Ocean Dr	Pacific Dr(Site 45)	8:09:04	0:00:34	52	8:28:53	0:00:27	66	8:46:17	0:00:39	46
1,048	Ocean Dr	Matthew Flinders Dr(Site 55)	8:10:18	0:01:14	51	8:29:50	0:00:57	66	8:47:13	0:00:56	67
7,208				0:08:47	49		0:09:41	45		0:08:08	53

Node No Distance (Metres)	Route 1(StoN)	7:00-10:00	Run 3			Run 4			Run 5		
			Node Time	Section Time	Speed	Node Time	Section Time	Speed	Node Time	Section Time	Speed
START	Ocean Dr	Emerald Dr(Site 55)	7:48:18			8:10:21			8:29:54		
982	Ocean Dr	Jonas Abaslom Dr(Site 45)	7:49:26	0:01:08	52	8:11:19	0:00:58	61	8:30:50	0:00:56	63
474	Ocean Dr	Crestwwod Dr(Site 56)	7:50:15	0:00:49	35	8:11:53	0:00:34	50	8:31:29	0:00:39	44
2,156	Ocean Dr	Lochinval Pl	7:52:37	0:02:22	55	8:13:50	0:01:57	66	8:33:32	0:02:03	63
610	Ocean Dr	Koala St(Site 41)	7:53:45	0:01:08	32	8:15:05	0:01:15	29	8:34:12	0:00:40	55
426	Ocean Dr	Lake Rd(Site 39)	7:56:40	0:02:55	9	8:15:51	0:00:46	33	8:34:44	0:00:32	48
517	Ocean Dr	Hindman St(Site 40)	7:57:23	0:00:43	43	8:16:30	0:00:39	48	8:36:08	0:01:24	22
394	Ocean Dr	Platt St	7:57:50	0:00:27	53	8:17:01	0:00:31	46	8:36:35	0:00:27	53
285	Ocean Dr	Table St	7:58:09	0:00:19	54	8:17:21	0:00:20	51	8:36:55	0:00:20	51
254	Hastings River Dr	Gordon St(Site 27)	7:58:36	0:00:27	34	8:17:46	0:00:25	37	8:37:17	0:00:22	42
206	Park St	Hastings River Dr(Site 26)	7:59:59	0:01:23	9	8:18:59	0:01:13	10	8:37:42	0:00:25	30
830	Park St	Bay St(Site 28)	8:01:24	0:01:25	35	8:20:03	0:01:04	47	8:38:57	0:01:15	40
7,134				0:13:06	33		0:09:42	44		0:09:03	47

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MATRIX

Node No Distance (Metres)	Route 1(NtoS)	7:00-10:00	Run 6			Run 7			Run 8			Run 9		
			Node Time	Section Time	Speed	Node Time	Section Time	Speed	Node Time	Section Time	Speed	Node Time	Section Time	Speed
START	Park St	Bay St(Site 28)	8:57:03			9:14:32			9:31:55			9:49:08		
790	Park St	Hastings River Dr(Site 26)	8:58:35	0:01:32	31	9:15:50	0:01:18	36	9:33:09	0:01:14	38	9:50:20	0:01:12	40
207	Hastings River Dr	Gordon St(Site 27)	8:58:57	0:00:22	34	9:16:10	0:00:20	37	9:33:25	0:00:16	47	9:50:38	0:00:18	41
249	Ocean Dr	Table St	8:59:50	0:00:53	17	9:17:02	0:00:52	17	9:34:12	0:00:47	19	9:51:26	0:00:48	19
284	Ocean Dr	Platt St	9:00:10	0:00:20	51	9:17:25	0:00:23	44	9:34:35	0:00:23	44	9:51:48	0:00:22	46
381	Ocean Dr	Kooloonbung Cl(Site 40)	9:00:34	0:00:24	57	9:17:48	0:00:23	60	9:34:59	0:00:24	57	9:52:15	0:00:27	51
524	Ocean Dr	Lake Rd(Site 39)	9:01:04	0:00:30	63	9:18:20	0:00:32	59	9:35:33	0:00:34	55	9:52:50	0:00:35	54
428	Ocean Dr	Koala St(Site 41)	9:01:28	0:00:24	64	9:18:45	0:00:25	62	9:35:59	0:00:26	59	9:53:17	0:00:27	57
601	Ocean Dr	Lochinval Pl	9:02:03	0:00:35	62	9:19:15	0:00:30	72	9:36:29	0:00:30	72	9:53:49	0:00:32	68
2,201	Ocean Dr	Dahlsford Dr(Site 56)	9:04:07	0:02:04	64	9:21:25	0:02:10	61	9:38:32	0:02:03	64	9:55:58	0:02:09	61
495	Ocean Dr	Pacific Dr(Site 45)	9:04:47	0:00:40	45	9:22:04	0:00:39	46	9:39:12	0:00:40	45	9:56:41	0:00:43	41
1,048	Ocean Dr	Matthew Flinders Dr(Site 55)	9:05:59	0:01:12	52	9:23:16	0:01:12	52	9:40:27	0:01:15	50	9:57:55	0:01:14	51
7,208				0:08:56	48		0:08:44	50		0:08:32	51		0:08:47	49

Node No Distance (Metres)	Route 1(StoN)	7:00-10:00	Run 6			Run 7			Run 8			Run 9		
			Node Time	Section Time	Speed	Node Time	Section Time	Speed	Node Time	Section Time	Speed	Node Time	Section Time	Speed
START	Ocean Dr	Emerald Dr(Site 55)	8:47:19			9:06:04			9:23:22			9:40:35		
982	Ocean Dr	Jonas Abaslom Dr(Site 45)	8:48:26	0:01:07	53	9:06:58	0:00:54	65	9:24:17	0:00:55	64	9:41:32	0:00:57	62
474	Ocean Dr	Crestwwod Dr(Site 56)	8:49:04	0:00:38	45	9:07:30	0:00:32	53	9:24:46	0:00:29	59	9:41:59	0:00:27	63
2,156	Ocean Dr	Lochinval Pl	8:51:13	0:02:09	60	9:09:18	0:01:48	72	9:26:38	0:01:52	69	9:43:53	0:01:54	68
610	Ocean Dr	Koala St(Site 41)	8:51:52	0:00:39	56	9:09:50	0:00:32	69	9:27:10	0:00:32	69	9:44:23	0:00:30	73
426	Ocean Dr	Lake Rd(Site 39)	8:52:27	0:00:35	44	9:10:21	0:00:31	49	9:27:38	0:00:28	55	9:44:50	0:00:27	57
517	Ocean Dr	Hindman St(Site 40)	8:53:22	0:00:55	34	9:11:59	0:01:38	19	9:29:18	0:01:40	19	9:46:31	0:01:41	18
394	Ocean Dr	Platt St	8:53:50	0:00:28	51	9:12:26	0:00:27	53	9:29:43	0:00:25	57	9:46:58	0:00:27	53
285	Ocean Dr	Table St	8:54:09	0:00:19	54	9:12:45	0:00:19	54	9:30:04	0:00:21	49	9:47:17	0:00:19	54
254	Hastings River Dr	Gordon St(Site 27)	8:54:31	0:00:22	42	9:13:01	0:00:16	57	9:30:20	0:00:16	57	9:47:36	0:00:19	48
206	Park St	Hastings River Dr(Site 26)	8:55:50	0:01:19	9	9:13:15	0:00:14	53	9:30:45	0:00:25	30	9:47:58	0:00:22	34
830	Park St	Bay St(Site 28)	8:56:54	0:01:04	47	9:14:24	0:01:09	43	9:31:50	0:01:05	46	9:49:02	0:01:04	47
7,134				0:09:35	45		0:08:20	51		0:08:28	51		0:08:27	51

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MATRIX Traffic and Transport Data

Node No Distance (Metres)	Route 1(NtoS)	15:00-18:00	Average all Runs		Run 1			Run 2		
			Speed	Section Time	Node Time	Section Time	Speed	Node Time	Section Time	Speed
START	Park St	Bay St(Site 28)			14:57:17			15:16:04		
790	Park St	Hastings River Dr(Site 26)	41	0:01:10	14:58:40	0:01:23	34	15:17:00	0:00:56	51
207	Hastings River Dr	Gordon St(Site 27)	31	0:00:24	14:59:05	0:00:25	30	15:17:25	0:00:25	30
249	Ocean Dr	Table St	16	0:00:57	15:00:25	0:01:20	11	15:18:27	0:01:02	14
284	Ocean Dr	Platt St	51	0:00:20	15:00:45	0:00:20	51	15:18:48	0:00:21	49
381	Ocean Dr	Kooloonbung Cl(Site 40)	50	0:00:27	15:01:15	0:00:30	46	15:19:16	0:00:28	49
524	Ocean Dr	Lake Rd(Site 39)	49	0:00:38	15:01:51	0:00:36	52	15:19:56	0:00:40	47
428	Ocean Dr	Koala St(Site 41)	31	0:00:49	15:03:23	0:01:32	17	15:21:30	0:01:34	16
601	Ocean Dr	Lochinval Pl	57	0:00:38	15:04:03	0:00:40	54	15:22:05	0:00:35	62
2,201	Ocean Dr	Dahlsford Dr(Site 56)	67	0:01:59	15:05:52	0:01:49	73	15:24:09	0:02:04	64
495	Ocean Dr	Pacific Dr(Site 45)	51	0:00:35	15:06:27	0:00:35	51	15:24:55	0:00:46	39
1,048	Ocean Dr	Matthew Flinders Dr(Site 55)	59	0:01:04	15:07:29	0:01:02	61	15:25:58	0:01:03	60
7,208			**48**	**0:09:01**		0:10:12	42		0:09:54	44

Node No Distance (Metres)	Route 1(StoN)	15:00-18:00	Average all Runs		Run 1			Run 2		
			Speed	Section Time	Node Time	Section Time	Speed	Node Time	Section Time	Speed
START	Ocean Dr	Emerald Dr(Site 55)			15:07:33			15:26:03		
982	Ocean Dr	Jonas Abaslom Dr(Site 45)	59	0:01:00	15:08:38	0:01:05	54	15:26:58	0:00:55	64
474	Ocean Dr	Crestwwod Dr(Site 56)	49	0:00:35	15:09:08	0:00:30	57	15:27:36	0:00:38	45
2,156	Ocean Dr	Lochinval Pl	67	0:01:56	15:11:00	0:01:52	69	15:29:27	0:01:51	70
610	Ocean Dr	Koala St(Site 41)	48	0:00:45	15:11:35	0:00:35	63	15:30:02	0:00:35	63
426	Ocean Dr	Lake Rd(Site 39)	43	0:00:36	15:12:01	0:00:26	59	15:30:48	0:00:46	33
517	Ocean Dr	Hindman St(Site 40)	43	0:00:43	15:12:32	0:00:31	60	15:31:41	0:00:53	35
394	Ocean Dr	Platt St	51	0:00:28	15:13:03	0:00:31	46	15:32:09	0:00:28	51
285	Ocean Dr	Table St	50	0:00:20	15:13:23	0:00:20	51	15:32:29	0:00:20	51
254	Hastings River Dr	Gordon St(Site 27)	43	0:00:21	15:13:43	0:00:20	46	15:32:48	0:00:19	48
206	Park St	Hastings River Dr(Site 26)	16	0:00:46	15:14:03	0:00:20	37	15:33:06	0:00:18	41
830	Park St	Bay St(Site 28)	40	0:01:15	15:15:51	0:01:48	28	15:34:39	0:01:33	32
7,134			**49**	**0:08:45**		0:08:18	52		0:08:36	50

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MATRIX Traffic and Transport Data

Node No Distance (Metres)	Route 1(NtoS)	15:00-18:00	Run 3 Node Time	Run 3 Section Time	Run 3 Speed	Run 4 Node Time	Run 4 Section Time	Run 4 Speed	Run 5 Node Time	Run 5 Section Time	Run 5 Speed
START	Park St	Bay St(Site 28)	15:34:47			15:52:26			16:08:49		
790	Park St	Hastings River Dr(Site 26)	15:35:41	0:00:54	53	15:53:32	0:01:06	43	16:10:07	0:01:18	36
207	Hastings River Dr	Gordon St(Site 27)	15:36:10	0:00:29	26	15:54:00	0:00:28	27	16:10:33	0:00:26	29
249	Ocean Dr	Table St	15:36:32	0:00:22	41	15:54:21	0:00:21	43	16:11:31	0:00:58	15
284	Ocean Dr	Platt St	15:36:54	0:00:22	46	15:54:43	0:00:22	46	16:11:51	0:00:20	51
381	Ocean Dr	Kooloonbung Cl(Site 40)	15:37:21	0:00:27	51	15:55:08	0:00:25	55	16:12:17	0:00:26	53
524	Ocean Dr	Lake Rd(Site 39)	15:38:14	0:00:53	36	15:55:53	0:00:45	42	16:12:48	0:00:31	61
428	Ocean Dr	Koala St(Site 41)	15:38:53	0:00:39	40	15:56:26	0:00:33	47	16:13:21	0:00:33	47
601	Ocean Dr	Lochinval Pl	15:39:28	0:00:35	62	15:57:16	0:00:50	43	16:13:57	0:00:36	60
2,201	Ocean Dr	Dahlsford Dr(Site 56)	15:41:46	0:02:18	57	15:59:07	0:01:51	71	16:16:19	0:02:22	56
495	Ocean Dr	Pacific Dr(Site 45)	15:42:25	0:00:39	46	15:59:36	0:00:29	61	16:17:01	0:00:42	42
1,048	Ocean Dr	Matthew Flinders Dr(Site 55)	15:43:27	0:01:02	61	16:00:34	0:00:58	65	16:18:05	0:01:04	59
7,208				0:08:40	50		0:08:08	53		0:09:16	47

Node No Distance (Metres)	Route 1(StoN)	15:00-18:00	Run 3 Node Time	Run 3 Section Time	Run 3 Speed	Run 4 Node Time	Run 4 Section Time	Run 4 Speed	Run 5 Node Time	Run 5 Section Time	Run 5 Speed
START	Ocean Dr	Emerald Dr(Site 55)	15:43:33			16:00:39			16:18:10		
982	Ocean Dr	Jonas Abaslom Dr(Site 45)	15:44:36	0:01:03	56	16:01:39	0:01:00	59	16:19:11	0:01:01	58
474	Ocean Dr	Crestwwod Dr(Site 56)	15:45:16	0:00:40	43	16:02:09	0:00:30	57	16:19:44	0:00:33	52
2,156	Ocean Dr	Lochinval Pl	15:47:19	0:02:03	63	16:03:59	0:01:50	71	16:21:34	0:01:50	71
610	Ocean Dr	Koala St(Site 41)	15:48:16	0:00:57	39	16:04:30	0:00:31	71	16:22:06	0:00:32	69
426	Ocean Dr	Lake Rd(Site 39)	15:48:42	0:00:26	59	16:05:19	0:00:49	31	16:22:37	0:00:31	49
517	Ocean Dr	Hindman St(Site 40)	15:49:15	0:00:33	56	16:05:51	0:00:32	58	16:24:17	0:01:40	19
394	Ocean Dr	Platt St	15:49:43	0:00:28	51	16:06:17	0:00:26	55	16:24:43	0:00:26	55
285	Ocean Dr	Table St	15:50:02	0:00:19	54	16:06:37	0:00:20	51	16:25:03	0:00:20	51
254	Hastings River Dr	Gordon St(Site 27)	15:50:24	0:00:22	42	16:06:55	0:00:18	51	16:25:23	0:00:20	46
206	Park St	Hastings River Dr(Site 26)	15:50:57	0:00:33	22	16:07:12	0:00:17	44	16:26:17	0:00:54	14
830	Park St	Bay St(Site 28)	15:52:18	0:01:21	37	16:08:42	0:01:30	33	16:27:19	0:01:02	48
7,134				0:08:45	49		0:08:03	53		0:09:09	47

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MATRIX Traffic and Transport Data

Node No Distance (Metres)	Route 1(NtoS)	15:00-18:00	Run 6 Node Time	Run 6 Section Time	Run 6 Speed	Run 7 Node Time	Run 7 Section Time	Run 7 Speed	Run 8 Node Time	Run 8 Section Time	Run 8 Speed
START	Park St	Bay St(Site 28)	16:27:26			16:44:47			17:02:50		
790	Park St	Hastings River Dr(Site 26)	16:28:43	0:01:17	37	16:45:55	0:01:08	42	17:04:05	0:01:15	38
207	Hastings River Dr	Gordon St(Site 27)	16:29:07	0:00:24	31	16:46:14	0:00:19	39	17:04:29	0:00:24	31
249	Ocean Dr	Table St	16:29:48	0:00:41	22	16:47:30	0:01:16	12	17:05:33	0:01:04	14
284	Ocean Dr	Platt St	16:30:08	0:00:20	51	16:47:50	0:00:20	51	17:05:53	0:00:20	51
381	Ocean Dr	Kooloonbung Cl(Site 40)	16:30:34	0:00:26	53	16:48:16	0:00:26	53	17:06:21	0:00:28	49
524	Ocean Dr	Lake Rd(Site 39)	16:31:09	0:00:35	54	16:48:52	0:00:36	52	17:06:55	0:00:34	55
428	Ocean Dr	Koala St(Site 41)	16:31:39	0:00:30	51	16:49:39	0:00:47	33	17:07:38	0:00:43	36
601	Ocean Dr	Lochinval Pl	16:32:14	0:00:35	62	16:50:13	0:00:34	64	17:08:16	0:00:38	57
2,201	Ocean Dr	Dahlsford Dr(Site 56)	16:34:08	0:01:54	70	16:52:02	0:01:49	73	17:10:15	0:01:59	67
495	Ocean Dr	Pacific Dr(Site 45)	16:34:42	0:00:34	52	16:52:32	0:00:30	59	17:10:48	0:00:33	54
1,048	Ocean Dr	Matthew Flinders Dr(Site 55)	16:35:44	0:01:02	61	16:53:37	0:01:05	58	17:11:55	0:01:07	56
7,208				0:08:18	52		0:08:50	49		0:09:05	48

Node No Distance (Metres)	Route 1(StoN)	15:00-18:00	Run 6 Node Time	Run 6 Section Time	Run 6 Speed	Run 7 Node Time	Run 7 Section Time	Run 7 Speed	Run 8 Node Time	Run 8 Section Time	Run 8 Speed
START	Ocean Dr	Emerald Dr(Site 55)	16:35:49			16:53:42			17:12:01		
982	Ocean Dr	Jonas Abaslom Dr(Site 45)	16:36:44	0:00:55	64	16:54:41	0:00:59	60	17:13:05	0:01:04	55
474	Ocean Dr	Crestwwod Dr(Site 56)	16:37:12	0:00:28	61	16:55:21	0:00:40	43	17:13:40	0:00:35	49
2,156	Ocean Dr	Lochinval Pl	16:39:19	0:02:07	61	16:57:19	0:01:58	66	17:15:36	0:01:56	67
610	Ocean Dr	Koala St(Site 41)	16:40:03	0:00:44	50	16:58:14	0:00:55	40	17:16:33	0:00:57	39
426	Ocean Dr	Lake Rd(Site 39)	16:40:34	0:00:31	49	16:58:52	0:00:38	40	17:17:09	0:00:36	43
517	Ocean Dr	Hindman St(Site 40)	16:41:05	0:00:31	60	16:59:28	0:00:36	52	17:17:53	0:00:44	42
394	Ocean Dr	Platt St	16:41:35	0:00:30	47	16:59:58	0:00:30	47	17:18:17	0:00:24	59
285	Ocean Dr	Table St	16:41:55	0:00:20	51	17:00:19	0:00:21	49	17:18:38	0:00:21	49
254	Hastings River Dr	Gordon St(Site 27)	16:42:15	0:00:20	46	17:00:43	0:00:24	38	17:19:01	0:00:23	40
206	Park St	Hastings River Dr(Site 26)	16:43:34	0:01:19	9	17:01:43	0:01:00	12	17:20:00	0:00:59	13
830	Park St	Bay St(Site 28)	16:44:41	0:01:07	45	17:02:44	0:01:01	49	17:21:00	0:01:00	50
7,134				0:08:52	48		0:09:02	47		0:08:59	48

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MATRIX Traffic and Transport Data

Node No Distance (Metres)	Route 1(NtoS)	15:00-18:00	Run 9 Node Time	Run 9 Section Time	Run 9 Speed	Run 10 Node Time	Run 10 Section Time	Run 10 Speed
START	Park St	Bay St(Site 28)	17:21:09			17:39:15		
790	Park St	Hastings River Dr(Site 26)	17:22:18	0:01:09	41	17:40:24	0:01:09	41
207	Hastings River Dr	Gordon St(Site 27)	17:22:36	0:00:18	41	17:40:45	0:00:21	35
249	Ocean Dr	Table St	17:23:51	0:01:15	12	17:41:58	0:01:13	12
284	Ocean Dr	Platt St	17:24:10	0:00:19	54	17:42:16	0:00:18	57
381	Ocean Dr	Kooloonbung Cl(Site 40)	17:24:38	0:00:28	49	17:42:46	0:00:30	46
524	Ocean Dr	Lake Rd(Site 39)	17:25:16	0:00:38	50	17:43:20	0:00:34	55
428	Ocean Dr	Koala St(Site 41)	17:26:01	0:00:45	34	17:43:58	0:00:38	41
601	Ocean Dr	Lochinval Pl	17:26:37	0:00:36	60	17:44:41	0:00:43	50
2,201	Ocean Dr	Dahlsford Dr(Site 56)	17:28:24	0:01:47	74	17:46:35	0:01:54	70
495	Ocean Dr	Pacific Dr(Site 45)	17:28:54	0:00:30	59	17:47:09	0:00:34	52
1,048	Ocean Dr	Matthew Flinders Dr(Site 55)	17:30:00	0:01:06	57	17:48:15	0:01:06	57
7,208				0:08:51	49		0:09:00	48

Node No Distance (Metres)	Route 1(StoN)	15:00-18:00	Run 9 Node Time	Run 9 Section Time	Run 9 Speed	Run 10 Node Time	Run 10 Section Time	Run 10 Speed
START	Ocean Dr	Emerald Dr(Site 55)	17:30:07			17:48:20		
982	Ocean Dr	Jonas Abaslom Dr(Site 45)	17:31:06	0:00:59	60	17:49:17	0:00:57	62
474	Ocean Dr	Crestwwod Dr(Site 56)	17:31:46	0:00:40	43	17:49:52	0:00:35	49
2,156	Ocean Dr	Lochinval Pl	17:33:44	0:01:58	66	17:51:45	0:01:53	69
610	Ocean Dr	Koala St(Site 41)	17:34:39	0:00:55	40	17:52:37	0:00:52	42
426	Ocean Dr	Lake Rd(Site 39)	17:35:17	0:00:38	40	17:53:16	0:00:39	39
517	Ocean Dr	Hindman St(Site 40)	17:35:53	0:00:36	52	17:53:53	0:00:37	50
394	Ocean Dr	Platt St	17:36:23	0:00:30	47	17:54:18	0:00:25	57
285	Ocean Dr	Table St	17:36:44	0:00:21	49	17:54:40	0:00:22	47
254	Hastings River Dr	Gordon St(Site 27)	17:37:08	0:00:24	38	17:55:04	0:00:24	38
206	Park St	Hastings River Dr(Site 26)	17:38:08	0:01:00	12	17:56:02	0:00:58	13
830	Park St	Bay St(Site 28)	17:39:12	0:01:04	47	17:57:02	0:01:00	50
7,134				0:09:05	47		0:08:42	49

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MATRIX Traffic and Transport Data

Route 2(NtoS) 7:00-10:00

Node No			Average all Runs		Run 1			Run 2		
Distance (Metres)			Speed	Section Time	Node Time	Section Time	Speed	Node Time	Section Time	Speed
START	Oxley Hwy	Sherwood Rd(Site 30)			7:16:05			7:50:19		
1,239	Oxley Hwy	Clifton Dr(Site 31)	58	0:01:17	7:17:23	0:01:18	57	7:51:31	0:01:12	62
479	Oxley Hwy	Widderson St(Site 32)	41	0:00:42	7:17:58	0:00:35	49	7:52:10	0:00:39	44
788	Oxley Hwy	Westerweler Way(Site 57)	41	0:01:10	7:18:55	0:00:57	50	7:53:04	0:00:54	53
239	Gordon St	Hastings River Dr(Site 27)	12	0:01:13	7:20:17	0:01:22	10	7:54:25	0:01:21	11
466	Gordon St	Holingworth St(Site 48)	41	0:00:41	7:20:56	0:00:39	43	7:55:01	0:00:36	47
331	Gordon St	Horton(Site 33)	36	0:00:33	7:21:34	0:00:38	31	7:55:36	0:00:35	34
237	Lake Rd	Lake Rd(Site 34)	30	0:00:28	7:22:06	0:00:32	27	7:56:04	0:00:28	30
497	Lake Rd	Morrish St	45	0:00:40	7:22:48	0:00:42	43	7:56:44	0:00:40	45
280	Lake Rd	Hill St(Site 49)	43	0:00:23	7:23:15	0:00:27	37	7:57:06	0:00:22	46
464	Lake Rd	Savoy St	41	0:00:41	7:23:58	0:00:43	39	7:57:46	0:00:40	42
902	Lake Rd	Ocean Dr(Site 39)	47	0:01:09	7:25:15	0:01:17	42	7:58:51	0:01:05	50
661	Lake Rd	Central Rd(Site 38)	24	0:01:39	7:27:12	0:01:57	20	8:00:23	0:01:32	26
804	Lake Rd	Jindalee Rd(Site 37)	27	0:01:49	7:29:10	0:01:58	25	8:01:54	0:01:31	32
639	Oxley Hwy	Lake Rd(Site 30)	35	0:01:05	7:30:15	0:01:05	35	8:03:42	0:01:48	21
616	Oxley Hwy	Wrights Rd(Site 29)	57	0:00:39	7:30:55	0:00:40	55	8:04:17	0:00:35	63
1,829	Oxley Hwy	Oxley Hwy on ramp(Site 58)	76	0:01:27	7:32:23	0:01:28	75	8:05:42	0:01:25	77
3,635	Oxley Hwy	Pacific Hwy(Site 5)	74	0:02:56	7:35:22	0:02:59	73	8:08:35	0:02:53	76
14,106			**46**	**0:18:32**		0:19:17	44		0:18:16	46

Route 2(StoN) 7:00-10:00

Node No			Average all Runs		Run 1			Run 2		
Distance (Metres)			Speed	Section Time	Node Time	Section Time	Speed	Node Time	Section Time	Speed
START	Oxley Hwy	Pacific Hwy(Site 5)			7:00:12			7:34:24		
3,597	Oxley Hwy	Oxley Hwy on ramp(Site 58)	80	0:02:43	7:03:05	0:02:53	75	7:37:14	0:02:50	76
1,799	Oxley Hwy	Wrights Rd(Site 29)	70	0:01:32	7:04:25	0:01:20	81	7:38:33	0:01:19	82
604	Oxley Hwy	Sherwood Rd(site 30)	24	0:01:31	7:05:05	0:00:40	54	7:39:12	0:00:39	56
699	Lake Rd	Jindalee Rd(Site 37)	40	0:01:02	7:06:05	0:01:00	42	7:40:14	0:01:02	41
804	Lake Rd	Central Rd(Site 38)	43	0:01:08	7:07:14	0:01:09	42	7:41:17	0:01:03	46
661	Lake Rd	Ocean Dr(Site 39)	43	0:00:55	7:08:10	0:00:56	42	7:42:08	0:00:51	47
894	Lake Rd	Savoy St	36	0:01:28	7:09:42	0:01:32	35	7:43:21	0:01:13	44
464	Lake Rd	Hill St(Site 49)	41	0:00:41	7:10:20	0:00:38	44	7:44:06	0:00:45	37
280	Lake Rd	Morrish St	46	0:00:22	7:10:41	0:00:21	48	7:44:27	0:00:21	48
461	Lake Rd	Lake Rd(Site 34)	46	0:00:36	7:11:12	0:00:31	54	7:45:02	0:00:35	47
273	Gordon St	Horton(Site 33)	41	0:00:24	7:11:35	0:00:23	43	7:45:27	0:00:25	39
330	Gordon St	Hastings River Dr(Site 48)	41	0:00:29	7:12:08	0:00:33	36	7:45:54	0:00:27	44
471	Gordon St	Hindmaa St(Site 27)	33	0:00:52	7:12:52	0:00:44	39	7:46:38	0:00:44	39
250	Oxley Hwy	Morton St(Site 57)	18	0:00:50	7:13:15	0:00:23	39	7:47:02	0:00:24	38
800	Oxley Hwy	Widderson St(Site 32)	37	0:01:17	7:14:21	0:01:06	44	7:48:10	0:01:08	42
471	Oxley Hwy	Fernhill Rd(Site 31)	45	0:00:38	7:14:53	0:00:32	53	7:48:45	0:00:35	48
1,214	Oxley Hwy	Laker Rd(Site 30)	54	0:01:20	7:16:15	0:01:22	53	7:49:57	0:01:12	61
14,072			**48**	**0:17:46**		0:16:03	53		0:15:33	54

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MATRIX Traffic and Transport Data

Route 2(NtoS) 7:00-10:00

Node No	Distance (Metres)			Run 3			Run 4			Run 5		
				Node Time	Section Time	Speed	Node Time	Section Time	Speed	Node Time	Section Time	Speed
START		Oxley Hwy	Sherwood Rd(Site 30)	8:35:45			9:16:12			9:50:03		
1,239		Oxley Hwy	Clifton Dr(Site 31)	8:37:05	0:01:20	56	9:17:33	0:01:21	55	9:51:15	0:01:12	62
479		Oxley Hwy	Widderson St(Site 32)	8:37:59	0:00:54	32	9:18:08	0:00:35	49	9:52:03	0:00:48	36
788		Oxley Hwy	Westerweler Way(Site 57)	8:39:39	0:01:40	28	9:19:13	0:01:05	44	9:53:17	0:01:14	38
239		Gordon St	Hastings River Dr(Site 27)	8:41:03	0:01:24	10	9:19:45	0:00:32	27	9:54:42	0:01:25	10
466		Gordon St	Holingworth St(Site 48)	8:41:54	0:00:51	33	9:20:22	0:00:37	45	9:55:23	0:00:41	41
331		Gordon St	Horton(Site 33)	8:42:26	0:00:32	37	9:20:52	0:00:30	40	9:55:54	0:00:31	38
237		Lake Rd	Lake Rd(Site 34)	8:42:50	0:00:24	36	9:21:18	0:00:26	33	9:56:24	0:00:30	28
497		Lake Rd	Morrish St	8:43:32	0:00:42	43	9:21:57	0:00:39	46	9:57:02	0:00:38	47
280		Lake Rd	Hill St(Site 49)	8:43:56	0:00:24	42	9:22:20	0:00:23	44	9:57:22	0:00:20	50
464		Lake Rd	Savoy St	8:44:39	0:00:43	39	9:22:57	0:00:37	45	9:58:03	0:00:41	41
902		Lake Rd	Ocean Dr(Site 39)	8:45:46	0:01:07	48	9:24:01	0:01:04	51	9:59:15	0:01:12	45
661		Lake Rd	Central Rd(Site 38)	8:47:02	0:01:16	31	9:25:34	0:01:33	26	10:01:13	0:01:58	20
804		Lake Rd	Jindalee Rd(Site 37)	8:49:19	0:02:17	21	9:27:24	0:01:50	26	10:02:43	0:01:30	32
639		Oxley Hwy	Lake Rd(Site 30)	8:50:08	0:00:49	47	9:28:19	0:00:55	42	10:03:33	0:00:50	46
616		Oxley Hwy	Wrights Rd(Site 29)	8:50:46	0:00:38	58	9:29:02	0:00:43	52	10:04:10	0:00:37	60
1,829		Oxley Hwy	Oxley Hwy on ramp(Site 58)	8:52:16	0:01:30	73	9:30:27	0:01:25	77	10:05:36	0:01:26	77
3,635		Oxley Hwy	Pacific Hwy(Site 5)	8:55:09	0:02:53	76	9:33:24	0:02:57	74	10:08:35	0:02:59	73
14,106					0:19:24	44		0:17:12	49		0:18:32	46

Route 2(StoN) 7:00-10:00

Node No	Distance (Metres)			Run 3			Run 4			Run 5		
				Node Time	Section Time	Speed	Node Time	Section Time	Speed	Node Time	Section Time	Speed
START		Oxley Hwy	Pacific Hwy(Site 5)	8:14:43			8:55:09			9:33:24		
3,597		Oxley Hwy	Oxley Hwy on ramp(Site 58)	8:17:28	0:02:45	78	8:57:39	0:02:30	86	9:36:00	0:02:36	83
1,799		Oxley Hwy	Wrights Rd(Site 29)	8:19:03	0:01:35	68	8:59:51	0:02:12	49	9:37:15	0:01:15	86
604		Oxley Hwy	Sherwood Rd(site 30)	8:22:11	0:03:08	12	9:02:15	0:02:24	15	9:37:57	0:00:42	52
699		Lake Rd	Jindalee Rd(Site 37)	8:23:15	0:01:04	39	9:03:21	0:01:06	38	9:38:57	0:01:00	42
804		Lake Rd	Central Rd(Site 38)	8:24:29	0:01:14	39	9:04:25	0:01:04	45	9:40:05	0:01:08	43
661		Lake Rd	Ocean Dr(Site 39)	8:25:18	0:00:49	49	9:05:24	0:00:59	40	9:41:04	0:00:59	40
894		Lake Rd	Savoy St	8:26:32	0:01:14	43	9:07:25	0:02:01	27	9:42:25	0:01:21	40
464		Lake Rd	Hill St(Site 49)	8:27:12	0:00:40	42	9:08:05	0:00:40	42	9:43:05	0:00:40	42
280		Lake Rd	Morrish St	8:27:33	0:00:21	48	9:08:26	0:00:21	48	9:43:30	0:00:25	40
461		Lake Rd	Lake Rd(Site 34)	8:28:13	0:00:40	41	9:09:01	0:00:35	47	9:44:08	0:00:38	44
273		Gordon St	Horton(Site 33)	8:28:36	0:00:23	43	9:09:28	0:00:27	36	9:44:31	0:00:23	43
330		Gordon St	Hastings River Dr(Site 48)	8:29:04	0:00:28	42	9:09:56	0:00:28	42	9:45:00	0:00:29	41
471		Gordon St	Hindmaa St(Site 27)	8:29:49	0:00:45	38	9:11:15	0:01:19	21	9:45:46	0:00:46	37
250		Oxley Hwy	Morton St(Site 57)	8:31:19	0:01:30	10	9:11:41	0:00:26	35	9:47:12	0:01:26	10
800		Oxley Hwy	Widderson St(Site 32)	8:33:24	0:02:05	23	9:12:57	0:01:16	38	9:48:02	0:00:50	58
471		Oxley Hwy	Fernhill Rd(Site 31)	8:34:04	0:00:40	42	9:13:39	0:00:42	40	9:48:41	0:00:39	43
1,214		Oxley Hwy	Laker Rd(Site 30)	8:35:18	0:01:14	59	9:15:20	0:01:41	43	9:49:54	0:01:13	60
14,072					0:20:35	41		0:20:11	42		0:16:30	51

Date : Tue, 9th Feb 2016

MATRIX

Node No Distance (Metres)	Route 2(NtoS)	15:00-18:00	Average all Runs Speed	Average all Runs Section Time	Run 1 Node Time	Run 1 Section Time	Run 1 Speed	Run 2 Node Time	Run 2 Section Time	Run 2 Speed
START	Oxley Hwy	Sherwood Rd(Site 30)			15:01:21			15:40:16		
1,239	Oxley Hwy	Clifton Dr(Site 31)	55	0:01:21	15:02:45	0:01:24	53	15:41:38	0:01:22	54
479	Oxley Hwy	Widderson St(Site 32)	41	0:00:42	15:03:22	0:00:37	47	15:42:40	0:01:02	28
788	Oxley Hwy	Westerweler Way(Site 57)	40	0:01:11	15:04:21	0:00:59	48	15:43:49	0:01:09	41
239	Gordon St	Hastings River Dr(Site 27)	17	0:00:51	15:05:02	0:00:41	21	15:44:55	0:01:06	13
466	Gordon St	Holingworth St(Site 48)	32	0:00:53	15:05:51	0:00:49	34	15:45:42	0:00:47	36
331	Gordon St	Horton(Site 33)	35	0:00:34	15:06:31	0:00:40	30	15:46:15	0:00:33	36
237	Lake Rd	Lake Rd(Site 34)	29	0:00:29	15:07:00	0:00:29	29	15:46:46	0:00:31	28
497	Lake Rd	Morrish St	47	0:00:38	15:07:38	0:00:38	47	15:47:28	0:00:42	43
280	Lake Rd	Hill St(Site 49)	47	0:00:21	15:08:00	0:00:22	46	15:47:49	0:00:21	48
464	Lake Rd	Savoy St	41	0:00:40	15:08:42	0:00:42	40	15:48:31	0:00:42	40
902	Lake Rd	Ocean Dr(Site 39)	35	0:01:33	15:09:50	0:01:08	48	15:49:42	0:01:11	46
661	Lake Rd	Central Rd(Site 38)	36	0:01:06	15:10:54	0:01:04	37	15:51:12	0:01:30	26
804	Lake Rd	Jindalee Rd(Site 37)	29	0:01:41	15:12:51	0:01:57	25	15:54:23	0:03:11	15
639	Oxley Hwy	Lake Rd(Site 30)	29	0:01:20	15:13:51	0:01:00	38	15:55:16	0:00:53	43
616	Oxley Hwy	Wrights Rd(Site 29)	50	0:00:44	15:14:34	0:00:43	52	15:55:58	0:00:42	53
1,829	Oxley Hwy	Oxley Hwy on ramp(Site 58)	78	0:01:24	15:15:59	0:01:25	77	15:57:25	0:01:27	76
3,635	Oxley Hwy	Pacific Hwy(Site 5)	84	0:02:35	15:18:33	0:02:34	85	15:59:59	0:02:34	85
14,106			**47**	**0:18:04**		0:17:12	49		0:19:43	43

Node No Distance (Metres)	Route 2(StoN)	15:00-18:00	Average all Runs Speed	Average all Runs Section Time	Run 1 Node Time	Run 1 Section Time	Run 1 Speed	Run 2 Node Time	Run 2 Section Time	Run 2 Speed
START	Oxley Hwy	Pacific Hwy(Site 5)			15:18:33			15:59:59		
3,597	Oxley Hwy	Oxley Hwy on ramp(Site 58)	86	0:02:31	15:21:03	0:02:30	86	16:02:34	0:02:35	84
1,799	Oxley Hwy	Wrights Rd(Site 29)	82	0:01:19	15:22:24	0:01:21	80	16:03:53	0:01:19	82
604	Oxley Hwy	Sherwood Rd(site 30)	29	0:01:16	15:23:06	0:00:42	52	16:06:29	0:02:36	14
699	Lake Rd	Jindalee Rd(Site 37)	29	0:01:27	15:24:05	0:00:59	43	16:10:00	0:03:31	12
804	Lake Rd	Central Rd(Site 38)	41	0:01:11	15:25:14	0:01:09	42	16:11:18	0:01:18	37
661	Lake Rd	Ocean Dr(Site 39)	27	0:01:27	15:26:54	0:01:40	24	16:12:53	0:01:35	25
894	Lake Rd	Savoy St	46	0:01:10	15:27:58	0:01:04	50	16:14:08	0:01:15	43
464	Lake Rd	Hill St(Site 49)	40	0:00:41	15:28:37	0:00:39	43	16:14:51	0:00:43	39
280	Lake Rd	Morrish St	47	0:00:21	15:28:56	0:00:19	53	16:15:12	0:00:21	48
461	Lake Rd	Lake Rd(Site 34)	45	0:00:37	15:29:32	0:00:36	46	16:15:48	0:00:36	46
273	Gordon St	Horton(Site 33)	45	0:00:22	15:29:51	0:00:19	52	16:16:09	0:00:21	47
330	Gordon St	Hastings River Dr(Site 48)	41	0:00:29	15:30:19	0:00:28	42	16:16:38	0:00:29	41
471	Gordon St	Hindmaa St(Site 27)	34	0:00:50	15:31:19	0:01:00	28	16:17:25	0:00:47	36
250	Oxley Hwy	Morton St(Site 57)	15	0:01:01	15:31:45	0:00:26	35	16:18:56	0:01:31	10
800	Oxley Hwy	Widderson St(Site 32)	42	0:01:08	15:33:18	0:01:33	31	16:19:52	0:00:56	51
471	Oxley Hwy	Fernhill Rd(Site 31)	48	0:00:36	15:33:55	0:00:37	46	16:20:29	0:00:37	46
1,214	Oxley Hwy	Laker Rd(Site 30)	30	0:02:25	15:40:07	0:06:12	12	16:22:18	0:01:49	40
14,072			**45**	**0:18:51**		0:21:34	39		0:22:19	38

Date : Tue, 9th Feb 2016

MATRIX

Node No Distance (Metres)	Route 2(NtoS)	15:00-18:00	Run 3 Node Time	Run 3 Section Time	Run 3 Speed	Run 4 Node Time	Run 4 Section Time	Run 4 Speed	Run 5 Node Time	Run 5 Section Time	Run 5 Speed
START	Oxley Hwy	Sherwood Rd(Site 30)	16:22:41			16:58:06			17:34:21		
1,239	Oxley Hwy	Clifton Dr(Site 31)	16:24:04	0:01:23	54	16:59:27	0:01:21	55	17:35:34	0:01:13	61
479	Oxley Hwy	Widderson St(Site 32)	16:24:41	0:00:37	47	17:00:06	0:00:39	44	17:36:10	0:00:36	48
788	Oxley Hwy	Westerweler Way(Site 57)	16:26:15	0:01:34	30	17:01:22	0:01:16	37	17:37:06	0:00:56	51
239	Gordon St	Hastings River Dr(Site 27)	16:26:51	0:00:36	24	17:01:45	0:00:23	37	17:38:33	0:01:27	10
466	Gordon St	Holingworth St(Site 48)	16:27:31	0:00:40	42	17:03:12	0:01:27	19	17:39:15	0:00:42	40
331	Gordon St	Horton(Site 33)	16:28:08	0:00:37	32	17:03:40	0:00:28	43	17:39:45	0:00:30	40
237	Lake Rd	Lake Rd(Site 34)	16:28:37	0:00:29	29	17:04:09	0:00:29	29	17:40:13	0:00:28	30
497	Lake Rd	Morrish St	16:29:16	0:00:39	46	17:04:45	0:00:36	50	17:40:49	0:00:36	50
280	Lake Rd	Hill St(Site 49)	16:29:38	0:00:22	46	17:05:04	0:00:19	53	17:41:12	0:00:23	44
464	Lake Rd	Savoy St	16:30:16	0:00:38	44	17:05:43	0:00:39	43	17:41:53	0:00:41	41
902	Lake Rd	Ocean Dr(Site 39)	16:31:31	0:01:15	43	17:08:14	0:02:31	22	17:43:34	0:01:41	32
661	Lake Rd	Central Rd(Site 38)	16:32:35	0:01:04	37	17:09:11	0:00:57	42	17:44:28	0:00:54	44
804	Lake Rd	Jindalee Rd(Site 37)	16:33:36	0:01:01	47	17:10:25	0:01:14	39	17:45:29	0:01:01	47
639	Oxley Hwy	Lake Rd(Site 30)	16:35:25	0:01:49	21	17:12:33	0:02:08	18	17:46:19	0:00:50	46
616	Oxley Hwy	Wrights Rd(Site 29)	16:36:11	0:00:46	48	17:13:15	0:00:42	53	17:47:07	0:00:48	46
1,829	Oxley Hwy	Oxley Hwy on ramp(Site 58)	16:37:37	0:01:26	77	17:14:35	0:01:20	82	17:48:31	0:01:24	78
3,635	Oxley Hwy	Pacific Hwy(Site 5)	16:40:09	0:02:32	86	17:17:11	0:02:36	84	17:51:11	0:02:40	82
14,106				0:17:28	48		0:19:05	44		0:16:50	50

Node No Distance (Metres)	Route 2(StoN)	15:00-18:00	Run 3 Node Time	Run 3 Section Time	Run 3 Speed	Run 4 Node Time	Run 4 Section Time	Run 4 Speed	Run 5 Node Time	Run 5 Section Time	Run 5 Speed
START	Oxley Hwy	Pacific Hwy(Site 5)	16:40:09			17:17:11			17:57:12		
3,597	Oxley Hwy	Oxley Hwy on ramp(Site 58)	16:42:39	0:02:30	86	17:19:36	0:02:25	89	17:59:45	0:02:33	85
1,799	Oxley Hwy	Wrights Rd(Site 29)	16:43:56	0:01:17	84	17:20:55	0:01:19	82	18:01:04	0:01:19	82
604	Oxley Hwy	Sherwood Rd(site 30)	16:45:38	0:01:42	21	17:21:34	0:00:39	56	18:01:45	0:00:41	53
699	Lake Rd	Jindalee Rd(Site 37)	16:46:39	0:01:01	41	17:22:27	0:00:53	47	18:02:38	0:00:53	47
804	Lake Rd	Central Rd(Site 38)	16:47:47	0:01:08	43	17:23:37	0:01:10	41	18:03:46	0:01:08	43
661	Lake Rd	Ocean Dr(Site 39)	16:49:21	0:01:34	25	17:24:40	0:01:03	38	18:05:11	0:01:25	28
894	Lake Rd	Savoy St	16:50:26	0:01:05	50	17:25:54	0:01:14	43	18:06:21	0:01:10	46
464	Lake Rd	Hill St(Site 49)	16:51:08	0:00:42	40	17:26:36	0:00:42	40	18:07:02	0:00:41	41
280	Lake Rd	Morrish St	16:51:29	0:00:21	48	17:27:01	0:00:25	40	18:07:23	0:00:21	48
461	Lake Rd	Lake Rd(Site 34)	16:52:05	0:00:36	46	17:27:37	0:00:36	46	18:08:04	0:00:41	40
273	Gordon St	Horton(Site 33)	16:52:28	0:00:23	43	17:28:01	0:00:24	41	18:08:26	0:00:22	45
330	Gordon St	Hastings River Dr(Site 48)	16:52:58	0:00:30	40	17:28:31	0:00:30	40	18:08:55	0:00:29	41
471	Gordon St	Hindmaa St(Site 27)	16:53:39	0:00:41	41	17:29:23	0:00:52	33	18:09:45	0:00:50	34
250	Oxley Hwy	Morton St(Site 57)	16:54:57	0:01:18	12	17:30:54	0:01:31	10	18:10:05	0:00:20	45
800	Oxley Hwy	Widderson St(Site 32)	16:55:54	0:00:57	51	17:32:10	0:01:16	38	18:11:03	0:00:58	50
471	Oxley Hwy	Fernhill Rd(Site 31)	16:56:27	0:00:33	51	17:32:46	0:00:36	47	18:11:38	0:00:35	48
1,214	Oxley Hwy	Laker Rd(Site 30)	16:57:42	0:01:15	58	17:34:10	0:01:24	52	18:13:04	0:01:26	51
14,072				0:17:33	48		0:16:59	50		0:15:52	53

Date : Thu, 11th Feb 2016

MATRIX Traffic and Transport Data

Node No Distance (Metres)	Route 3(NtoS)	7:00-10:00	Average all Runs		Run 1			Run 2		
			Speed	Section Time	Node Time	Section Time	Speed	Node Time	Section Time	Speed
START	Ocean Dr	Houston Mitchell Dr			7:07:54			7:50:33		
1,001	Ocean Dr	Bonny View Dr	65	0:00:56	7:08:41	0:00:47	77	7:51:33	0:01:00	60
1,174	Ocean Dr	Beach St	67	0:01:03	7:09:44	0:01:03	67	7:52:37	0:01:04	66
2,022	Ocean Dr	Third Ave	52	0:02:20	7:12:00	0:02:16	54	7:54:55	0:02:18	53
4,400	Ocean Dr	Edith St	72	0:03:40	7:15:33	0:03:33	74	7:58:39	0:03:44	71
934	Ocean Dr	The Parade	45	0:01:14	7:16:44	0:01:11	47	7:59:48	0:01:09	49
1,251	Ocean Dr	Bridge St	39	0:01:55	7:18:33	0:01:49	41	8:01:36	0:01:48	42
780	Ocean Dr	George St	41	0:01:08	7:19:32	0:00:59	48	8:02:47	0:01:11	40
513	Ocean Dr	Kew Rd	44	0:00:42	7:20:08	0:00:36	51	8:03:31	0:00:44	42
1,654	Ocean Dr	Captain Cook Bicentenary Rd	43	0:02:18	7:22:13	0:02:05	48	8:06:22	0:02:51	35
2,517	Ocean Dr	Sirius Dr	56	0:02:43	7:24:46	0:02:33	59	8:09:06	0:02:44	55
2,995	Ocean Dr	Pacific Hwy SB Ramps	61	0:02:55	7:27:40	0:02:54	62	8:12:04	0:02:58	61
318	Ocean Dr	Nancy Bird Walton Dr	38	0:00:30	7:28:11	0:00:31	37	8:12:36	0:00:32	36
19,559			55	0:21:26		0:20:17	58		0:22:03	53

Node No Distance (Metres)	Route 3(StoN)	7:00-10:00	Average all Runs		Run 1			Run 2		
			Speed	Section Time	Node Time	Section Time	Speed	Node Time	Section Time	Speed
START	Ocean Dr	Nancy Bird Walton Dr			7:28:21			8:12:54		
312	Ocean Dr	Pacific Hwy SB Ramps	43	0:00:26	7:28:48	0:00:27	42	8:13:20	0:00:26	43
3,074	Ocean Dr	Sirius Dr	65	0:02:50	7:31:38	0:02:50	65	8:16:05	0:02:45	67
2,517	Ocean Dr	Captain Cook Bicentenary Rd	62	0:02:27	7:34:07	0:02:29	61	8:18:30	0:02:25	62
1,654	Ocean Dr	Kew Rd	48	0:02:05	7:36:06	0:01:59	50	8:20:39	0:02:09	46
513	Ocean Dr	George St	47	0:00:39	7:36:47	0:00:41	45	8:21:17	0:00:38	49
780	Ocean Dr	Bridge St	36	0:01:19	7:38:36	0:01:49	26	8:22:29	0:01:12	39
1,250	Ocean Dr	The Parade	42	0:01:47	7:40:29	0:01:53	40	8:24:08	0:01:39	45
953	Ocean Dr	Edith St	47	0:01:13	7:41:41	0:01:12	48	8:25:22	0:01:14	46
4,376	Ocean Dr	Panorama Dr	68	0:03:51	7:45:35	0:03:54	67	8:29:12	0:03:50	68
2,022	Ocean Dr	Beach St	52	0:02:19	7:48:04	0:02:29	49	8:31:29	0:02:17	53
1,174	Ocean Dr	Bonny View Dr	63	0:01:07	7:49:15	0:01:11	60	8:32:39	0:01:10	60
1,001	Ocean Dr	Houston Mitchell Dr	53	0:01:08	7:50:20	0:01:05	55	8:33:49	0:01:10	51
19,626			56	0:21:12		0:21:59	54		0:20:55	56

Date : Thu, 11th Feb 2016

MATRIX Traffic and Transport Data

Node No Distance (Metres)	Route 3(NtoS)	7:00-10:00	Run 3 Node Time	Run 3 Section Time	Run 3 Speed	Run 4 Node Time	Run 4 Section Time	Run 4 Speed
START	Ocean Dr	Houston Mitchell Dr	8:34:03			9:17:25		
1,001	Ocean Dr	Bonny View Dr	8:35:00	0:00:57	63	9:18:23	0:00:58	62
1,174	Ocean Dr	Beach St	8:36:01	0:01:01	69	9:19:28	0:01:05	65
2,022	Ocean Dr	Third Ave	8:38:27	0:02:26	50	9:21:49	0:02:21	52
4,400	Ocean Dr	Edith St	8:42:12	0:03:45	70	9:25:28	0:03:39	72
934	Ocean Dr	The Parade	8:43:36	0:01:24	40	9:26:42	0:01:14	45
1,251	Ocean Dr	Bridge St	8:45:34	0:01:58	38	9:28:48	0:02:06	36
780	Ocean Dr	George St	8:46:49	0:01:15	37	9:29:57	0:01:09	41
513	Ocean Dr	Kew Rd	8:47:29	0:00:40	46	9:30:44	0:00:47	39
1,654	Ocean Dr	Captain Cook Bicentenary Rd	8:49:38	0:02:09	46	9:32:52	0:02:08	47
2,517	Ocean Dr	Sirius Dr	8:52:43	0:03:05	49	9:35:22	0:02:30	60
2,995	Ocean Dr	Pacific Hwy SB Ramps	8:55:42	0:02:59	60	9:38:13	0:02:51	63
318	Ocean Dr	Nancy Bird Walton Dr	8:56:08	0:00:26	44	9:38:44	0:00:31	37
19,559				0:22:05	53		0:21:19	55

Node No Distance (Metres)	Route 3(StoN)	7:00-10:00	Run 3 Node Time	Run 3 Section Time	Run 3 Speed	Run 4 Node Time	Run 4 Section Time	Run 4 Speed
START	Ocean Dr	Nancy Bird Walton Dr	8:56:15			9:38:51		
312	Ocean Dr	Pacific Hwy SB Ramps	8:56:41	0:00:26	43	9:39:17	0:00:26	43
3,074	Ocean Dr	Sirius Dr	8:59:39	0:02:58	62	9:42:04	0:02:47	66
2,517	Ocean Dr	Captain Cook Bicentenary Rd	9:02:05	0:02:26	62	9:44:32	0:02:28	61
1,654	Ocean Dr	Kew Rd	9:04:11	0:02:06	47	9:46:37	0:02:05	48
513	Ocean Dr	George St	9:04:50	0:00:39	47	9:47:15	0:00:38	49
780	Ocean Dr	Bridge St	9:05:53	0:01:03	45	9:48:27	0:01:12	39
1,250	Ocean Dr	The Parade	9:07:40	0:01:47	42	9:50:16	0:01:49	41
953	Ocean Dr	Edith St	9:08:54	0:01:14	46	9:51:27	0:01:11	48
4,376	Ocean Dr	Panorama Dr	9:12:44	0:03:50	68	9:55:17	0:03:50	68
2,022	Ocean Dr	Beach St	9:14:57	0:02:13	55	9:57:35	0:02:18	53
1,174	Ocean Dr	Bonny View Dr	9:15:58	0:01:01	69	9:58:43	0:01:08	62
1,001	Ocean Dr	Houston Mitchell Dr	9:17:10	0:01:12	50	9:59:50	0:01:07	54
19,626				0:20:55	56		0:20:59	56

Date : Thu, 11th Feb 2016

MATRIX Traffic and Transport Data

Node No Distance (Metres)	Route 3(NtoS)	15:00-18:00	Average all Runs		Run 1			Run 2		
			Speed	Section Time	Node Time	Section Time	Speed	Node Time	Section Time	Speed
START	Ocean Dr	Houston Mitchell Dr			14:55:02			15:38:08		
1,001	Ocean Dr	Bonny View Dr	58	0:01:02	14:56:06	0:01:04	56	15:39:12	0:01:04	56
1,174	Ocean Dr	Beach St	66	0:01:04	14:57:10	0:01:04	66	15:40:16	0:01:04	66
2,022	Ocean Dr	Third Ave	51	0:02:22	14:59:31	0:02:21	52	15:42:38	0:02:22	51
4,400	Ocean Dr	Edith St	68	0:03:52	15:03:22	0:03:51	69	15:46:28	0:03:50	69
934	Ocean Dr	The Parade	45	0:01:14	15:04:42	0:01:20	42	15:47:45	0:01:17	44
1,251	Ocean Dr	Bridge St	42	0:01:47	15:06:25	0:01:43	44	15:49:30	0:01:45	43
780	Ocean Dr	George St	43	0:01:05	15:07:33	0:01:08	41	15:50:36	0:01:06	43
513	Ocean Dr	Kew Rd	46	0:00:40	15:08:14	0:00:41	45	15:51:17	0:00:41	45
1,654	Ocean Dr	Captain Cook Bicentenary Rd	45	0:02:13	15:10:33	0:02:19	43	15:53:33	0:02:16	44
2,517	Ocean Dr	Sirius Dr	62	0:02:27	15:12:59	0:02:26	62	15:55:58	0:02:25	62
2,995	Ocean Dr	Pacific Hwy SB Ramps	65	0:02:45	15:15:45	0:02:46	65	15:58:45	0:02:47	65
318	Ocean Dr	Nancy Bird Walton Dr	37	0:00:31	15:16:14	0:00:29	39	15:59:14	0:00:29	39
19,559			**56**	**0:21:03**		0:21:12	55		0:21:06	56

Node No Distance (Metres)	Route 3(StoN)	15:00-18:00	Average all Runs		Run 1			Run 2		
			Speed	Section Time	Node Time	Section Time	Speed	Node Time	Section Time	Speed
START	Ocean Dr	Nancy Bird Walton Dr			15:16:22			15:59:21		
312	Ocean Dr	Pacific Hwy SB Ramps	46	0:00:24	15:16:45	0:00:23	49	15:59:46	0:00:25	45
3,074	Ocean Dr	Sirius Dr	65	0:02:50	15:19:33	0:02:48	66	16:02:33	0:02:47	66
2,517	Ocean Dr	Captain Cook Bicentenary Rd	60	0:02:31	15:22:00	0:02:27	62	16:05:00	0:02:27	62
1,654	Ocean Dr	Kew Rd	47	0:02:06	15:24:11	0:02:11	45	16:07:07	0:02:07	47
513	Ocean Dr	George St	49	0:00:38	15:24:50	0:00:39	47	16:07:45	0:00:38	49
780	Ocean Dr	Bridge St	41	0:01:08	15:25:59	0:01:09	41	16:08:52	0:01:07	42
1,250	Ocean Dr	The Parade	40	0:01:54	15:27:49	0:01:50	41	16:10:54	0:02:02	37
953	Ocean Dr	Edith St	45	0:01:15	15:29:06	0:01:17	45	16:12:06	0:01:12	48
4,376	Ocean Dr	Panorama Dr	64	0:04:06	15:33:05	0:03:59	66	16:15:55	0:03:49	69
2,022	Ocean Dr	Beach St	48	0:02:30	15:35:32	0:02:27	50	16:18:16	0:02:21	52
1,174	Ocean Dr	Bonny View Dr	62	0:01:08	15:36:40	0:01:08	62	16:19:17	0:01:01	69
1,001	Ocean Dr	Houston Mitchell Dr	54	0:01:07	15:37:55	0:01:15	48	16:20:19	0:01:02	58
19,626			**54**	**0:21:38**		0:21:33	55		0:20:58	56

Date : Thu, 11th Feb 2016

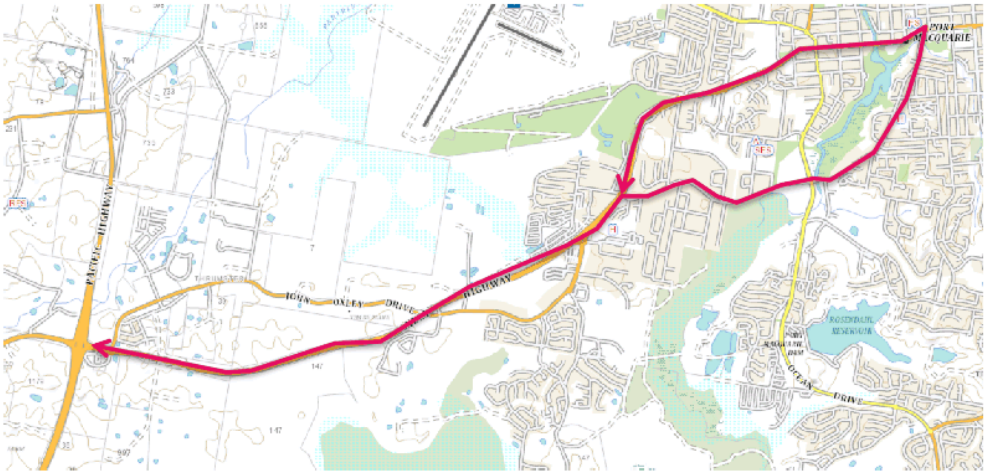
MATRIX Traffic and Transport Data

Node No Distance (Metres)	Route 3(NtoS)	15:00-18:00	Run 3 Node Time	Run 3 Section Time	Run 3 Speed	Run 4 Node Time	Run 4 Section Time	Run 4 Speed	Run 5 Node Time	Run 5 Section Time	Run 5 Speed
START	Ocean Dr	Houston Mitchell Dr	16:20:32			17:02:34			17:49:02		
1,001	Ocean Dr	Bonny View Dr	16:21:31	0:00:59	61	17:03:34	0:01:00	60	17:50:05	0:01:03	57
1,174	Ocean Dr	Beach St	16:22:40	0:01:09	61	17:04:36	0:01:02	68	17:51:08	0:01:03	67
2,022	Ocean Dr	Third Ave	16:25:03	0:02:23	51	17:06:58	0:02:22	51	17:53:28	0:02:20	52
4,400	Ocean Dr	Edith St	16:28:54	0:03:51	69	17:10:49	0:03:51	69	17:57:26	0:03:58	67
934	Ocean Dr	The Parade	16:30:06	0:01:12	47	17:12:01	0:01:12	47	17:58:37	0:01:11	47
1,251	Ocean Dr	Bridge St	16:31:51	0:01:45	43	17:13:51	0:01:50	41	18:00:29	0:01:52	40
780	Ocean Dr	George St	16:32:57	0:01:06	43	17:14:57	0:01:06	43	18:01:30	0:01:01	46
513	Ocean Dr	Kew Rd	16:33:37	0:00:40	46	17:15:36	0:00:39	47	18:02:10	0:00:40	46
1,654	Ocean Dr	Captain Cook Bicentenary Rd	16:35:45	0:02:08	47	17:17:48	0:02:12	45	18:04:18	0:02:08	47
2,517	Ocean Dr	Sirius Dr	16:38:11	0:02:26	62	17:20:15	0:02:27	62	18:06:47	0:02:29	61
2,995	Ocean Dr	Pacific Hwy SB Ramps	16:40:59	0:02:48	64	17:22:59	0:02:44	66	18:09:29	0:02:42	67
318	Ocean Dr	Nancy Bird Walton Dr	16:41:31	0:00:32	36	17:23:34	0:00:35	33	18:09:59	0:00:30	38
19,559				0:20:59	56		0:21:00	56		0:20:57	56

Node No Distance (Metres)	Route 3(StoN)	15:00-18:00	Run 3 Node Time	Run 3 Section Time	Run 3 Speed	Run 4 Node Time	Run 4 Section Time	Run 4 Speed
START	Ocean Dr	Nancy Bird Walton Dr	16:41:39			17:25:33		
312	Ocean Dr	Pacific Hwy SB Ramps	16:42:03	0:00:24	47	17:25:59	0:00:26	43
3,074	Ocean Dr	Sirius Dr	16:44:52	0:02:49	65	17:28:55	0:02:56	63
2,517	Ocean Dr	Captain Cook Bicentenary Rd	16:47:21	0:02:29	61	17:31:36	0:02:41	56
1,654	Ocean Dr	Kew Rd	16:49:25	0:02:04	48	17:33:39	0:02:03	48
513	Ocean Dr	George St	16:50:03	0:00:38	49	17:34:16	0:00:37	50
780	Ocean Dr	Bridge St	16:51:10	0:01:07	42	17:35:26	0:01:10	40
1,250	Ocean Dr	The Parade	16:52:49	0:01:39	45	17:37:30	0:02:04	36
953	Ocean Dr	Edith St	16:54:02	0:01:13	47	17:38:50	0:01:20	43
4,376	Ocean Dr	Panorama Dr	16:57:55	0:03:53	68	17:43:31	0:04:41	56
2,022	Ocean Dr	Beach St	17:00:18	0:02:23	51	17:46:21	0:02:50	43
1,174	Ocean Dr	Bonny View Dr	17:01:20	0:01:02	68	17:47:41	0:01:20	53
1,001	Ocean Dr	Houston Mitchell Dr	17:02:22	0:01:02	58	17:48:50	0:01:09	52
19,626				0:20:43	57		0:23:17	51

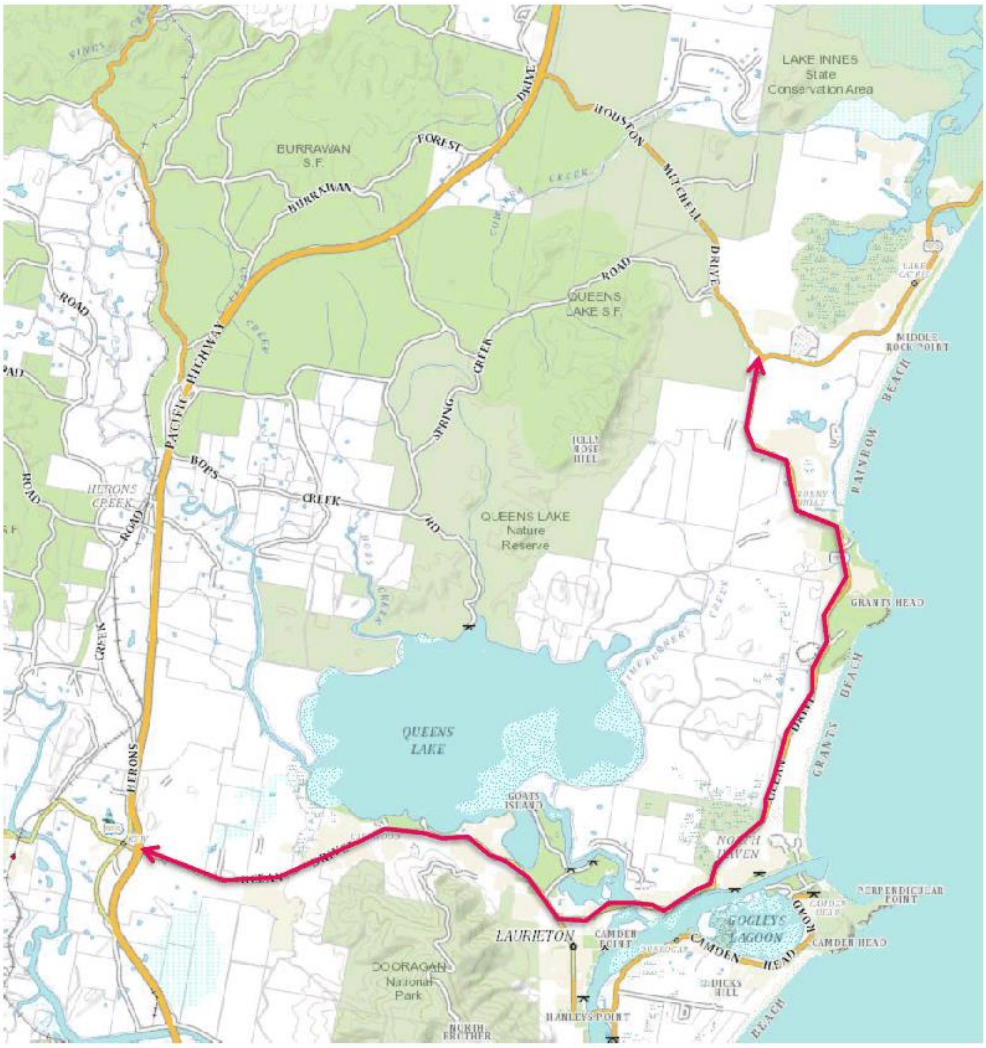
Map Source: SIX Maps

Figure I.4 Travel Time Survey Route Ocean Drive North



Map Source: SIX Maps

Figure I.5 Travel Time Survey Route Oxley Highway



Map Source: SIX Maps

Figure I.6 Travel Time Survey Route Ocean Drive South

GHD

Suite 7A, 66 Lord Street PO Box 2875

Port Macquarie NSW 2444

T: 02 6586 8700 F: 02 6586 8701 E: pqqmail@ghd.com

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Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	T. Bickerstaff	E. Jackson		S. Keevil-Jones		22/06/18

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AGENDA

ORDINARY COUNCIL
20/05/2015

Planning and Providing Our Infrastructure

Item: 13.04

Subject: ROAD NETWORK PLANNING

Presented by: Infrastructure & Asset Management, Jeffery Sharp

Alignment with Delivery Program

5.1.1 Plan, investigate, design and construct road and transport assets which include pedestrian, cyclist and vehicular needs.

RECOMMENDATION

That Council:

1. **Endorse the investigation and planning for new road links and upgrades within the Local Government Area including:**
   - **(a) new North-South and East-West links**
   - **(b) additional links to Port Macquarie Regional Airport**
   - **(c) new link between Central Road and Acacia Avenue**
   - **(d) options for additional access to the southern section of the Lake Road Industrial area through to Kingfisher Drive/Wrights Road area.**
   - **(e) Upgrade of Lake Road to two lanes in each direction between the Oxley Highway and Ocean Drive.**
2. **Consider the proposed link road investigations in the preparation of the Urban Growth Management Strategy (UGMS) review and prior to commencing any investigations for the future rezoning of land that may be affected by future link roads.**
3. **Actively seek external funding for the preconstruction activities required for the upgrade of Lake Road and consider funding the preconstruction activities in the 2016 - 2017 budget.**

Executive Summary

A significant function of Council is to plan for the future needs of the region. Of particular concern is the need for long term planning of new roads or major road upgrades and the assurance that corridor locations are planned, protected and acquired where necessary.

Council has a strong focus on economic development in the area and providing infrastructure that will sustain business growth. This includes the operations of the Regional Airport and the potential to leverage this valuable asset following recent runway upgrades and new planning for an Airport Business park.

There are some significant issues relating to the existing road network and its ability to meet capacity demands of the current population and transport needs and this translates as an inability to cope with future growth without hindering economic growth or sustainability.

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Planning and Providing Our Infrastructure

The most significant of these is the constrained east-west road links which push all traffic through either Lake Road or the Oxley Highway.

Currently traffic generated in the eastern areas of Port Macquarie gains access to Ocean Drive at eight main intersections with Ocean Drive, being Gordon Street, Lake Road (east), Koala Street, Greenmeadows Drive (both north & south intersections), Dahlsford Dr/Crestwood Dr, Pacific Dr/Jonas Absalom Dr and Matthew Flinders Dr/Emerald Dr.

There is, as noted above, then only two roads to take all westward bound traffic, being the Oxley Highway and Lake Road (west).

Other major issues include better access to the airport and Hastings River Drive from the south, an alternate access for the industrial area south of Lake Road and potential connection of Acacia Avenue and Central Road.

These issues have all been discussed at length through the Roads & Infrastructure Portfolio meetings, with Councillors taking a significant lead in moving forward with the planning for our road network.

Discussion

One of the key strategic functions of Council is to adequately manage and plan for necessary changes in the road network. These changes are driven by a need to accommodate population growth as well as changes in land use and travel patterns. Constructing new roads or upgrading existing roads ensures that the efficiency and capacity of the network is maintained. This requires the identification and planning of new road corridors as well as increasing the corridors of existing roads.

The road network is heavily constrained for east-west movements, with all traffic travelling through the Lake Road / Oxley Highway Roundabout and funnelling through the Oxley Highway between Lake Road and the Pacific Highway. The only alternatives are Houston Mitchell Drive, some 14km to the south or Hastings River Drive which caters more for northern traffic movements and diverts traffic through the town. Hastings River Drive will lose its direct connection to the Pacific Highway once the current highway upgrades are completed. Currently all north-south traffic is funnelled through the Port Macquarie township, with significant volumes travelling over Clifton Drive which is a narrow local road. Furthermore the Airport is heavily constrained by the flooding and condition of Boundary Street and alternate access is required if growth in airport usage and potential business development is sought.

In light of the current situation, ongoing residential growth, increases in major traffic generators such as the base hospital and higher education facilties, changes in land use, and a desire to have a prosperous and sustainable economy, it is clear that there is an imperative to plan for new road corridors and existing network upgrades.

An increase in traffic crashes and negative driver behaviour can be readily related to increased congestion and delayed travel times, and can be tracked through regular data collection and analysis. However, the impact of traffic congestion on business productivity, sustainability and growth is often overlooked.

To better assess this issue, an Infrastructure Gap Analysis was commissioned by the Economic Development Steering Group (EDSG) and completed by PSA Consulting.

Planning and Providing Our Infrastructure

The report prepared by the consultant along with EDSG commentary was considered at the 19 November 2014 Ordinary Meeting of Council, where Council resolved as follows:

RESOLVED: Sargeant/Roberts

That Council:

1. Note the Port Macquarie-Hastings Infrastructure Gap Analysis report.
2. Note the views of Council's Economic Development Steering Group with regard to the key priorities and future actions stemming from this analysis.

CARRIED: 8/0
FOR: Besseling, Cusato, Griffiths, Hawkins, Intemann, Levido, Roberts and Sargeant
AGAINST: Nil

The EDSG, in considering the Infrastructure Gap Analysis Report, determined the following view point as contained in the Council report:

> *"To ensure long-term economic growth opportunities in the future, Council needs to identify and plan for infrastructure that will facilitate this growth. Without this infrastructure in place, our region's economic growth and prosperity may be stymied."*

The EDSG also identified five critical projects to assist in ensuring long term economic growth opportunities:

- Lake Road duplication [*between the Oxley Highway and Ocean Drive*]
- Hastings River Drive Duplication (between Park and Aston Street)
- A southern access road to the airport
- Boundary St Upgrade
- A southern ring road that would link Ocean Drive to John Oxley Drive

Staff have commenced design work on the duplication of Lake Road between the Oxley Highway and Toorak Court which will provide dual lanes through from Acacia Avenue to the Highway. Concepts for the upgrade of Lake Road to dual lanes have previously been developed; however, funding should be sought for the remaining design work including intersection upgrades and environmental approvals. A funding allocation for preconstruction activities for Lake Road between the Oxley Highway and Ocean Drive should be considered in the development of the 2016/17 Operational Plan.

The duplication of Hastings River Drive between Park and Aston Streets forms part of the current 2014/15 Operational Plan and Draft 2015/16 Operational Plan.

Currently, Council has allocated $150,000 to investigations for the North South Link road. However, to ensure the appropriate network is planned for, it is proposed that, as part of this project, corridors are also investigated for an east-west link (southern ring road) and alternate accesses for the Regional Airport.

This proposal will see three of the five priority projects identified by the EDSG investigated; being the southern access to the airport, Boundary Street upgrade and a southern ring road. A corridor plan incorporating these projects will allow Hastings

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River Drive to be clearly connected to the Oxley Highway and John Oxley Drive, forming an orbital road around the Port Macquarie Township to provide better access to the broader network.

In addition to the above projects, the Roads and Infrastructure Portfolio has also identified the potential of a link between Acacia Avenue and Central Road. This link may provide some traffic relief to Lake Road and provide a better link in the long term. It may also assist traffic movements following the introduction of a central median in Lake Road in vicinity of the Acacia Avenue intersection.

The proposed investigations will provide valuable data for inclusion in the Area Wide Traffic Study that Council is undertaking. This will allow better analysis of these and other potential corridors and upgrades and their short, medium and long term effects on the road network.

By failing to plan for, and construct over time, the necessary new roads and upgrades, we will be left with an under capacity inefficient road network that will negatively impact upon the long term growth and economy of the area.

Options

Council has the option of accepting or amending the recommendations presented within this report, or rejecting the recommendations and determining an alternate resolution.

Community Engagement & Internal Consultation

Community engagement will not form part of these preliminary corridor investigations. Any form of community engagement will not be possible until there is clearer understanding of what may be feasible and more detailed investigation is then undertaken on identified routes.

Internal consultation has occurred with:

- Roads Portfolio
- Mayor & Councillors
- General Manager
- Director Infrastructure and Asset Management
- Group Manager Transport & Stormwater Network
- Group Manager Strategic land use Planning
- Transport & Traffic Engineer

Planning & Policy Implications

There are no planning or policy implications from undertaking the recommended investigations. However there may be implications resulting from the proposed investigations.

Financial & Economic Implications

Currently there is a $150,000 budget allocation in the 2014-15 Operation Plan for preconstruction activities for a North South Link Road, which can accommodate the additional corridor review and investigations for an East West Link and alternate access to the Regional Airport.

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There is also current funding for an Area Wide Traffic Study and model which will also be utilised in time to assess any proposed new linkages and road upgrades.

Currently there is no allocation to fund further design work on Lake Road. This can be considered by Council in future budgets as well as seeking external funding grants for the design works.

There is also a significant opportunity cost to the community as a whole if these investigations are not completed and the road network is not properly managed to ensure safe and efficient capacity is maintained.

Attachments

1View. Road Corridors for Investigation

INFRASTRUCTURE

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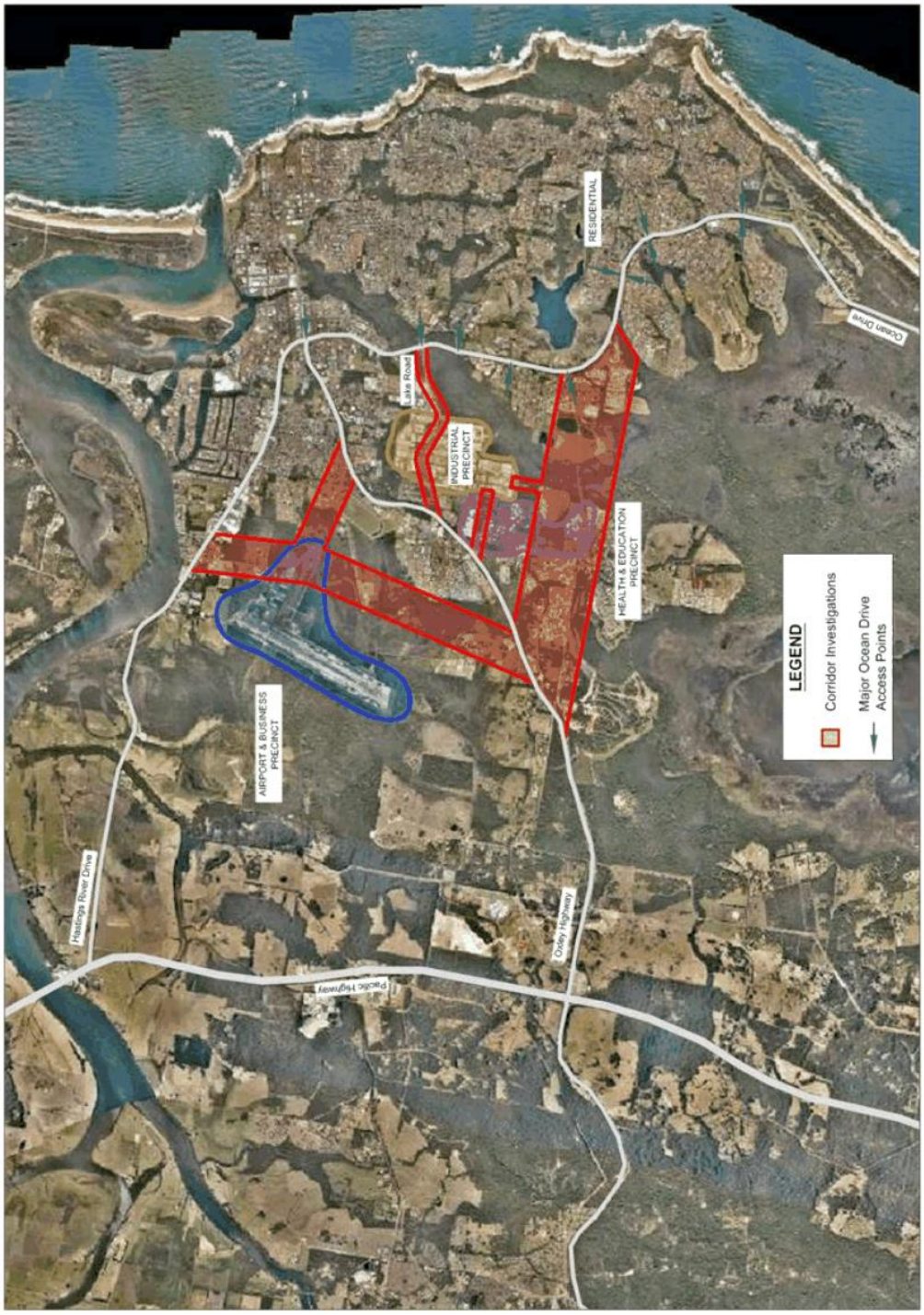
ATTACHMENT

ORDINARY COUNCIL
20/05/2015



13.04 ROAD NETWORK PLANNING

Mr Ross Cargill, representing Men at Work, addressed Council in support of the recommendation.

RESOLVED: Intemann/Sargeant

That Council:

1. Endorse the investigation and planning for new road links and upgrades within the Local Government Area including:
   (a) new North-South and East-West links
   (b) additional links to Port Macquarie Regional Airport
   (c) new link between Central Road and Acacia Avenue
   (d) options for additional access to the southern section of the Lake Road Industrial area through to Kingfisher Drive/Wrights Road area
   (e) upgrade of Lake Road to two lanes in each direction between the Oxley Highway and Ocean Drive.
2. Consider the proposed link road investigations in the preparation of the Urban Growth Management Strategy (UGMS) review and prior to commencing any investigations for the future rezoning of land that may be affected by future link roads.
3. Actively seek external funding for the preconstruction and construction activities required for the upgrade of Lake Road.
4 Consider funding the preconstruction activities in 2016 - 2017 budget if other funding is not forthcoming.

CARRIED: 8/0
FOR: Besseling, Cusato, Griffiths, Intemann, Levido, Roberts, Sargeant and Turner
AGAINST: Nil

09.01 STATUS OF OUTSTANDING REPORTS TO COUNCIL

RESOLVED: Levido/Intemann

That the information in the May 2015 Status of Outstanding Reports to Council be noted.

CARRIED: 8/0
FOR: Besseling, Cusato, Griffiths, Intemann, Levido, Roberts, Sargeant and Turner
AGAINST: Nil

09.02 DELEGATED AUTHORITIES - CERTIFICATE OF IDENTIFICATION ISSUED UNDER THE SWIMMING POOLS ACT 1992

RESOLVED: Sargeant/Cusato

That the seal of Council be affixed to the certificates of identification issued under the Swimming Pools Act 1992 for:

Port Macquarie – Hastings Council

Port Macquarie Orbital Link Road Corridor:
Engineering Feasibility Investigation Report

Contract Number: VP41625
Project Number: T-14519.00

Contact Details

Name: WSP Opus

ABN 79 086 342 065
Sydney Office
L13, Tower 2, 475 Victoria Avenue
PO Box 5340, West Chatswood NSW 1515

Telephone: +61 2 9325 5600

Document Details:

Date: 21 December 2018
Reference: T-14519.00
Status: Engineering Feasibility Report: FINAL

Prepared by:

Monty Beale | Graduate Civil Engineer

Reviewed by:

Rodney Charlton | Principal Engineer

Approved for Release by:

James Wallis | Senior Project Manager

Opus International Consultants is now part of WSP Australia & New Zealand.

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Executive Summary

Context

Port Macquarie Hastings Council has engaged WSP Opus to undertake an Engineering Feasibility Investigation for a new Port Macquarie Orbital Road. This Orbital Road would provide a link from Hastings River Drive, to the Oxley Highway and through to Ocean Drive and provide a more accessible route through Port Macquarie and alleviate the currently congested Oxley Highway and Lake Road.

Scope

The scope for the Engineering Feasibility Investigation was to undertake the optioneering of new alignments within the Council's preferred corridor. These alignments are to meet Australian Standards for strategic horizontal geometric design and be conducted based on an approved road cross-section. Subsequently analysis was undertaken to identify preferred routes and inform Council of the potential environmental constraints and the cost benefit of an Orbital project. The deliverables would include:

- Undertaking of a project wide Preliminary Environmental Assessment
- Assessment of geometric constraints – alignment optioneering
- Multicriteria Analysis
- Strategic Cost Estimating
- Complete a Preliminary Economic Appraisal (Strategic Benefit Cost Analysis)

Project Outcomes

Four preferred geometric alignment routes were detailed, following a Council workshops reviews and consultation with internal stakeholders and the Road & Maritime Service (RMS).

At the completion of the environmental assessments, geometric alignment optioneering, strategic cost estimation review and multicriteria analysis, each potential alignment was ranked. Of these Option 1/1A was first overall, scoring the highest ranking in MCA analysis and 2nd highest in the strategic cost analysis.

The Preliminary Economic Assessment concluded that, compared to the do minimum Base Case (i.e. no implementation of an Orbital for Port Macquarie), all options/alignment variants tested have positive Strategic Benefit Cost Ratios (BCR) ratings demonstrating at the strategic level that, in principle, the new Orbital is an economically viable and justifiable undertaking.

As an outcome of this report, it is recommended that Council now consider the next stages to the development of the proposed Orbital which would entail following the New South Wales State Government, Infrastructure New South Wales Project Assurance Framework. This includes the development of the Strategic Business Case, outlining the findings to date, undertaking Community Consultation as well as completing project specific Traffic Studies, detailed environmental investigations and associated project concept design work.

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7.0 Preliminary Economic Appraisal (Strategic) 25

8.0 Conclusions 27

Appendix A – Alignment Options Drawings .....

Appendix B – Preliminary Environmental Assessment .....

Appendix C – Multicriteria Analysis Report .....

Appendix D – Strategic Cost Estimation Report .....

Appendix E – Preliminary Economic Appraisal .....

Appendix F – Safety in Design Register .....

1.0 Introduction

As part of Port Macquarie Hastings Council's (Council) future road network strategy, the concept of an Orbital link road has long been recognised as an important component. As such Council resolved to conduct an engineering feasibility investigation of such a link.

Port Macquarie Hastings Council (Council) commissioned Opus International Consultants (now part of WSP) to undertake an Engineering Feasibility Investigation to ascertain potential alignments for the orbital. These options would initially be prepared based on geometrical design considerations and initial Council feedback. Subsequently each alignment option would undergo analysis from both qualitative (Multi-Criteria Analysis) and economic perspectives.

On review of these outcomes, and following Council stakeholder reviews, on the preferred alignments further Strategic Benefit Cost Analysis (BCA) was undertaken.

This Engineering Feasibility Report provides a summary of the design decisions made and constraints considered in the preparation of various alignments for the proposed Port Macquarie Orbital. These have been documented on the project drawings.

As such the objectives of this Engineering Feasibility Report are to:

- Provide information on the background to design decisions;
- Provide detail on options investigated and reasons for the progression of the preferred options;
- Summarise key design criteria and assumptions;
- Undertake a Preliminary Environmental Assessment;
- Undertake a Multicriteria Analysis of the preferred alignments;
- Run a Strategic Benefit Cost Analysis on the adoption of an Orbital (on the preferred route); and
- Provide initial advice to Council on the next stages of the project.

2.0 Alignment Optioneering Process

The project's aim is to investigate the Engineering Feasibility of an Orbital road for Port Macquarie, with specific reference to engineering "hard" issues:

- Focus of topographical constraints;
- Variable alignments to current codes; and
- What infrastructure will be required.

The various alignments to be considered were to be set within a specific route corridor set by Council which guided the feasibility process (refer to Figure 1 – Corridor Investigation Area). For each route the following tools were to be utilised:

- Geometric Constraints;
- Desktop Environmental Assessment;
- Understand environmental constraints;
- Establish which stakeholders will require consultation;
- Multi-Criteria Analysis; and
- Strategic Cost Estimation.

Within this corridor several alignments were developed and workshopped, which established a revised corridor and a combination of 4 main route options with two alignments to tie into Ocean Drive at the South Eastern connection.

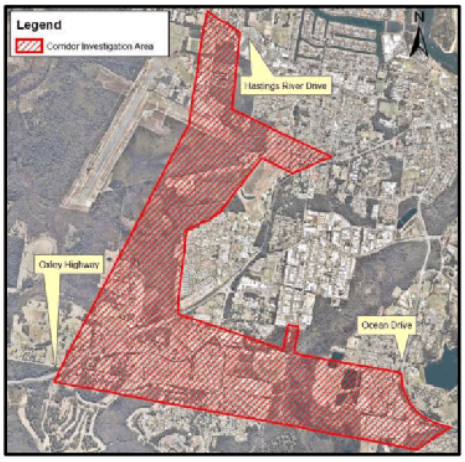

Figure 1 – Corridor Investigation Area

2.1 Potential Routes & Optioneering.

Potential routes underwent a workshopping iteration based on engineering mechanics which included:

- Review proposed route corridors;
- Understand physical constraints;
- Propose routes in accordance with AustRoads guidelines;
- Establish built engineering requirements; and
- Refine route options.

In discussion with Council a typical dual carriageway arrangement was developed, and this was subsequently adopted for each option alignment, and the driver for developing the earthworks easement.

Out of this exercise an understanding of what specific infrastructure would be required; in terms of bridging structures, intersections and earth works footprints.

Further consideration was made regarding the types and location of prime services, such as hospitals, schools and universities; as well as access point constraints onto the RMS controlled Oxley Highway.

The four main options/variants are shown in Figure 2 and are identified as:

- Option 1 Yellow;
- Option2: Red;
- Option 3: Blue; and
- Option 4: Green.

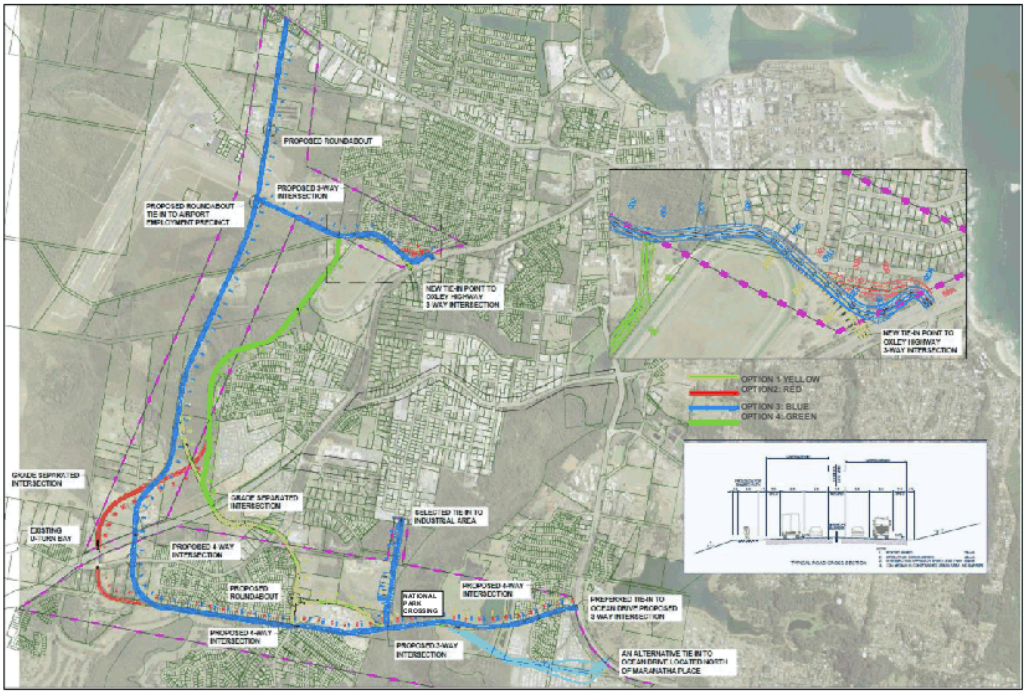

Figure 2 - Combined Orbital alignment options

2.2 Alignment Commonalities

During the optioneering three main commonalities were presented and would subsequently feature in all proposed routes. These included:

- National Park crossing corridor
- Tie-in to the Airport Precinct / Boundary Street
- Airport Access Link Road

National Park Crossing Corridor

The alignment has been fixed to cross the Lake Innes Nature Reserve (National Park) along the already cleared power and water easement, shown in Figure 3 This was chosen as the best location to have the least impact on the biodiversity within the National Park as the trees are already cleared for the power lines. Any future road would likely be bridged over this area with existing water and electricity services attached to the bridge. This would allow the area under the bridge to be environmentally rehabilitated to increase the biodiversity connectivity within the Lake Innes Nature Reserve. Council would liaise closely with the existing utility providers to facilitate a joint use of this corridor. Specific approvals in accordance with the National Parks Act and associated guidelines are required to revoke national park land for a road corridor. This will need to be a key element in the project approvals process.

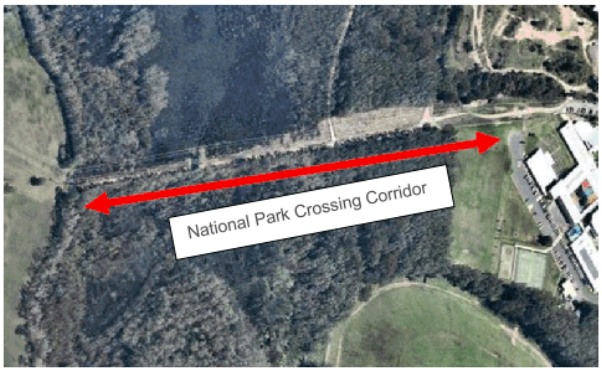

Figure 3 – National Park Orbital Corridor

Tie-in to the Airport Precinct / Boundary Street

The connection into the Airport Precinct (and an extended Boundary Street) from the South had been historically defined by Council and was set as part of the future airport precinct plan. This connection which would be the North Western tie-in point and "close" the orbital link with Hastings River Drive.

Airport Access Link Road

A common corridor for each alignment option to connect into the Oxley Highway was defined. However, options for ultimate intersection tie-in location were considered. As an extension of this Orbital feasibility analysis a strategic concept design for an Airport Access Link Road has been completed in order to get more certainty regarding any new intersection on the Oxley Highway to and to meet RMS requirements.

Ocean Drive Tie-in

A common variant to all alignments was the two alternative South Eastern tie-in locations with Ocean Drive. Each was considered for each primary route.

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3.0 Alignment Criteria

3.1 Design Speed Criteria

To provide the best possible through route, a design speed of 80km/h shall be tested, with the potential for a reduction to 70km/h. Else, depending on geometric constraints, 60km/h would be acceptable.

The adopted design speed values from the proposed speed values are shown in Table 3-1 below.

Table 3-1 Speed Values

SPEED PARAMETER	VALUE
Port Macquarie Orbital – Main Alignments	
Posted speed	70 km/h
Design speed	80 km/h
Intersection Approaches	
Design Speed – Operating Speed	50 km/h

3.2 Design Vehicles

Design vehicles are shown in Table 3-2.

Table 3-2 Design vehicle parameters

SPEED PARAMETER	VALUE
Prime-mover and Semi-Trailer (19m)	Turning Paths
Car	Stopping Sight Distance

It should be noted RMS has stated the routes under design are not B-Double routes, therefore these vehicles have not been taken into consideration as speed parameters at the Feasibility Design stage. However, Council may choose to introduce B-Doubles into these routes as a result of the project. In which case, B-Double's as a speed parameter can be analysed in the future.

3.3 Design Guidelines

The guidelines used for design are, in order of priority:

- The Project Brief
- Austroads Guide to Road Design Series.
- RMS Traffic Signal Design Guide
- Australian Standards.
- Council Design Standards (Development Design Specification – Geometric Road Design (Urban and Rural))

3.4 Typical Road Section

The adopted alignment, as shown in Figure 4 - Typical Orbital Cross Section, is to contain the following features in accordance with the listed design guidelines:

- The design of a 4-lane dual carriageway for the Orbital which contained 3.5m wide lanes and a 2.5m wide central median.
- Provision would be made for a Shared Path of 3mon either one or both sides of the carriageway.

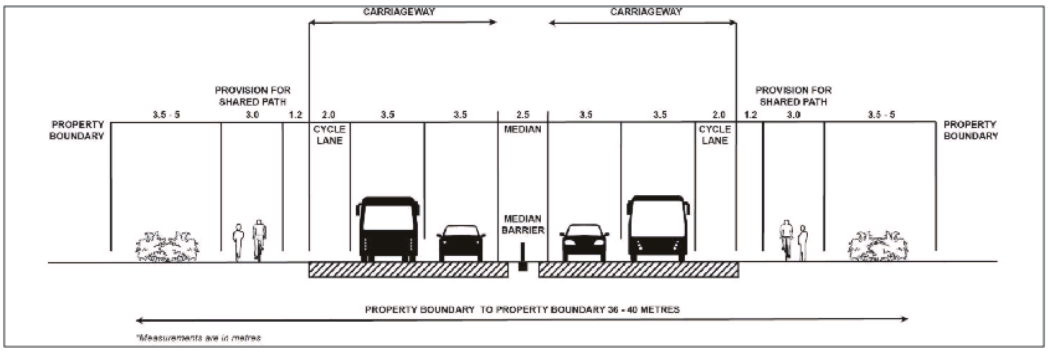

Figure 4 - Typical Orbital Cross Section

3.5 Earthworks

This design has adopted typical earthworks batters of 4 to 1 in cut and 3 to 1 in fill, in accordance with best practise and Council's advice.

3.6 Traffic modelling & considerations

Separate to this Feasibility Investigation, Council separately commissioned an Area Wide Traffic Study (prepared by GHD) which discusses the traffic impacts and requirements of an Orbital Road for Port Macquarie. This has been used to inform the alignment optioneering and under take the Preliminary Economic Appraisal, however, it should be noted that there has not been any project specific traffic modelling undertaken as part of this Feasibility Investigation.

It is recommended that further traffic modelling specific to this project be undertaken to ratify the conclusions made within the Area Wide Traffic Study.

3.7 Safety in Design Considerations (SiD)

An initial "Safety in Design" assessment has been undertaken only. Items identified have been recorded with the Safety in Design Risk Register, which can be found within Appendix F.

No formal workshop has been undertaken with Council or stakeholders. This should be undertaken at subsequent project stages.

It is assumed that considerations to date will be monitored by Council and passed on to the relevant bodies as the project progresses.

4.0 Alignment Options Summary - Geometric

The following section provides a descriptor of each option. Note full option drawings are appended to this report within Appendix A.

4.1 Option 1/1A

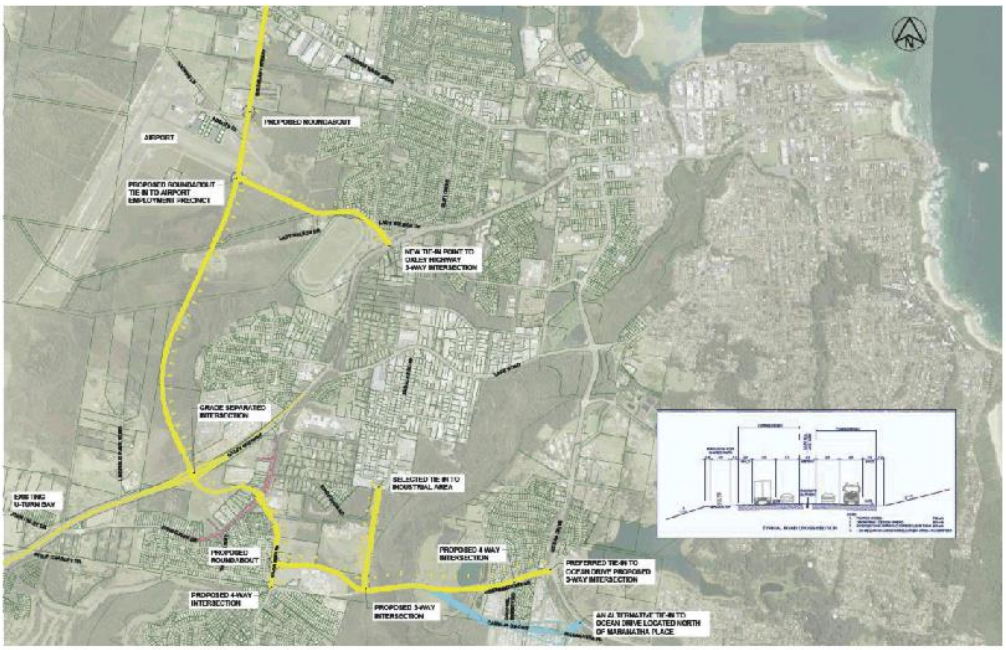

Figure 5 Option 1/1A Alignment

Option 1, shown in Figure 5 above, considered an outer route from the Airport Precinct tie in west of the wetlands, onto a grade separated intersection with Oxley Highway, and a link into Major Innes Rd at the existing intersection with John Oxley Drive. This route would then involve the upgrade of Major Innes Rd as a feeder to a link west around the new university campus. As is common with all routes the National Park crossing follows an existing cleared HV Electrical easement; the intention being to utilise an existing pathway.

4.1.1 Key Alignment Facts:

Road Length (km)	Number of Bridges	Intersections / Roundabouts
8.6	12	9

During the design workshop process, Option 1 was developed into Option 1A which added the inclusion of accommodation works to John Oxley Drive (show on Figure 5 in purple). Option 1A was subsequently adopted as the Primary Option.

4.2 Option 2A / 2B

With reference to Figure 6 the Primary Route Option 2 took the form of 2 variants. However, the key feature common to both variants was the southern location for the Oxley Highway cross over, which would coincide with the existing John Oxley Drive intersection bringing all the confluences at the same locations, and utilising existing infrastructure. Option 2 variants also included the southern link which would be a fully new highway constructed south of the existing developments. This would minimise through traffic on the existing infrastructure.

Where 2A varied from 2B was with respect to the North South link between the Oxley Highway and the Airport Precinct. Option 2A followed the same western route as Option 1A, whereas Option 2B took an Eastern alignment which adjoined the Eastern side of the town, and connected into Lady Nelson Drive first, rather than the Airport Precinct directly.

4.2.1 Key Alignment Facts:

Option variant	Road Length (km)	Number of Bridges	Intersections / Roundabouts
2A	9.5	17	9
2B	9.8	19	10

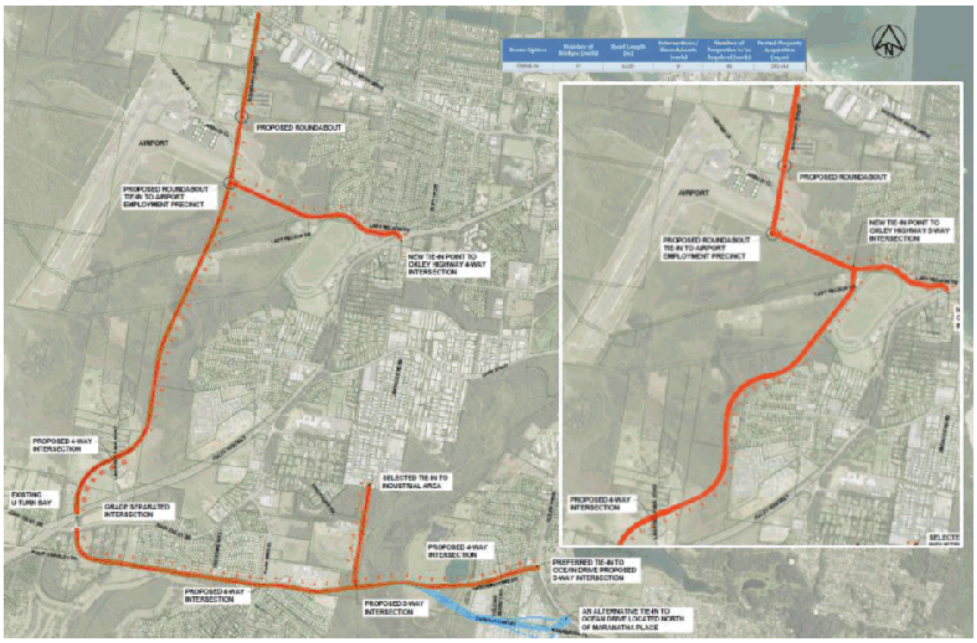

Figure 6 - Option 2A and 2B (Insert) Alignments

4.3 Option 3

The development of Option 3, shown below in Figure 7, began as a progression of Option 2A. The major difference is that it included an alternative location to tie-into the Oxley Highway, maintaining the separation between the two potential intersections, potentially more favourable with the RMS.

4.3.1 Key Alignment Facts:

Option variant	Road Length (km)	Number of Bridges	Intersections / Roundabouts
3	9.0	17	9

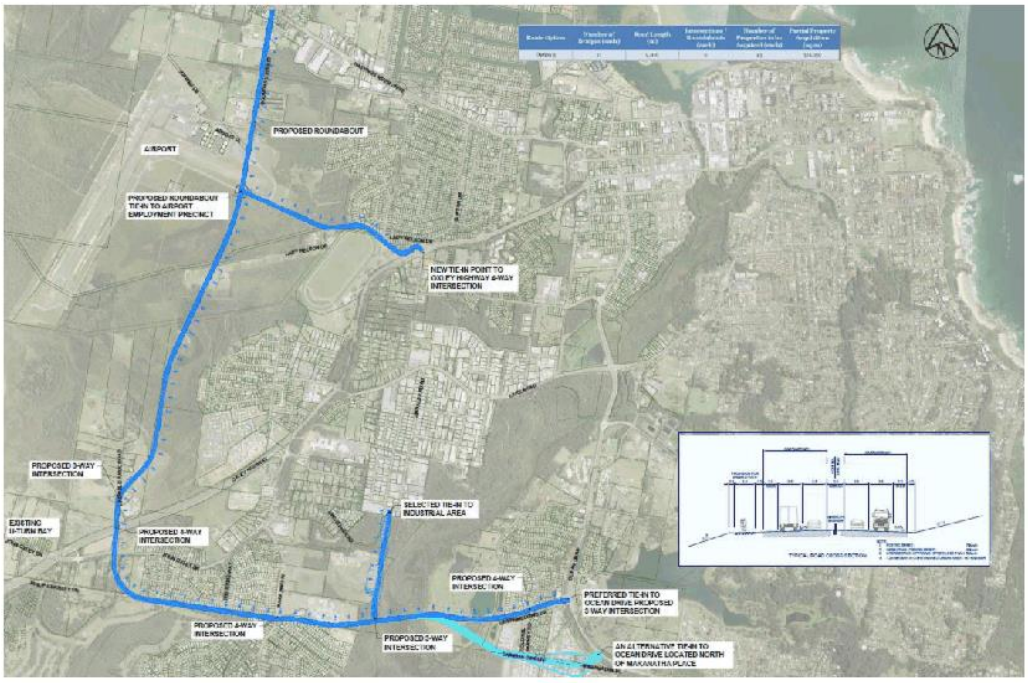

Figure 7 - Option 3 Alignment

4.4 Option 4/4A

With reference to Figure 8, Option 4 was predominantly a progression of Options 1/1A, whereby there is a distinct grade separated interchange onto the Oxley Highway; and the east west link from the Oxley Highway to Ocean Drive.

This Option also incorporated a connection onto John Oxley Drive and Major Innes Road and with Council's inclusion of the John Oxley Drive accommodation works (in purple) and this Option was subsequently identified as Option 4A

It should be noted that as the John Oxley Drive accommodating work is only optional, it has not been considered within this main report's feasibility assessment.

4.4.1 Key Facts:

Road Length (km)	Number of Bridges	Intersections / Roundabouts
8.6	12	9

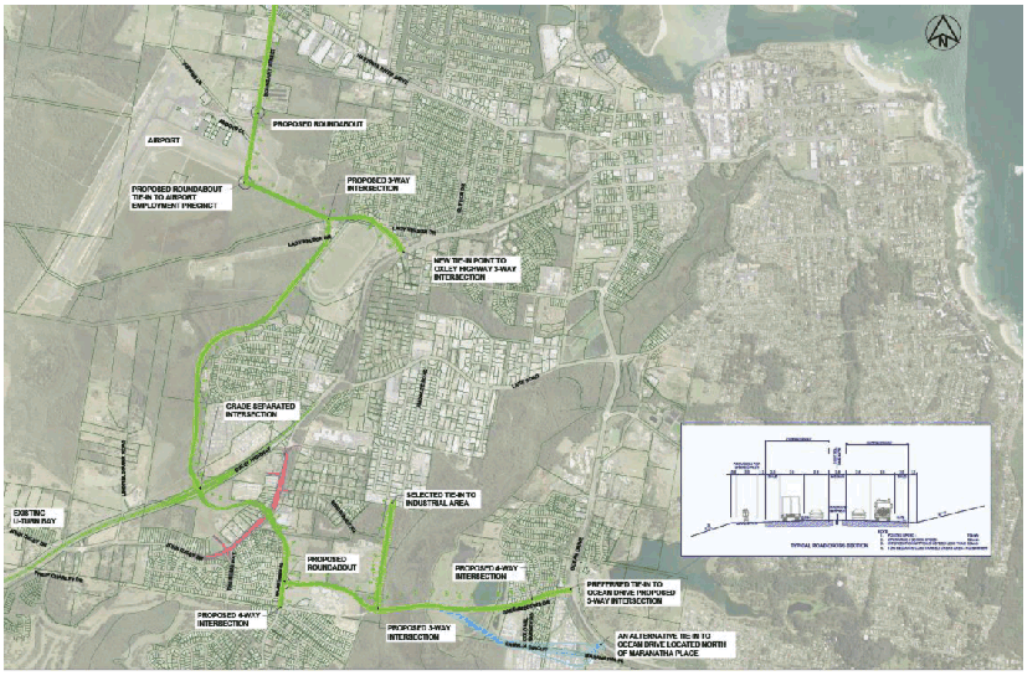

Figure 8- Option 4A Alignment

4.5 Port Macquarie Health & Education Precinct

It has been noted that the Port Macquarie Health & Education Precinct, which is currently under development, may be in proximity to the southern east west link of the proposed orbital corridor (north of the St Columba Anglican School). As a result, it is appreciated that the section of the Orbital between which John Oxley Drive and the National Park crossing point has potential to changes and should be explored further at subsequent project development phases.

5.0 Options Analysis

To provide the initial constraints and guidance to advise the development of potential Orbital road alignments a **Desktop Environmental Assessment** was undertaken. This provided an understanding of the environmental constraints associated with the land onto which the Orbital Road would be located, and as a result advise of the various bodies that will be required to be consulted with. Key was the identification of areas of National Park and those of Cultural significance. A summary of the outcomes is detailed in Section 5.1 and copy of the report is included with Appendix B

After a period of alignment optioneering and information gathering to understanding the main physical and environmental constraints of the alignments chosen, a project specific **Multi-Criteria Analysis** tool was developed which pulls together all the social and contiguous elements of the Orbital, as well as site wide factors such as utilities and National Park constraints, and then applied severity and risk ratings to produce a "qualitative" ranking.

This was followed by a **Strategic Cost Estimation**, utilising the RMS guide to get an appreciation of the potential costs for each option. This was based on specific segments allowing further future breakdown of cost.

A **Benefit Cost Analysis** on the preferred option was subsequently undertaken. The intention was to provide an understanding of how an Orbital (of any route) would stand when considering the impact traffic flows vs cost associated.

A separate specialist report was produced for each of the above analyses but have been summarised below. Copies of the specialist reports have been appended to this summary report.

5.1 Desktop Environmental Assessment

The Desktop Environmental Assessment incorporated the following activities:

- Preparation of Preliminary Environmental Assessment (PEA);
- Desk-top environmental assessment;
- Database searches;
- Environmental Constraints assessment; and
- Establish which bodies will require consultation.

In developing this, background searches covered the following:

- EPBC Act 1999 Protected Matters Search;
- Aboriginal Heritage Information System;
- BioNet Atlas;
- NSW Spatial Information Exchange Vegetation Layer;
- Contaminated Land;
- Australian Heritage Database;
- NSW State Heritage Register;
- State Environmental Planning Policies; and
- Council's LEP.

The site environmental Assessment considered many factors, as listed below.

- Soils and geology;
- Hydrology, flooding and water quality;
- Ecology, flora, and fauna;
- Noise and vibration;
- Climate, air quality and energy;
- Non-Aboriginal Heritage;
- Aboriginal Heritage;
- Visual Amenity; and
- Waste Generation and Contamination.

The outcomes of these assessments were then able to be mapped and incorporated into the subsequent multi-criteria analysis.

5.2 Multi Criteria Analysis Desktop

The Multi-Criteria Analysis (MCA) requirement was developed into an online mapping tool allowing a visual analysis of all the constraints assess. The full MCA report has been appended to this report and can be found within Appendix C. The key processes and outcomes have been summarised within this report as follows.

The overall MCA process can be summarised by the following work flow diagram Figure 9:

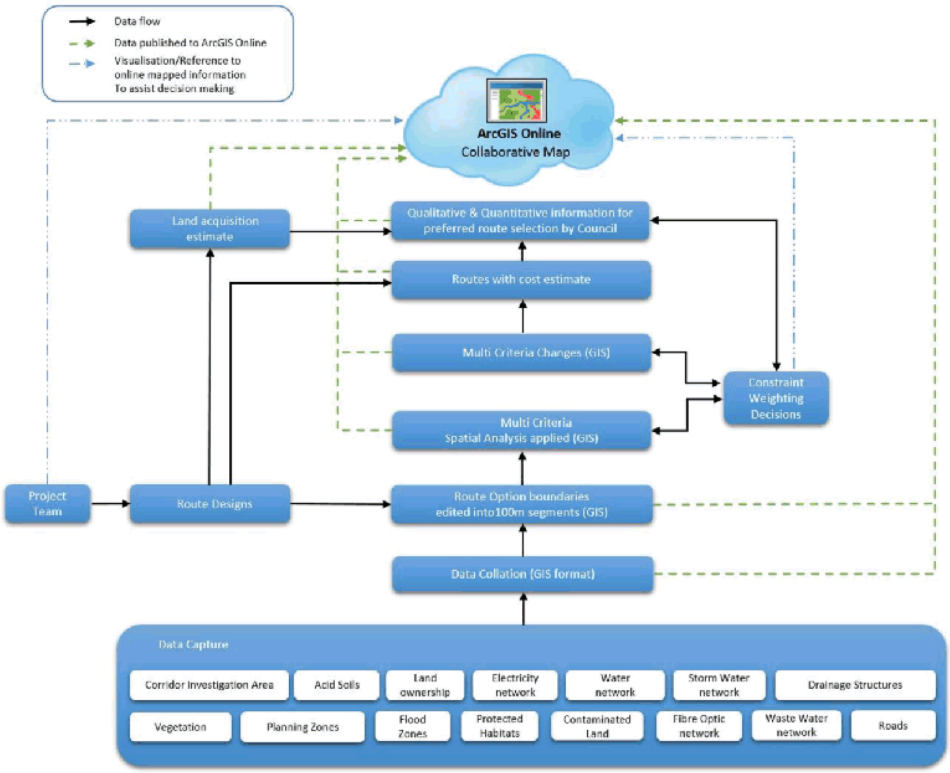

Figure 9 - Multi-Criteria-Analysis Process Diagram

The MCA process can be broken down into the following stages:

- Alignment Data Capture;
- Segmentation;
- Criteria Analysis undertaken;
- Weighting; and
- Qualitative outcomes.

To improve the usefulness of the MCA outcomes a process of segmentation was undertaken. This allowed for smaller parts, each of 100m, of the whole route to be assessed discreetly and an understanding of where key critical areas were located, namely “hot spots”.

An example of the segmentation process is demonstrated below in Figure 10 and Figure 11.

Figure 10 - Extract from proposed route; note carriageway and earthworks are shown.

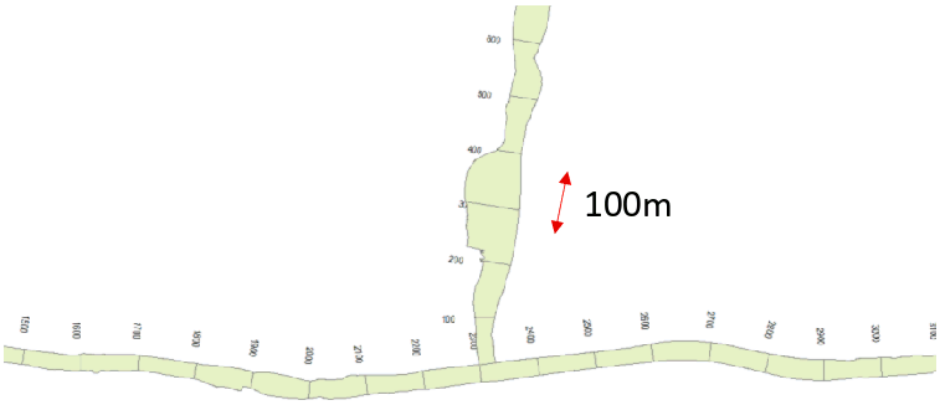

Figure 11 - Segmented route of the extract in Figure 10

Within each segment the following heading criteria were assessed:

- Protected Vegetation Areas (ECC/SEPP14 – *now TEC and Coastal SEPP*);
- Land Quality (Acidity/Contamination);
- Protected Habitats;
- Flooding;
- Utilities;
- Land ownership; and
- Interaction with existing infrastructure.

The above criteria were separately broken down into the parts (utilities separated into gas, elec etc) and then weightings were applied to each criterion. The weighting was developed in consultation with Council and represented a factor of how significant the various issues would be in the design and construction of the orbital.

The full summary breakdown of the MCA weighted criteria is shown in Table 3.

Table 3 Constraint criteria with allocated relative weighted values (preliminary and revised versions)

Port Macquarie Orbital - Multi Criteria Analysis

Preliminary Weighted Criteria Summary

Constriant Subject	Item (Sub set)	Weighting (out of 10)
Utilities		
	Electric Pole	3
	Electric Street Light	3
	Electric Sub Station	3
	Electric URD	3
	Sewer Gravity	2
	Sewer Pressure Main	1
	Sewer Manhole	2
	Water Main	1
	Water Main Reclaimed	1
	Storm Water Pipe	1
	Fibre Optic Network	7
Land quality		
	AcidSoil HighRisk	4
	AcidSoil LowRisk	2
	AcidSoil Disturbed Land	1
	Contaminated land type A	5
	Contaminated land type B	3
Flood zones		
	Flood 100year	3
Protected Habitat		
	Fish Habitat	3
	Koala PoM	5
	Koala Site Records	5
Land ownership		
	Freehold Urban	5
	Freehold Rural	3
	Council	1
	Government Agency	3
	Crown	3
	State Forest	10
Road Hierarchy		
	Local	2
	Collector	4
	Sub Arterial	5
	Arterial	6
	Major	7
Electric Hierarchy		
	Low Voltage	1
	11kV	3
	33kV	3
	132kV	5
Protected Vegetation Areas		
	EEC Vegetation Cover	7
	SEPP14 Vegetation Cover	7

Revised Weighted Criteria Summary

Constriant Subject	Item (Sub set)	Weighting (out of 10)
Utilities		
	Electric Pole	2
	Electric Street Light	2
	Electric Sub Station	3
	Electric URD	3
	Sewer Gravity	3
	Sewer Pressure Main	1
	Sewer Manhole	2
	Water Main	1
	Water Main Reclaimed	1
	Storm Water Pipe	1
	Fibre Optic Network	6
Land quality		
	AcidSoil HighRisk	4
	AcidSoil LowRisk	2
	AcidSoil Disturbed Land	1
	Contaminated land type A	5
	Contaminated land type B	3
Flood zones		
	Flood 100year	3
Protected Habitat		
	Fish Habitat	3
	Koala PoM	3
	Koala Site Records	5
Land ownership		
	Freehold Urban	5
	Freehold Rural	3
	Council	1
	Government Agency	3
	Crown	3
	National Park	10
Road Hierarchy		
	Local	2
	Collector	4
	Sub Arterial	5
	Arterial	6
	State Highway	7
Electric Hierarchy		
	Low Voltage	1
	11kV	3
	33kV	3
	132kV	5
Protected Vegetation Areas		
	EEC Vegetation Cover	7
	SEPP14 Vegetation Cover	7

The outputs of the MCA were displayed visually so that critical areas could immediately be identified. Each option was modelled and the outcomes extracted as noted within the MCA report, which can be seen in the following Figures 10-14.

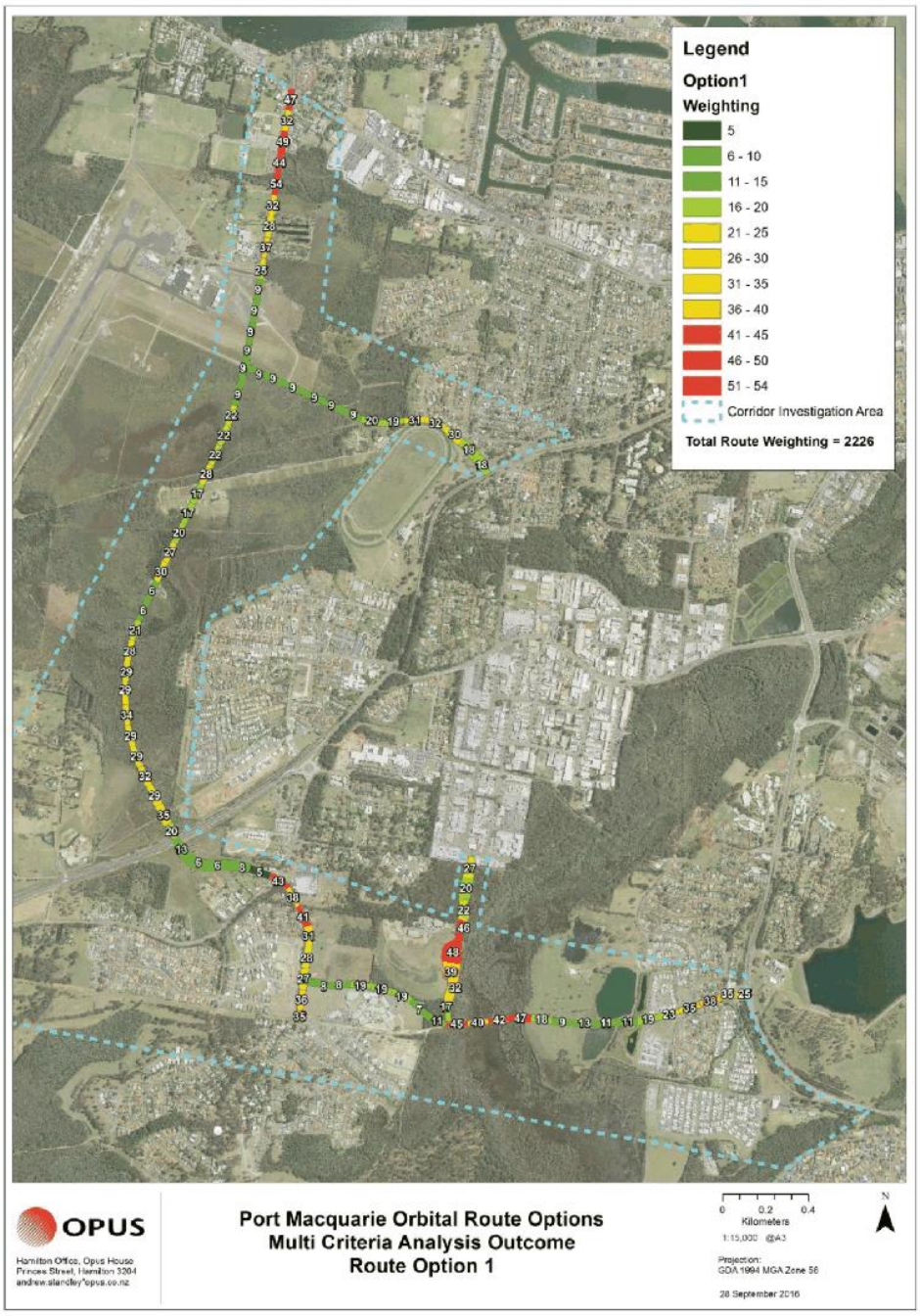

Figure 12: Route Option 1 Multi Criteria Constraint Weighting

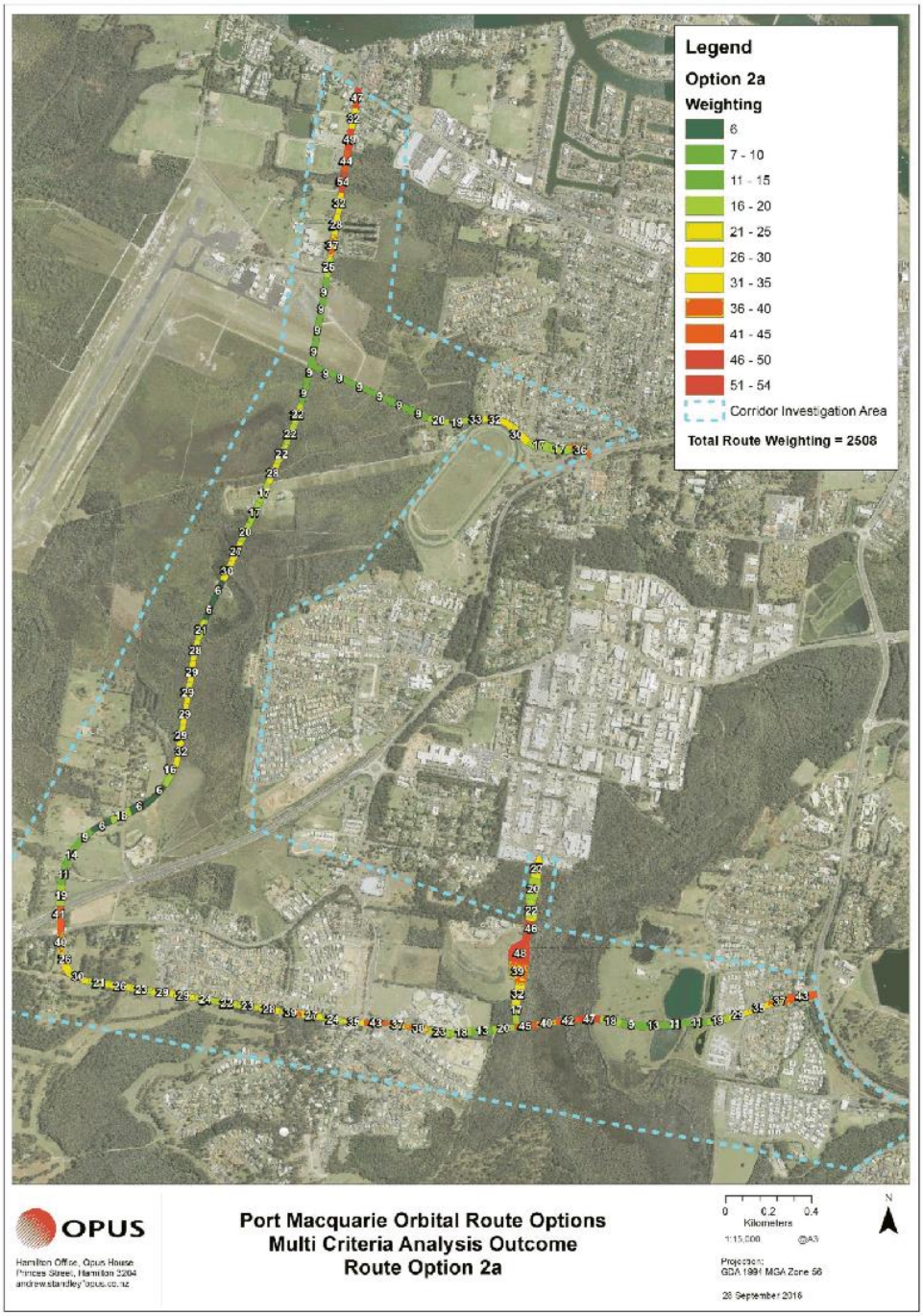

Figure 13: Route Option 2a Multi Criteria Constraint Weighting

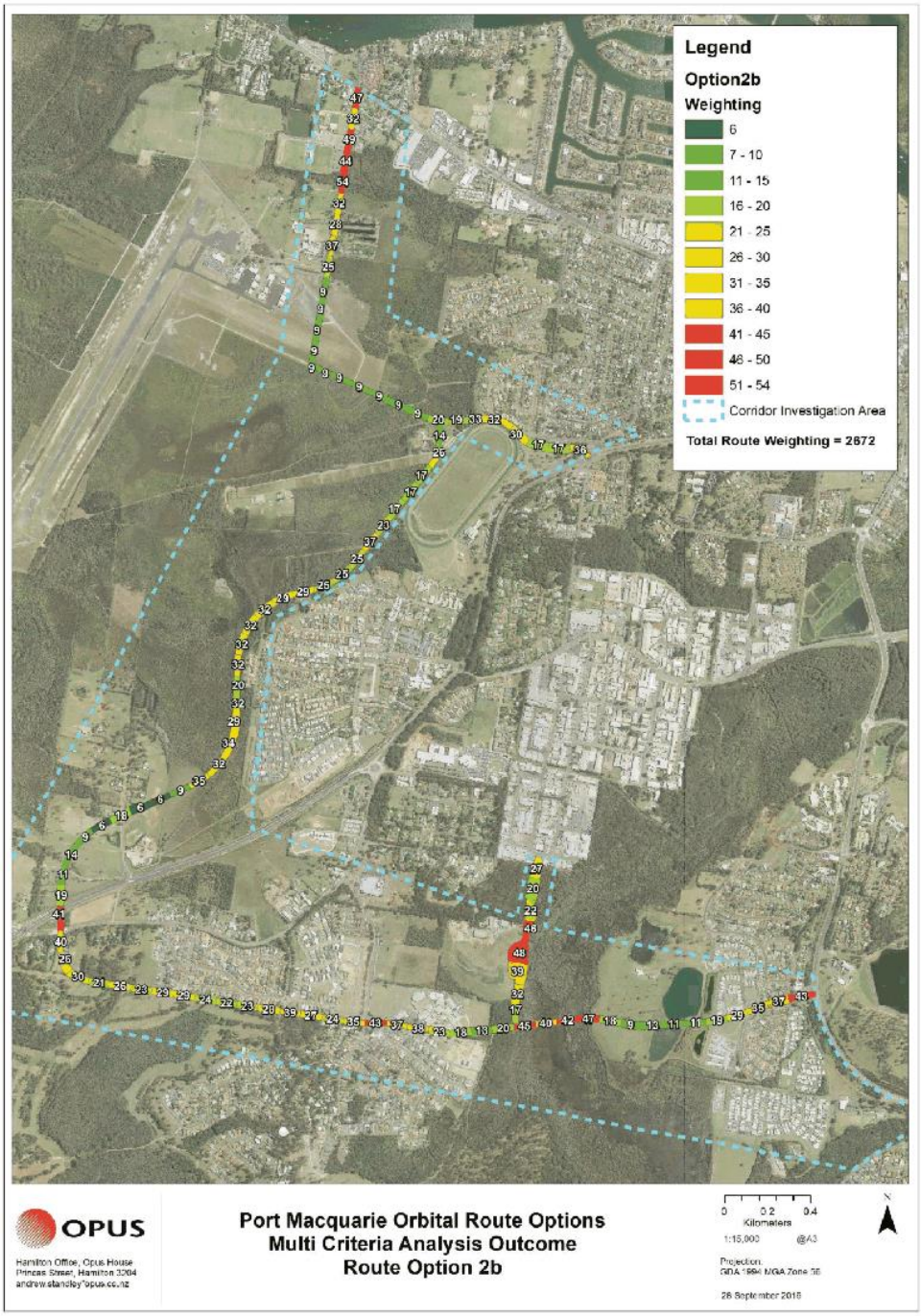

Figure 14: Route Option 2b Multi Criteria Constraint Weighting

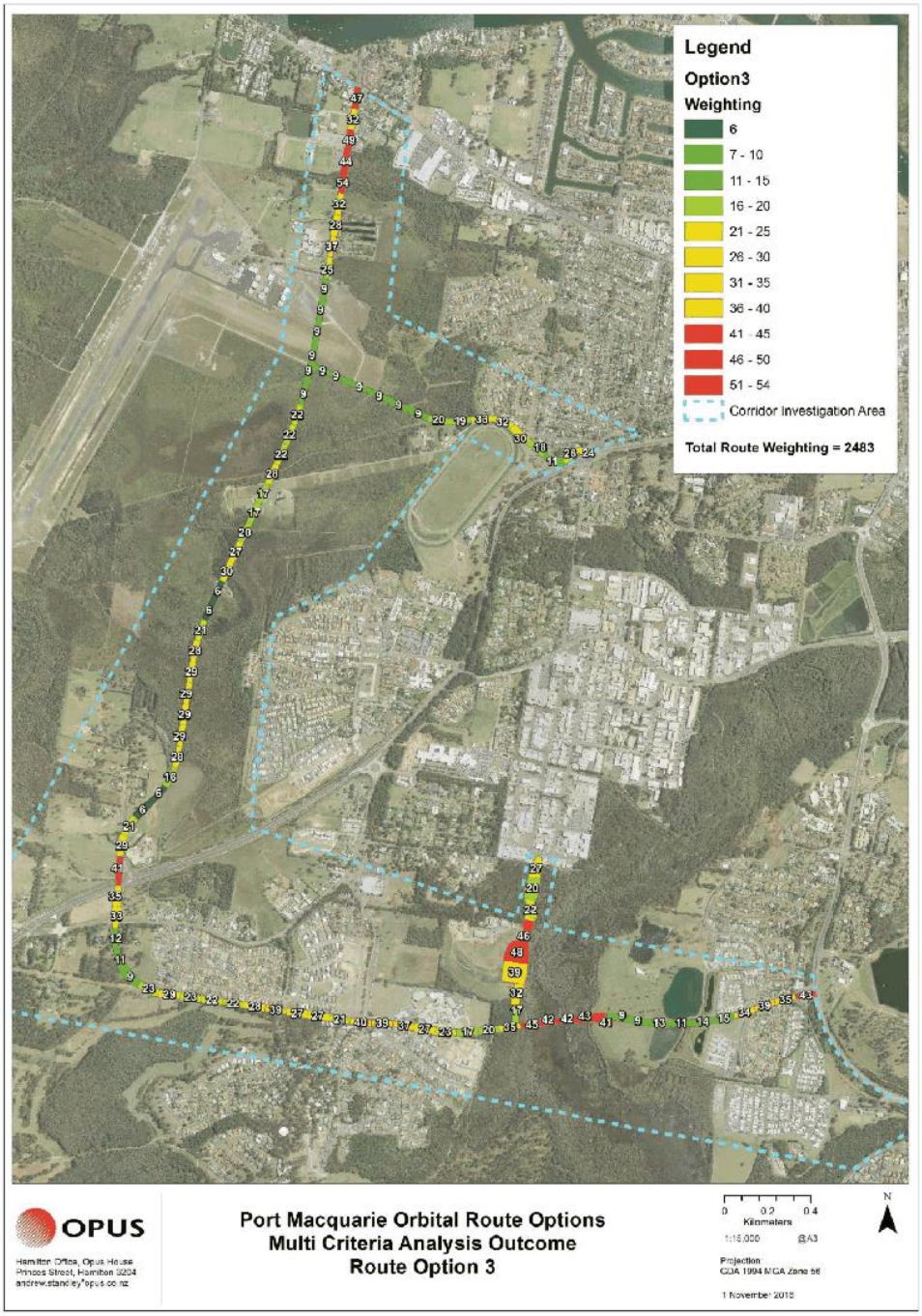

Figure 15: Route Option 3 Multi Criteria Constraint Weighting

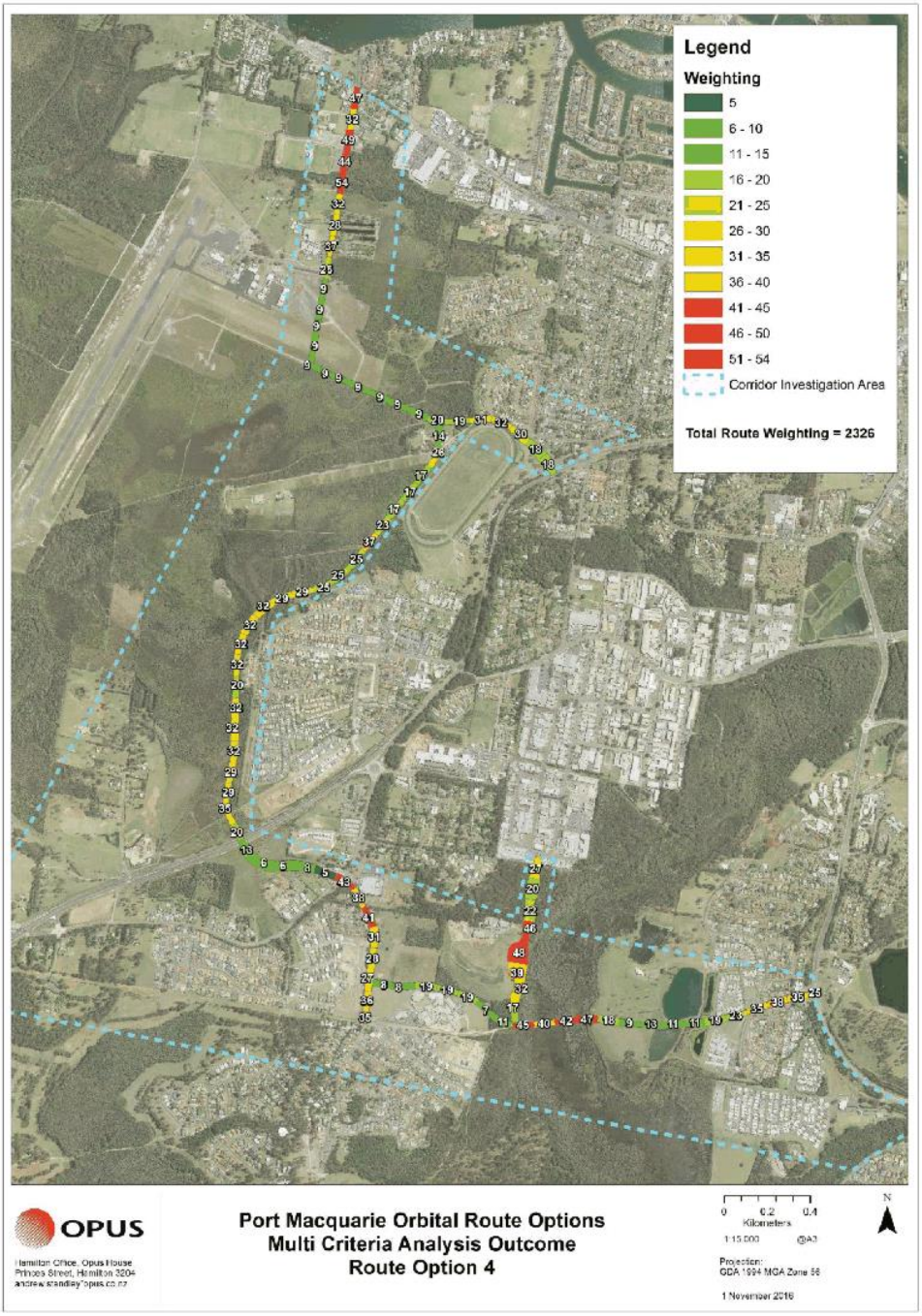

Figure 16: Route Option 4 Multi Criteria Constraint Weighting

5.2.1 MCA Outcomes

With reference to Figure 17 below, the chart represents a summary of total weighted constraint values for each of the multi criteria route options shown in **Figure 12** through **Figure 16**

As can be seen (according to the MCA), Option 1 has the lowest total weighted constraints score and hence the most favourable option to consider. Option 3 has the largest total weighted constraints score, identifying this route as the most constrained and hence, least preferred.

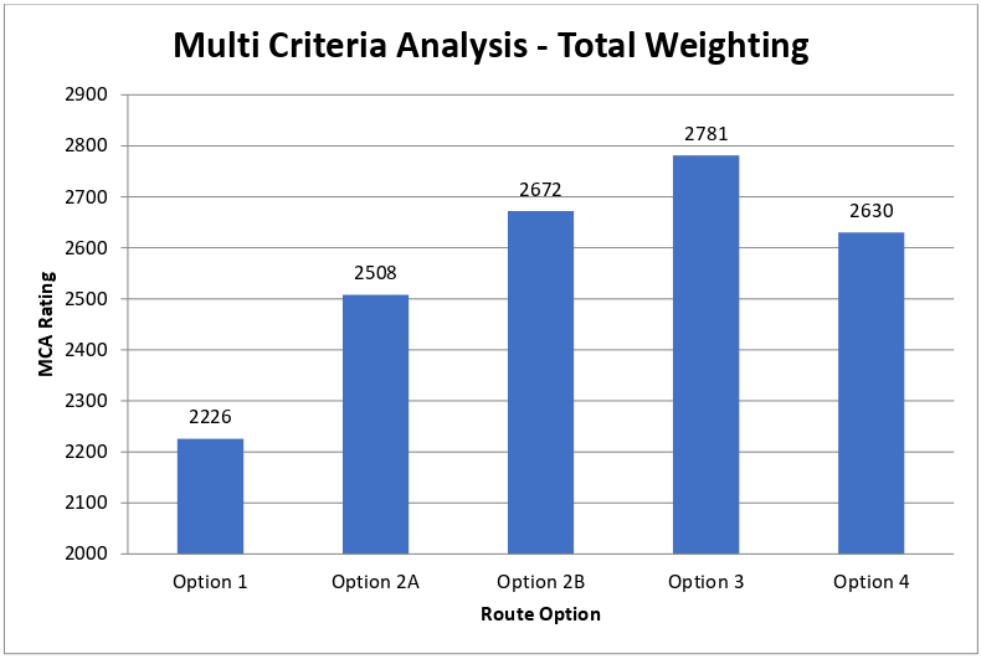

Figure 17- Multi-Criteria Analysis – Weighting

5.3 Cost Estimation

The cost estimate for each alignment option was prepared in accordance with RMS "Project Estimating for the Strategic Stage".

The format of building up the overall estimate was to price the routes in separable parts whereby common parts for multiple options could be combined. The cost estimates have made allowances for:

- Concept Development costs;
  - Concept design;
  - Design development including route optioneering;
  - EIS development with community liaison;
- Detail Design & Documentation costs;
  - Investigation works;
  - Design;
- Property Acquisition costs;
- Utility Adjustment costs;
- Infrastructure Construction costs;
  - Production or construction of base infrastructure;
  - Environmental works;
- Finalisation costs; and
- Contingency.

5.3.1 Key facts

A summary of the strategic cost estimates for each option is provided in Table 4 below. For the purpose of comparison, these estimates include contingency allowances and assume the Ocean Drive tie-in is via Greenmeadows Drive.

Table 4

Route Option	Road Length (km)	Estimated Costs - EX-GST ($M)
Option 1	8.6	$875 M
Option 2a	9.5	$1,025 M
Option 2b	9.8	$1,000 M
Option 3	9.0	$950 M
Option 4	8.8	$850 M

It should be noted that, of the estimates calculated in Table 4, is that that the cost logically include those for the National Park crossing, and but also the Greenmeadows Drive tie-in with Ocean Drive option. The Ocean Drive tie-in a Greenmeadows Drive was included within the optioneering estimates (as noted in Table 4) this was the cheaper of the two potential tie-in points. The cost differences are shown in Table 5 below. Similarly, its should be noted that the National Park crossing and Ocean Drive tie-in section of the Orbital Road accounts for nearly 35% of the overall project costs, which is primarily due to the sensitivity of the National Park crossing route and the assumed need for a viaduct along the entire section.

Table 5

Route Option	Road Length (km)	Estimated Costs - EX-GST ($M)
Ocean Drive tie-in: North of Maranatha Pl	1.5	$400 M
Ocean Drive tie-in: Greenmeadows Drive	1.3	$300 M

A full cost estimation report has been prepared separately and can be found within Appendix D.

6.0 Alignment Reviews Summary

6.1 Analytical Review

As noted throughout this report, the final element of in assessing the Engineering Feasibility of the Port Macquarie Orbital is to complete the Benefit Cost Analysis (BCA) and establish how an Orbital would function in the overall Port Macquarie environment. This was to be undertaken on the preferred option(s) in accordance with the AustRoad requirements, and where achievable, will adopt the requirements of the Transport for New South Wales Guide on Economic Appraisals.

In determining the preferred alignment, an initial simplistic overall score and ranking based on the Qualitative (MCA rank) and Quantitative (Economic rank) has been developed. This assumed both parts have equal weighting, and based on this, Table 6 has been developed:

Table 6

Route Option	Road Length (km)	Multi Criteria Analysis Total Weighted Score	Rank	Estimated Costs EX-GST ($M)	Rank	Overall Combined Score
Option 1/1A	8.6	2226	1	$875 M	2	3
Option 2a	9.5	2508	2	$1,025 M	5	7
Option 2b	9.8	2672	4	$1,000 M	4	8
Option 3	9.0	2781	5	$950 M	3	8
Option 4/4A	8.8	2630	3	$850 M	1	4

This analysis identified Option 1/1A and Option 4/4A are the preferred top two alignments.

6.2 Stakeholder Engagement

As well as the above, additional consideration was given to the outcomes of the initial stakeholder consultation. The Roads & Maritime Services (RMS) as well as Council own internal planning and engineering department representatives were consulted. A workshop was held on 18th October 2016, and the following key points were raised:

- RMS recommended that the preferred option should not have any impact on the existing Oxley Highway with additional on-grade intersections. Therefore, options 1A and 4A were preferred as they both incorporated grade a separated tie-in to the Oxley Highway;
- RMS stated that they did not recommend an intersection be located close to John Oxley Drive. This would have been the case for Options 2A and 2B; with Option 3 more viable;
- At the grade separated intersection with The Oxley Highway, Council noted that as an alternative, signals may provide a more cost-effective solution; however, RMS noted that this is not preferred, citing that with signals there are concerns about sufficient capacity and the ability to incorporate stacking. The foot print required may be prohibitive;
- When comparing the North/South link, be-it the Western route or Eastern route (adjacent to the existing town development) it was noted there is a requirement to link in with Airport corridors; and as such Option 4 requires additional intersection with Lady Nelson Drive; and
- Options that allowed for staged construction works/sections should be considered.

It was concluded that the RMS preference was to further consider Options 1/1A and Option 4/4A.

7.0 Preliminary Economic Appraisal (Strategic)

Following initial sensitivity analysis of the four proposed alignments, two alignments (Option 1 and Option 4) were considered for Strategic Benefit Cost Analysis (BCA). Given subsequent constraints associated with the available traffic modelling data, this analysis has been limited to the assessment of one alignment (Option 1) which will be segmented so as to review the impact of implements separate stages of the orbital. The appraisal measures the economic benefits generated and compares them to the expenditure required to implement the Options.

The alignment was broken down into three segments and seven model cases; comprising a Base Case, East-West link, North-South link and an Airport Access Link. These are identified within Figure 18.

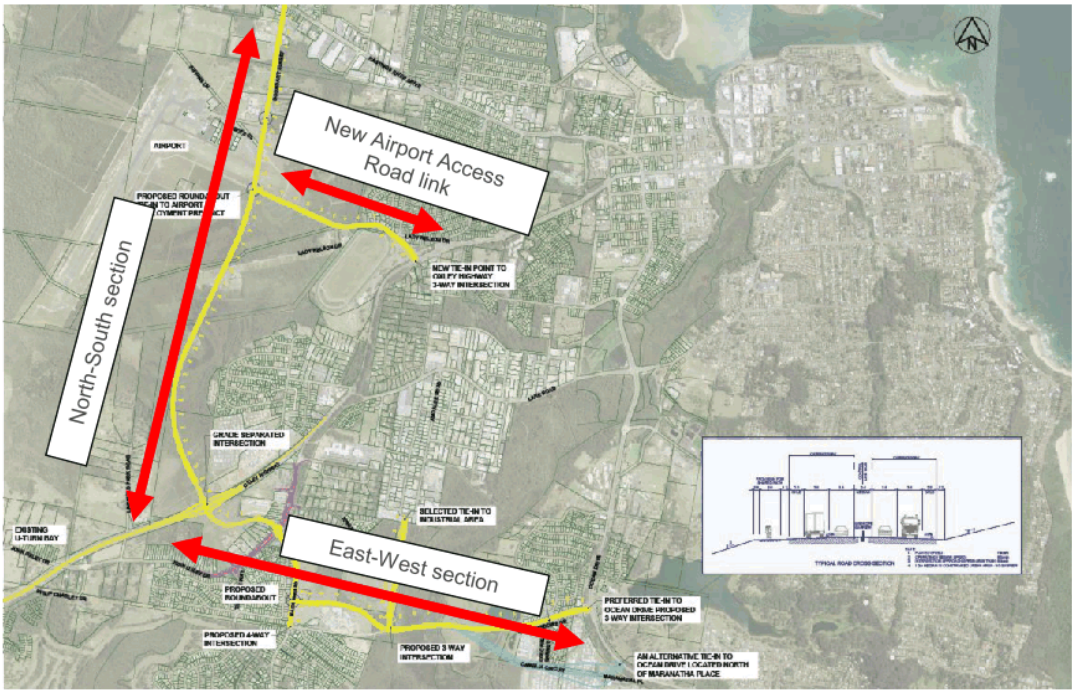

Figure 18 Preliminary Economic Appraisal section breakdown of the Orbital Route

All benefits have been established from traffic modelling output for each of the seven model cases, which was undertaken using a mesoscopic traffic model using the AIMSUN software. All traffic modelling data was provided to Opus by Council based on analysis undertaken by GHD for the Areas Wide Traffic Study, and the model output provided was used as direct input into this economic appraisal

The economic appraisal has been carried out according to New South Wales (NSW) Government guidelines, principally the document "Principles and Guidelines for Economic Appraisal of Transport Investment and Initiative, March 2016" (PGEATII). Project benefits and costs have been estimated for each of seven model cases, for the following elements:

- Travel time savings
- Vehicle operating cost savings
- Crash cost savings
- Avoided environment externality cost savings
- Capital construction and maintenance costs

The economic evaluation has shown that, compared to the do minimum Base Case all options tested have positive Benefit Cost Ratios (BCR) ratings, from 31.6 for Option 4 (New Airport Access Road link only) to 7.8 for Option 7 (full Orbital route plus New Airport Access Road link)

An incremental analysis has shown that when all links of the Orbital were incorporated, the greatest economic benefits for the capital cost invested was achieved. A number of sensitivity tests have also been undertaken, that all show positive BCR ratings (>1.0) and significantly positive NPV ratings are forecast under all sensitivity parameters tested.

It was noted that there appeared to be some unexpected trends when each scenario was compared to the base case individually, however this is likely a result of the constrained traffic modelling data available.

Consequently, it is recommended that the next stage of the project would require a more detailed traffic impact analysis to be carried out. This would enable a more robust basis for providing output for a further cost-benefit analysis exercise which would provide further refined results to those presented in this economic appraisal.

The full detailed Preliminary Economic Appraisal Report can be found within Appendix E.

8.0 Conclusions

The conclusions and preferences that can be drawn from the Engineering Feasibility Investigation is that in principle, the project is economically viable. Undertaking an assessment of the environmental constraints, engineering requirements, assessment of the severity of know mapped issues and the overall strategic cost estimation; resulted in an overall ranking for each Alignment.

Of these Option 1/1A was first overall, scoring the highest ranking in MCA analysis and 2nd highest in the economic analysis. Option 4/4A was second overall, ranking 3rd in the MCA analysis but highest in the economic review.

Consultation with RMS was also considered, providing practical feedback, with the intention to understand any potential early clashes in philosophy. As noted above, the overall preference was to progress with Option 1/1A and Option 4/4A.

It has been concluded through the Preliminary Economic Assessment that, compared to the do minimum Base Case (i.e. no implementation of an Orbital for Port Macquarie), all options/alignment variants tested have positive Benefit Cost Ratios (BCR) ratings demonstrating at the strategic level, in principle, the viability of this new road link.

This report has documented the process of the Engineering Feasibility Investigation for an Orbital for Port Macquarie.

As an outcome of this report, it is recommended that Council now consider the next stages to the development of the proposed Orbital further.

This would entail the following of the New South Wales State Government, Infrastructure New South Wales Project Assurance Framework. Key is the development of the Strategic Business Case, which would incorporate outlining the findings to date as well as completing project specific Traffic Studies, detailed environmental investigations and associated project concept design work. It would also include the outcomes of stakeholder consultation which would typically contain, as a minimum, community and local groups, the RMS, infrastructure bodies (TfNSW), the Office of Environment and Heritage (OEH), the NSW department if Planning & Environment as well as the relevant fund stream bodies.

Appendix A – Alignment Options Drawings

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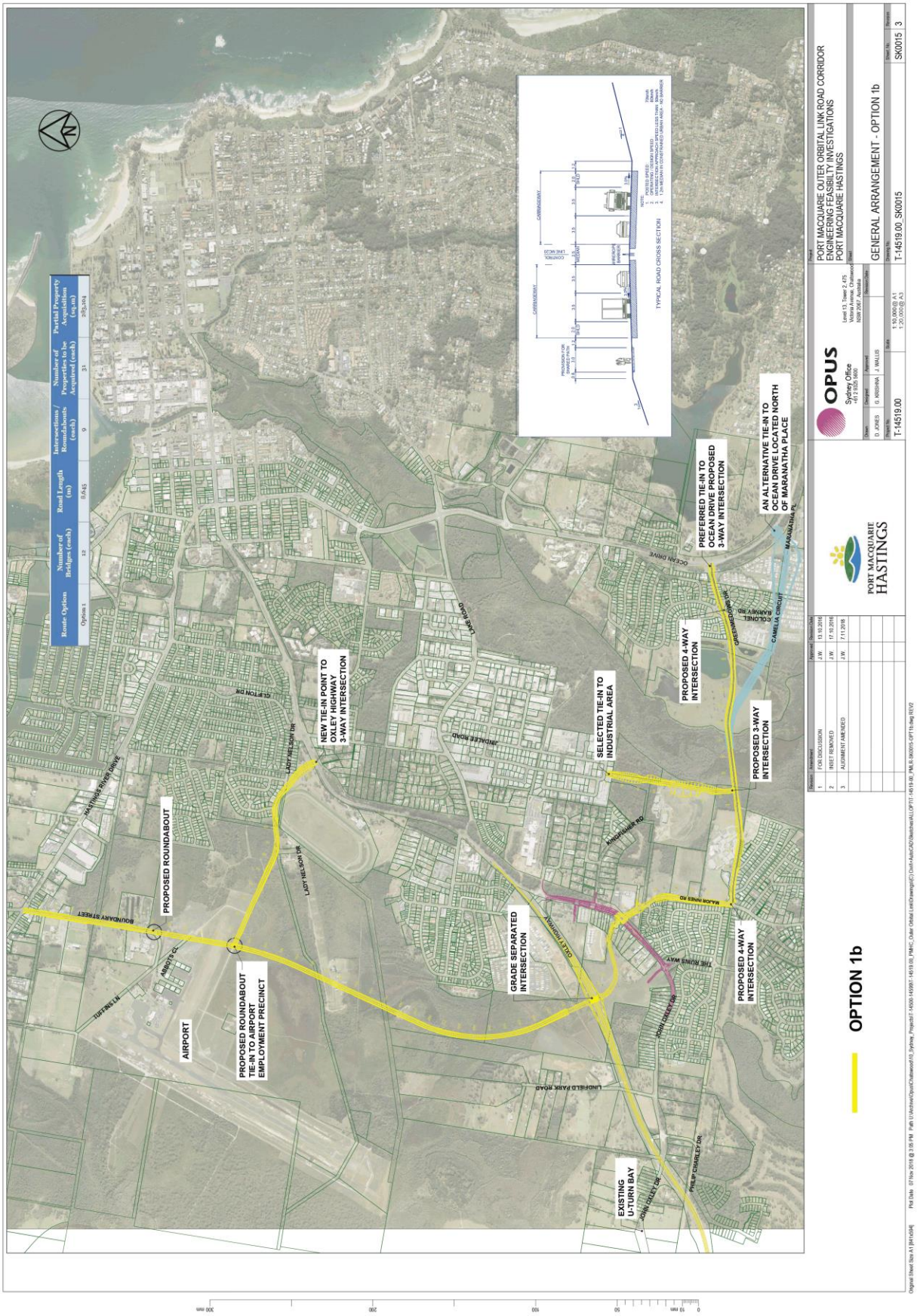
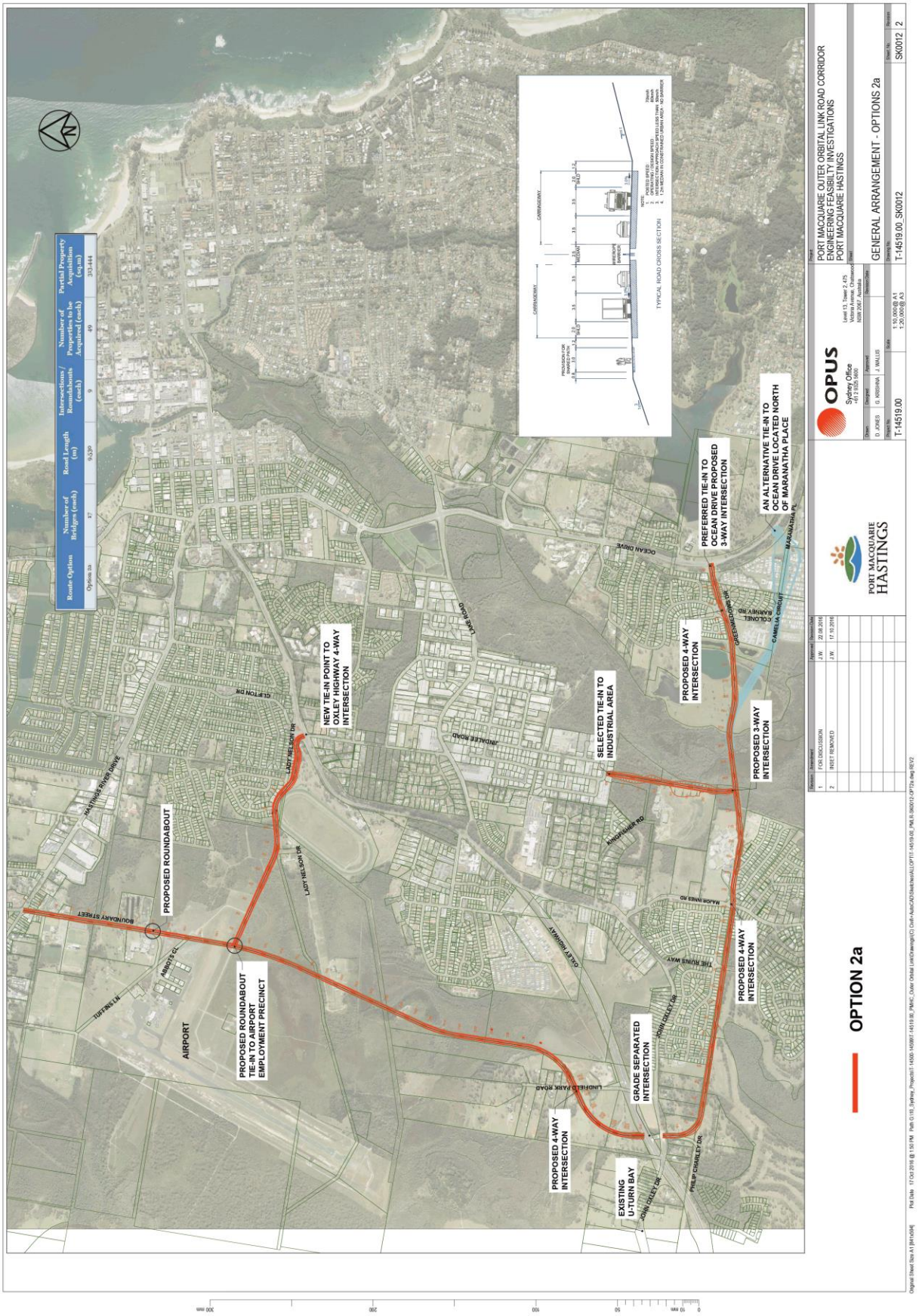


Route Option	Number of Bridges (each)	Road Length (m)	Intersections / Roundabouts (each)	Number of Properties to be Acquired (each)	Partial Property Acquisition (sq.m)
Option 1	12	8,645	9	31	283,104


Route Option | Number of Bridges (each) | Road Length (m) | Intersections / Roundabouts (each) | Number of Properties to be Acquired (each) | Partial Property Acquisition (sq.m)
Option 2a | 37 | 9,320 | 9 | 49 | 325,444
PROPOSED ROUNDABOUT
PROPOSED ROUNDABOUT TIE-IN TO AIRPORT EMPLOYMENT PRECINCT
AIRPORT
NEW TIE-IN POINT TO OXLEY HIGHWAY 4-WAY INTERSECTION
SELECTED TIE-IN TO INDUSTRIAL AREA
PROPOSED 4-WAY INTERSECTION
PREFERRED TIE-IN TO OCEAN DRIVE PROPOSED 3-WAY INTERSECTION
AN ALTERNATIVE TIE-IN TO OCEAN DRIVE LOCATED NORTH OF MARANATHA PLACE
PROPOSED 3-WAY INTERSECTION
PROPOSED 4-WAY INTERSECTION
GRADE SEPARATED INTERSECTION
PROPOSED 4-WAY INTERSECTION
EXISTING U-TURN BAY
TYPICAL ROAD CROSS SECTION
OPTION 2a
OPUS
PORT MACQUARIE HASTINGS
PORT MACQUARIE OUTER ORBITAL LINK ROAD CORRIDOR
PRELIMINARY FEASIBILITY INVESTIGATIONS
PORT MACQUARIE HASTINGS
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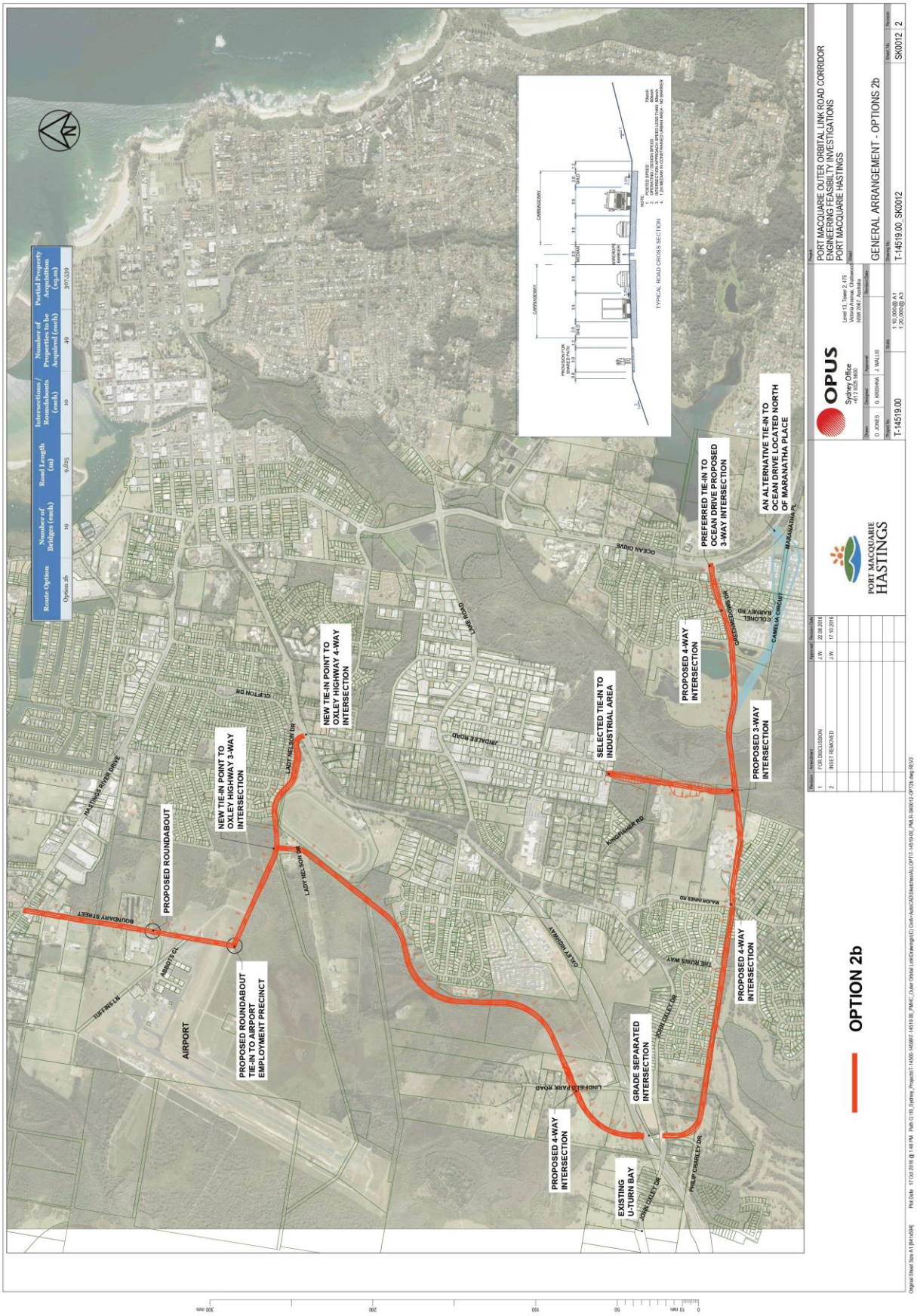
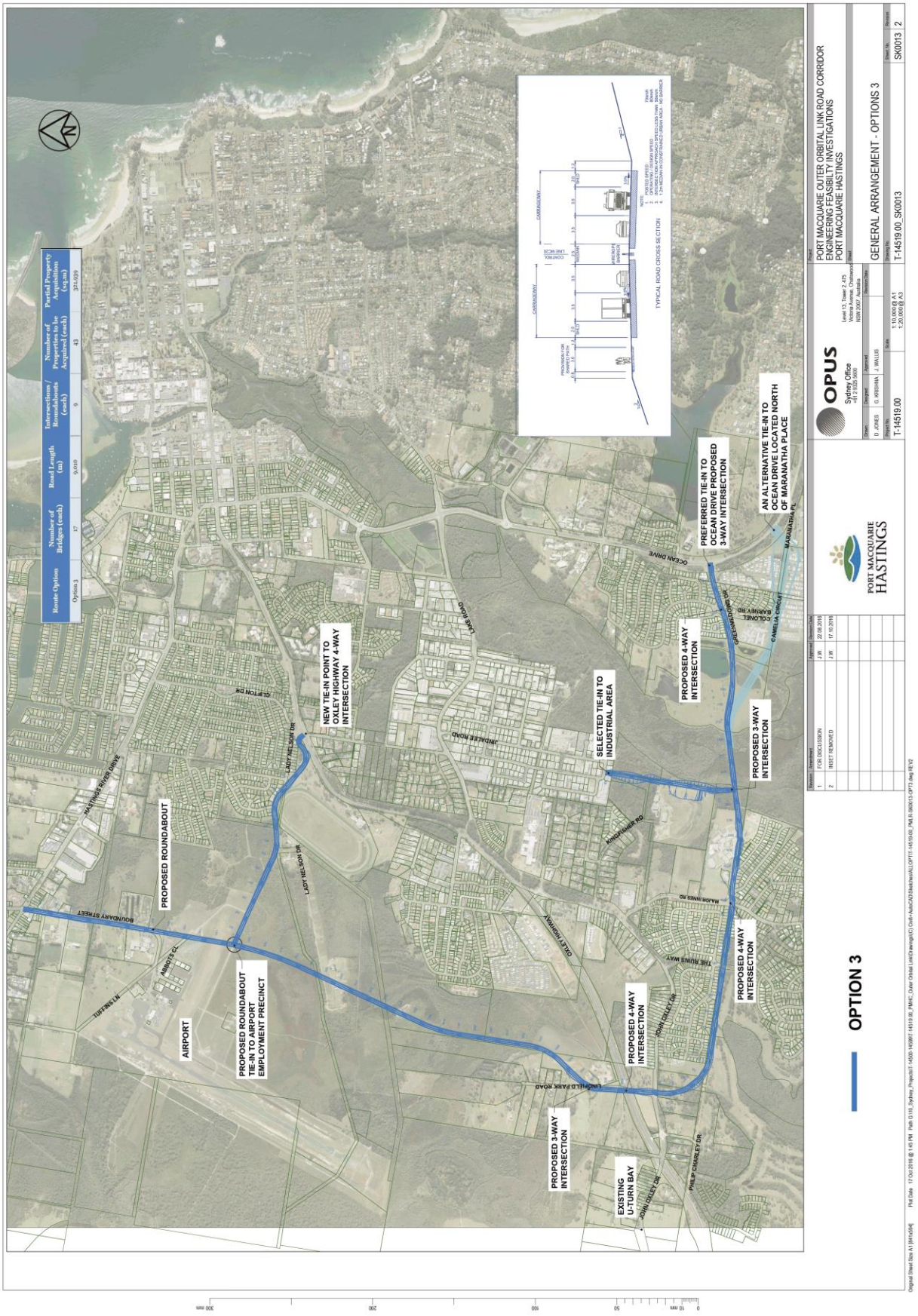


Route Option	Number of Bridges (each)	Road Length (m)	Intersections / Roundabouts (each)	Number of Properties to be Acquired (each)	Partial Property Acquisition (sq.m)
Option 2b	19	9,825	20	49	307,539


Route Option | Number of Bridges (each) | Road Length (m) | Intersections / Roundabouts (each) | Number of Properties to be Acquired (each) | Partial Property Acquisition (sqm)
Option 3 | 17 | 9,010 | 9 | 43 | 321,659
TYPICAL ROAD CROSS SECTION
PROPOSED ROUNDABOUT
NEW TIE-IN POINT TO OXLEY HIGHWAY 4-WAY INTERSECTION
SELECTED TIE-IN TO INDUSTRIAL AREA
PREFERRED TIE-IN TO OCEAN DRIVE PROPOSED 3-WAY INTERSECTION
AN ALTERNATIVE TIE-IN TO OCEAN DRIVE LOCATED NORTH OF MARANATHA PLACE
PROPOSED 4-WAY INTERSECTION
PROPOSED 3-WAY INTERSECTION
PROPOSED 4-WAY INTERSECTION
PROPOSED ROUNDABOUT TIE-IN TO AIRPORT EMPLOYMENT PRECINCT
AIRPORT
PROPOSED 4-WAY INTERSECTION
PROPOSED 3-WAY INTERSECTION
EXISTING U-TURN BAY
OPTION 3
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PORT MACQUARIE HASTINGS
PORT MACQUARIE OUTER ORBITAL LINK ROAD CORRIDOR
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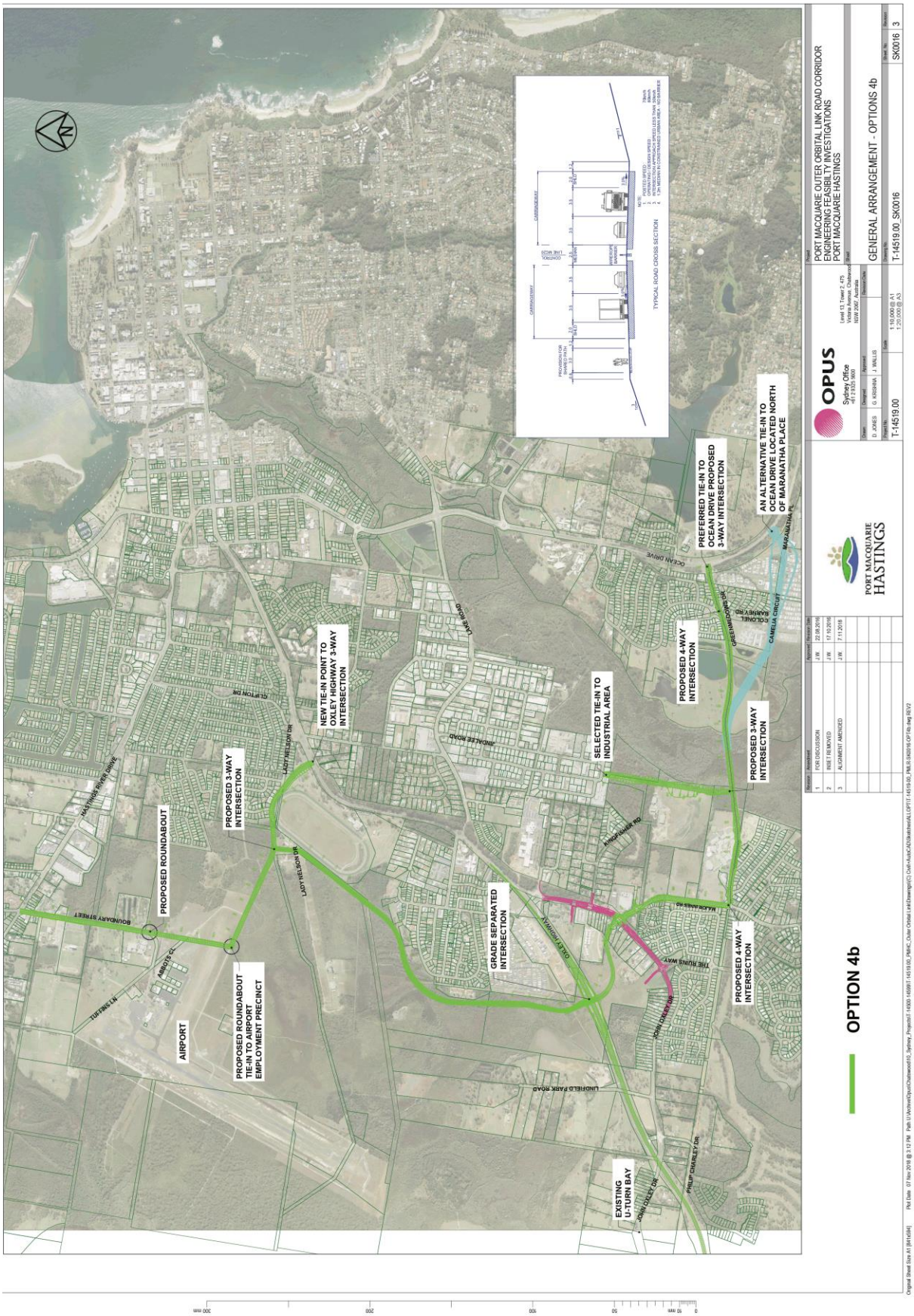
PROPOSED ROUNDABOUT
PROPOSED 3-WAY INTERSECTION
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PROPOSED 4-WAY INTERSECTION
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AIRPORT
EXISTING U-TURN BAY
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ENGINEERING FEASIBILITY INVESTIGATIONS
PORT MACQUARIE HASTINGS
GENERAL ARRANGEMENT - OPTIONS 4b
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3

Appendix B – Preliminary Environmental Assessment

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OPUS

Preliminary Environmental Assessment Port Macquarie Orbital Link Road

Prepared for:

Port Macquarie Hastings Council

Preliminary Environmental Assessment

Port Macquarie Orbital Link Road

Prepared for:

Port Macquarie Hastings Council

Prepared By

Hunter Brownscombe
Principal Environmental Consultant

Approved for Release By

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Date: 17 August 2016

Reference: T-14519.00

Status: Final

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Executive Summary

Opus International Consultants (Australia) Pty Ltd (Opus) has been engaged by Port Macquarie Hastings Council (Council) to prepare a Preliminary Environmental Assessment (PEA) of the proposed Outer Orbital Link Road (OOLR) project. The PEA identifies potential impacts associated with the construction of the project. The OOLR will connect Hastings River Drive via the Port Macquarie airport to the Oxley Highway and Ocean Drive, Port Macquarie, New South Wales.

This PEA has identified that the following environmental constraints will need to be considered during the design and development of the OOLR:

- The Lake Innes Nature Reserve and Environmental Conservation Zones;
- SEPP 14 and 71 Wetlands;
- Potential presence of listed threatened species listed under the *Environment Protection and Biodiversity Conservation Act 1999;*
- Four endangered ecological communities and potential presence of species listed under the *Threatened Species Conservation Act 1995;*
- Aboriginal Heritage;
- Non-Aboriginal Heritage;
- Contaminated Sites; and
- Wetlands and Priority Oyster Areas.

Of the environmental constraints listed above, the presence of the Lake Innes Nature Reserve and SEPP 14 Wetlands, the presence of endangered ecological communities under the *Threatened Species Conservation Act 1995* and the potential presence of listed threatened species under the *Environment Protection and Biodiversity Conservation Act 1999* have been identified as posing major constraints to the development of the OOLR.

The actions required by Council to ensure that due consideration is given to the above constraints will depend on the planning approval process that is found to be the most appropriate for the development. The development may be assessed as regional development under Part 4 of the EP&A Act. However, consultation with government agencies has indicated that, due to the size of the project and the potential for the project to impact a range of environmental values, including matters of State or National interest, the regional development, or state significant infrastructure approval pathways may apply. The approval pathway will depend on the final design, scope, and costs associated with the development and should be guided by consultation between Council and the Assessments Branch of the New South Wales Department of Planning and Environment (DP&E). Council should seek advice from the Assessments Branch of DP&E as a matter of priority in order to confirm an early determination of the project classification and approval pathway.

Consultation with State agencies including DP&E, New South Wales Office of Environment and Heritage, NSW National Parks and Wildlife Service, and DPI Fisheries should also commence as a matter of priority. These tasks are necessary to confirm the State's statutory requirements for the development and whether the development triggers an Environmental Impact Statement (EIS) under State or Commonwealth legislation.

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1 Introduction

Opus International Consultants (Australia) Pty Ltd (Opus) have been engaged by Port Macquarie Hastings Council (Council) to prepare a Preliminary Environmental Assessment (PEA) to identify potential impacts associated with the construction of the proposed outer orbital link road (OOLR) connecting Hastings River Drive via the Port Macquarie airport to the Oxley Highway (approximately 4.5 km to the south east) and Ocean Drive (approximately 5 km to the south west), Port Macquarie, New South Wales.

This PEA includes descriptions and maps of environmental constraints found within the Corridor Investigation Area (CIA) for the proposed OOLR. The CIA includes the area to be considered for the project feasibility assessment. The aim of the PEA is to:

- identify areas within the CIA that will require detailed environmental or ecological assessment if they are to be impacted by construction of the OOLR;
- identify areas within the CIA to avoid disturbing based on their environmental value;
- identify permit and licence requirements that are likely to be associated with the construction;
- prepare maps that will guide selection of the final footprint of the OOLR by identifying environmental constraints associated with various route options for the OOLR; and
- provide recommendations for further environmental assessments required to ensure that potential environmental impacts of the proposed OOLR are either avoided or minimised.

1.1 Purpose of the PEA

The OOLR is an important component of Port Macquarie's future road network as it will alleviate current pressure on the road network and supply infrastructure for the predicted increase in traffic volumes. A feasibility study is required to identify whether the link road option is feasible in terms of physical factors such as topography, land ownership and environmental constraints. This PEA is to address the environmental constraints associated with construction of the link road, to identify any constraints that will reduce the feasibility of the link road and to guide design options for the link road that will have the least environmental impacts.

1.2 Project location

The CIA for the proposed works is shown in **Figure 1-1** and the project location in a regional context is shown in **Figure 1-2**.

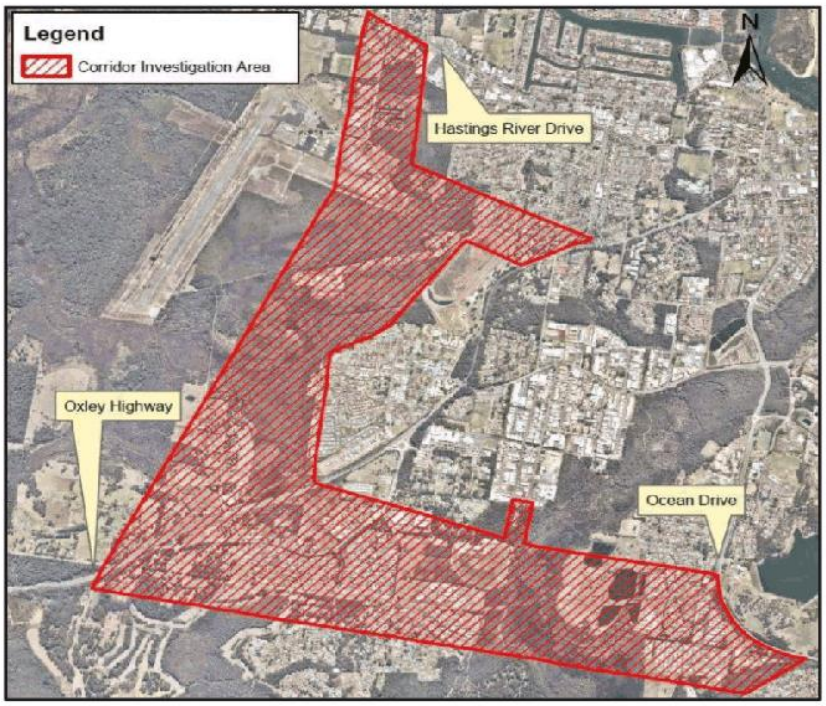


Figure 1-1 Proposed CIA connecting Hastings River Drive via the airport to the Oxley Highway and Ocean Drive, Port Macquarie, New South Wales

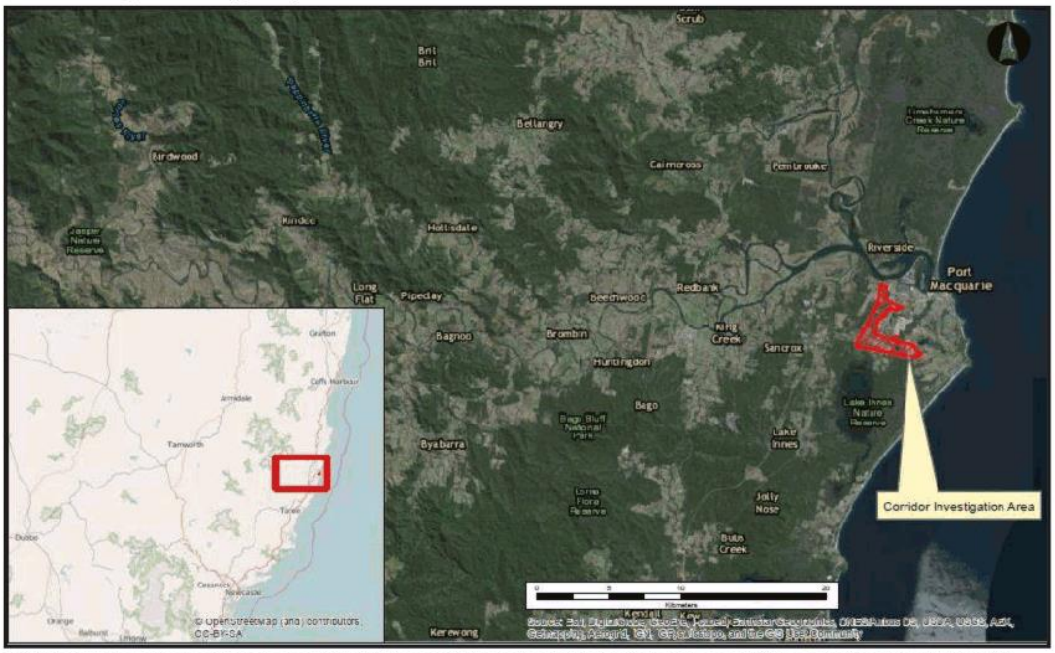


Figure 1-2 Location of proposed OOLR in a relation to surrounding areas and regional context (inset)

2 Desktop Environmental Assessment

A desktop study was conducted to identify environmental constraints that are associated with the CIA. This involved searches of the relevant databases, government information sources, maps and Environmental Planning Instruments (EPIs) including:

- Commonwealth Department of the Environment (DotE) *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Search Tool (PMST) to identify matters protected under the EPBC Act;
- DotE Species Profiles and Threats Databases;
- DotE Australian Heritage Database;
- Office of Environment and Heritage (OEH) BioNet Wildlife Atlas data records;
- OEH Threatened Species Profiles;
- OEH SIXMaps Vegetation Layer;
- OEH Aboriginal Heritage Information Management Systems;
- OEH NSW State Heritage Register;
- State Environmental Planning Policy (SEPP) 14 and maping;
- SEPP 71 and mapping;
- NSW Environmental Protection Authority (EPA) Contaminated Land Record;
- NSW EPA List of Contaminated Sites Notified to the EPA; and
- Council's LEP.

2.1 EPBC Act Protected Matters Search

Table 2-1 shows results of a search of the DotE *Environment Protection and Biodiversity Conservation Act 1999* (EPBC) Protected Matters Search Tool (PMST) conducted on 11 January 2016 for a five kilometre buffer around the CIA. **Figure 2-1** shows the area considered in the PMST search and the results of the search are included in **Appendix C**.

Table 2-1: Results of EPBC Protected Matters Search

Matters of National Environmental Significance	Number of items within search area
World Heritage Properties	None
National Heritage Places	None
Wetlands of International Importance	None
Great Barrier Reef Marine Park	None
Commonwealth Marine Areas	None
Listed Threatened Ecological Communities	3
Listed Threatened Species	54
Listed Migratory Species	66
Commonwealth Land	5
Commonwealth Heritage Places	None
Listed Marine Species	82

Matters of National Environmental Significance	Number of items within search area
Whales and Other Cetaceans	14
Critical Habitats	None
Commonwealth Reserves Terrestrial	None
Commonwealth Reserves Marine	None

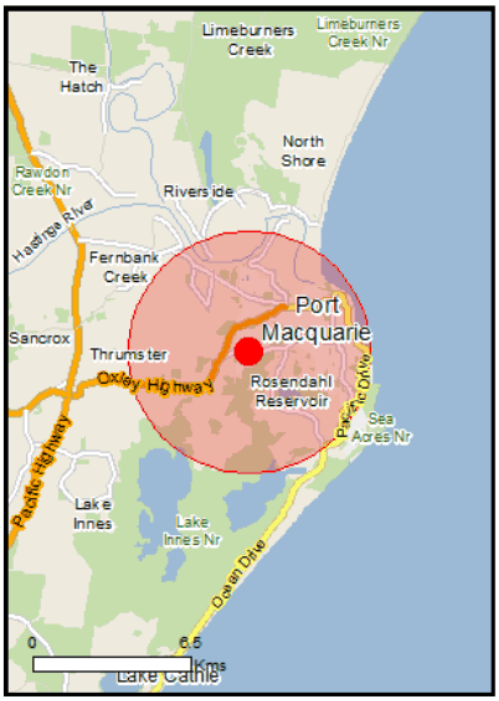


Figure 2-1: PMST buffer area with a 5 km radius

2.1.1 Listed threatened ecological communities

The three threatened ecological communities (TECs) identified during the PMST search are listed in **Table 2-2**.

Table 2-2: Threatened ecological communities identified using PMST

Threatened Ecological Community	Status	Likelihood of occurrence	Description
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia (Littoral Rainforest)	Critically Endangered	Likely to occur	This community includes over 70 threatened plants and animals and provides an important buffer to coastal erosion and wind damage. Vegetation in the community is typically closed canopy, structurally diverse with native trees, shrubs, vines and ground layers all potentially being present (DotE 2015b; DotE 2011a).

Threatened Ecological Community	Status	Likelihood of occurrence	Description
			The community is typically found within 2 km of the coast or adjacent to large bodies of salt water on the east coast of Australia. Further information about this community can be found in (DotE 2011a)
Lowland Rainforest of Subtropical Australia (Lowland Rainforest)	Critically Endangered	May occur	Primarily occurs from Maryborough in Queensland to Clarence River in New South Wales with isolated areas between the Clarence and Hunter Rivers including the Hastings Valley (DotE 2011b). Occurs on basalt and alluvial soils as well as floodplain alluvia in areas < 300 m above sea level with high annual rainfall (> 1,300 mm). Community differs from Littoral Rainforest by the level of coastal or estuarine influence (such as windshear) and distance from the coast (generally > 2 km however is known to intergrade with Littoral Rainforest in some coastal areas. Has the most diverse tree flora of any vegetation type in NSW, is generally to moderately tall (> 20 m to > 30 m), with closed, multilayered canopy.
Subtropical and Temperate Coastal Saltmarsh (Coastal Saltmarsh)	Vulnerable	Likely to occur	This community consists mainly of salt-tolerant vegetation (halophytes) including: grasses, herbs, sedges, rushes and shrubs. Succulent herbs, shrubs and grasses generally dominate and vegetation is generally of less than 0.5 m height. (DotE 2013). Occurs within a relatively narrow margin of the Australian coastline under regular or intermittent tidal influence. Mainly associated with soft substrate shores of estuaries and embayments and on some open, low wave energy coasts.

2.1.2 Listed threatened species

Threatened species are protected as MNES under the EPBC Act. The PMST report lists 27 threatened bird species, one threatened fish species, one threatened frog species, eight threatened mammal species, nine threatened plant species, five threatened reptile species and three threatened shark species that are known to, likely to, or may occur or whose breeding or foraging habitat is likely to occur within five kilometres of the CIA. These species are listed in **Table 2-3**. *Pteropus poliocephalus*, the vulnerable grey-headed flying fox and *Phascolarctos cinereus* koalas have both been listed, and known to occur as being associated with the area.

Table 2-3: Species identified in PMST potentially occurring in the vicinity of the CIA

Scientific name	Common name	Status	Likelihood of occurrence
Birds			
Anthochaera phrygia	Regent Honeyeater	Critically Endangered	Species or species habitat known to occur within area
Botaurus poiciloptilus	Australasian Bittern	Endangered	Species or species habitat known to occur within area
Dasyornis brachypterus	Eastern Bristlebird	Endangered	Species or species habitat likely to occur within area
Grantiella picta	Painted Honeyeater	Vulnerable	Species or species habitat may occur within area

Scientific name	Common name	Status	Likelihood of occurrence
Lathamus discolor	Swift Parrot	Endangered	Species or species habitat likely to occur within area
Numenius madagascariensis	Eastern Curlew	Critically Endangered	Roosting known to occur within area
Rostratula australis	Australian Painted Snipe	Endangered	Species or species habitat may occur within area
Fish			
Epinephelus daemelii	Black Rockcod, Black Cod, Saddled Rockcod	Vulnerable	Species or species habitat likely to occur within area
Amphibians			
Litoria aurea	Green and Golden Bell Frog	Vulnerable	Species or species habitat likely to occur within area
Mammals			
Chalinolobus dwyeri	Large-eared Pied Bat, Large Pied Bat	Vulnerable	Species or species habitat likely to occur within area
Dasyurus maculatus (SE mainland population)	Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (south eastern mainland population)	Endangered	Species or species habitat known to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)	Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)	Vulnerable	Species or species habitat known to occur within area
Pseudomys novaehollandiae	New Holland Mouse, Pookila	Vulnerable	Species or species habitat likely to occur within area
Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	Roosting known to occur within area
Plants			
Acronychia littoralis	scented acronychia	Endangered	Species or species habitat likely to occur within area
Allocasuarina defungens	dwarf heath casuarina	Endangered	Species or species habitat known to occur within area
Arthraxon hispidus	hairy-joint grass	Vulnerable	Species or species habitat may occur within area
Cryptostylis hunteriana	leafless tongue-orchid	Vulnerable	Species or species habitat likely to occur within area
Cynanchum elegans	white-flowered wax plant	Endangered	Species or species habitat likely to occur within area
Euphrasia arguta	-	Critically Endangered	Species or species habitat may occur within area
Melaleuca biconvexa	biconvex paperbark	Vulnerable	Species or species habitat known to occur within area
Phaius australis	lesser swamp-orchid	Endangered	Species or species habitat may occur within area
Thesium australe	Austral toadflax, toadflax	Vulnerable	Species or species habitat likely to occur within area

2.1.3 Listed migratory species

The PMST report lists 19 migratory marine birds, 19 migratory marine species, seven migratory terrestrial species and 21 migratory wetlands species that either are known to, likely to, or may occur or whose roosting, foraging, feeding or related habitats are known, likely, or may occur in the area. Therefore, there is potential for the works to impact migratory wetland bird species or their habitats.

2.1.4 Listed marine species

The PMST report lists 52 marine birds, 20 marine fish, three marine mammals and seven marine reptiles that either are known to, likely to, or may occur or whose roosting, foraging, feeding or related habitats are known, likely, or may occur in the area.

2.2 BioNet Atlas

A search of the OEH BioNet Wildlife Atlas (26 February 2016) returned 17,692 records of 1,701 species. Of these, 65 were listed as threatened under the *Threatened Species Conservation Act 1995* (TSC Act) and 16 were listed as threatened under the EPBC Act (**Table 2-4**; **Appendix C**). Ecological surveys conducted at the site are required to target the potential presence of species listed in **Table 2-4** that are considered likely, known, or may occur or whose breeding, roosting, foraging or feeding habitats are likely, known, or may occur in the CIA.

Conversely to the findings of the PMST search, the Large-eared Pied Bat was not included in the EPBC listed species associated with the area. However, several TSC-listed bat species were identified and the koala was identified in both the PMST search and the BioNet search.

Table 2-4: Threatened species listed under the TSC and EPBC Act identified through BioNet search Source: OEH (2016)

Scientific name	Common name	TSC Act status	EPBC Act status
Amphibians			
Crinia tinnula	Wallum Froglet	V,P	
Litoria aurea	Green and Golden Bell Frog	E1,P	V
Reptiles			
Caretta caretta	Loggerhead Turtle	E1,P	E
Plants			
Acronychia littoralis	scented acronychia	E1,P	E
Allocasuarina defungens	dwarf heath casuarina	E1,P	E
Asperula asthenes	trailing woodruff	V,P	V
Chamaesyce psammogeton	sand spurge	E1,P	
Dendrobium melaleucaphilum	spider orchid	E1,P,2	
Eucalyptus nicholii	narrow-leaved black peppermint	V,P	V
Maundia triglochinoides	-	V,P	
Melaleuca biconvexa	biconvex paperbark	V,P	V
Oberonia titania	red-flowered king of the fairies	V,P,2	
Senna acclinis	rainforest cassia	E1,P	

Scientific name	Common name	TSC Act status	EPBC Act status
Sophora tomentosa	silverbush	E1,P	
Insects			
Petalura gigantea	Giant Dragonfly	E1	
Whales and other cetaceans			
Dugong dugon	Dugong	E1,P	
Megaptera novaeangliae	Humpback Whale	V,P	V
Birds			
Anseranas semipalmata	Magpie Goose	V,P	
Anthochaera phrygia	Regent Honeyeater	E4A,P	CE
Ardenna carneipes	Flesh-footed Shearwater	V,P	J,K
Botaurus poiciloptilus	Australasian Bittern	E1,P	E
Burhinus grallarius	Bush Stone-curlew	E1,P	
Calyptorhynchus lathami	Glossy Black-Cockatoo	V,P,2	
Charadrius mongolus	Lesser Sand-plover	V,P	C,J,K
Circus assimilis	Spotted Harrier	V,P	
Coracina lineata	Barred Cuckoo-shrike	V,P	
Daphoenositta chrysoptera	Varied Sittella	V,P	
Ephippiorhynchus asiaticus	Black-necked Stork	E1,P	
Esacus magnirostris	Beach Stone-curlew	E4A,P	
Glossopsitta pusilla	Little Lorikeet	V,P	
Grus rubicunda	Brolga	V,P	
Haematopus fuliginosus	Sooty Oystercatcher	V,P	
Haematopus longirostris	Pied Oystercatcher	E1,P	
Ixobrychus flavicollis	Black Bittern	V,P	
Lathamus discolor	Swift Parrot	E1,P,3	E
Lophoictinia isura	Square-tailed Kite	V,P,3	
Ninox strenua	Powerful Owl	V,P,3	
Numenius madagascariensis	Eastern Curlew	P	CE,C,J,K
Onychoprion fuscata	Sooty Tern	V,P	
Oxyura australis	Blue-billed Duck	V,P	
Pandion cristatus	Eastern Osprey	V,P,3	
Petroica boodang	Scarlet Robin	V,P	
Ptilinopus magnificus	Wompoo Fruit-Dove	V,P	
Sternula albifrons	Little Tern	E1,P	C,J,K
Stictonetta naevosa	Freckled Duck	V,P	
Thalassarche cauta	Shy Albatross	V,P	V
Tyto longimembris	Eastern Grass Owl	V,P,3	
Tyto novaehollandiae	Masked Owl	V,P,3	
Xenus cinereus	Terek Sandpiper	V,P	C,J,K

Scientific name	Common name	TSC Act status	EPBC Act status
Mammals			
Chalinolobus nigrogriseus	Hoary Wattled Bat	V,P	
Dasyurus maculatus	Spotted-tailed Quoll	V,P	E
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V,P	
Miniopterus australis	Little Bentwing-bat	V,P	
Miniopterus schreibersii oceanensis	Eastern Bentwing-bat	V,P	
Mormopterus norfolkensis	Eastern Freetail-bat	V,P	
Myotis macropus	Southern Myotis	V,P	
Petaurus australis	Yellow-bellied Glider	V,P	
Petaurus norfolcensis	Squirrel Glider	V,P	
Phascogale tapoatafa	Brush-tailed Phascogale	V,P	
Phascolarctos cinereus	Koala	V,P	V
Planigale maculata	Common Planigale	V,P	
Pteropus poliocephalus	Grey-headed Flying-fox	V,P	V
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V,P	
Scoteanax rueppellii	Greater Broad-nosed Bat	V,P	
Vespadelus troughtoni	Eastern Cave Bat	V,P	
Pseudomys gracilicaudatus	Eastern Chestnut Mouse	V,P	

E1: Endangered; P: Protected: V: Vulnerable; 3: Category 3 sensitive species; E4A: Critically endangered species; 2: Category 2 sensitive species; E: Endangered; CE: Critically endangered: C: CAMBA; J: JAMBA; K: ROKAMBA

2.3 NSW vegetation communities

The NSW Spatial Information Exchange Maps (SIXMaps) Vegetation Layer showed four vegetation formations exist within the CIA. These are listed in **Table 2-5** and shown in **Figure 2-2**.

These four vegetation formations are associated with primary and secondary (A) koala habitat and the wet sclerophyll forest in the southern stretch of the corridor contains secondary (A) koala habitat.

The Port Macquarie-Hastings LGA Vegetation and Endangered Ecological Community (EEC) Maps 2014 VIS IDS 4205 and 4206 spatial layers map individual vegetation communities within the CIA. These communities are shown in **Figure 2-3**. Some of these communities are also associated with a TSC Act EEC type, which are listed in **Table 2-5**. The distribution of vegetation communities associated with an EEC type is shown in **Figure 2-4**. The TSC EEC types that are mapped within the CIA include:

- Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions;
- Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions;
- River-flat Eucalypt Forest on Coastal Floodplain of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions; and
- Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions.

Table 2-5: Vegetation formations found within the CIA

Class name	Formation name	Formation description	Communities	TSC Act EEC type
Coastal Swamp Forests and Coastal Floodplain Wetlands	Forested Wetlands	Dominant species is *Melaleuca quinquenervia*. Primary koala habitat. Dune swales and flats with waterlogged soils on coastal sand plains and floodplains. Rarely above 50 m elevation. Known for their swamp orchids (*Phaius* spp.), which are some of the largest terrestrial orchids in Australia.	Broad-leaved Paperbark Swamp Woodland/Forest	Swamp Sclerophyll Forest on Coastal Floodplains
			Blackbutt Grassy Forest	Nil
			Flax-leaved Paperbark - Prickly-leaved Tea Tree Forests	Swamp Sclerophyll Forest on Coastal Floodplains
			Blackbutt Coastal Dune Satinwood Forest	Nil
			Swamp Mahogany Forest	Swamp Sclerophyll Forest on Coastal Floodplains
			Swamp Oak Coastal Floodplain Wetland Forest	Swamp Oak Floodplain Forest
			Flax-leaved Paperbark - Mixed Eucalypt Coastal Floodplain Wetlands Forest Complex	River-flat Eucalypt Forest on Coastal Floodplain
			Broad-leaved Paperbark - Mixed Eucalypt Swamp Forest Complex	Swamp Sclerophyll Forest on Coastal Floodplains
			Blackbutt Shrubby Moist Forest	Nil
			Broad-leaved Paperbark - Swamp Mahogany Swamp Forest	Swamp Sclerophyll Forest on Coastal Floodplains
			Swamp Oak - Mixed Eucalypt Coastal Floodplain Wetland Forest Complex	Swamp Oak Floodplain Forest
Northern Hinterland Wet Sclerophyll Forests	Wet Sclerophyll Forests	Dominant species are *Eucalyptus propinqua* and *E. siderophloia*. Secondary (A) koala habitat	Blackbutt Shrubby Moist Forest	Nil
			Grey Gum - Grey Ironbark Moist Forest	Nil
			Sydney Blue Gum - Tallowwood +/- Brush Box White Mahogany Moist Forest	Nil
Coastal Heath Swamps and Coastal Freshwater Lagoons	Freshwater Wetlands	Dominant species is *M. sieberi*.	Heath-leaved Banksia Sandplain Shrublands	Nil
			Twig-rush Coastal Lagoon Sedgeland	Freshwater wetlands on coastal floodplains
			Tea-tree Heathy Shrubland - EEC type	Freshwater wetlands on coastal floodplains
			Swamp Banksia Heathy Sandplain Shrubland	Nil
Coastal Dune Dry	Dry Sclerophyll Forests	Dominant species is *E. pilularis*. Secondary (A) koala habitat.	Scribbly Gum Dune Heathy Woodland	Nil

Class name	Formation name	Formation description	Communities	TSC Act EEC type
Sclerophyll Forests				

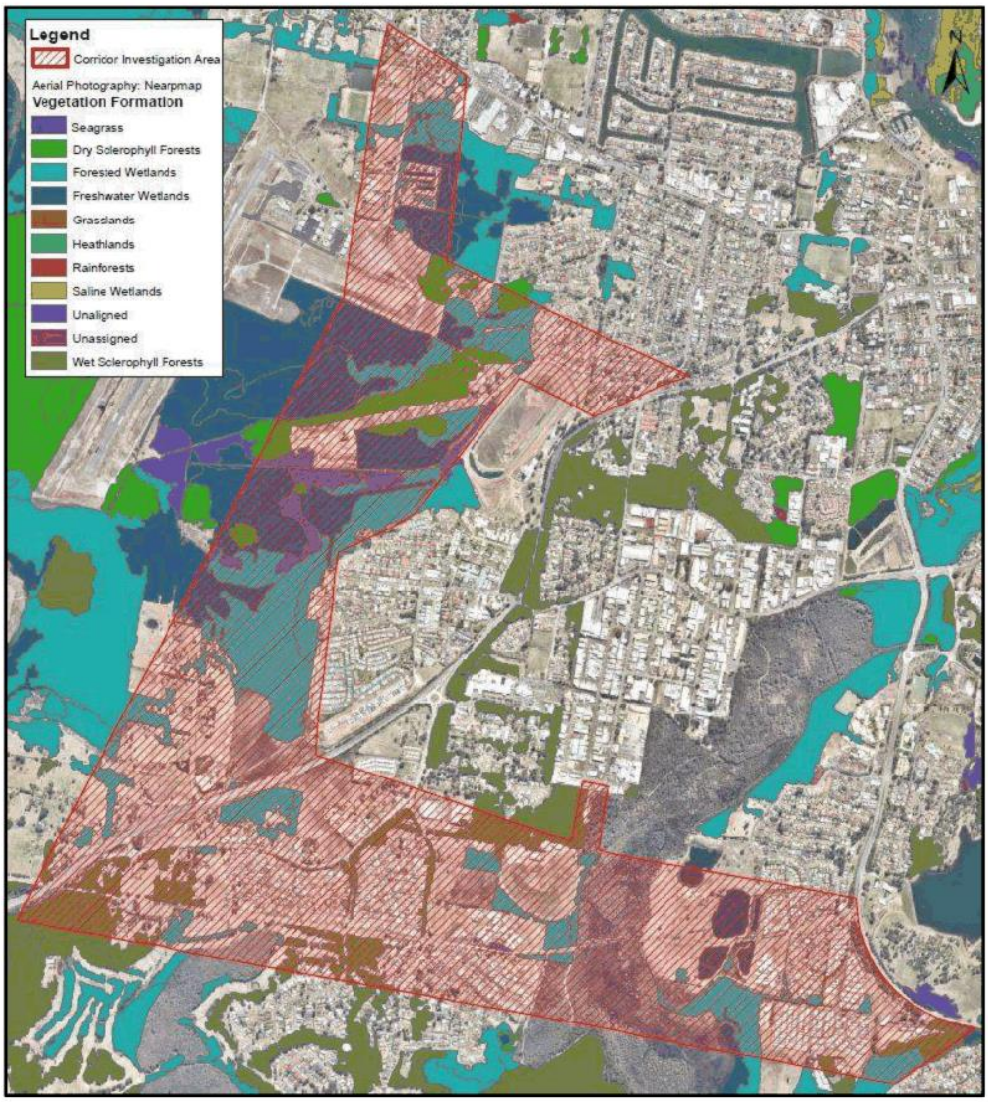


Figure 2-2: Vegetation Formations Environmental Constraints Map (Appendix A) showing distribution of vegetation formations within the CIA. Source: OEH (2015b)

Figure 2-3. Excerpt from Vegetation Communities Environmental Constraints Map (Appendix A) showing distribution of vegetation communities within the CIA. Source: OEH (2015b)

Figure 2-4. Excerpt from Endangered Ecological Community Environmental Constraints Map - (Appendix A) showing distribution of EEC types within the CIA. Source: OEH (2015b)

2.4 Aboriginal cultural heritage sites

A basic search of the Aboriginal Heritage Information Management System (AHIMS) was conducted on 11 January 2016 (**Appendix C** – Database searches). Six Aboriginal heritage sites were recorded in or near the CIA (1 km; **Figure 2-5**). An extensive search was conducted to determine the details of the Aboriginal sites (**Appendix C** – Database searches). These are described in **Table 2-6** and their locations are shown in **Figure 2-6**. Two of the sites are within the CIA.

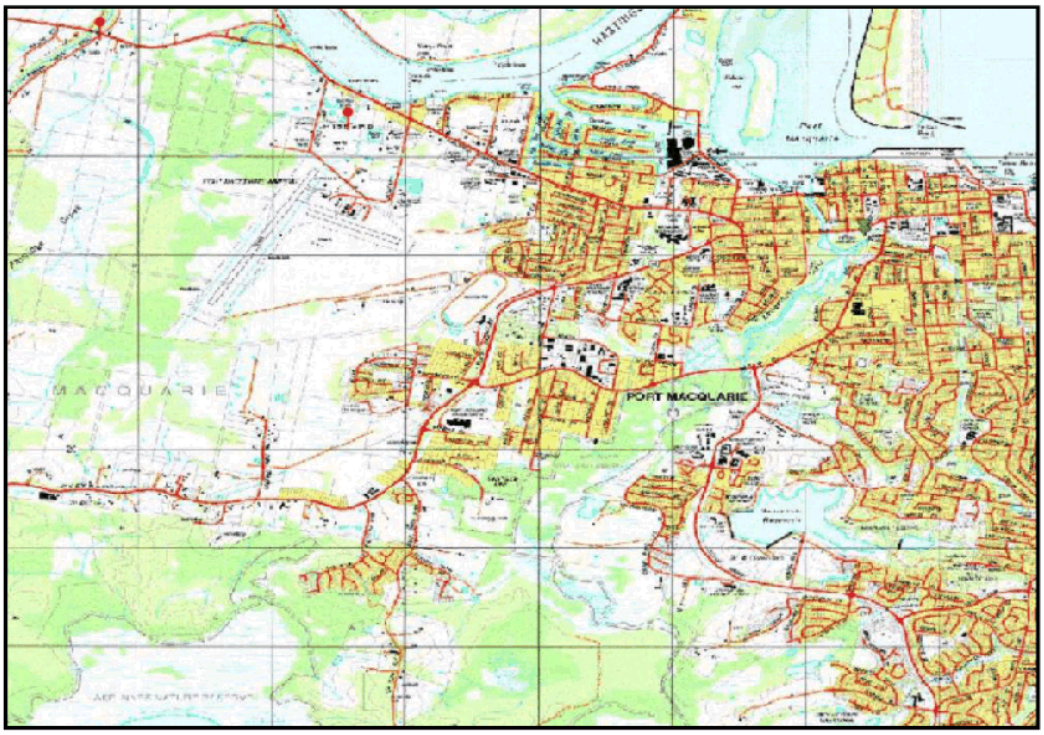


Figure 2-5. Area considered in basic AHIMS search

Table 2-6: Details of extensive AHIMS search

Site Name; Site ID	Site Feature; Site Type	Datum and Easting and Northing	Distance and direction CIA
NQ 1 (Newtons Quarry); 30-3-0232	Artefact; isolated find	AGD 56; E: 489500; N: 6518620	Within CIA
Kooloonbung 1; 30-3-0218	Artefact; isolated find	AGD 56; E: 490070; N: 6518250	South of CIA at south east corner
Kooloonbung 3; 30-3-0219	Artefact; open camp site	AGD 56 E: 489900; N: 6518320	South of CIA at south east corner
Kooloonbung 2; 30-3-0220	Artefact; open camp site	AGD 56 E: 489950; N: 6518170	South of CIA at south east corner
Ah-E2; 30-3-0322	Artefact 1	AGD 56 E: 486775; N: 6519450	Within CIA

Figure 2-6. Excerpt from Heritage Environmental Constraints Map (Appendix A) showing Aboriginal Sites (pink stars) identified by the extensive AHIMS search within the CIA

2.5 Australian heritage database

The Australian Heritage Database identifies 16 sites in Port Macquarie that have non-Aboriginal heritage significance (**Appendix C**). None of these are located directly within the CIA.

2.6 NSW state heritage register

The NSW State Heritage Register lists 11 sites as having non-Aboriginal heritage significance within the Port Macquarie-Hastings LGA (**Appendix C**). None of these are located directly within the CIA.

2.7 SEPP 14 – coastal wetlands and SEPP 71 - coastal protection

The CIA affects land subject to SEPP 14 – Coastal Wetlands and SEPP 71 – Coastal Protection Zones (**Figure 2-7**).

Figure 2-7: Excerpt from SEPP 14 and SEPP 71 Environmental Constraints Map (Appendix A) showing SEPP 14 and SEPP 71 zones within the CIA

2.8 SEPP 62 – sustainable aquaculture

Parts of the Hastings River are mapped as Priority Oyster Aquaculture Areas under the NSW Oyster Industry Sustainable Aquaculture Strategy 2014 and SEPP 62 – Sustainable Aquaculture.

2.9 Contaminated land

A search of the NSW EPA Contaminated Land Record of Notices did not return any records for the Port Macquarie-Hastings LGA (**Appendix C**). The list of contaminated sites notified to the EPA contains 11 sites in Port Macquarie and the POEO licence list contains 13 sites in Port Macquarie (**Appendix C**). One of the contaminated sites notified to the EPA, a former Mobile service station, lies within the CIA (**Figure 2-8**). If these sites are to be acquired for development of the OOLR, Council will likely need to conduct preliminary site investigations for each site to identify whether there is any contamination at these sites that needs to be remediated prior to development.

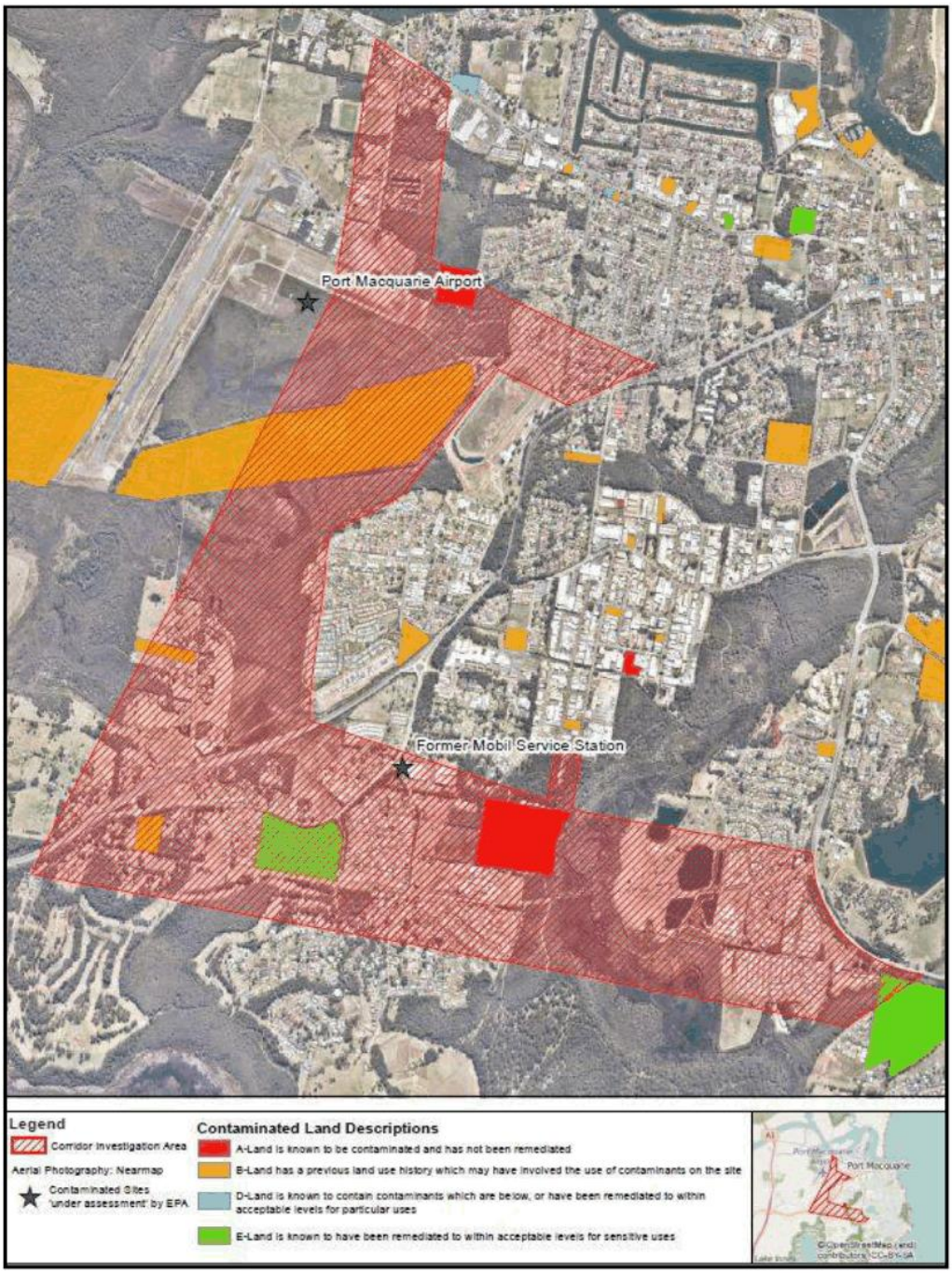


Figure 2-8: Excerpt from Contaminated Sites Environmental Constraints Map (Appendix A). Contaminated sites notified to EPA (stars), Contaminated sites from Council's contaminated land map

Council also identifies non-remediated contaminated land and potentially contaminated land within the CIA. These sites are also shown as "A-land" in **Figure 2-8** and should be managed in accordance with Council's due diligence requirements under SEPP 55 (**Section 5.2.2.2**).

2.10 Australian Soil Resource Information System

The Australian Soil Resource Information System (ASRIS) Atlas of Australian Soils, maps four soils within the CIA. These are Sodosols (Tb46), Ferrosols (Mg22), Podosols (Ca7) and Hydrosols (J3). Mapping of soils of the CIA is shown in **Figure 2-9** and described in **Table 2-7**.

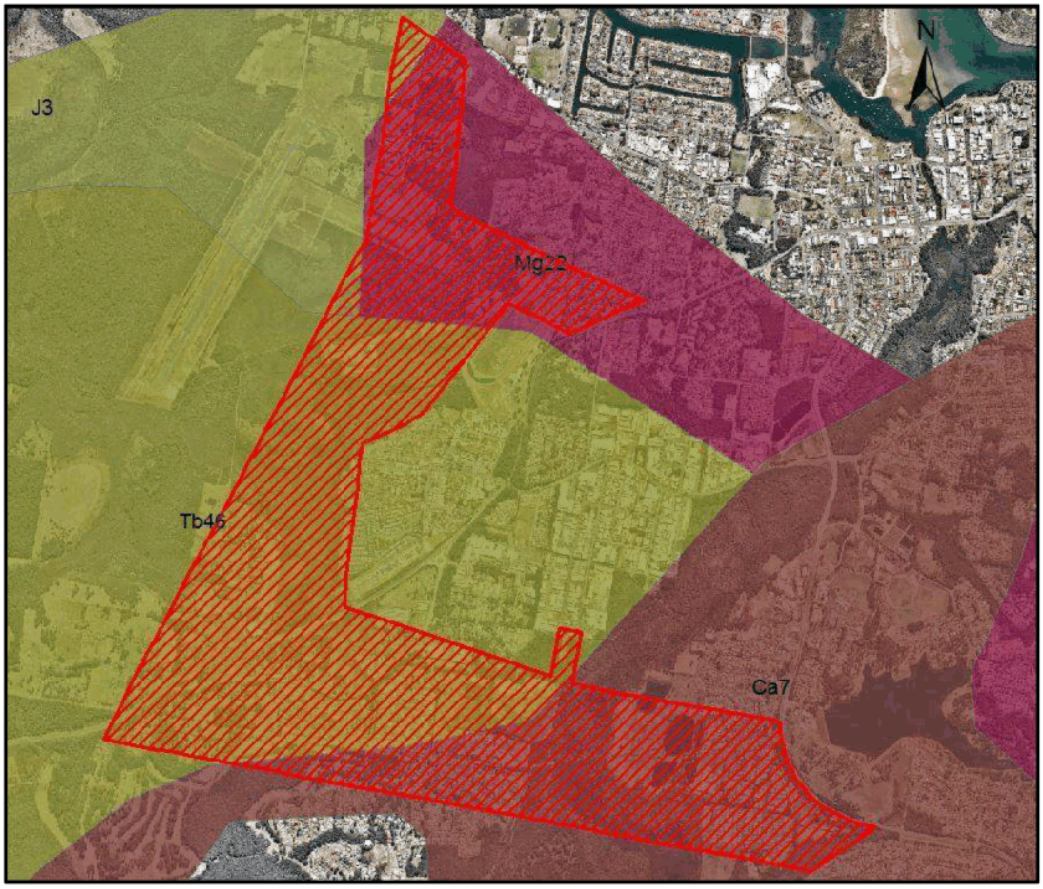


Figure 2-9: The CIA area with overlay of the Atlas of Australian Soils. Source: ASRIS (2013)

Table 2-7: Description of Australian Soils Atlas Codes. Source: (McKenzie and Hook 1992)

Soil code	Permeability	Profile Water Holding Capacity	Texture	pH	Nutrient status	Depth
Tb46	Very Slow (0.2 mm/hr)	Very Low (< 50 mm)	Duplex	Acid	Low nutrient status in terms of nitrogen, phosphorus, potassium and most micronutrients	Moderate (0.5 - 1.5 m)
Mg22	Fast (> 21 mm/hr)	Medium (150 – 250 mm	Gradational	Acid	Moderate responses to N and P with occasional response to some micronutrients	Deep (> 1.5 m)
Ca7	Fast (> 21 mm/hr)	Low (50-150 mm)	Uniform Coarse	Acid	Low nutrient status in terms of nitrogen, phosphorus, potassium and most micronutrients	Deep (> 1.5 m)
J3	Slow (0.2-2 mm/hr)	Low (50-150 mm)	Uniform Fine	Neutral	Low nutrient status in terms of nitrogen, phosphorus, potassium and most micronutrients	Moderate (0.5 - 1.5 m)

2.11 Port Macquarie-Hastings Local Environmental Plan

2.11.1 Land zoning

Council's land zone map is presented in **Appendix A** and the land zones within the CIA are as follows:

- B5 – Business development;
- B7 – Business park;
- E1 – National parks and nature reserves;
- E2 – Environmental Conservation;
- IN2 – Light industrial;
- R1 – General residential;
- RE1 - Public recreation;
- RE2 – Private recreation;
- RU2 – Rural landscape;
- RU1 – Primary production; and
- SP2 – Infrastructure.

Council's land zoning map shows that substantial areas within the CIA are classed as either E1 (National Parks and Nature Reserves) or E2 (Environmental Conservation). This is discussed further in **Section 3.3.3**.

The Port Macquarie Airport also falls within the CIA.

2.11.2 Acid sulfate soils

Council's LEP shows that the CIA impacts on Class 2, 3 and 5 acid sulfate soil (ASS) zones and the OEH ASS risk maps also classify certain areas within the CIA as having various probability of ASS occurrence. Mapping of acid sulfate soils is shown in **Figure 2-10**.

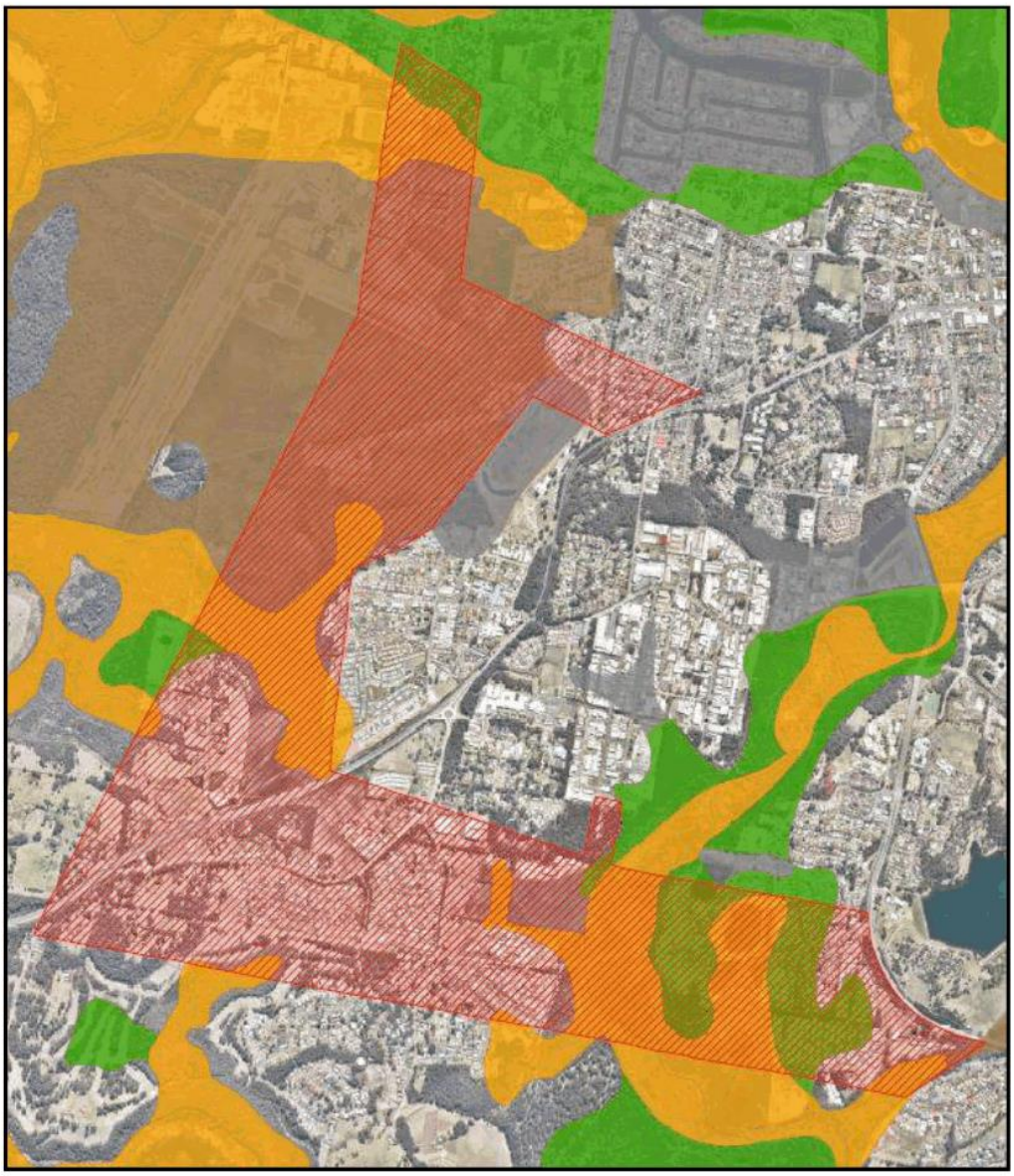


Figure 2-10: Excerpt from the Acid Sulfate Soil Risk Environmental Constraints Map (Appendix A) showing ASS Risk and probability of occurrence classes within the CIA. Source: OEH (2015a)

2.11.3 Acoustics controls, coastal erosion and visually sensitive land map

Council's acoustics controls, coastal erosion and visually sensitive land map shows that a portion of the CIA is "Subject to acoustic controls". The objective of Clause 7.9 of the LEP is to ensure that development for residential or tourist purposes, or for any other purpose involving regular human

occupation on land subject to significant exposure to noise (including road traffic noise) incorporates appropriate mitigation measures. The Clause applies to land identified as "Subject to acoustic controls" on the acoustic controls map.

2.11.4 Flood planning, wetlands and key fish habitats

Council's flood map (**Figure 2-11**) shows extensive areas within the CIA are within flood planning areas and the probable maximum flood. Clause 7.3 and Clause 7.4 of Council's LEP are applicable to flood planning and restrict the types of development that can occur within flood zones.

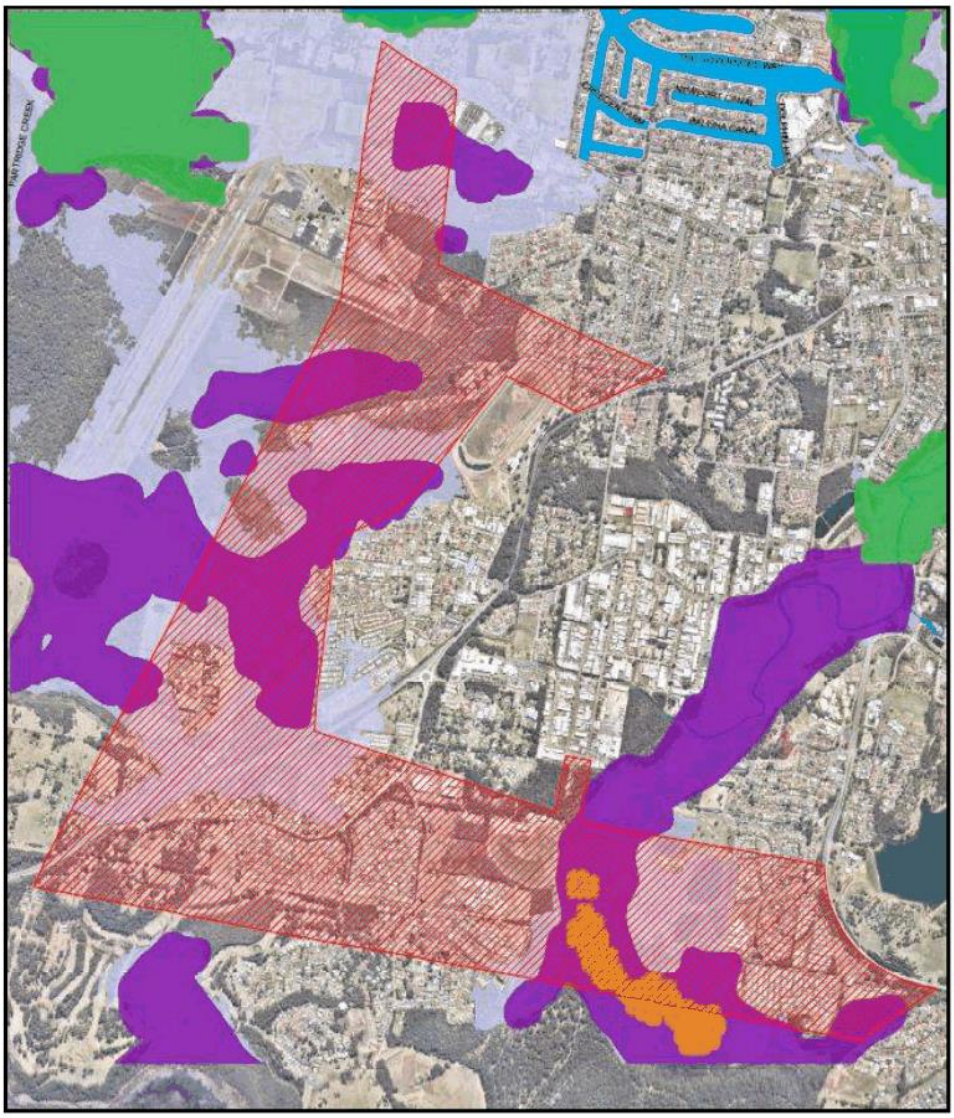


Figure 2-11: Excerpt from Water Bodies, Flooding and Key Fish Habitat Environmental Constraints Map (Appendix A) showing Council-mapped wetlands, flood levels and water bodies within the CIA

2.11.5 Heritage map

Council's heritage map shows that there are two items of general heritage significance (Lake Innes House ruins complex and Cemetery) within the CIA. Heritage sites are shown in **Figure 2-12**. If the final OOLR corridor encroaches on these items, consultation with OEH will be required and a Statement of Heritage Impact (SoHI) will need to be prepared for the project.

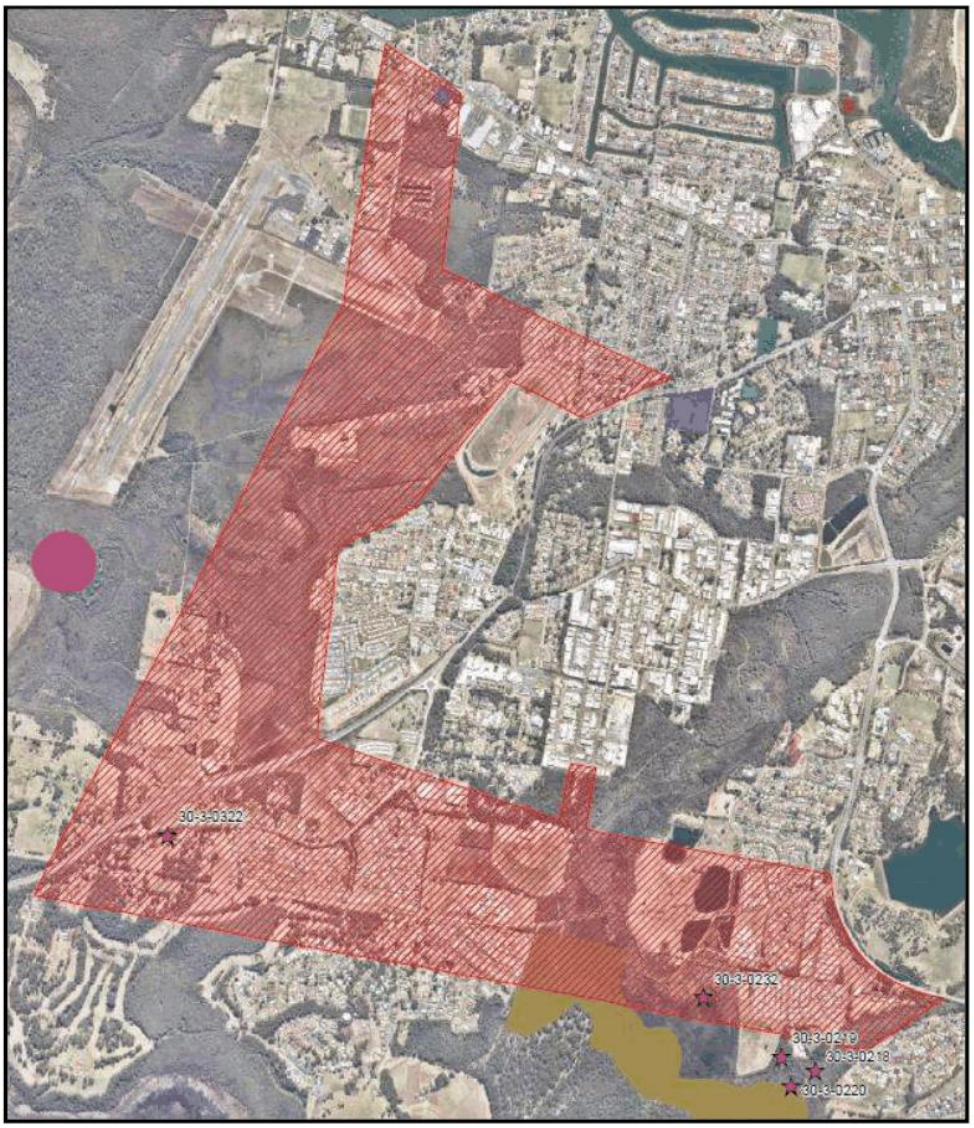


Figure 2-12: Excerpt from Aboriginal and European Heritage Sites Environmental Constraints Map (Appendix A) showing Council-mapped heritage items and Aboriginal sites identified in extensive AHIMS search within the CIA

2.11.6 Koala sightings map

Council's koala sightings map shows that koalas are known to occur within the affected area with approximately 115 sightings recorded within the CIA (**Figure 2-13**).

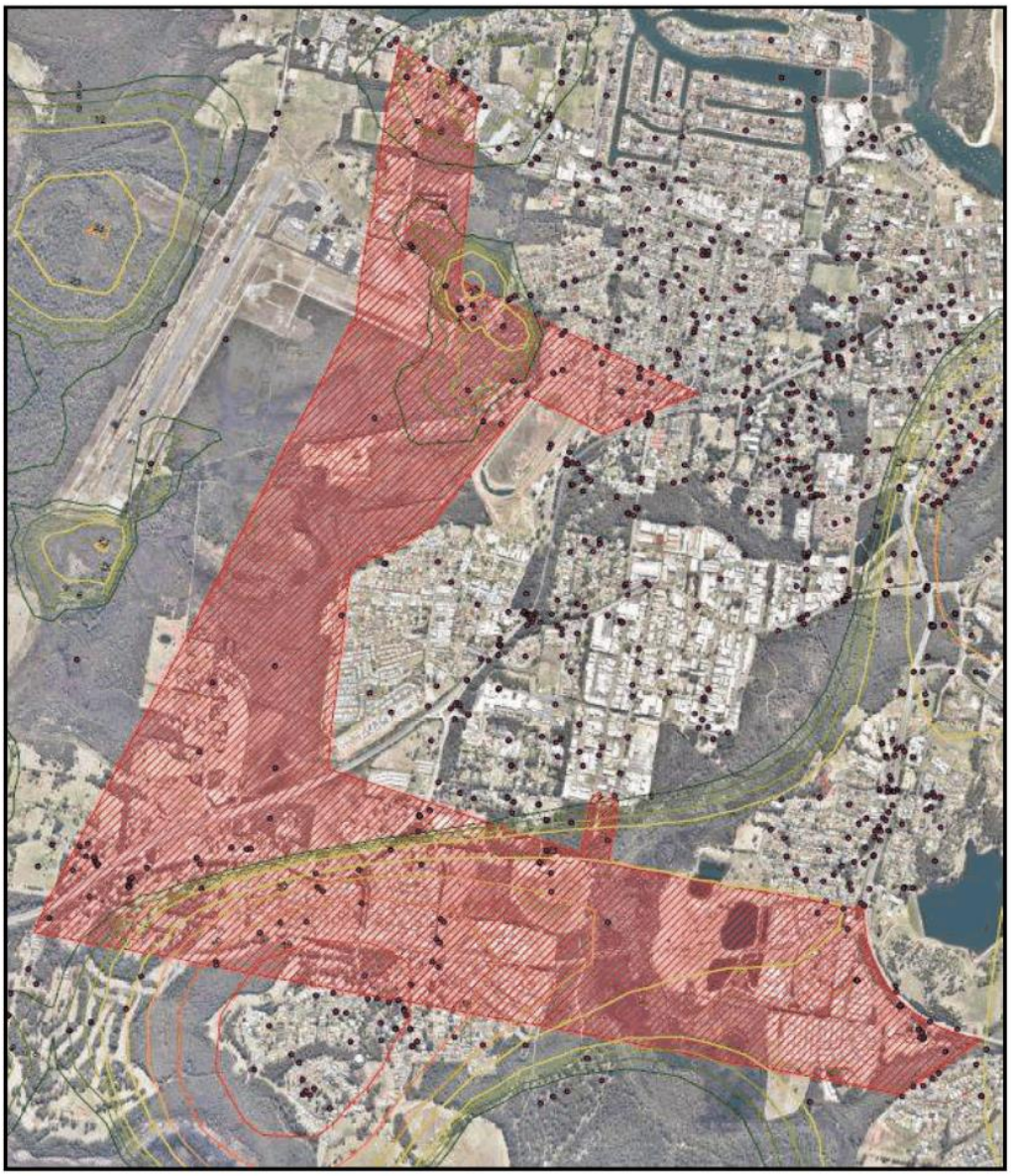


Figure 2-13: Excerpt from Koala Records Environmental Constraints Map (Appendix A) showing Council's koala sightings recorded within the CIA

2.12 Recreation walking track

The Googik Heritage Walking Track is also within the CIA between Kyla Crescent and Greenmeadows Drive (**Figure 2-14**). The walking track is part of the Lake Innes Nature Reserve.

The southern end of the walking track falls within the CIA. The walking track is managed by the NPWS and runs from Kyle Crescent and Iona Avenue in the south and Chestnut Road, at the northern end. The two kilometre walking track follows the western side of Kooloonbung Creek, in Lake Innes Nature Reserve.

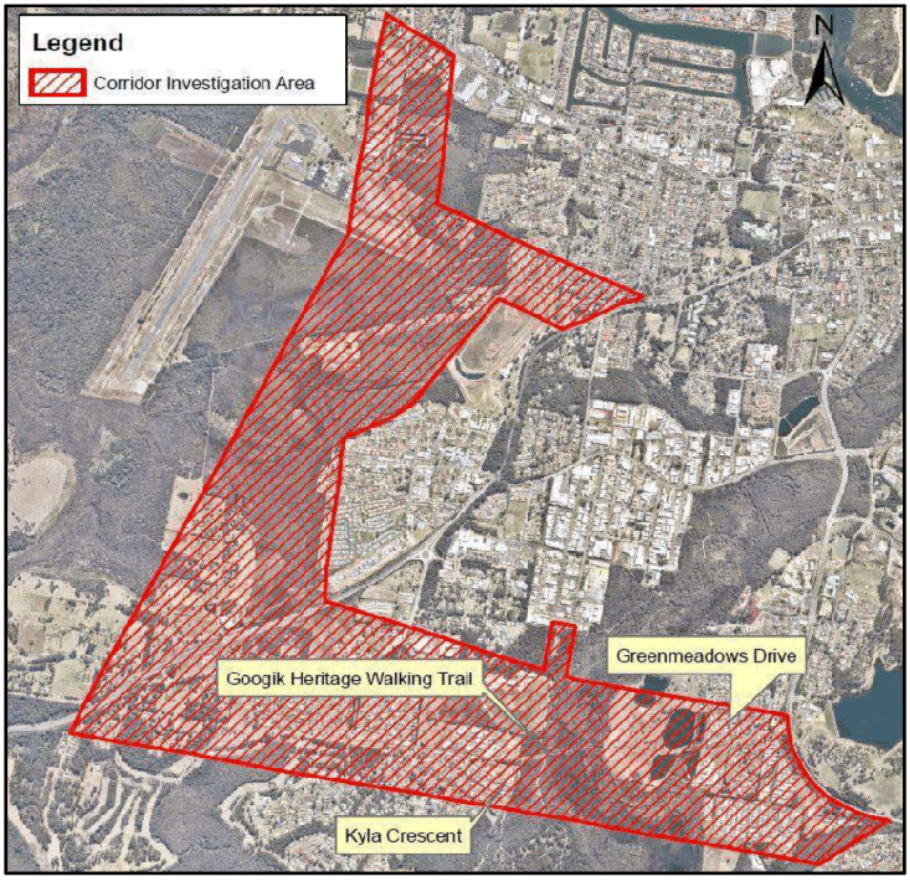


Figure 2-14: CIA location map showing the Googik Heritage Walking Trail between Kyla Crescent and Greenmeadows Drive

3 Environmental constraints

Council has been provided with an interactive PDF of the environmental constraints that will need to be considered during selection of the final corridor footprint for the proposed OOLR. The individual layers have also been attached as **Appendix A** and include the following maps:

- Land Zoning Map (Source: Port Macquarie-Hastings Council (2011))
- Contaminated sites;
- SEPP 14 and SEPP 71;
- Vegetation Formations;
- Vegetation Communities;
- Endangered Ecological Communities;
- Heritage;
- Koala habitat;
- Acid sulfate soils;
- Wetland Areas and Historic Flood Extents.

The implications of these mapped constraints are discussed in more detail in the sections below.

3.1 Soils and geology

As per **Section 2.11.2**, the CIA is mapped as potentially having ASS, which construction activities may disturb or expose during the project. Clause 7.1 of the LEP addresses ASS as an additional local provision to the LEP. The objective of Clause 7.1 is to ensure that development does not disturb, expose, or drain ASS and cause environmental damage. Under the clause, development consent is carried out for works described in **Table 3-1** on land shown on the ASS map as being of the class specified for those works. Clause 7.1 (3) of the LEP states that:

"Development consent must not be granted under this clause for the carrying out of works unless an acid sulfate soils management plan has been prepared for the proposed works in accordance with the Acid Sulfate Soils Manual and has been provided to the consent authority".

Under 7.1(4) (a) and (b) of the LEP, Council will be required to conduct ASS investigations on the construction footprint once it is confirmed and, if Potential ASS or ASS are identified, an ASS management plan will be required for the works. However, if the preliminary assessment prepared in accordance with the *Acid Sulfate Soils Manual* indicates that an ASS management plan is not required for the works and Council has confirmed this assessment in writing, an ASS Management Plan will not be required.

Table 3-1: Class of land and restricted works under clause 7.1 of Council's LEP

Class of land	Works
1	Any works
2	Works below the natural ground surface Works by which the water table is likely to be lowered
3	Works more than 1 metre below the natural ground surface. Works by which the water table is likely to be lowered more than 1 metre below the natural ground surface.

Class of land	Works
4	Works more than 2 metres below the natural ground surface. Works by which the water table is likely to be lowered more than 2 metres below the natural ground surface.
5	Works within 500 metres of adjacent Class 1, 2, 3 or 4 land that is below 5 metres Australian Height Datum and by which the water table is likely to be lowered below 1 metre Australian Height Datum on adjacent Class 1, 2, 3 or 4 land.

In addition to risks associated with ASS and PASS exposure, construction activities have potential to result in erosion and sedimentation of other excavated soil and rock material. Strategies to mitigate environmental impacts such as erosion and sedimentation will need to be identified and documented in an erosion and sediment control plan prepared in accordance with *Managing Urban Stormwater: Soils and Construction "The Blue Book"*, Landcom (2004).

3.2 Hydrology, flooding and water quality

The location of much of the site within the flood zone (**Section 2.11.4**) indicates that design of the OOLR should include flood planning mitigation strategies that are beneficial for both the community in terms of welfare during flood events and the environment. The road should be designed to allow tidal movement and flood flows to be unimpeded with appropriate drainage structures incorporated into the design.

Downstream environmental impacts (for example, erosion and water quality impacts) should be avoided or minimised through appropriate stormwater engineering design in accordance with applicable standards and guidelines.

As per **Section 2.8**, parts of the Hastings River are mapped as Priority Oyster Aquaculture Areas. Under SEPP 62 – Sustainable Aquaculture and the NSW Oyster Industry Sustainable Aquaculture Strategy 2014, the water quality in these areas needs to be maintained within certain parameters to ensure the operation and development of a viable and sustainable New South Wales oyster aquaculture industry. Although the proposed OOLR is unlikely to directly affect these areas due to its distance from the Hastings River, water quality management measures may need to be implemented to demonstrate that no sedimentation or other impacts will cause a decline in water quality via run-off into the Hastings River. Water quality management measures will include emergency management of spills, acid sulfate soil management and erosion management.

3.3 Ecology, flora and fauna

3.3.1 Threatened ecological communities

Background searches in **Section 2.1**, **Section 2.2**, **Section 2.3**, and **Section 2.11.6** identified threatened species and ecological communities within the CIA that may potentially be impacted by the development of the OOLR. An ecological assessment of the full extent of the project area will be required to determine the presence of TECs, EECs, threatened species and habitat within the CIA.

Four EECs listed under the TSC Act were identified within the CIA (**Figure 2-4**). Based on the vegetation communities mapped as being present in the CIA, there are not any EPBC-listed TECs present within the CIA.

3.3.2 Migratory and marine species

Habitat removal may impact migratory terrestrial species and marine species, which were discussed in **Section 2.1.3**. Migratory and marine species have been reported in the vicinity of the CIA and ecological surveys will be required to determine the local presence of these species.

3.3.3 Lake Innes Nature Reserve and environmental conservation zones

The CIA crosses the Lake Innes Nature Reserve and environmental conservation zones. Part 2, Clause 2.6BB of the LEP describes the objectives for development, development permissible without consent, development permissible with consent and prohibited development for each zone, E1 and E2 (**Table 3-2**). The Lake Innes Nature Reserve is in Zone E1 and the environmental conservation zones are in Zone E2.

Table 3-2: Objectives and permitted use of zones E1 and E2. Source: Port Macquarie-Hastings Council (2011)

Zone	Objectives of zone	Permitted and prohibited development
E1	• To enable the management and appropriate use of land that is reserved under the *National Parks and Wildlife Act 1974* (NPW Act) or that is acquired under Part 11 of that Act. • To enable authorised uses under the NPW Act. • To identify land that is to be reserved under the NPW Act and to protect the environmental significance of that land.	• Uses authorised under the NPW Act are permitted without consent. • No uses are permitted with consent. • All development not authorised under the NPW Act is prohibited.
E2	• 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 coastal wetlands and littoral rainforests. • To protect land affected by coastal processes and environmentally sensitive land. • To prevent development that adversely affects, or would be adversely affected by, coastal processes. • To enable development of public works and environmental facilities where such development would not have an overall detrimental impact on ecological, scientific, cultural or aesthetic values.	• No uses are permitted without consent. • Environmental facilities, environmental protection works, recreation areas, research stations and roads are permitted with consent. • Business premises; Hotel or motel accommodation; Industries; Multidwelling housing; Recreation facilities (major); Residential flat buildings; Retail premises; Seniors housing; Service stations; Warehouse or distribution centres; and any other development not permitted with or without consent are prohibited.

Consultation with NPWS and the OEH will be necessary to discuss the potential impact of the project on the Lake Innes Nature Reserve and to determine the process for revocation of part of the nature reserve to accommodate the road corridor. Issues such as the road design solutions, extent and level of impact of the project across the Kooloonbung Creek corridor, approval requirements and timeframes will need discussion and agreement. These discussions will be informed by the proposed road alignment and design options for the crossing of Kooloonbung Creek, land resumption requirements, project program and approval plan.

Council may need to request OEH to revoke part of the Nature Reserve or design the project in such a way that the impacts on the nature reserve are acceptable to OEH and consistent with the principles of the NPW Act.

The process for revocation of a nature reserve is prescribed in the NPW Act OEH (2014) and involves Ministerial and Parliamentary assessment, which can take in excess of 24 months. Council will need to prepare a detailed proposal for the Minister that describes the possible alternatives to the project, the potential compensatory measures being put forward and demonstrates how the project results in an overall public good outcome having regard to all of the conservation, cultural heritage and other values of the Lake Innes Nature Reserve.

As roads are a permitted use with consent in the environmental conservation zone (E2), the presence of this zone within the CIA is unlikely to pose a major constraint to the project. However, the appropriate assessments will still need to be carried out to determine whether there are any threatened species or populations that are likely to be impacted by the proposal within these zones.

3.3.4 Koalas

The Port Macquarie – Hastings LGA is listed in Schedule 1 of SEPP 44 – Koala Habitat Protection, which indicates that the SEPP applies to the project. Furthermore, as addressed in **Section 2.11.6** and **Table 5-3**, Council's Koala Habitat map and vegetation map identifies areas within the CIA that may include potential koala habitat. One section of koala habitat appears to be residential development connected to a koala habitat area to the south. It is likely that Council would be able to avoid this area in the final design and construction footprint of the OOLR. However, the SIXMaps vegetation formation layers identify some of the vegetation formations within the CIA as being of primary or secondary (A) koala habitat (**Table 2-5**), suggesting that koalas may be impacted by activities occurring throughout many of the vegetated areas within the CIA.

As part of the ecological surveys required for this project, mapping of the distribution of koala habitat within the CIA will need to be completed, for use in application for project approvals.

Section 5.2.9 discusses the recommendation regarding referral of the project to the Department of the Environment.

3.3.5 Key fish habitat

As outlined in **Section 2.11.4**, Council's Key Fish Habitat map (**Figure 2-11**) shows that three types of key fish habitat (coastal lagoons and lakes; coastal wetlands; estuarine wetlands) occur within the CIA. These areas area likely to be affected by the proposed works and consultation with DPI Fisheries will be required to clarify permit and approval requirements.

3.3.6 Wetlands

As discussed in **Section 2.7**, areas within the CIA are mapped as SEPP 14, Coastal Wetlands and SEPP 71 Coastal Protection Zones. As discussed in **Section 6**, a new Coastal Management SEPP, amalgamating SEPPs 14, 71 and 26 is currently being developed and DP&E expect the revised SEPP to be exhibited by September 2016. The amalgamated SEPP will include revised mapping for these zones and will have implications for this project. The draft revised SEPP maps will be released to Councils for review prior to finalisation of the SEPP. Council is advised to consider the new SEPP and the revised maps as they seek planning approval for the project.

In addition to the presence of SEPP 14 coastal wetlands, there are a number of Council-mapped wetlands and key fish habitats (**Figure 2-11**) within the CIA. If Council proceeds with the development of the OOLR, consultation with DPI Fisheries regarding permits for activities within or near wetlands will be required. Permits are likely to be required for activities including dredging

and reclamation (section 200 of the *Fisheries Management Act 1994* (FM Act)), harm to marine vegetation (section 205 of the FM Act) and obstructions to fish passage (section 219 of the FM Act).

3.4 Noise and vibration

As discussed in **Section 2.11.3**, Council's acoustics controls, coastal erosion and visually sensitive land map shows that a portion of the CIA is "Subject to acoustic controls" and, therefore, Council will need to ensure that design of the road within the areas mapped as being subject to acoustic controls incorporates appropriate mitigation measures.

The potential noise impacts caused by the proposed OOLR are variable across the CIA. The development will involve construction noise such as heavy machinery, trucks, light vehicles and power tools. The sensitive receivers are residences, child care facilities, schools and aged care facilities.

Council should conduct a community engagement program to inform the community and nearby residents of the project, it's program, likely timing of noisy activities, among other matters. A noise and vibration management plan should also be developed to ensure that potential impacts are avoided or minimised.

Noise and vibration are also likely to have impacts post-construction of the road, as the road will pass through some areas that are not currently affected by road traffic noise, such as the environmental conservation and Lake Innes Nature Reserve zones. In addition, increased traffic loads on some roads may result in increased levels of traffic noise for existing road-side properties. These factors may need to be addressed in a Traffic Impact Assessment, which should be produced for the development.

The Interim Construction Noise Guideline (DECC 2009) sets out guidelines for allowable noise levels at sensitive locations (**Table 3-3**). The operation of construction machinery is likely to contribute to increased noise levels surrounding the subject site for the duration of any works (**Table 3-4**).

Table 3-3: Noise rating background level – urban area. Source: DECC (2009)

Land use of the receiver area	Recommended Acceptable Daytime (Background) Limit (L_{A90})	Construction Planning Criteria		
		Construction Period < 4 weeks: Background + 20 dBA	Construction Period 4-26 weeks: Background + 10 dBA	Construction period > 26 Weeks: Background + 5 dBA
Rural	45	35	55	50
Residential	45	65	55	50
Residential on busy road	50	70	60	55
Church, hospital, school on busy road	50	70	60	55
Shop or commercial office on a busy road	55	75	65	60

Table 3-4: Typical construction plan and acoustic power levels

Plant equipment	Typical acoustic power level (L_W(dBA))
Excavator	109
Backhoe	106
Concrete Truck	110
Crane	114
Bobcat	105
Combined (all plant)	116

3.5 Climate

Port Macquarie experiences warm summers, with maximum temperatures ranging from 29.0 ^{0}C – 29.4 ^{0}C throughout the summer months and relatively mild winters, with minimum temperatures ranging from about 17.8 ^{0}C – 18.8 ^{0}C. Port Macquarie receives 1,430 mm of rain per year. Rainfall is variable with dryer months from July to October and quite high rainfall (110 mm- 167 mm per month) during the remainder of the year.

Table 3-5: Summary of the Rainfall in Port Macquarie accessed on 2 March 2016. Source: Bureau of Meteorology (2016)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean max. temp (^{0}C)	29.0	29.4	27.5	25.4	23.0	20.7	19.8	22.4	25.3	25.8	27.0	29.4
Mean min. temp (^{0}C)	25.4	25.6	25.0	21.7	20.3	18.4	17.8	18.8	20.9	22.2	22.9	24.2
Mean rainfall (mm)	158.7	167.8	165.0	144.0	121.6	135.9	66.2	64.1	63.3	72.6	159.8	110.6

3.6 Non-aboriginal heritage

Two non-Aboriginal heritage places or items are known to exist within the CIA (**Section 2.5**, **Section 2.6** and **Section 2.11.5**). In the event that disturbance to these, or other sites of heritage significance, OEH should be consulted to determine if a Heritage Impact Assessment and Heritage Impact Statement need to be prepared for the development or if any other compensatory or ameliorative actions are required.

3.7 Aboriginal heritage

As per the discussion in **Section 2.4**, there are three Aboriginal heritage sites within the CIA. Consultation with OEH will be required to confirm their statutory requirements with regard to the presence of Aboriginal sites within the CIA. NPWS should also be made aware of the potential impacts to Aboriginal sites to ensure that their statutory interests are addressed.

A due diligence assessment will need to be carried out in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECC 2010) to determine whether these objects are likely to be impacted by the works. Initial consultation with OEH suggested that an assessment of the site will likely need to be carried out by a qualified heritage consultant or archaeologist, which includes consultation with the local Aboriginal community. The assessment will need to determine the significance of the known objects within

the CIA as well as the extent of as yet unidentified objects or places that may be associated with the known objects. If present, these may include sub-surface items, which will require a test pit assessment to be carried out prior to commencement of any ground disturbance works.

3.8 Visual amenity

Port Macquarie is known for its scenic location, dominated by coastal and river landscapes. It is situated on Australia's east coast at the mouth of the Hastings River. The CIA is located within urban zones. However, some sections of the corridor cross the Lake Innes Nature Reserve and area adjacent to other natural areas. Council should implement mitigation measures to avoid impacts to visual amenity in the design of the proposed OOLR, which could focus on enhancing visual amenity within these sections of the OOLR and minimising disturbance.

3.9 Port Macquarie airport

The Port Macquarie Airport falls within the CIA and Council will need to consider this matter in discussion with Commonwealth regulators.

3.10 Waste generation and contamination

As discussed in **Section 2.9**, there are a number of known contaminated sites, potential contaminated sites and sites notified to the EPA within the CIA (**Section 2.9**). Council may need to show that there is no contamination on the sites that could pose a threat to the environment, should these sites form part of the project alignment. The contaminated site assessment would generally involve a Phase 2 Contaminated Site Investigation followed by remediation, if necessary and site validation. If these sites do not need to be acquired for the OOLR, these investigations are unlikely to be a requirement for development of the proposed OOLR.

The construction of the proposed OOLR will generate construction waste, which is likely to include asphalt, bricks, concrete, steel, timber, spoil, excavated soil and rock and other building materials, including packaging. The construction workforce will also generate personal waste such as food, food wrappings, containers and office waste. Storage and use of fuel and other chemicals on site has the potential to contaminate soil.

Construction and demolition waste requires a Waste Plan and, for projects valued at over $ 50,000 a Waste Management Plan is required (where development consent is required to demonstrate to the determining authority that disposal of construction material will be in accordance with OEH NSW *Waste Classification Guidelines Part 1: Classifying Wastes* (EPA, 2014). Under these guidelines, most of the waste would likely be classified as General Solid Waste (non-putrescibles) which may be disposed of at a licensed landfill, such as the one located on Kingfisher Road, off John Oxley Drive that receives domestic waste including green waste, timber, ferrous and non-ferrous metals and inert concrete, masonry, stone and hazardous materials.

Section 2.9 describes that POEO licence lists sites contained within the CIA. Three of these are all related to the waste storage and processing facility at the south east end of Kingfisher Driver and may need to be considered as part of the proposed works.

3.11 Socio-economic considerations

According to the Australian Bureau of Statistics (Australian Bureau of Statistics 2011) the suburb of Port Macquarie had a weekly household income of $855.00 in the year 2011. Most common occupations in 2011 were Professionals, Clerical and Administrative Workers, Technicians and Trades Workers, Community and Pastoral Service Workers and Sales Workers. The resident population of Port Macquarie in 2011 was 41,491.

A community and stakeholder engagement process will be required to be conducted as part of this project to enable community concerns and questions about the project to be addressed and resolved.

A formal consultation process with the relevant government departments, guided by the planning approval process that is found to be appropriate for the proposed OOLR development, will also be required to ensure compliance with all statutory requirements. Government agencies that are expected to be required to be involved with consultation include DP&E, DotE, NP&W, DPI Fisheries and OEH.

Suggested consultation to be undertaken in Stage 2 of the project is presented in **Section 7**.

3.12 Cumulative impacts

The above sections have identified and described the individual environmental impacts that may be associated with the proposed OOLR. The scale of the project and the extent of different impacts, including impacts and potential impacts to Wetlands, the Lake Innes Nature Reserve, threatened species and Aboriginal heritage sites, is likely to result in cumulative impacts. The design of the final alignment of the proposed OOLR should consider all impacts and attempt to minimise their cumulative effects as far as possible. The potential cumulative impacts should be further analysed and assessed during the selection of the optimal alignment and the environmental impact assessment for the project.

3.13 Environmental constraints consideration

Clause 228 (2) of the EP&A Regulation lists the factors that must be taken into account when considering the impact of an activity on the environment. These factors have been addressed in **Table 3-6** to ensure that the likely impacts of the proposed OOLR on the natural and built environment are fully considered.

Table 3-6: Consideration of Environmental Assessment

Assessment Factor	Description of potential impact
a) Any environmental impact on a community.	Impact of the proposal on the community may be substantial in the short term depending on the requirement for land acquisitions, road closures and traffic disruptions and noise and vibration impacts. The impact on the community in the long term should be positive because the traffic flow will be improved and access throughout Port Macquarie will be more convenient. Clearing of vegetation and habitat will be necessary. The level of clearing will be minimised to the lowest level, to provide a safe and efficient road, while considering the impact on ecological communities and habitat.

Assessment Factor	Description of potential impact
b) Any transformation of a locality.	Loss of vegetation, construction activity and a change to the landscape from the construction of the road will lead to a change in the visual amenity of the project area.
c) Any environmental impact on the ecosystems of the locality.	There are likely to be impacts on the ecosystems of the locality, particularly in the sections of the corridor that cross Nature Reserve and Environmental Conservation zones. These areas will need to be assessed for the presence of ecologically significant species and communities prior to commencement of any construction activity. Where impacts on threatened species are unavoidable, a species impact statement will be prepared.
d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality.	The proposal is likely to have an impact on the aesthetic and environmental quality and value of the Lake Innes Nature Reserve and environmental conservation areas. The project is also likely to require revocation of a part of a Lake Innes Nature Reserve under the NPW Act. The route of the Googik Heritage Walking Track will be crossed by the alignment of the OOLR. There is the possibility that the walking trail will need to be realigned, or modified in other ways to allow continued use of the track during construction of the road and after construction.
e) Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations	There are heritage sites within the CIA. These sites may trigger the need for further detailed Aboriginal and non-Aboriginal surveys of the final corridor area to be conducted. If impacts to heritage items are unable to be avoided, an application for an Aboriginal Heritage Impact permit will need to be lodged with OEH and approved before commencement of construction works or a Heritage Impact Statement will need to be prepared.
f) Any impact on the habitat of protected fauna (within the meaning of the *National Parks and Wildlife Act 1974*).	Protected fauna is native fauna of NSW. The project will have an impact on habitat of protected fauna, with habitat to be cleared and fragmented. The impact of the project on habitat on protected fauna will be assessed in the EIS for the project.
g) Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air.	The project will have an impact on plant and animal species. The impact of the project on habitat on plant and animal species will be assessed in the EIS for the project.
h) Any long-term effects on the environment.	The proposal will result in long term changes along the alignment of the road, in the form of clearing of vegetation, fragmentation of habitat and alternation to overland surface water flows. These impacts will be assessed in the EIS for the project.
i) Any degradation of the quality of the environment.	The design of the road and construction will be undertaken to protect all aspects of the local environment, to avoid environmental degradation.
j) Any risk to the safety of the environment.	The road may be built on an embankment, that may cause disruption to overland surface water flows across the Fernbank Creek floodplain to the south of the Port Macquarie Airport. Disturbance to acid sulfate soils during construction and as a result of changes to groundwater levels may result in formation of sulphuric precipitates, lowering groundwater and surface water pH, with potential impacts to freshwater ecosystems. These potential impacts will be assessed in the EIS for the project.

Assessment Factor	Description of potential impact
k) Any reduction in the range of beneficial uses of the environment.	The road will have a footprint of up to 100 ha, based on a maximum estimated length of 10 km and a corridor width of approximately 100 m. The alignment of the road is undeveloped and comprises a mix of natural areas, parkland and open space. Beneficial uses of the local environment will continue to be realised, with allowance made within the project design for fauna movement, continued overland surface water flows and provision of habitat for wildlife.
l) Any pollution of the environment.	The proposal will not result in pollution to the environment provided that measures are implemented to ensure that construction waste is removed from all construction areas and that the construction areas are completely rehabilitated and landscaped, in accordance with the final project design. Stormwater design should include measures to ensure that no downstream impacts occur as a result of increased stormwater discharge.
m) Any environmental problems associated with the disposal of waste.	The proposal will not result in environmental problems associated with disposal of waste provided that documented waste disposal procedures are implemented.
n) Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply.	The proposal will not result in increased demands on resources that are, or are likely to become, in short supply provided that a documented Environmental Management Plan and Construction Environmental Management Plan are implemented.
o) Any cumulative environmental effect with other existing or likely future activities.	Cumulative impacts will be appropriately managed by consulting with Council and maintaining the construction site through complying with an EMP or CEMP.

4 Environmental approvals and consultation requirements

The potential environmental constraints to the proposed OOLR and probable requirements for approvals, consultation and management are listed in **Table 4-1**.

Table 4-1: Environmental constraints associated with the development and likely requirements for compliance with legislation

Constraint	Likely approval, consultation and management requirements
Acid Sulfate Soils	• Determination of final construction footprint. • Acid Sulfate Soil assessment of affected area. • Development of Acid Sulfate Soil Management Plan. • Approval of Acid Sulfate Soil Management Plan.
Threatened ecological communities, threatened species and MNES	• Determination of final construction footprint. • Ecological investigations to identify presence and location of EECs and associated threatened species. • Consultation with OEH and DotE. • Preparation of EIS if required in accordance with TOR developed by OEH or DotE and likely including detailed flora and fauna assessment reports and 7 part tests, acid sulfate soil assessment reports, preliminary contaminated site investigation reports if required, aboriginal heritage impact assessment reports if required and any other detailed assessment reports as required. • Preparation of species specific and ecosystem specific management plans. • Pre-clearance inspections immediately prior to clearing operations. • Presence of fauna spotter catcher during clearing operations.
Aboriginal heritage	• Consultation with OEH. • Aboriginal Heritage Impact Assessment if required. • Aboriginal Heritage Impact Permt application if required.
Contaminated sites	• Preliminary and Phase 2 Contaminated site investigations if required. • Remediation and validation if contamination present.
SEPP 14 – Coastal wetlands	• Review new SEPP and maps when released. • Identify appropriate compensation offsets. • Consultation with Department of Planning on approvals and information requirements. • Design OOLR route to minimise impacts to areas mapped as SEPP 14 wetlands. • Preparation of management plan including proposed safeguards and rehabilitation measures to be implemented and approval of management plan by Department of Planning. • Implement proposed rehabilitation and amelioration measures prior to, during and after construction.
SEPP 44 - Koalas	• Field assessment of CIA for potential koala habitat. • Mapping of koala sightings and koala food trees. • Design of OOLR route to avoid or minimise impacts to koalas and habitat. • Preparation of Koala Management Plan. • Pre-clearance inspections immediately prior to clearing operations.

Constraint	Likely approval, consultation and management requirements
	• Presence of fauna spotter catcher during clearing operations.
SEPP 62 – Sustainable Aquaculture	• Consultation with Department of Planning. • Water Quality Management and Monitoring Plan to monitor and manage any potential impacts of the proposed development of the OOLR to water quality in the Hastings River.
SEPP 71 – Coastal protection	• Review new SEPP and maps when released. • Consultation with Department of Planning. • Design OOLR route to minimise impacts. • Preparation of management plan including proposed safeguards and rehabilitation measures to be implemented and approval of management plan by Department of Planning. • Implement proposed rehabilitation and amelioration measures prior to, during and after construction.
Noise	• Community consultation process to advise community of project and complaints register. • Development of appropriate noise mitigation strategies in accordance with DECC (2009) and Clause 7.9 of Council's LEP.
Lake Innes Nature Reserve	• Consult with NPWS and supply required documentation regarding the project. • NPWS to brief Chief Executive and Minister about the revocation proposal. • Minister to provide written approval for NPWS to proceed to further examine the potential revocation of the relevant area and undertake discussions with relevant parties. • Council to provide the Chief Executive and Minister with details regarding the proposal including but not limited to: » any land proposed as compensation; » demonstration that the revocation is essential and that, when combined with the proposed revocation, will result in an overall public good outcome; » demonstration that viable, practical alternatives to the revocation have been considered; and » positive and negative impacts of the proposal.
Environmental conservation	• Carry out rezoning of the required parcel of the Environmental Conservation zone including compensatory land if required.
Social impacts	• Community consultation process to advise community of project and complaints register. • Inclusion of social impact assessment section in EIS if required.
Visual amenity	• Community consultation process to advise community of project and complaints register. • Design of OOLR to maintain or enhance visual amenity of the area. • Inclusion of visual impact assessment section in EIS if required.

5 Legislative, policy and planning context

5.1 Assessment systems

The *Environmental Planning and Assessment Act 1979* (EP&A Act) prescribes the planning approval process in New South Wales. There are nine different planning approval pathways in New South Wales that are determined by the size and scale of development.

The approval pathway for the proposed OOLR will depend on the final design and cost of the project, as well as the application of SEPPs to the project area. Consultation with the Assessments Branch of the Department of Planning and Environment (DP&E) is required to confirm which approval pathway is appropriate for this project.

The project has the potential to be assessed under one of the following approval pathways:

- regional development;
- state significant development; or
- state significant infrastructure.

A description of these three planning approval pathways is provided in **Table 5-1**.

Table 5-1: Descriptions of the planning approval pathways that may be applicable for the OOLR. Source: NSW DP&E (2016)

Planning Approval Pathway	Planning Approval Pathway Description
Regional Development	• includes developments with Capital Investment Value greater than $5 million for Council related developments, where Council is the applicant or will carry out the project; and greater than $20 million for general developments. • regional development projects are defined in Schedule 4A of the EP&A Act and in Part 4 of the SEPP (State and Regional Development).
State Significant Development	• developments are state significant developments if a SEPP determines that the development is permissible and the development is listed in Schedule 1 or Schedule 2 of the SEPP (State and Regional Development). • categories of developments are classified as state significant development such as (but not limited to) intensive livestock agriculture, air transport facilities, rail and related transport facilities, manufacturing industries and extractive industries. Some categories of development have trigger values. • roads are not listed state significant developments in Schedule 1 or Schedule 2.
State Significant Infrastructure	• development is carried out on land where an environmental planning instrument allows development without development consent and specified in Schedule 3 of the SEPP (State and Regional Development). • developments are state significant infrastructure if listed in Schedule 3 of the SEPP (State and Regional Development). Categories include port facilities, rail infrastructure, pipelines and submarine telecommunication cables. • infrastructure for which the proponent is also the determining authority and, in the opinion of the proponent, require an EIS under Part 5 of the EP&A Act is defined as state significant infrastructure.

From the definition of the planning approval pathways most likely to apply to the OOLR project, described in **Table 5-1**, it is considered that the project meets the criteria for regional development. **Table 5-2** outlines how the three planning approval pathways applies to the OOLR.

Table 5-2: Planning approval pathway application to OOLR

Planning Approval Pathway	Applicability to Outer Orbital Link Road Project
Regional Development	The project meets the regional development criteria as: • it is Council related development over a value of $5 million and the project will be carried out by Council; • due to the operation of SEPP 14, it is development that requires consent.
State Significant Development	The project does not meet the criteria of state significant development as defined by SEPP (State and Regional Development): • while the development on land affected by the project requires consent approval due to the operation of an environmental planning instrument, in this case SEPP 14, the development is not specified in Schedule 1 or Schedule 2 of the SEPP (State and Regional Development).
State Significant Infrastructure	The project does not meet the criteria of state significant infrastructure as: • an applicable environmental planning instrument needs to apply to land where the project will be built that allows for development without consent. This is not the case for the alignment of the project; • Schedule 3 of the SEPP (State and Regional Development) does not apply to Council projects.

The OOLR project meets the Regional development criteria in the following way:

- the project is a local government project, being a project of the Port Macquarie Hastings Council;
- it has a value of greater than $5 million; and
- it is development that requires consent, by the operation of SEPP 14 and the project having an impact on areas mapped as wetland, under the SEPP.

The project does not meet the criteria of state significant development or state significant infrastructure as the type of project (road infrastructure) is not covered by the relevant Schedules of SEPP (State and Regional Development) or Council projects are not eligible projects in the case of state significant infrastructure projects under Schedule 3 of the SEPP (State and Regional Development).

With the triggering of SEPP 14, the project will be designated development under Clause 7 (3) of the SEPP. Designated development requires the preparation of an EIS under Part 4 of the EP&A Act under Section 78A (8)(a) of the EP&A Act.

5.2 Relevant environmental planning instruments

This PEA has been prepared in accordance with the context of the New South Wales EP&A Act. A review of the relevant regulatory instruments is provided below.

5.2.1 Council's LEP

Local Environmental Plans (LEPs) provide the statutory planning framework under the EP&A Act and ensure that local needs and interests are taken into account when planning for development. The *Port Macquarie Hastings LEP 2011* (Council's LEP) is applicable to the OOLR.

5.2.2 State environmental planning policies

5.2.2.1 NSW State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (Infrastructure) 2007 (SEPP (Infrastructure)) seeks to provide a consistent planning regime for infrastructure and the provision of services across New South Wales that improves regulatory certainty and efficiency. The SEPP (Infrastructure) prevails over most other environmental planning instruments (EPIs) when there is an inconsistency between the other EPI (including LEPs) and SEPP (Infrastructure) subject to Section 74 (1) of the EP&A Act.

Clause 94 (1) of SEPP (Infrastructure) states that *"Development for the purpose of a road or road infrastructure facilities may be carried out by or on behalf of a public authority without consent on any land".*

However, in the case of this project, SEPP 14 overrides SEPP (Infrastructure), as the project will affect areas mapped as SEPP 14 wetlands. SEPP 14 requires that consent be obtained for projects that impact on wetlands covered by policy.

5.2.2.2 State Environmental Planning Policy (State and Regional Development) 2011

State Environmental Planning Policy (State and Regional Development) 2011 identifies development that is Regional development, State significant development, State significant infrastructure, amongst other forms of development. SEPP (State and Regional Development) to confers functions on joint regional planning panels to determine development applications. The SEPP (State and Regional Development) prevails over any other EPIs when there is an inconsistency between the other EPIs and SEPP (State and Regional Development) subject to Section 74 (1) of the EP&A Act.

Infrastructure development is declared to be State Significant if it is permissible without consent under Part 4 of the EP & A Act and if it is specified in Schedule 3 of the SEPP. Schedule 3, Clause 1 (1) states that:

Infrastructure or other development that (but for Part 5.1 of the Act and within the meaning of Part 5 of the Act) would be an activity for which the proponent is also the determining authority and would, in the opinion of the proponent, require an environmental impact statement to be obtained under Part 5 of the Act.

However, this clause is followed by Schedule 3, Clause 1 (2), which states that:

This clause does not apply to development if the proponent is a council or county council.

Under Schedule 3, Clause 1 (2) the proposed development will not be assessed as state significant infrastructure unless the Minister calls-in the development as State Significant Infrastructure on recommendation of the Planning Assessment Commission (NSW Department of Planning and Infrastructure 2012).

Development is declared to be Regional Development if it is Council related and has a capital investment value over $5 million under schedule 4A Part 4 of the EP&A Act.

Therefore, it is likely that the project will be declared regional development, due to the project being a Council project with a value of greater than $5 million and that requires consent. However, this interpretation will need to be confirmed in discussion with the Assessments Branch of DP&E.

5.2.2.3 Other applicable State Environmental Planning Policies

There are a number of other SEPPs that apply to the Port Macquarie Hastings Local Government Area and the CIA (**Table 5-3**).

Table 5-3: Other SEPPs potentially applicable to the proposed OOLR

SEPP	Description	Relevance
SEPP 14 – Coastal Wetlands	Clause 7 of the SEPP requires Council consent and concurrence of the Minister for the Environment for certain work on SEPP 14 land.	The proposed development affects land subject to this EPI (**Figure 2-7**). Council will be required to consult with the Department of Planning and Environment about the proposal for consideration of concurrence under this SEPP. DP&E will examine concurrence and take into consideration factors such as: • Whether adequate safeguards and rehabilitation measures have been, or will be, made to protect the coastal wetlands; and • Whether conditions requiring the carrying out of the works to preserve or enhance the value of surrounding wetlands should be applied. The development should consider measures to ameliorate impacts on SEPP 14 Wetlands in its design including: • design, construction and management features so that the development impacting wetland areas is limited in area and the spread of disturbance to wetlands is contained; • offsetting the loss of wetlands; and • establishing new wetland habitats. Under SEPP 14, the project will be designated development under Clause 7 (3). Designated development requires the preparation of an EIS under Part 4 of the EP&A Act.
SEPP 19 – Bushland in Urban Areas	The aims of this policy are to preserve bushland for its community, heritage, aesthetic, recreational, educational and scientific values, protect and preserve plant communities and associated fauna which were once characteristic of land now within urban areas.	Port Macquarie Hastings LGA is not listed in Schedule 1 of the SEPP and, therefore, the proposed activity does not affect land subject to this EPI. Regardless, Council should aim to retain and restore impacted bushland areas that are impacted by the proposed works.
SEPP 44 – Koala Habitat Protection	This policy 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. Clause 7 of the SEPP requires Council to determine whether land to which a development application applies is core or potential koala habitat before it may grant consent to the carrying out of the development.	The proposed activity is located within a local government area to which this SEPP applies, as listed in Schedule 1 of the SEPP. However, the development is being carried out under SEPP (Infrastructure) and is development without consent, which overrides the requirements of SEPP 44. Regardless of this, potential impacts to koalas or their habitats should be assessed and a management plan to avoid or minimise impacts should be developed prior to construction. Koala habitat protection is discussed in **Section 2.11.6** and **Section 3.3.4**.

SEPP	Description	Relevance
	Clause 10 of the SEPP requires Council to take guidelines into consideration in determining an application for consent to carry out development on land to which this Part applies.	
SEPP 55 – Remediation of Land	The object of this policy is to provide a state-wide planning approach to the remediation of contaminated land for the purpose of reducing risk to human health or any other aspect of the environment. Under this SEPP, Council must not consent to development unless: • Council has considered whether the land is contaminated; and • If the land is contaminated, Council is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out. If the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, Council is satisfied that the land will be remediated before the land is used for that purpose.	This SEPP applies to the whole of NSW. There are a number of contaminated sites and sites where contaminating activities have been conducted that are within the CIA (**Figure 2-8**). If these sites are to be acquired for development of the proposed OOLR, Council will need to conduct Phase 1 or Phase 2 contaminated site investigations and remediation if required to demonstrate their due diligence under the SEPP. Contamination is discussed in **Section 2.9** and **Section 3.10**.
SEPP 71 – Coastal Protection	Clause 4 of the SEPP requires Council consent and concurrence of the Minister for the Environment for certain work on SEPP 71 land.	The proposed activity affects land subject to this EPI (**Figure 2-7**). Council will need to consult with the Department of Planning and Environment about the proposal for consideration of concurrence under this SEPP. Coastal protection is discussed in **Section 2.7**.

5.2.3 Environmental Planning and Assessment Act 1979

The EP&A Act is the principal piece of legislation guiding the planning process in New South Wales. Part 4 of the Act determines whether development needs consent, does not need consent or is prohibited.

The Act applies to the OOLR through the operation of SEPP 14. The project will require consent and will be designated development, to be assessed through an EIS. The project will be assessed under Part 4 of the Act, for projects that are development with consent.

Part 4, Division 1 Clause 76A (1) states that:

"If an environmental planning instrument provides that specified development may not be carried out except with development consent, a person must not carry the development out on land to which the provision applies unless:

(a) such a consent has been obtained and is in force, and

(b) the development is carried out in accordance with the consent and the instrument."

SEPP 14 determines that the project will require consent under the Act, due to the impact on SEPP 14 wetlands.

Part 4, Division 1 Clause 76A (1) states that:

"A development application (other than an application in respect of State significant development) must be accompanied by:

(a) if the application is in respect of designated development—an environmental impact statement prepared by or on behalf of the applicant in the form prescribed by the regulations, or

(b) if the application is in respect of development on land that is, or is a part of, critical habitat or is likely to significantly affect threatened species, populations or ecological communities, or their habitats—a species impact statement prepared in accordance with Division 2 of Part 6 of the Threatened Species Conservation Act 1995."

Therefore, with SEPP 14 determining that the project is designated development, it will need to be assessed under Part 4 of the EP&A Act, with an EIS prepared for assessment of project related impacts.

5.2.4 Protection of Environment Operations Act 1997

When a scheduled activity under the *Protection of the Environment Operations Act 1997* (POEO Act) is conducted, a licence is required from the New South Wales Environmental Protection Authority (EPA) for the emission of pollutants from the site.

Clause 35 of the POEO Act relates to road construction and declares scheduled activities to be road construction activities that result in the existence of four or more traffic lanes (other than bicycle lanes or lanes used for entry or exit) for at least:

(a) Where the road is classified, or proposed to be classified, as a freeway or tollway under the Roads Act 1993:

(i) 1 kilometre of their length in the metropolitan area, or

(ii) 5 kilometres of their length in any other area, or

(b) Where the road is classified, or proposed to be classified, as a main road (but not a freeway or tollway) under the Roads Act 1993:

(i) 3 kilometres of their length in the metropolitan area, or

(ii) 5 kilometres of their length in any other area.

It is yet to be determined how the proposed OOLR will be classified. If the OOLR is declared to be a scheduled activity under Clause 35, a licence will likely be required. However, liability for pollution is still applicable for unscheduled activities and Council will be required to implement pollution mitigation measures for factors including water quality and sediment and erosion control to ameliorate impacts even if a licence is not required for the works.

5.2.5 Threatened Species Conservation Act 1995

The EP&A Act requires that the impact that any proposed activity may have upon threatened species, populations, or ecological communities and their habitats must be assessed. Lists of threatened species, populations and ecological communities are contained in Schedules 1 and 2 of the *Threatened Species Conservation Act 1995*. If threatened species listed under the TSC Act will be impacted by the proposal, OEH should be consulted with regard to potential impacts and their statutory requirements.

5.2.6 Fisheries Management Act 1994

The *Fisheries Management Act 1994* (FM Act) requires approval to be obtained from New South Wales Department of Primary Industries Fisheries (DPI Fisheries) for any developments or activities within or on the banks of a waterway (NSW DPI 2013). Dredging and reclamation, which includes removal of riparian vegetation, harm to marine vegetation and obstructions to fish passage require permits under sections 200, 205 and 219 of the FM Act respectively. Areas within the CIA are mapped as Key Fish Habitat under Council's LGA and SEPP 14 Coastal Wetlands. DPI Fisheries will need to be consulted with regard to permits and approvals required should the proposed OOLR have impacts to riparian vegetation, marine vegetation or fish passage.

5.2.7 Water Management Act 2000

The *Water Management Act 2000* (WM Act) regulates construction activities in close proximity to waterways. Under the Act, controlled activity approvals from the New South Wales Office of Water are required where excavations are to be carried out on land within a prescribed distance (40 m) from coastal waters. However, under clause 39A (1) of the *Water Management Regulation 2004,* all public authorities and local councils are exempt from section 344 (1) (a) of the *Water Management Act 2000* and do not need controlled activity approvals for excavation works near waterways.

5.2.8 National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* (NPW Act) applies to the care, control, protection and management of all national parks, historic sites, nature reserves, reserves, Aboriginal sites, Aboriginal places, state games reserves and native flora and fauna. If any Aboriginal Heritage sites or places are identified within the proposed construction footprint, an Aboriginal Heritage investigation is likely to be required to determine the full extent of the potential impact. Under the Act, if harm to an Aboriginal heritage object or place cannot be avoided during the development of the proposed OOLR, Council will need to apply for an Aboriginal Heritage Impact Permit to undertake the works.

The CIA traverses land zoned as Nature Reserve. If the final OOLR will traverse this area, revocation of land will be required under the NPW Act in accordance with the *Revocation, recategorisation and road adjustment policy 2014*.

The policy states that "*revocations of lands reserved under the NPW Act will generally only be undertaken as an avenue of last resort and where no other practical options are available*".

Therefore, under the policy, Council will need to submit a proposal to the Minister that outlines:

- How the proposal will result in an overall public good outcome having regard to all of conservation, cultural heritage and other values of the land being revoked and the values of any land provided as compensation;
- Compensation for the revocation in the form of the transfer of land to the Minister for reservation under the NPW Act (preferably as an addition to the park that is subject to the revocation) that is:
  - Preferably of greater size than the area of land being revoked and at least of equal size;
  - Matches the area, type and quality of habitat and cultural heritage values on land being revoked with the area of land proposed as compensation where possible; and
  - Desirably close to the area being revoked and preferably adjacent to the affected reserve.

The Minister must be satisfied that the proposed or likely compensation is of equal or greater conservation value both in terms of natural and cultural heritage value than the land that is proposed to be revoked before agreement to the revocation is granted.

5.2.9 *Environment Protection and Biodiversity Conservation Act 1999*

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) applies to projects that are likely to have a significant impact on Matters of National Environmental Significance (MNES). MNES include nationally threatened species and ecological communities, migratory species, Ramsar wetlands and world heritage properties, amongst other matters.

As described in **Section 2.1** and **Section 3.3**, a number of MNES have been identified in the CIA. The PMST identified listed species such as koalas, the grey-headed flying fox and the golden bell frog in the search area, centred on the CIA. There are 40 species that have the possibility of being in and around the project area. The Port Macquarie Airport Master Plan – Biodiversity Certification Assessment and Biocertification Strategy (Eco Logical Australia ELA 2015) summarises the findings of ecological surveys and assessments across the Airport and Thrumster area. These surveys and assessments were conducted from 2002 to 2014. A wide range of EPBC listed threatened species have been located in the vicinity of the CIA, to the east and south-east of the Airport.

To assist with determining the need to refer this project to the Department of the Environment, the koala habitat assessment tool from the EPBC Act referral guidelines for the vulnerable koala has been used. The assessment tool provides a structured approach to help determine the sensitivity, value and quality of koala habitat on project site and whether the habitat is critical to the survival of the koala.

Table 5-4 presents the scores for each of the five variables of the koala habitat assessment tool, with a description of the information used to arrive at each score.

Table 5-4: Koala habitat assessment tool scores

Attribute	Score	Habitat appraisal	
Koala occurrence	2	desktop	Council koala mapping records across the CIA. PMST lists koalas as known to occur in the project area and surrounding area. Atlas of Living Australia records them. OEH Atlas of NSW Wildlife recorded 184 records since 1.1.2010 in a search area centred on the CIA.

Attribute	Score	Habitat appraisal	
Vegetation structure and composition	2	desktop	Vegetation mapping records a range of eucalypt vegetation communities in or near the CIA, that are suitable habitat for the koala.
Habitat connectivity	2	desktop	The habitat of the CIA is part of large contiguous area of habitat east of the Pacific Highway.
Key existing threats	1	desktop	Vehicle strike and dog attacks occur on the edges of the built up area, adjacent to the CIA. Fire is also a threat to koalas in this area.
Recovery value	2	desktop	As a large area of habitat, with koalas present, this area is important for achieving koala recovery objectives. There is a diversity of habitat available to koalas across the area.
Total	9		

The koala referral guidelines state that an impact area with a score of five or more may include habitat that is critical to the survival of the koala. Projects that have an impact on habitat critical to the survival of a listed species should be referred to the Department of the Environment for assessment and a decision on whether the project will be a controlled action, under the EPBC Act.

As the koala habitat assessment tool resulted in a score of nine, it is proposed that the project be referred, on the basis that the habitat in the vicinity of the project is critical to the survival of the koala. In addition to the outcome of the koala habitat assessment tool, the project is likely to cause an impact to listed species through the clearing of habitat, fragmentation of habitat and introduction of traffic into an undeveloped area.

5.3 Summary of licences, permits and approvals

There are a number of permits and approvals that are likely to be required for the outer orbital link road to proceed. These are summarised in **Table 5-5**.

Table 5-5: Summary of licences, permits and approvals of relevance to the project

Legislation	Authority	Relevance to the project	Likely Approval/Licence Requirement
EPBC Act	Commonwealth Department of the Environment	Approval of DotE if any significant impacts are expected on matters of national environmental significance.	Referral of the project to DotE is recommended, as likely there will be a significant impact to species such as koala. Assessment under EPBC Act will form part of the project EIS.
Contaminated Land Management Act 1997	OEH	Any contaminated land which presents a significant risk of harm.	If the project encroaches on contaminated land, a contaminated site investigation will be required and the land will need to be remediated to a state that meets the environmental and health investigation levels of the proposed new use of the land in accordance with the *National Environment Protection (Assessment of Site Contamination) Measure 1999* (NEPC 2011).
POEO Act	OEH	Noise, air and water pollution and waste management for scheduled	If the project is declared a scheduled activity under clause 35, a licence will be required.

Legislation	Authority	Relevance to the project	Likely Approval/Licence Requirement
		activities or activities that may cause water pollution.	
Waste Avoidance and Resource Recovery Act 2001	OEH	The project would use resources and generate waste and, as such, needs to consider the waste hierarchy of avoidance, resource recovery and disposal.	No approvals or licences required.
Pesticides Act 1999	OEH	Pesticides, if used.	Labelling requirements for pesticides to be adhered to. Certificates for use of restricted pesticides.
Fisheries Management Act 1994	DPI Fisheries	The *Fisheries Management Act 1994* applies if works will involve dredging or reclamation, fish passage obstruction, harm to marine vegetation, or use of explosives or electrical devices.	If works will be occurring within or on the banks of a waterway, consultation with DPI Fisheries and approval under the *Fisheries Management Act 1994* will be required.
Water Management Act 2000	Office of Water	Water extraction from waterways for activities such as dust suppression during construction. Construction of temporary earthworks or structure across an area. Works are within protected waters or within 40 m of top of bank.	Approval is unlikely to be required as work will be conducted by Council.
Heritage Act 1977	OEH	Relates to non-Aboriginal historic artefacts and sites (older than 50 years) if found	If found, excavation permits may be required.
Noxious Weeds Act 1993	DPI Agriculture	Removal and disposal of noxious weeds	No permits or approval required but responsibility for removal and proper disposal.
National Parks and Wildlife Act 1974	OEH	Disturb or destroy any Aboriginal objects or places. Removal of any detected threatened species.	A permit may be required for the removal of native vegetation unless the clearing activity is permitted. If Aboriginal objects or human remains are uncovered, a permit may be required. The project is likely to require revocation of a nature reserve. This will involve consultation with NPW and require ministerial and parliamentary assessment.
Rural Fires Act 1997	NSW Rural Fire Service	Under Section 63 public authorities must take all practicable steps to prevent the occurrence and spread of bush fires on or from land vested in or under its control or management. The provisions of the Rural Fires and Environmental Assessment Legislation Amendment Act commenced in 2002. Under these provisions, all proposed development that is located within land that is identified as bushfire prone must comply with conditions published by the NSW Rural Fire Service, *Planning for Bushfire*	Consideration should be given to *Planning for Bushfire Protection* (NSW Rural Fire Service 2006) in the design of the proposed OOLR.

Legislation	Authority	Relevance to the project	Likely Approval/Licence Requirement
		Protection (NSW Rural Fire Service 2006).	
TSC Act	OEH	Harm or damage to any threatened species, populations, communities, or their habitat.	A Section 91 licence will be required if any threatened species or EECs are to be removed or impacted following a 7 Part Test and a Species Impact Statement (if required).

6 Agency consultation

Consultation was conducted with State government departments to clarify some of the initial requirements for the proposed OOLR and the likely approvals and permits that will be required given the major constraints including the nature reserve zone, the SEPP 14 zones and the potential presence of MNES. **Table 6-1** outlines consultation that has occurred with NPWS, DPI Fisheries, OEH, DP&E and how it has been considered in this PEA. Copies of written correspondence are presented in **Appendix B** – Consultation records.

Table 6-1: Consultation and Response

Agency/Personnel/ Date	Topic and PEA Reference	Details
National Parks and Wildlife – Steve Atkins of Port Macquarie office (02 6588 5555) *10 March 2016*	E1 and E2 zones	National Parks and Wildlife was contacted to enquire about the presence of National parks and Nature Reserves (E1) and Environmental Conservation (E2) zones within the CIA. NPWS advised that: • E1 zoned land can be excised from the Nature Reserve via a gazettal process involving ministerial and parliamentary assessment. The assessment would involve: » Assessment of potential impacts by Regional Operations; » Review and assessment of compensatory land by NPWS • Council will need to demonstrate the project is in the public interest and the Minister will have to agree. • NPWS can't enter into further assessment without the Minister's agreement so Council will need to provide a firm proposal to the minister who will then assess the proposal and agree or disagree with the assessment proceeding. • Compensatory land needs to be identified, assessed and agreed by the Minister prior to any change overs of land and prior to commencement of the project. • The revocation process can be expected to take in excess of 24 months. • Council's proposal falls into the revocation section because it is a new non-permissible activity or development proposed by another party. • OEH's *Revocation, Recategorisation and Road Adjustment Policy* (OEH 2014) provides procedures for revocations including: » Compensation criteria, which includes size, location and quality requirements; and » Council's obligation to demonstrate that the revocation and compensation will result in an overall good public outcome; and » Procedures for consulting with NPW and the Minister and for submitting documentation to NPWS and the Minister.
New South Wales DPI Fisheries – Hastings office (0407 957 631), Troy Northey – Fisheries Conservation Officer (0447 537 168) *10 March 2016*	Wetlands and Priority Oyster Leases	DPI Fisheries was contacted to enquire about the presence Freshwater Wetlands, Forested Wetlands, Coastal Lagoons and Lakes, Coastal Wetlands, Estuarine Wetlands, SEPP 14 Wetlands and SEPP 71 Coastal Protection zones within the CIA. DPI Fisheries advised that: • If the proposal is assessed under EP&A Act Part 5 it will trigger the *Policy and Guidelines for Fish Habitat Conservation and Management* (NSW DPI 2013) due to the presence of wetlands. The presence of SEPP 14 will trigger the requirement for offsets and compensatory measures under Section 200 – Dredging and Reclamation and 205 – Harm to Marine Vegetation (seagrasses, mangroves and

Agency/Personnel/ Date	Topic and PEA Reference	Details
		saltmarshes) of the FM Act. The following offset requirements are applicable: » Offsets for areas outside of SEPP 14 have a 2 for 1 offset requirement; » Offsets for areas within SEPP 14 have a 10 for 1 offset requirement; » Unlike terrestrial legislation, there are no bio banking agreements; » Damage footprint with regard to seagrass requires fiscal compensation because seagrass is difficult to rehabilitate so if there are three types of habitat affected, vegetation offsets would apply for saltmarshes and mangroves but a fiscal compensation would apply for the seagrasses. • Section 218-220 - Obstruction to Fish Passage of the FM Act would also likely be triggered. There is no permit for Section 218-220 – the requirement for this permit is covered by the Section 200 permit (note that a Section 205 permit will be in addition to the Section 200 permit). • Also need to consider SEPP 62 – Sustainable Aquaculture due to the presence of Priority Oyster Aquaculture areas in the Hastings River. This has implications for water quality and the proposal may need to demonstrate, through a monitoring program or other, that the proposal will not cause any impacts to water quality in the Hastings River. The *NSW Oyster Industry Sustainable Aquaculture Strategy* (NSW DPI 2014) sets out water quality parameters that need to be maintained in affected areas.
OEH – Rosalie Neve (02 6659 8221; Rosalie.neve@environment.nsw.gov.au) *15 March 2016*	Aboriginal sites	OEH was contacted to enquire about the presence of Aboriginal sites within the CIA. OEH advised that: • The presence of three Aboriginal sites within the CIA, particularly, but not only, the site that forms the part of the cluster at the south east corner of the CIA, indicates the potential for more Aboriginal sites to be present. • The known sites are evidence that Aboriginal people once gathered at these locations and any links between these sites needs to be identified to determine the activity associated with and significance of, this historical gathering. • Where there are clusters of objects, there can be subsurface links between these objects that would be impacted by any ground disturbance works occurring between the objects. • An Aboriginal Heritage Assessment of the CIA is required to be undertaken by a suitably qualified heritage consultant or archaeologist that includes: » A desktop study to collate the full extent of information regarding the known identified sites within the 1 km buffer zone of the CIA; and » Consultation with the local Aboriginal community to discern the cultural opinion about the known objects and any potential previously unidentified sites or places of Aboriginal significance that might be associated with them. • If the Aboriginal Heritage Assessment finds that there are likely to be subsurface or other sites or places of Aboriginal heritage significance within the CIA, a test-pit excavation will likely be required to determine the extent of the potential site or place.
OEH – Shelley Braithwaite (02 6650 7113; Shelley.Braithwaite@environment.nsw.gov.au)	EECs and vegetation communities	OEH was contacted to enquire about the presence of Endangered Ecological Communities, Forested Wetlands, Freshwater Wetlands, Littoral Rainforest and Coastal Vine Thickets of Eastern Australia (Littoral Rainforest), Lowland Rainforest of Subtropical Australia (Lowland Rainforest) and Subtropical and Temperate Coastal Saltmarsh (Coastal Saltmarsh).

Agency/Personnel/ Date	Topic and PEA Reference	Details
		OEH advised that: • OEH suggested the project may be assessed as State Significant Development based on the scale of the project and, if so, that they would have an advisory role involving reviewing the adequacy of documentation and providing advice and recommendations for the project. • If the development is assessed under Part 5 of the EP&A Act, OEH is mainly concerned with projects that have impacts to Aboriginal sites or places or scheduled items under the TSC Act, in which case they again play an advisory role including reviewing the adequacy of documentation produced for assessment by a determining Authority. • OEH is able to review documents at Council's request and provide advisory comments and feedback.
NSW Department of Planning and Environment – Allan Young (allan.young@planning.nsw.gov.au); Craig Diss (craig.diss@planning.nsw.gov.au; 02 6701 9685)	SEPP 14 and 71	The Department of Planning and Environment was contacted to enquire about the presence SEPP 14 and SEPP 71 Wetlands within the CIA. The Department advised that: • SEPP 14 is likely be more of a constraint to the project than SEPP 71. • Under the current legislation, if Council proposes to develop land that is mapped as SEPP 14, they will likely need to produce an EIS for the development. • However, the legislation is currently being reviewed, with a new Coastal Management Manual and Bill being exhibited in February 2016 for which submissions are currently undergoing review and SEPPs 14, 71 and 26 being brought together into one Coastal Management SEPP, which will be exhibited within the next few months and will be implemented late in 2016. • New mapping for SEPP 14, 71 and 26 will be produced as part of the new SEPP. Draft versions of these maps will be sent out to the relevant Council's within the next few months for review and feedback to ensure that the new maps that get released are the best informed maps as possible. • New maps may have implications for the project, particularly if the mapping for SEPPs 14 and 71 has changed. • Other changes will have implications for the proposal which may include, for example, changes to concurrence roles, which are currently with the Department of Planning but may shift to another agency, such as Council.
NSW Department of Planning and Environment –Craig Diss (craig.diss@planning.nsw.gov.au; 02 6701 9685)	Major Project	The Department of Planning and Environment was contacted to enquire about whether the project would be considered a major project. The advice included: • The type of project that this project is assessed as will have implications as follows: » If it is declared State Significant Development, the State Government will become the Determining Authority; » If the project is assessed as a major local project, it will go via Council to the Joint Regional Planning Panel for determination; » If it is a local infrastructure project, Council will be the Determining Authority under Part 5 of the EP&A Act and SEPP (Infrastructure). • Once the exact details (including design and costs) of the project are determined, the Assessment Branch of the Department of Planning in Sydney will be able to advise whether the project is designated development, state significant development, local development or local major development. The number for assessments is 02 9228 6333. • Dan Croft of Port Macquarie-Hastings Council was recommended as being able to provide advice regarding the appropriate planning process for the development.

Agency/Personnel/ Date	Topic and PEA Reference	Details
NSW Department of Planning and Environment – Allan Young (allan.young@planning.nsw.gov.au); Craig Diss (craig.diss@planning.nsw.gov.au; 02 6701 9685)	Koalas	The Department of Planning and Environment was contacted to enquire about the application of SEPP 44 to the project. Advice from Allan Young consisted of: • Because the area is listed on SEPP 44, Council may have a general requirement to prepare a Koala Plan of Management • SEPP 44 applies to land to which a development application has been made. • If Council is proposing to construct the OOLR under Part 5 of the EP&A Act, the proposed works do not need to reference SEPP 44 and a koala plan of management will not be required.

7 Stage 2 consultation

The delivery of the OOLR project will involve a complex series of environmental assessment, consultation and approvals.

Consultation will be needed with key New South Wales Government agencies that are responsible for environmental and planning assessment, application of State Environmental Planning Policies and management of areas reserved under the *National Parks and Wildlife Act 1974*.

The major issues to be discussed with the agencies are listed in **Table 7-1**. The most important of these is to determine the approval pathway for the project. The project's impact on the Lake Innes Nature Reserve, SEPP 14 wetlands and matters of national environmental significance are key aspects of the project that will influence the final approval pathway.

Consultation in Stage 2 with government agencies is proposed to include a two phased approach:

- Phase 1 – introductory meetings with individual agencies to present the project concept, design, cost estimate, timing, project need and anticipated impact. The purpose of these initial meetings is to provide information to agencies of the project's status and outline Council's project plan to deliver the project. These meetings will be held individually with each relevant government agency involved in the environmental and planning assessment of the project – NPWS, OEH, DP&E. It is anticipated that the meetings will be approximately 90 minutes in length to allow for Council to outline the project scope and discuss the agency's response. Before the meeting, it is proposed that Council circulate a short briefing paper to meeting attendees to give the background to the project and summarise Council's view of the approval pathway. The purpose of the briefing paper is to maximise the benefit of the meeting and to allow time for agencies to consider the project and related approval matters.

  Following these initial meetings, Council's position on the approval pathway for the project can be formalised, based on advice from agencies and consideration of Council's own view on this matter.
- Phase 2 – NSW agency approval workshop with all agencies (NPWS, OEH, DP&E) to work through the approval triggers and discuss and agree on the most appropriate proposed by Council.

Consultation with the Commonwealth Department of the Environment, on impacts to MNES can occur once discussions have commenced with the state agencies and advice of the DP&E is sought on the need for referral. The EPBC Bilateral Agreement between the Commonwealth and the State of New South Wales requires DP&E's advice on EPBC matters before referring the project to the Commonwealth.

Table 7-1: Stage 2 agency consultation issues

Agency	Consultation topics	Inputs to support consultation
National Parks and Wildlife Service (NSW)	• Project need and design • Design and alignment options assessed • Impact of project on Lake Innes Nature Reserve • Means of addressing impact on Lake Innes Nature Reserve • Nature Reserve revocation process, information requirements and timing • Cultural heritage impacts	• Alignment of OOLR and land requirement • Design options for bridge across nature reserve • Land resumption plans for nature reserve • Area estimate of resumption • Project construction program
OEH (NSW)	• Nature Reserve revocation process, information requirements and timing • Cultural heritage impacts • Threatened species and communities' impacts	• Alignment of OOLR and land requirement • Design options for bridge across nature reserve • Land resumption plans for nature reserve • Area estimate of resumption • Project construction program
Department of Planning and Environment (NSW)	• Approvals pathway • Application of SEPP (Infrastructure) • Application of SEPPs to project approval • Implications for amalgamated SEPP 14, 26 and 71 for the project • Need for referral under EPBC Act	• Alignment of OOLR and land requirement • Design options for bridge across nature reserve and fauna passage • Land resumption plans • Area estimate of resumption • Project construction program • Impact on SEPP14, SEPP71 lands
Department of the Environment (Cth)	• EPBC referral • Impact of project on MNES	• Alignment of OOLR and land requirement • Presence of MNES, especially koala • Estimate of impact to MNES • Proposed mitigation measures • Road design • Outcomes from NSW agencies consultation
DPI Fisheries (NSW)	• Approvals pathway	• Alignment of OOLR and land requirement • Design options for waterway crossings • Mapping of SEPP14, SEPP71 lands, Council wetlands and waterways • Impact on SEPP14, SEPP71 lands

8 Summary of potential impacts and mitigation measures

Table 8-1 provides recommendations for environmental safeguards that may be implemented to reduce potential impacts of the proposed OOLR on the environment. **Table 8-1** includes suggested recommendations and that further recommendations are likely to be included in the final Environmental Management Plan, Construction Environmental Management Plan and species specific management plans, Review of Environmental Factors (REF) if required and EIS (if required).

Table 8-1: Summary of potential safeguards that may be implemented to reduce potential impacts on environmental factors

Environmental factor	Potential impacts	Recommended safeguards
Soils and geology	• Exposure of ASS • Erosion • Water quality impact	• Undertake an assessment of ASS in areas mapped of high probability of ASS; • Prepare an ASS Management Plan based on the results of the ASS assessment and project construction methods; • Prepare an Erosion and Sediment Control Plan in accordance with the *Managing Urban Stormwater: Soils and Construction The Blue Book* (Landcom 2004) to be approved by Council prior to construction; • Specific soil management recommendations shall be detailed in the construction contractor's CEMP in accordance with *AS3798-2007: Guidelines on Earthworks for Commercial and Residential Developments* (Standards Australia 2007); • The CEMP should consider prevailing wind direction, wind speeds and where practicable, timing of works so that they occur during the drier months of the year, to avoid dust impacts on neighbouring properties and vegetation; • Provide a designated construction compound and stockpile area(s) in an existing cleared area; • After top-soil stripping, exposed sub-soil should be compacted (by rolling) in preparation for construction. This should be carried out in a timely fashion to prevent erosion; • Stockpiled material shall be covered or kept wet to prevent wind dispersal and erosion before being reused in landscaping or disposed of at an appropriate facility; and • If obvious erosion occurs, consider restabilising vegetation in accordance with *Managing Urban Stormwater: Soils and Construction The Blue Book* (Landcom 2004). Examples of the controls that may be used include soil retention blankets (with appropriate seeding mixture) for non-structural cover. Species used should be compatible with those of the area
Hydrology, flooding and water quality	• Increased stormwater discharge to downstream waterbodies and watercourses • Downstream water pollution or decreased water quality	• Prepare a Stormwater management plan to describe how stormwater and overland water flows are to be managed during the project • Prepare emergency spill management plan prior to commencement of development; and • Prepare an Erosion and Sediment Control Plan in accordance with the *Managing Urban Stormwater: Soils and Construction The Blue Book* (Landcom 2004) to be approved by Council prior to construction
Ecology, flora and fauna	• Impacts to MNES (including threatened	• Complete a detailed flora and fauna survey and assessment of the project area to identify the presence and extent of listed species, communities and habitat;

Environmental factor	Potential impacts	Recommended safeguards
	ecosystems and species) • Impacts to TSC-listed flora and fauna	• Incorporate the findings of the ecology surveys into the project design, to avoid or minimise impacts on species, communities and habitat; • Develop EIS if required in consultation with DotE; • Adhere to management plans throughout construction; • Minimise vegetation removal as far as possible and develop offset plans including revegetation of disturbed area and vegetation of offset areas • Undertake pre-clearance inspections immediately prior to clearing to identify the presence of fauna in vegetation; • Arrange for a fauna spotter catcher to be present during clearing of vegetation; • Develop and adhere to weed management plan and weed hygiene protocols; • Minimise ground disturbance as far as possible; • Install nest boxes and artificial hollows around the works area to supplement any loss of hollows due to vegetation removal; • If wildlife is found in an area of the work site, for example, in a tree required to be cleared, work will cease in that area of the works site until the wildlife naturally vacate the area; • If injured wildlife is found, work will cease in the immediate area surrounding the location of the injured wildlife and a local wildlife carer will be contacted to treat the animal and to take to a vet; • Consider alternative options to the need for structures that may temporarily obstruct fish passage; • Construction activities should be restricted to daylight hours to prevent impacts to roosting fauna and nocturnal wildlife; • Prepare a koala management plan, where it is found that koalas are likely to be present in the vicinity of the project area, with the plan covering tree clearing, arrangements to manage koala encounters, worker training, liaison with Council and OEH; • Prepare a Bat Management Plan (BMP) setting out measures to minimise impacts on microbats in the CEMP. The BMP should include a description of the bats present or potentially present, a description of the staging of works and timing (based on breeding cycles), management techniques, a description of relocation measures if possible, a description of other ameliorative measures and monitoring requirements; • Construction works will be assessed and restricted as necessary on extreme or catastrophic fire danger days; • Culvert crossing and approach road design will address requirements of *Planning for Bushfire Protection* (NSW Rural Fire Service 2006) Section 4.1.3(1); • Council may wish to consult with the NSW Rural Fire Service or a bushfire consultant with a Fire Protection Association Australia, Bush Fire Planning and Design (BPAD) Accreditation to ensure that the proposed OOLR is designed and constructed in accordance with NSW Rural Fire Service (2006)
Climate, air quality and energy	Pollution	• Erosion and sediment control plan including provisions for windy and high bushfire risk days prepared in accordance with the Managing Urban Stormwater: Soils and Construction "The Blue Book" (Landcom, 2004) to be approved by Council's Approved Person prior to construction; • Vehicle traffic speed will be reduced to 40 km/h in and around the construction site where dust could be generated; • Water will be used to dampen exposed soil and stockpiles when dust levels become unacceptable;

Environmental factor	Potential impacts	Recommended safeguards
		• Vehicles and machinery will be maintained to minimise emissions; • Vehicles or machinery are not to be left idling unnecessarily; and • There will be no burning of timber or other material
Non-Aboriginal heritage	Disturbance to heritage items	• Avoid disturbance to all heritage items, unless approved; • Prepare a heritage management plan where heritage items are confirmed; and • If an item of non-Aboriginal heritage is discovered (a 'chance find'), cease work immediately and notify Council's Authorised Person and OEH.
Aboriginal Heritage	Disturbance to heritage items	• Avoid disturbance to all items of cultural heritage, unless approved; • Consultation with OEH to ensure that all statutory requirements are complied with • Undertake an Aboriginal Heritage Impact Assessment by suitably qualified person • Apply for an AHIP, if required • In the event of an item of Aboriginal heritage significance being uncovered during the construction phase (a 'chance find'), works will cease in the vicinity of the find and Council's Approved Person is to be contacted immediately. Works will not recommence until an investigation has been completed by a suitably qualified person in accordance with OEH guidelines; and • If skeletal remains are discovered cease work immediately and contact Council's Approved Person, OEH and NSW Police.
Visual Amenity	Decreased visual amenity	• Minimise vegetation removal as far as practicable; • Following the completion of each stage of the proposed works, all machinery and unnecessary signage and fencing should be moved to a compound near the site office to minimise the visual impact of the works before being relocated off site; • Minimise ground disturbance to allow area to regrow groundcover under natural processes; • Regenerated the site to a more natural state and therefore assist with the mitigation of any visual impacts at the completion of the works; and • Maintain the construction site by removing waste materials, parking in designated areas and storing construction equipment appropriately
Waste Generation and Contamination	• Contamination of site due to fuel and chemical storage; • Construction waste generation including concrete, steel and timber • Construction crew waste including food and food wrappings	• All waste generated by the proposal will be classified in accordance with the *NSW Waste Classification Guidelines Part 1: Classifying Wastes* (DECC, 2014); • Any timber requiring disposal will be removed from the site and will not be burnt or buried; • Resource management hierarchy principles are to be followed: » avoid unnecessary resource consumption as a priority; » avoidance is followed by resource recovery (including reuse of materials, reprocessing and recycling and energy recovery); and » disposal is undertaken as a last resort (in accordance with the *Waste Avoidance & Resource Recovery Act 2001*); • Waste material is not to be left on site once the works have been completed; • Working areas are to be maintained, kept free of rubbish and cleaned up at the end of each working day;

Environmental factor	Potential impacts	Recommended safeguards
		• Oils, fuels and chemicals will be stored in a locked bund capable of holding 110 % of the capacity of the containers within; • Equipment will be serviced and maintained regularly to minimise potential for loss of fluids; • Cease work and contact Council's Authorised Person of suspected contaminated soil is uncovered; • Develop contingency plans to deal with any spills that occur during construction. Spill kit to be on site at all times and workers trained in its use; • Refuel machinery in a designated location at least 20 m from drainage lines and using plastic trays to collect spilt fuel; • Waste would be removed by a licensed contractor; • Any excavated soil will be reused on site as fill; and • Waste will not be burnt or buried on site.
Socio-economic considerations	• Traffic delays • Access restrictions	• Consult with local residents, businesses and road users through means such as letter box drops, newspaper advertisements and signs in local shops to provide advice about the works and any potential inconveniences.
Noise	• Disturbance to residents and sensitive receivers	• Community will be notified of the nature and timing of construction activity and provided with contact details. This will be guided by the construction contractors CEMP; • Deliveries will be scheduled during the hours of 10 am and 3 pm where practicable; • Work site will be orientated to minimise use of reversing alarms; • Plant will be located as far as practicable from residences and sensitive land uses; • A complaints register will be established to record and respond to complaints within 24 hours where practicable; • Equipment will be regularly inspected and maintained; • Work will occur during standard construction hours (7 am to 6 pm Monday to Friday, 8 am to 1 pm Saturday and no work on Sundays or public holidays). Where works are required outside of standard working hours, consultation with potentially affected noise sensitive receivers will occur; and • Noise screens or similar noise dampening options will be considered where numerous complaints are received.
Cumulative impacts	• Multiple impacts over large special and temporal scales	• The design of the final alignment of the proposed OOLR should consider all impacts and attempt to minimise their cumulative effects as far as possible; and • The potential cumulative impacts should be further analysed and assessed during the selection of the optimal alignment and the environmental impact assessment for the project.

9 Recommendations

The following actions are recommended to progress the project, with emphasis on the approval pathway:

- include environmental constraints in comparison of feasibility of options for the OOLR to determine the final preferred alignment option;
- finalise the selection of the OOLR route that reduces the impact on the Lake Innes Nature Resource, SEPP 14 wetlands and matters of national environmental significance;
- prepare a brief outlining the need, alignment, impact, final design, scope and costs of the OOLR for use in consultation with government agencies regarding project approval;
- develop a program of agency consultation to present the project, seek feedback and define the environmental and planning approval process;
- consult with NPWS, OEH, DP&E and DotE to determine the approval pathway that is appropriate for the project, including an introductory meeting with each agency followed by a workshop involving Council and all agencies to agree on the preferred approval pathway;
- with input from the agency consultation, Council to finalise the approval pathway, with reference to timeframe, cost, potential risks to Council;
- review new Coastal Management SEPP and final revised maps and determine application of the revised SEPP to the project. The timing of this recommendation is dependent on the release of the new Coastal Management SEPP for review and comment;
- identify appropriate compensation land for areas of nature reserve to be impacted by the preferred OOLR option and prepare brief for the proposal for revocation for NP&W;
- once the approval pathway is chosen, Council starts negotiations DP&E on establishing the EIS and applies to the Secretary of the Department for environmental assessment requirements;
- prepare and submit an EPBC referral (on the basis that DP&E advises that a referral is necessary); and
- commence the preparation of the EIS.

10 Conclusions

This PEA has summarised the environmental constraints within the CIA for the proposed OOLR and has identified that three of these can be classified as major constraints in terms of the level of assessment and approval processes expected to be involved to ensure the OOLR complies with environmental legislation. These four major constraints are:

- the presence of parts of the Lake Innes Nature Reserve in the south west corner of the CIA;
- the presence of SEPP 14 Coastal Wetlands in the CIA;
- the potential presence of MNES within the CIA; and
- the presence of TSC Act EECs and threatened species within the CIA.

Other constraints include Aboriginal and non-Aboriginal Heritage, contaminated sites and ASS.

The approval process applicable to this project will be determined in consultation with DP&E, NPWS, OEH and DotE and will depend on the final design, scope and cost of the project. A program of consultation with government agencies is recommended, to present information on the project to agencies, receive feedback on potential impacts and finalise the environmental and planning approval pathway.

It is expected that the project will be assessed under Part 4 of the EP&A Act and be determined as designated development due the impact on SEPP 14 wetlands. This process will require Council to prepare an EIS for the project. It is also highly likely that the project will be a controlled action under the EPBC Act. The EIS will be able to satisfy both NSW and Commonwealth assessment needs.

The project should be referred to the Department of the Environment, under the EPBC Act, due to a potentially significant impact to koalas and other listed threatened species likely to be found within the CIA.

As part of the EIA process, a number of tasks and detailed assessments may be required, depending on the design of the OOLR. These include but are not limited to:

- government consultation process to determine the appropriate approval pathway and other agency requirements;
- preparation of revocation proposal for revocation of the area of Nature Reserve required for the OOLR;
- community and stakeholder engagement process to inform the community and to provide the opportunity for community concerns, questions and feedback to be addressed;
- consultation with DP&E and DPI Fisheries regarding impacts to wetlands and key fish habitats, impacts to water quality including SEPP 62 Sustainable Aquaculture zones and associated assessments;
- detailed ecological survey of the vegetated areas within the CIA to identify MNES and TSC-listed matters;
- Aboriginal Heritage Assessment including consultation with local Aboriginal Community;
- contaminated site investigations of any sites known or suspected to be potentially contaminated based on previous or current uses that within the final footprint of the OOLR; and
- an acid sulfate soil assessment.

11 References

ASRIS. 2013. "Atlas of Australian Soils." Brisbane: Australian Soils Resource Information System, CSIRO. http://www.asris.csiro.au/themes/Atlas.html.

Australian Bureau of Statistics. 2011. "2011 Census QuickStats." www.censusdata.abs.gov.au.

Bureau of Meteorology. 2016. "NSW Data and Graphs." http://www.bom.gov.au.

DECC. 2009. *Interim Construction Noise Guideline*. Sydney: NSW Department of Environment and Climate Change. http://www.environment.nsw.gov.au/resources/noise/09265cng.pdf.

DECC. 2010. *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW*. Sydney: NSW Department of Environment and Climate Change.

DotE. 2011a. "Littoral Rainforest and Coastal Vine Thickets of Eastern Australia." Canberra: Australian Government Department of the Environment, Water, Heritage and the Arts.

DotE. 2011b. "Lowland Rainforest of Subtropical Australia - Conservation Advice." Canberra: Australian Government Department of Environment.

DotE. 2013. "Subtropical and Temperate Coastal Saltmarsh - Conservation Advice." Canberra: Australian Government Bureau of Rural Sciences.

DotE. 2015a. "EPBC Act Protected Matters Search Tool." Canberra: Australian Government Department of Environment. http://www.environment.gov.au/webgis-framework/apps/pmst/pmst.jsf.

DotE. 2015b. "Species Profile and Threats Database." Canberra: Australian Government Department of Environment. http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl.

Eco Logical Australia ELA. 2015. Port Macquarie Airport Master Plan and Port Macquarie - Hastings Council owned land within the Thrumster Area 13 Urban Release Area – Biodiversity Certification Assessment Report and Biocertification Strategy. Prepared for Port Macquarie – Hastings Council, January 2016.

EPA. 2014. *Waste Classification Guidelines Part 1: Classifying Waste*. Sydney: NSW Environmental Protection Authority.

Landcom. 2004. *Managing Urban Stormwater: Soils and Construction "The Blue Book."* 4th ed. Sydney: NSW Government.

McKenzie, Neil and John Hook. 1992. "Interpretation of Mapunit of Australian Soils: Consulting Report to the Environmental Resources Information Network (ERIN)." Canberra: CSIRO Division of Soils.

NEPC. 2011. "National Environment Protection (Assessment of Site Contamination) Measure." National Environment Protection Council. https://www.comlaw.gov.au/.

NSW Department of Planning and Infrastructure. 2012. "What Is State Significant Infrastructure and How Are Applications Assessed and Determined?" Sydney: New South Wales Department of Planning and Infrastructure.

NSW DP&E. 2016. "Planning Portal." Sydney: NSW Government Department of Planning & Environment. https://www.planningportal.nsw.gov.au/.

NSW DPI. 2013. "Policy and Guidelines for Fish Habitat Conservation and Management." NSW Department of Primary Industries Fisheries.

NSW DPI. 2014. "NSW Oyster Industry Sustainable Aquaculture Strategy." Sydney: New South Wales DPI Fisheries.

NSW Rural Fire Service. 2006. *Planning for Bush Fire Protection*. Sydney: NSW Rural Fire Service,.

OEH. 2014. "Revocation, Recategorisation and Road Adjustment Policy." Sydney: NSW Office of Environment and Heritage National Parks and Wildlife.

OEH. 2015a. "Acid Sulfate Soil Risk Maps." Sydney: NSW Government Office of Environment and Heritage. http://www.environment.nsw.gov.au/acidsulfatesoil/riskmaps.htm.

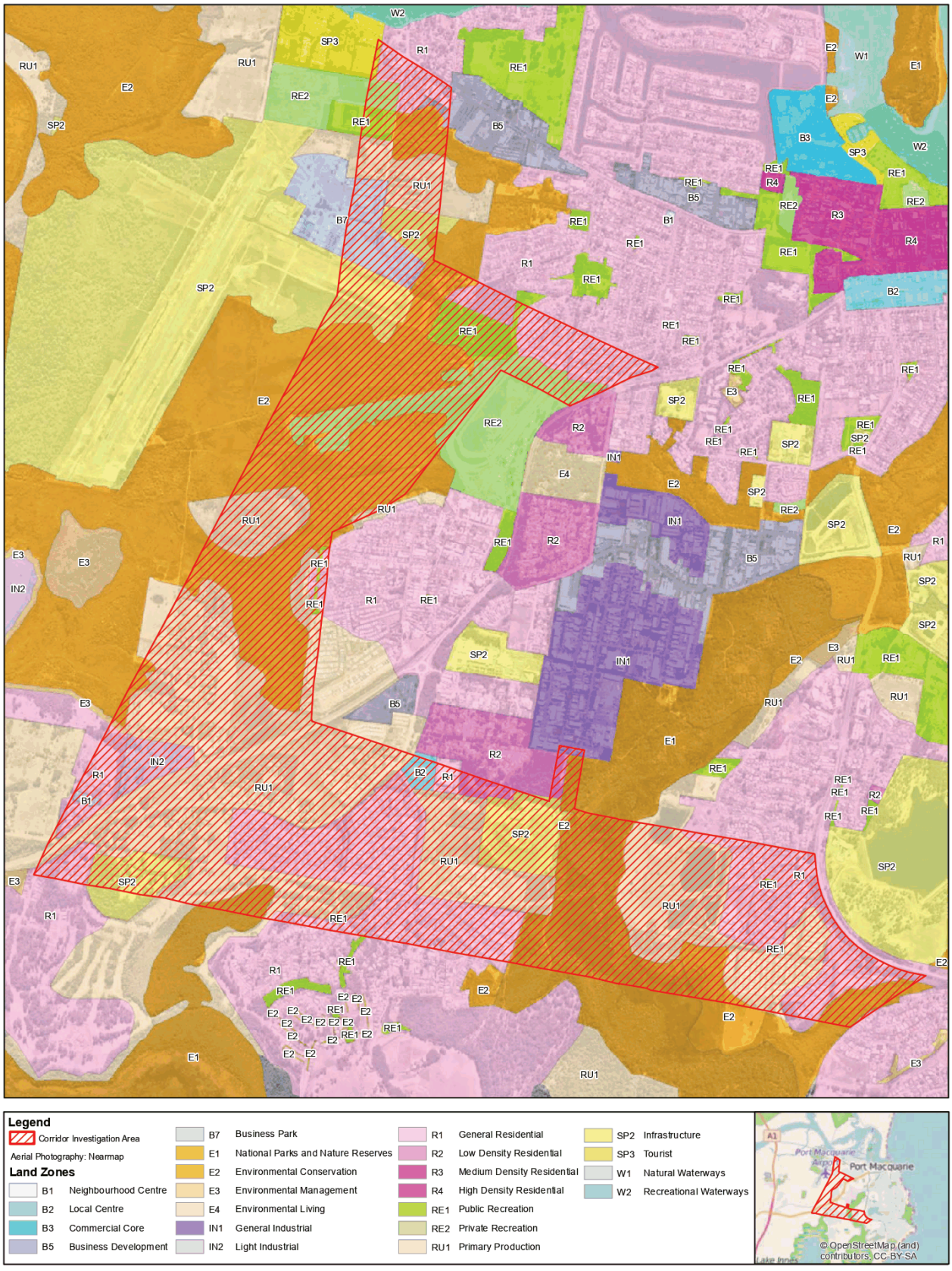
OEH. 2015b. "NSW SixMaps Vegetation Map Viewer." Sydney: NSW Government Office of Environment and Heritage. http://maps.six.nsw.gov.au/apps/channels_3.5/landing/vegetation/vegetation.html.

OEH. 2016. "BioNet Atlas of NSW Wildlife." NSW Government Office of Environment and Heritage. http://www.bionet.nsw.gov.au/.

Port Macquarie-Hastings Council. 2011. "Port Macquarie-Hastings Local Environmental Plan 2011," no. 84: 1–142.

Standards Australia. 2007. *AS 3798-2007 Guidelines on Earthworks for Commercial and Residential Developments*. Vol. 2007. Sydney: Standards Australia.

Appendix A – Environmental constraints maps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Corridor Investigation Area
Aerial Photography: Nearmap
Land Zones
B1 Neighbourhood Centre
B2 Local Centre
B3 Commercial Core
B5 Business Development
B7 Business Park
E1 National Parks and Nature Reserves
E2 Environmental Conservation
E3 Environmental Management
E4 Environmental Living
IN1 General Industrial
IN2 Light Industrial
R1 General Residential
R2 Low Density Residential
R3 Medium Density Residential
R4 High Density Residential
RE1 Public Recreation
RE2 Private Recreation
RU1 Primary Production
SP2 Infrastructure
SP3 Tourist
W1 Natural Waterways
W2 Recreational Waterways
Port Macquarie
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Port Macquarie - Environmental Constraints
LAND ZONING
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Project No: T-1451900
Map Author: Will White
Projection: Transverse Mercator
Datum: Geocentric Datum of Australia 1994
Grid: Map Grid of Australia Zone 56
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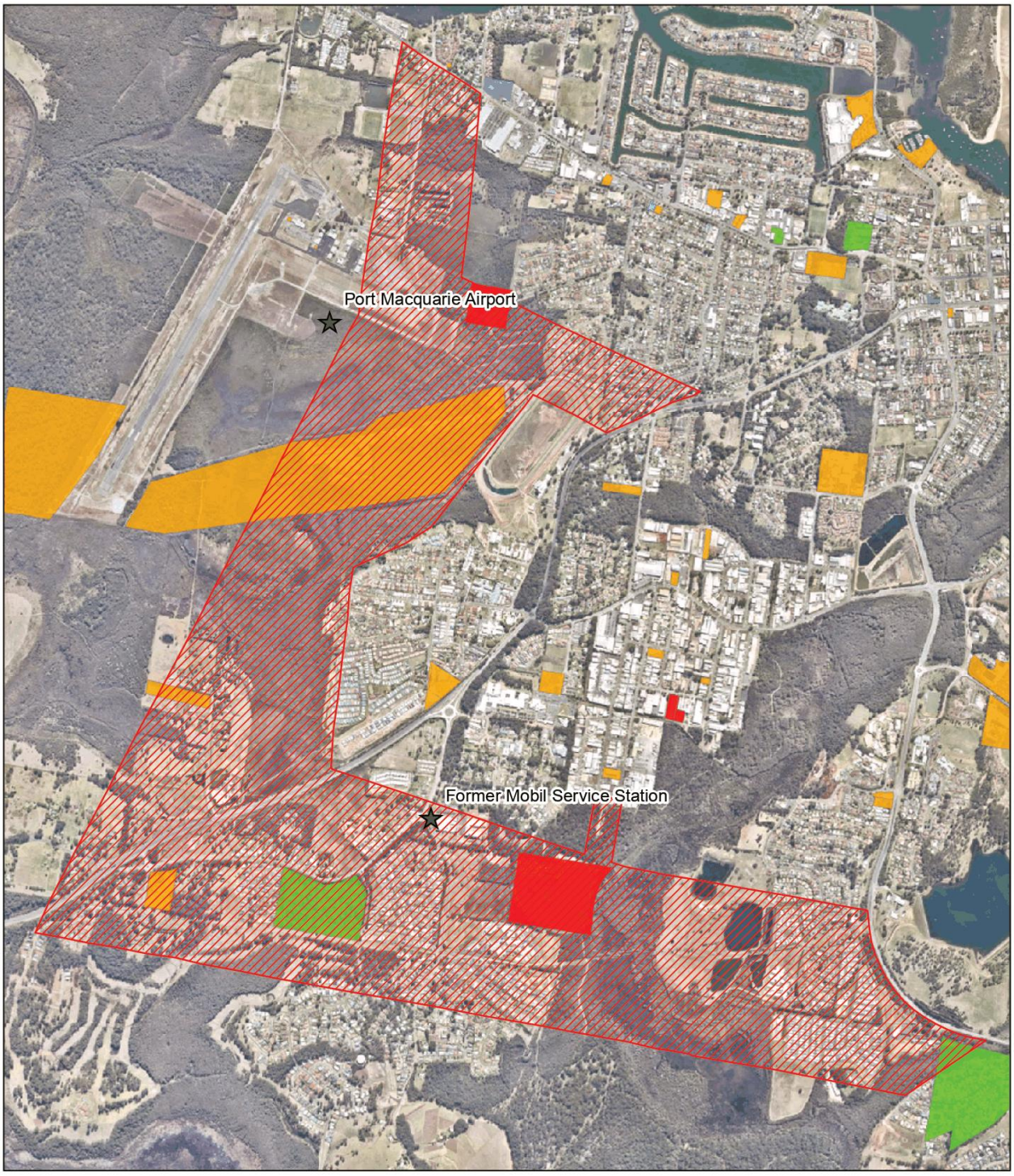
Revision 0
Revision Date

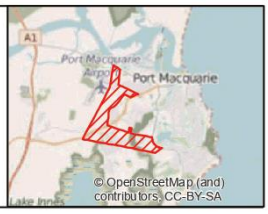


Legend

- Corridor Investigation Area
- Aerial Photography: Nearmap
- Contaminated Sites 'under assessment' by EPA

Contaminated Land Descriptions

- A-Land is known to be contaminated and has not been remediated
- B-Land has a previous land use history which may have involved the use of contaminants on the site
- D-Land is known to contain contaminants which are below, or have been remediated to within acceptable levels for particular uses
- E-Land is known to have been remediated to within acceptable levels for sensitive uses



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Port Macquarie - Environmental Constraints
CONTAMINATED SITES

N

Project No: T-1451900
Map Author: Will White

Projection: Transverse Mercator
Datum: Geocentric Datum of Australia 1994
Grid: Map Grid of Australia Zone 56

Note:

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Map No 3	Date 08/03/2016
Revision 3	Revision Date 28/07/2016

Legend

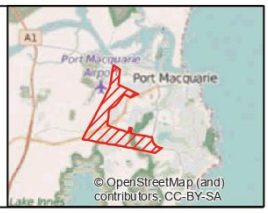
Corridor Investigation Area

Aerial Photography: Nearmap

SEPP14_Coastal_Wetlands_Poly

498 wet
499 wet
507 wet
507a wet
507b wet
508 wet
509 wet

SEPP71



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Port Macquarie - Environmental Constraints
SEPP 14 and SEPP 71

N

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Map Author: Will White

Projection: Transverse Mercator
Datum: Geocentric Datum of Australia 1994
Grid: Map Grid of Australia Zone 56

Note:

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Map No	Date
2	08/03/2016
Revision	**Revision Date**
3	27/07/2016

Legend
Corridor Investigation Area
Aerial Photography: Nearpmap
Vegetation Formation
Seagrass
Dry Sclerophyll Forests
Forested Wetlands
Freshwater Wetlands
Grasslands
Heathlands
Rainforests
Saline Wetlands
Unaligned
Unassigned
Wet Sclerophyll Forests
A1
Port Macquarie
Port Macquarie
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VEGETATION FORMATIONS
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Project No: T-1451900
Map Author: Will White
Projection: Transverse Mercator
Datum: Geocentric Datum of Australia 1994
Grid: Map Grid of Australia Zone 56
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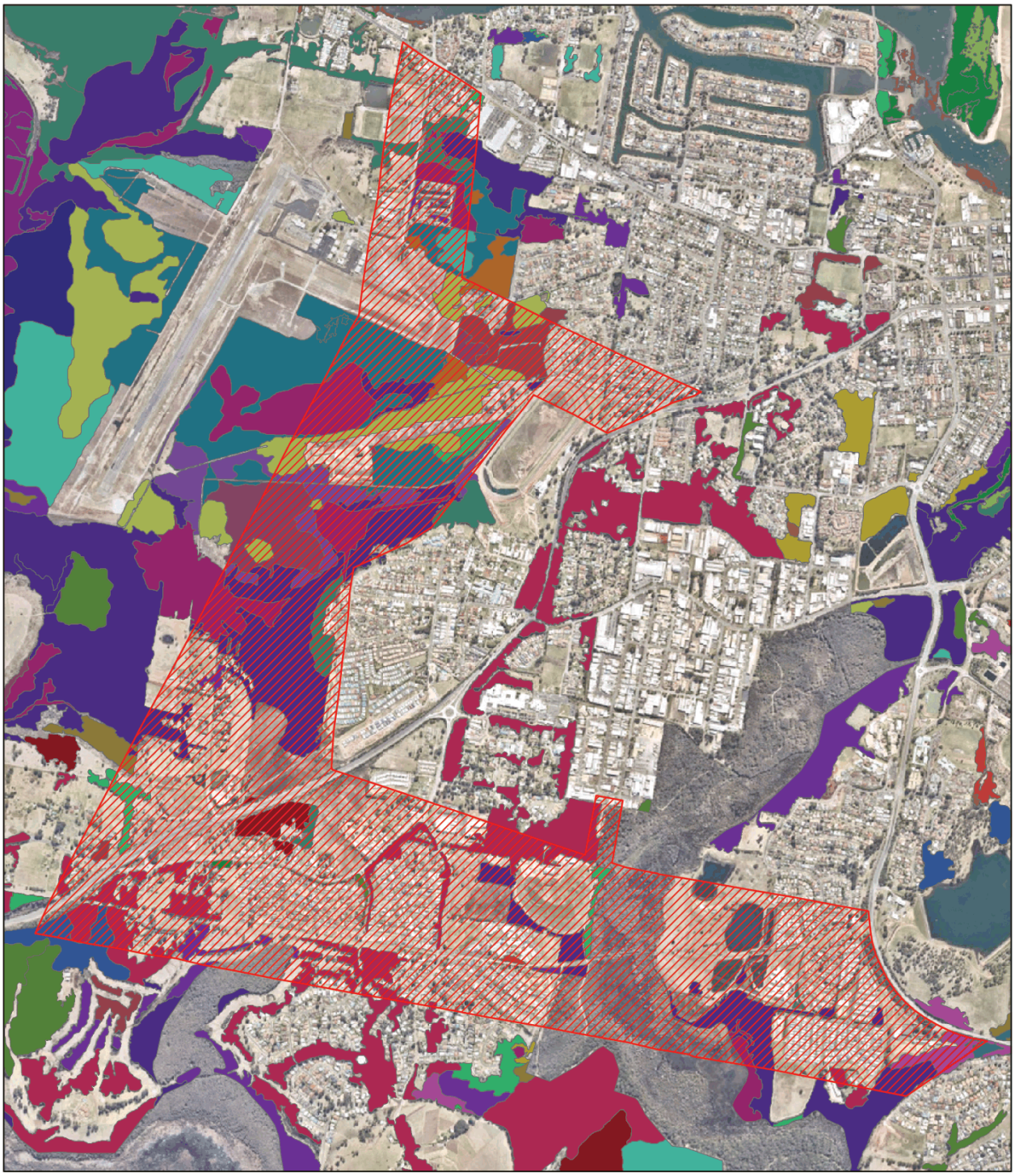
Revision 1
Revision Date 16/08/2016

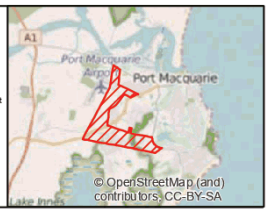


Legend Corridor Investigation Area

Aerial Photography: Nearmap

Community

- Blackbutt Coastal Dune Satinwood Forest
- Blackbutt Grassy Forest
- Blackbutt Shrubby Moist Forest
- Broad-leaved Paperbark - Bangalow Palm Swamp Rainforest
- Broad-leaved Paperbark - Forest Red Gum Swamp Forest
- Broad-leaved Paperbark - Mixed Eucalypt Swamp Forest Complex
- Broad-leaved Paperbark - Swamp Mahogany Swamp Forest
- Broad-leaved Paperbark Swamp Woodland/Forest
- Broadleaf Cumbungi Coastal Lagoon Wetland
- Coast Banksia - Wattle Wallum Shrubland
- Flax-leaved Paperbark - Mixed Eucalypt Coastal Floodplain Wetlands Forest Complex
- Flax-leaved Paperbark - Prickly-leaved Tea Tree Forests
- Flooded Gum Moist Riparian and Gully Forest
- Grey Gum - Grey Ironbark Moist Forest
- Grey Mangrove Woodland/Forest
- Heath-leaved Banksia Sandplain Shrublands
- Leptronia Coastal Lagoon Sedgeland
- Leptronia Coastal Lagoon Sedgeland (Derived)
- Partridge Creek Coastal Lagoon Sedgeland Complex
- Plantation (Der)
- Sand Couch Saltmarsh Grassland
- Scribbly Gum - Bloodwood Heathy Woodland
- Scribbly Gum Dune Heathy Woodland
- She-oak Scrub (Dist)
- Swamp Banksia Heathy Sandplain Shrubland
- Swamp Mahogany Forest
- Swamp Oak - Mixed Eucalypt Coastal Floodplain Wetland Forest Complex
- Swamp Oak Coastal Floodplain Wetland Forest
- Sydney Blue Gum - Tallowwood +/- Brush Box White Mahogany Moist Forest
- Tea-tree Heathy Shrubland
- Twig-rush Coastal Lagoon Sedgeland
- Unassigned
- Wattle Scrub (Dist)
- White Stringybark - Tallowwood - Grey Gum Dry Forest
- Zostera



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Port Macquarie - Environmental Constraints
VEGETATION COMMUNITIES

N

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Map Author: Will White

Projection: Transverse Mercator
Datum: Geocentric Datum of Australia 1994
Grid: Map Grid of Australia Zone 56

Note: Source - Port Macquarie LGA 2014 (4206 and 4205) Downloaded from S3XMAPS

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Revision	Revision Date
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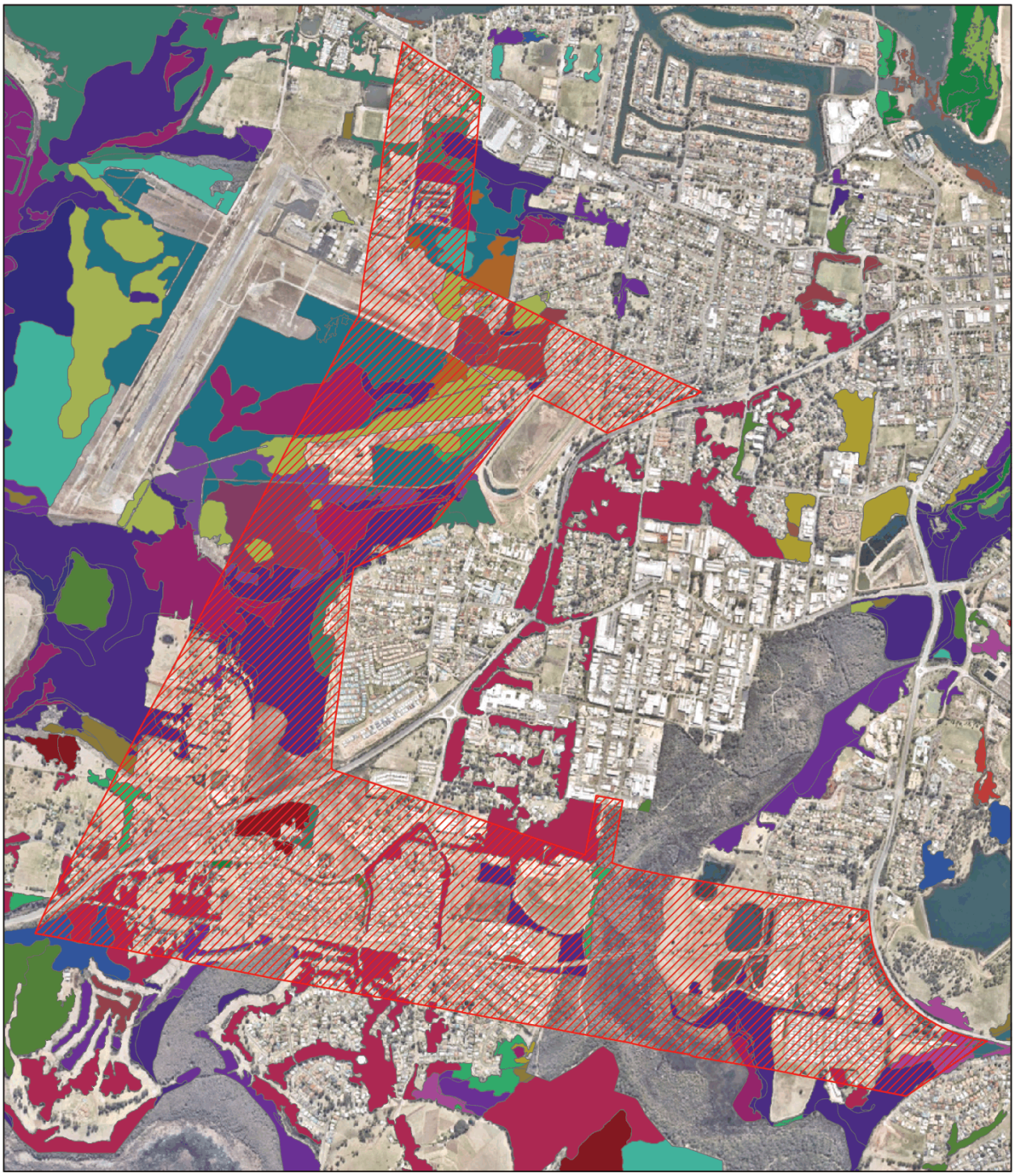

Legend

Corridor Investigation Area

Aerial Photography: Nearmap

Community

- Broad-leaved Paperbark - Bangalow Palm Swamp Rainforest
- Broad-leaved Paperbark - Mixed Eucalypt Swamp Forest Complex
- Broad-leaved Paperbark - Swamp Mahogany Swamp Forest
- Broad-leaved Paperbark Swamp Woodland/Forest
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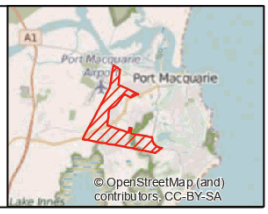
- Sydney Blue Gum - Tallowwood +/- Brush Box White Mahogany Moist Forest
- Twig-rush Coastal Lagoon Sedgeland



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Port Macquarie - Environmental Constraints
ENDANGERED ECOLOGICAL COMMUNITIES

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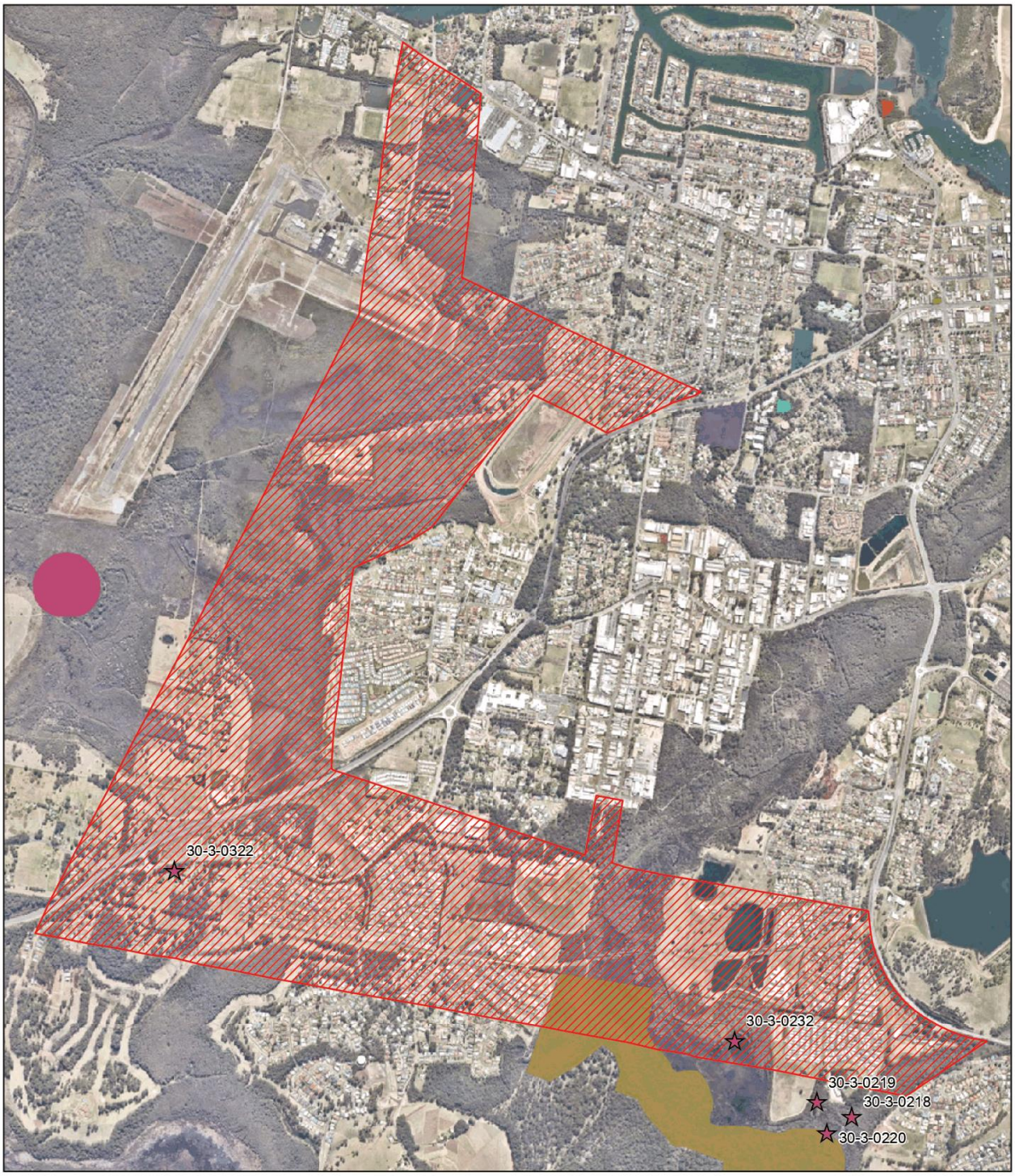

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Corridor Investigation Area

Aerial Photography: Nearmap

Aboriginal Heritage

Heritage Site ID

European Heritage

"Douglas Vale" dwelling house

"Elsinor"

"Grantham" dwelling house

Cemetery

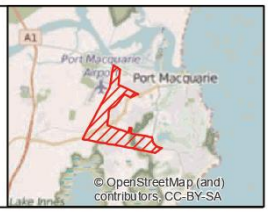
Former Hibbard Primary School

Hibbard slipway

Lake Innes House ruins complex

PAHS Thrumster Knoll Site A

The Cross navigational marker



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Port Macquarie - Environmental Constraints
ABORIGINAL AND EUROPEAN HERITAGE SITES

N

Project No: T-1451900
Map Author: Will White

Projection: Transverse Mercator
Datum: Geocentric Datum of Australia 1994
Grid: Map Grid of Australia Zone 56

Note:

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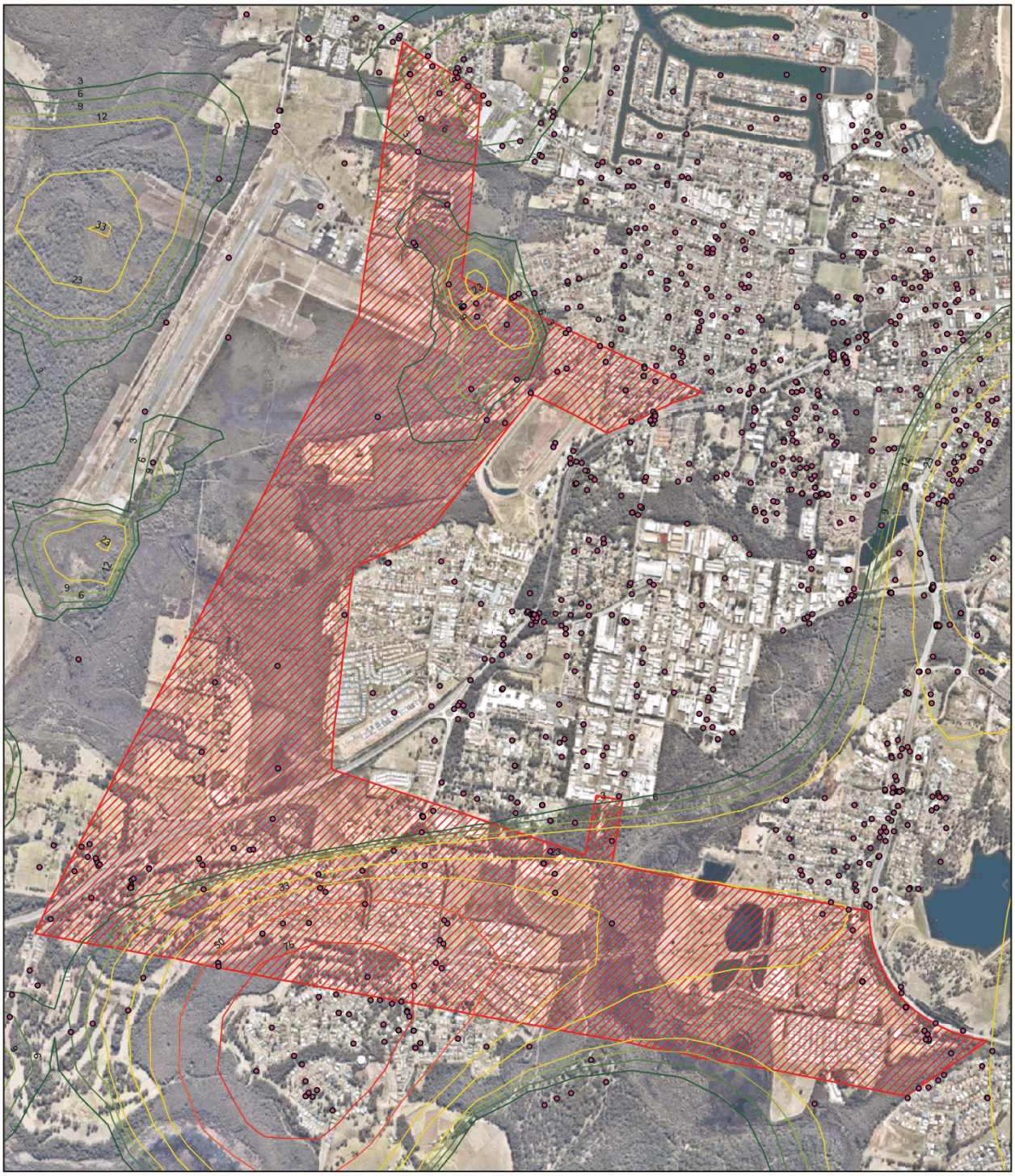
Map No 4	Date 08/03/2016
Revision 3	Revision Date 28/07/2016



Legend

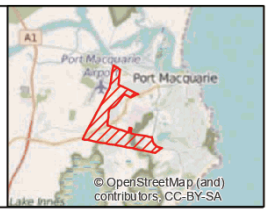
Corridor Investigation Area

Aerial Photography: Nearmap

PMHC Koala Records

Contour

3, 6, 9, 12, 23, 33, 50, 75



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Port Macquarie - Environmental Constraints
KOALA RECORDS

N

Project No: T-1451900
Map Author: Will White

Projection: Transverse Mercator
Datum: Geocentric Datum of Australia 1994
Grid: Map Grid of Australia Zone 56

Note:

Scale
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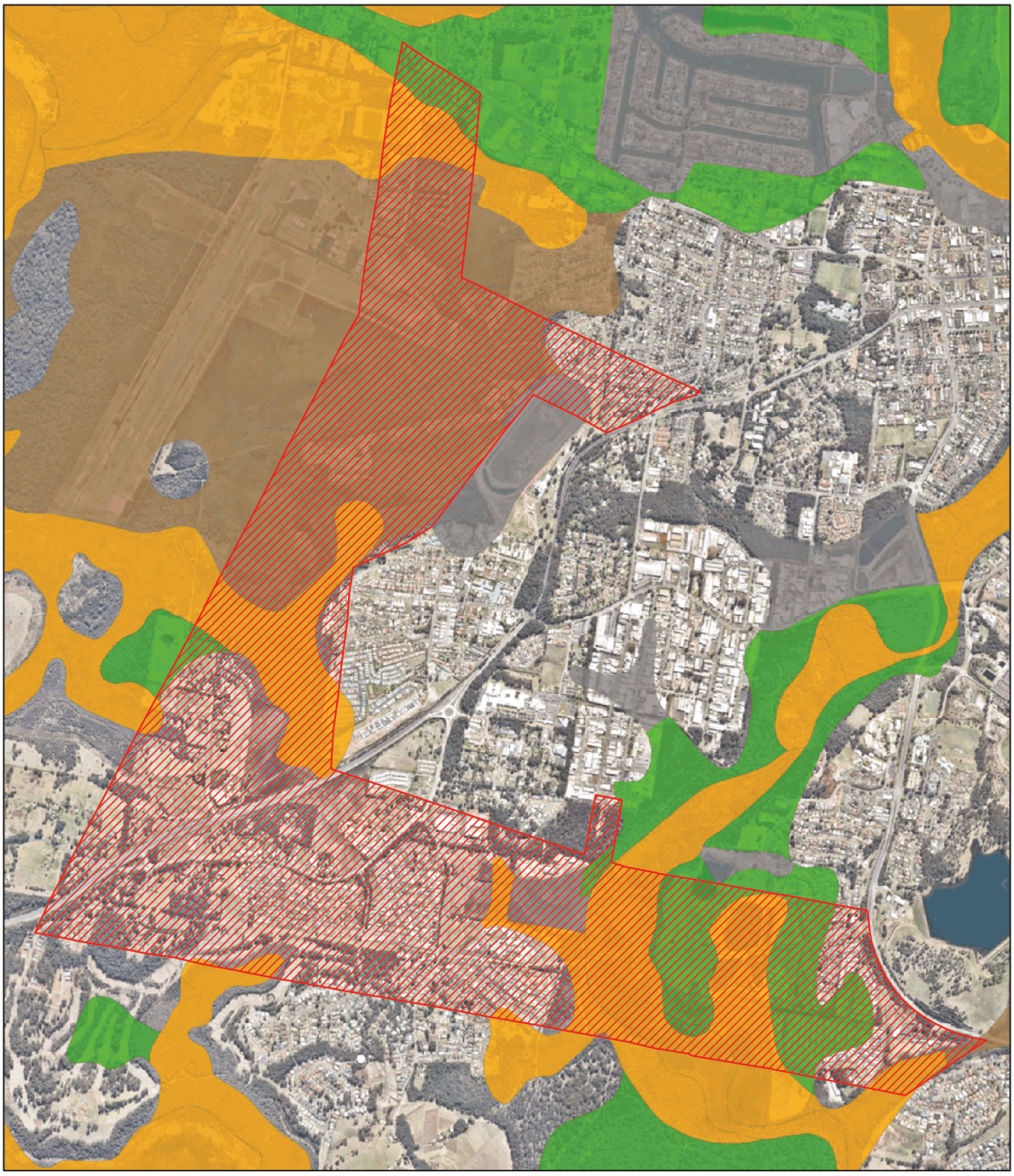
Meters
1:17,000 @A3

Map No 7	Date 08/03/2016
Revision 3	Revision Date 28/07/2016



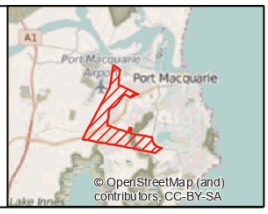
Legend

Corridor Investigation Area

Aerial Photography: Nearmap

Acid Sulfate Soil Risk

- Beach
- Disturbed
- Disturbed Terrain
- High probability of occurrence
- Low probability of occurrence
- No known occurrence



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Port Macquarie - Environmental Constraints
ACID SULPHATE SOIL RISK MAP

N

Project No: T-14519.00
Map Author: Will White

Projection: Transverse Mercator
Datum: Geocentric Datum of Australia 1994
Grid: Map Grid of Australia Zone 56

Note:

Scale
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Meters
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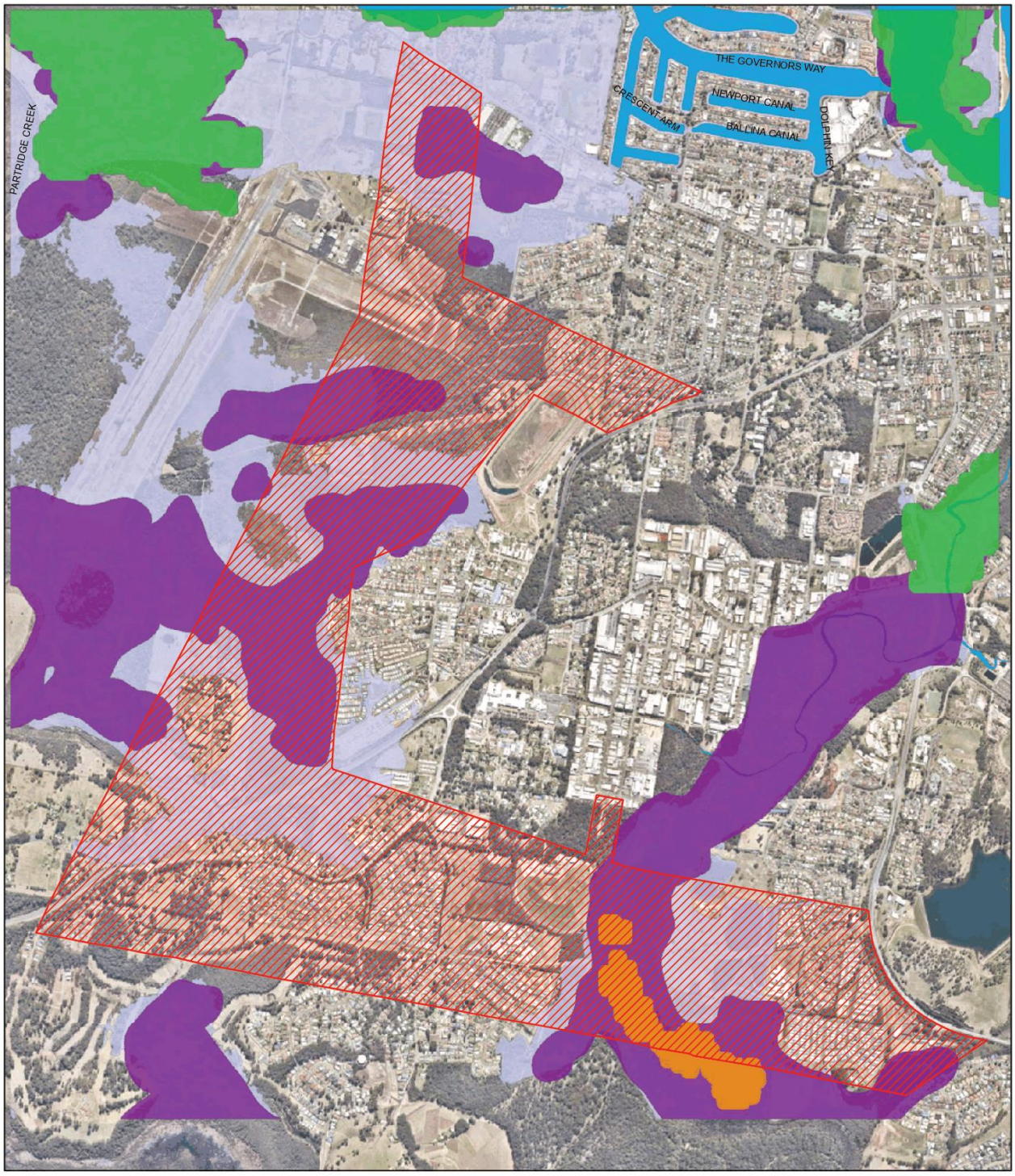
Map No 1	Date 08/03/2016
Revision 3	Revision Date 27/07/2016



Legend

- Corridor Investigation Area

Aerial Photography: Nearmap

- Water Bodies
- Flood Level (100yr Event)

Key Fish Habitat

- Coastal lagoons and lakes
- Coastal Wetlands
- Estuarine Wetland

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Port Macquarie - Environmental Constraints
WATER BODIES, FLOOD LEVELS, KEY FISH HABITAT

N

Project No: T-1451900
Map Author: Will White

Projection: Transverse Mercator
Datum: Geocentric Datum of Australia 1994
Grid: Map Grid of Australia Zone 56

Note:

Scale
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Meters
1:17,000 @A3

Map No	Date
6	08/03/2016
Revision	Revision Date
3	28/07/2016

Appendix B – Consultation records

Margaret Jewell

From: Shelley Braithwaite <Shelley.Braithwaite@environment.nsw.gov.au>
Sent: Tuesday, 15 March 2016 2:25 PM
To: Margaret Jewell
Cc: Stephen Atkins
Subject: Lake Innes NR - Port Macquarie Hastings Council Ring Road Proposal

Hi Margaret

As discussed, here's the link to the relevant OEH policy

http://www.environment.nsw.gov.au/policies/RevocationOfLandPolicy.htm

Council's proposal will fall into the revocation section as it is a new non-permissible activity or development proposed by another party. The others in there relate to recategorisations and road adjustments and are not appropriate for the new ring road

Regards
Shelley

Shelley Braithwaite
Reserve Establishment | National Parks & Wildlife Service | Office of Environment & Heritage
☎ **6650 7113** | F 6650 7134 | shelley.braithwaite@environment.nsw.gov.au
PO Box 1236 | Coffs Harbour | NSW | 2450

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If you are not the intended recipient, please notify the sender and then delete it immediately.
Any views expressed in this email are those of the individual sender except where the sender expressly and with authority states them to be the views of the NSW Office of Environment and Heritage.

PLEASE CONSIDER THE ENVIRONMENT BEFORE PRINTING THIS EMAIL

Appendix C – Database searches

Australian Government
Department of the Environment

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

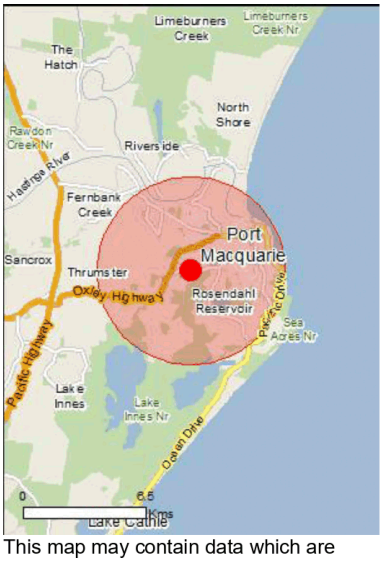
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 11/01/16 14:11:21

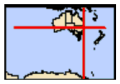
Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates
Buffer: 5.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	54
Listed Migratory Species:	66

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	5
Commonwealth Heritage Places:	None
Listed Marine Species:	82
Whales and Other Cetaceans:	14
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	4
Regional Forest Agreements:	1
Invasive Species:	37
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities		[Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	Critically Endangered	Community likely to occur within area
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community may occur within area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat likely to occur within area
Diomedea epomophora epomophora Southern Royal Albatross [25996]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora sanfordi Northern Royal Albatross [82331]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans antipodensis Antipodean Albatross [82269]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans exulans Tristan Albatross [82337]	Endangered	Species or species habitat may occur within area
Diomedea exulans gibsoni Gibson's Albatross [82271]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur

Name	Status	Type of Presence
		within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area
Lathamus discolor Swift Parrot [744]	Endangered	Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew [847]	Critically Endangered	Roosting known to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Pterodroma leucoptera leucoptera Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area
Pterodroma neglecta neglecta Kermadec Petrel (western) [64450]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta cauta Shy Albatross, Tasmanian Shy Albatross [82345]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta salvini Salvin's Albatross [82343]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche cauta steadi White-capped Albatross [82344]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris impavida Campbell Albatross [82449]	Vulnerable	Species or species habitat may occur within area
Fish		
Epinephelus daemelii Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Frogs		
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat likely to occur within area
Mammals		
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
Plants		
Acronychia littoralis Scented Acronychia [8582]	Endangered	Species or species habitat likely to occur within area
Allocasuarina defungens Dwarf Heath Casuarina [21924]	Endangered	Species or species habitat known to occur within area
Arthraxon hispidus Hairy-joint Grass [9338]	Vulnerable	Species or species habitat may occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat likely to occur within area
Cynanchum elegans White-flowered Wax Plant [12533]	Endangered	Species or species habitat likely to occur within area
Euphrasia arguta [4325]	Critically Endangered	Species or species habitat may occur within area
Melaleuca biconvexa Biconvex Paperbark [5583]	Vulnerable	Species or species habitat known to occur within area
Phaius australis Lesser Swamp-orchid [5872]	Endangered	Species or species habitat may occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur

Name	Status	Type of Presence
		within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding likely to occur within area
Sharks		
Carcharias taurus (east coast population) Grey Nurse Shark (east coast population) [68751]	Critically Endangered	Species or species habitat likely to occur within area
Carcharodon carcharias Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered*	Species or species habitat may occur within area
Diomedea epomophora (sensu stricto) Southern Royal Albatross [1072]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea gibsoni Gibson's Albatross [64466]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered*	Foraging, feeding or related behaviour likely to occur within area
Macronectes giganteus Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area

Name	Threatened	Type of Presence
Macronectes halli		
Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Phoebetria fusca		
Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Puffinus carneipes		
Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Foraging, feeding or related behaviour likely to occur within area
Sterna albifrons		
Little Tern [813]		Species or species habitat may occur within area
Thalassarche bulleri		
Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta (sensu stricto)		
Shy Albatross, Tasmanian Shy Albatross [64697]	Vulnerable*	Species or species habitat may occur within area
Thalassarche eremita		
Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
Thalassarche impavida		
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable*	Species or species habitat may occur within area
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini		
Salvin's Albatross [64463]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		
Balaenoptera edeni		
Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus		
Blue Whale [36]	Endangered	Species or species habitat may occur within area
Caperea marginata		
Pygmy Right Whale [39]		Species or species habitat may occur within area
Carcharodon carcharias		
Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Caretta caretta		
Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas		
Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area

Name	Threatened	Type of Presence
Dugong dugon Dugong [28]		Species or species habitat may occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area
Manta alfredi Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat may occur within area
Manta birostris Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding likely to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Roosting known to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]		Roosting known to occur within area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]		Roosting known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Roosting may occur within area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area
Heteroscelus brevipes Grey-tailed Tattler [59311]		Roosting known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew [847]	Critically Endangered	Roosting known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]		Roosting known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Xenus cinereus Terek Sandpiper [59300]		Roosting known to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land - Australian Postal Commission
Commonwealth Land - Australian Postal Corporation
Commonwealth Land - Australian Telecommunications Commission
Commonwealth Land - Commonwealth Bank of Australia
Commonwealth Land - Defence Service Homes Corporation

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Roosting known to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]		Roosting known to occur within area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]		Roosting known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area
Cuculus saturatus Oriental Cuckoo, Himalayan Cuckoo [710]		Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea dabbenena Tristan Albatross [66471]	Endangered*	Species or species habitat may occur within area
Diomedea epomophora (sensu stricto) Southern Royal Albatross [1072]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Vulnerable	Foraging, feeding or

Name	Threatened	Type of Presence
		related behaviour likely to occur within area
Diomedea gibsoni Gibson's Albatross [64466]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered*	Foraging, feeding or related behaviour likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Roosting may occur within area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Heteroscelus brevipes Grey-tailed Tattler [59311]		Roosting known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Endangered	Species or species habitat likely to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Macronectes giganteus Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew [847]	Critically Endangered	Roosting known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species

Name	Threatened	Type of Presence
		habitat known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]		Roosting known to occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Foraging, feeding or related behaviour likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area
Sterna albifrons Little Tern [813]		Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta (sensu stricto) Shy Albatross, Tasmanian Shy Albatross [64697]	Vulnerable*	Species or species habitat may occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable*	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Xenus cinereus Terek Sandpiper [59300]		Roosting known to occur within area
Fish		
Acentronura tentaculata Shortpouch Pygmy Pipehorse [66187]		Species or species habitat may occur within area
Festucalex cinctus Girdled Pipefish [66214]		Species or species

Name	Threatened	Type of Presence
		habitat may occur within area
Filicampus tigris Tiger Pipefish [66217]		Species or species habitat may occur within area
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippichthys heptagonus Madura Pipefish, Reticulated Freshwater Pipefish [66229]		Species or species habitat may occur within area
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area
Hippocampus whitei White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]		Species or species habitat may occur within area
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Solegnathus dunckeri Duncker's Pipehorse [66271]		Species or species habitat may occur within area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area
Solenostomus cyanopterus Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area
Solenostomus paegnius Rough-snout Ghost Pipefish [68425]		Species or species habitat may occur within area
Solenostomus paradoxus Ornate Ghostpipefish, Harlequin Ghost Pipefish, Ornate Ghost Pipefish [66184]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
Trachyrhamphus bicoarctatus Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within

Name	Threatened	Type of Presence
		area
Mammals		
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat may occur within area
Dugong dugon Dugong [28]		Species or species habitat may occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Hydrophis elegans Elegant Seasnake [1104]		Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding likely to occur within area
Pelamis platurus Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area

Whales and other Cetaceans		[Resource Information]
Name	Status	Type of Presence
Mammals		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area
Delphinus delphis Common Dophin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species

Name	Status	Type of Presence
		habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Species or species habitat likely to occur within area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Lake Innes	NSW
Macquarie	NSW
Sea Acres	NSW
Woregore	NSW

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included.

Name	State
North East NSW RFA	New South Wales

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur

Name	Status	Type of Presence
		within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Pycnonotus jocosus Red-whiskered Bulbul [631]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		

Name	Status	Type of Presence
Alternanthera philoxeroides Alligator Weed [11620]		Species or species habitat likely to occur within area
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus aethiopicus Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
Asparagus plumosus Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera subsp. rotundata Bitou Bush [16332]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Protasparagus densiflorus Asparagus Fern, Plume Asparagus [5015]		Species or species habitat likely to occur within area
Protasparagus plumosus Climbing Asparagus-fern, Ferny Asparagus [11747]		Species or species habitat likely to occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-31.44861 152.88778

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Parks and Wildlife Commission NT, Northern Territory Government
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Atherton and Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Animalia	Amphibia	Myobatrachidae	3137	*Crinia tinnula*		Wallum Froglet	V,P		42	
Animalia	Amphibia	Hylidae	3166	*Litoria aurea*		Green and Golden Bell Frog	E1,P	V	3	
Animalia	Reptilia	Cheloniidae	2004	*Caretta caretta*		Loggerhead Turtle	E1,P	E	4	
Animalia	Aves	Anseranatidae	0199	*Anseranas semipalmata*		Magpie Goose	V,P		1	
Animalia	Aves	Anatidae	0216	*Oxyura australis*		Blue-billed Duck	V,P		1	
Animalia	Aves	Anatidae	0214	*Stictonetta naevosa*		Freckled Duck	V,P		3	
Animalia	Aves	Columbidae	0025	*Ptilinopus magnificus*		Wompoo Fruit-Dove	V,P		2	
Animalia	Aves	Diomedeidae	0091	*Thalassarche cauta*		Shy Albatross	V,P	V	1	
Animalia	Aves	Procellariidae	0072	*Ardenna carneipes*		Flesh-footed Shearwater	V,P	J,K	1	
Animalia	Aves	Ciconiidae	0183	*Ephippiorhynchus asiaticus*		Black-necked Stork	E1,P		21	
Animalia	Aves	Ardeidae	0197	*Botaurus poiciloptilus*		Australasian Bittern	E1,P	E	1	
Animalia	Aves	Ardeidae	0196	*Ixobrychus flavicollis*		Black Bittern	V,P		1	
Animalia	Aves	Accipitridae	0218	*Circus assimilis*		Spotted Harrier	V,P		1	
Animalia	Aves	Accipitridae	0230	*^^Lophoictinia isura*		Square-tailed Kite	V,P,3		19	
Animalia	Aves	Accipitridae	8739	*^^Pandion cristatus*		Eastern Osprey	V,P,3		31	
Animalia	Aves	Gruidae	0177	*Grus rubicunda*		Brolga	V,P		1	
Animalia	Aves	Burhinidae	0174	*Burhinus grallarius*		Bush Stone-curlew	E1,P		2	
Animalia	Aves	Burhinidae	0175	*Esacus magnirostris*		Beach Stone-curlew	E4A,P		1	
Animalia	Aves	Haematopodida	0131	*Haematopus fuliginosus*		Sooty Oystercatcher	V,P		6	
Animalia	Aves	Haematopodidae	0130	*Haematopus longirostris*		Pied Oystercatcher	E1,P		14	
Animalia	Aves	Charadriidae	0139	*Charadrius mongolus*		Lesser Sand-plover	V,P	C,J,K	55	
Animalia	Aves	Scolopacidae	0160	*Xenus cinereus*		Terek Sandpiper	V,P	C,J,K	4	
Animalia	Aves	Laridae	0120	*Onychoprion fuscata*		Sooty Tern	V,P		1	
Animalia	Aves	Laridae	0117	*Sternula albifrons*		Little Tern	E1,P	C,J,K	13	
Animalia	Aves	Cacatuidae	0265	*^Calyptorhynchus lathami*		Glossy Black-Cockatoo	V,P,2		19	
Animalia	Aves	Psittacidae	0260	*Glossopsitta pusilla*		Little Lorikeet	V,P		7	
Animalia	Aves	Psittacidae	0309	*^^Lathamus discolor*		Swift Parrot	E1,P,3	E	3	
Animalia	Aves	Strigidae	0248	*^^Ninox strenua*		Powerful Owl	V,P,3		6	
Animalia	Aves	Tytonidae	0252	*^^Tyto longimembris*		Eastern Grass Owl	V,P,3		19	
Animalia	Aves	Tytonidae	0250	*^^Tyto novaehollandiae*		Masked Owl	V,P,3		2	
Animalia	Aves	Meliphagidae	0603	*Anthochaera phrygia*		Regent Honeyeater	E4A,P	CE	1	
Animalia	Aves	Neosittidae	0549	*Daphoenositta*		Varied Sittella	V,P		13	
Animalia	Aves	Campephagidae	0428	*Coracina lineata*		Barred Cuckoo-shrike	V,P		22	
Animalia	Aves	Petroicidae	0380	*Petroica boodang*		Scarlet Robin	V,P		1	
Animalia	Mammalia	Dasyuridae	1008	*Dasyurus maculatus*		Spotted-tailed Quoll	V,P	E	17	
Animalia	Mammalia	Dasyuridae	1017	*Phascogale tapoatafa*		Brush-tailed Phascogale	V,P		2	
Animalia	Mammalia	Dasyuridae	1045	*Planigale maculata*		Common Planigale	V,P		2	
Animalia	Mammalia	Phascolarctidae	1162	*Phascolarctos cinereus*		Koala	V,P	V	1236	
Animalia	Mammalia	Petauridae	1136	*Petaurus australis*		Yellow-bellied Glider	V,P		1	
Animalia	Mammalia	Petauridae	1137	*Petaurus norfolcensis*		Squirrel Glider	V,P		21	
Animalia	Mammalia	Pteropodidae	1280	*Pteropus poliocephalus*		Grey-headed Flying-fox	V,P	V	80	
Animalia	Mammalia	Emballonuridae	1321	*Saccolaimus flaviventris*		Yellow-bellied Sheathtail-bat	V,P		3	
Animalia	Mammalia	Molossidae	1329	*Mormopterus norfolkensis*		Eastern Freetail-bat	V,P		13	
Animalia	Mammalia	Vespertilionidae	1354	*Chalinolobus nigrogriseus*		Hoary Wattled Bat	V,P		1	
Animalia	Mammalia	Vespertilionidae	1372	*Falsistrellus tasmaniensis*		Eastern False Pipistrelle	V,P		2	
Animalia	Mammalia	Vespertilionidae	1346	*Miniopterus australis*		Little Bentwing-bat	V,P		27	
Animalia	Mammalia	Vespertilionidae	1834	*Miniopterus schreibersii oceanensis*		Eastern Bentwing-bat	V,P		12	
Animalia	Mammalia	Vespertilionidae	1357	*Myotis macropus*		Southern Myotis	V,P		7	
Animalia	Mammalia	Vespertilionidae	1361	*Scoteanax rueppellii*		Greater Broad-nosed Bat	V,P		10	
Animalia	Mammalia	Vespertilionidae	1025	*Vespadelus troughtoni*		Eastern Cave Bat	V,P		6	
Animalia	Mammalia	Muridae	1466	*Pseudomys*		Eastern Chestnut Mouse	V,P		12	
Animalia	Mammalia	Dugongidae	1558	*Dugong dugon*		Dugong	E1,P		3	

Animalia	Mammalia	Balaenopterida	1575	*Megaptera novaeangliae*	Humpback Whale	V,P	V	1
Animalia	Insecta	Petaluridae	I007	*Petalura gigantea*	Giant Dragonfly	E1		2
Plantae	Flora	Casuarinaceae	8980	*Allocasuarina defungens*	Dwarf Heath Casuarina	E1,P	E	2
Plantae	Flora	Euphorbiaceae	9851	*Chamaesyce psammogeton*	Sand Spurge	E1,P		2
Plantae	Flora	Fabaceae (Caesalpinioideae)	8772	*Senna acclinis*	Rainforest Cassia	E1,P		1
Plantae	Flora	Fabaceae (Faboideae)	3032	*Sophora tomentosa*	Silverbush	E1,P		6
Plantae	Flora	Juncaginaceae	3363	*Maundia triglochinoides*		V,P		3
Plantae	Flora	Myrtaceae	4134	*Eucalyptus nicholii*	Narrow-leaved Black	V,P	V	3
Plantae	Flora	Myrtaceae	6809	*Melaleuca biconvexa*	Biconvex Paperbark	V,P	V	22
Plantae	Flora	Orchidaceae	6630	*^Dendrobium melaleucaphilum*	Spider orchid	E1,P,2		1
Plantae	Flora	Orchidaceae	7077	*^Oberonia titania*	Red-flowered King of the	V,P,2		1
Plantae	Flora	Rubiaceae	6744	*Asperula asthenes*	Trailing Woodruff	V,P	V	1
Plantae	Flora	Rutaceae	6457	*Acronychia littoralis*	Scented Acronychia	E1,P	E	4

Office of Environment & Heritage
NSW GOVERNMENT

AHIMS Web Services (AWS)
Search Result

Purchase Order/Reference : Port Macquarie

Client Service ID : 206770

Opus International Consultants Australia

Date: 11 January 2016

Level 2 433 Boundary Street
Spring Hill Queensland 4004

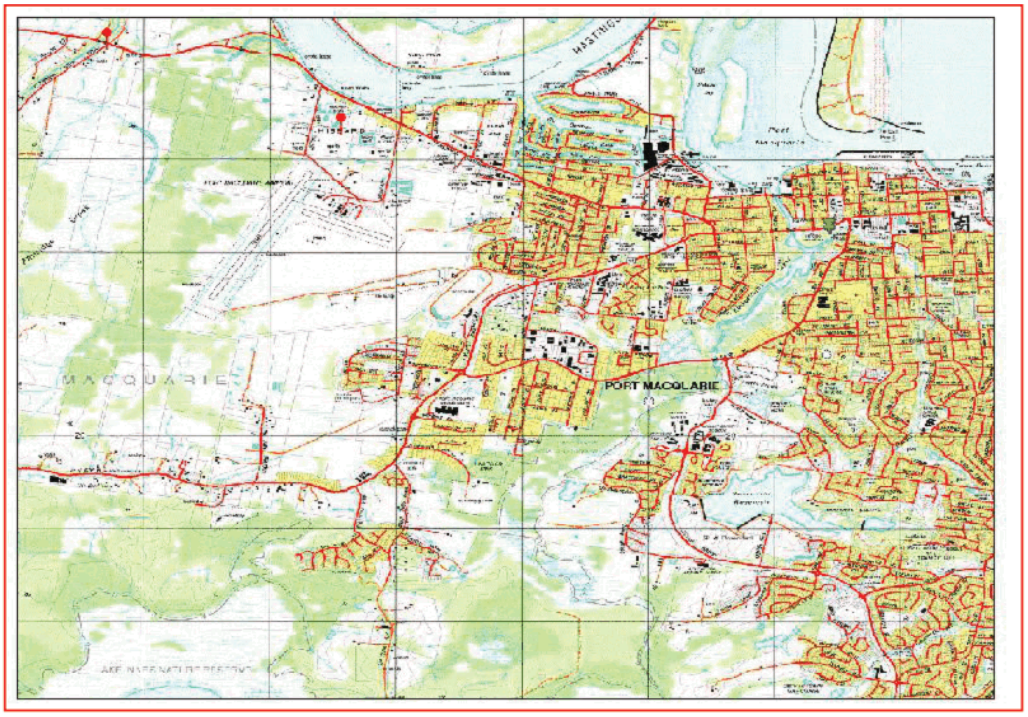
Attention: Margaret Jewell

Email: margaret.jewell@opus.com.au

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lat, Long From : -31.4698, 152.8716 - Lat, Long To : -31.4243, 152.8941 with a Buffer of 1000 meters, conducted by Margaret Jewell on 11 January 2016.

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



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

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

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

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

Important information about your AHIMS search

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

3 Marist Place, Parramatta NSW 2150
Locked Bag 5020 Parramatta NSW 2220
Tel: (02) 9585 6380 Fax: (02) 9873 8599

ABN 30 841 387 271
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Web: www.environment.nsw.gov.au

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : Port Macquarie

Client Service ID : 206770

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
30-3-0232	NQ 1 (Newtons Quarry)	AGD	56	489500	6518620	Open site	Valid	Artefact : -	Isolated Find	98713
	Contact	Recorders	Ms.Jacqueline Collins					Permits		
30-3-0218	Kooloonbung 1;	AGD	56	490070	6518250	Open site	Valid	Artefact : -	Isolated Find	
	Contact	Recorders	Ms.Jacqueline Collins					Permits		
30-3-0219	Kooloonbung 3;	AGD	56	489900	6518320	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	Recorders	Ms.Jacqueline Collins					Permits	1460	
30-3-0220	Kooloonbung 2;	AGD	56	489950	6518170	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	Recorders	Ms.Jacqueline Collins					Permits		
30-3-0321	E1	AGD	56	488077	6520175	Open site	Valid	Artefact : 1		
	Contact	Recorders	Ms.Jacqueline Collins					Permits		
30-3-0322	Ah-E2	AGD	56	486775	6519450	Open site	Valid	Artefact : 1		
	Contact	Recorders	ADISE Pty Ltd,Ms.Jacqueline Collins					Permits	3214,3216	

Report generated by AHIMS Web Service on 26/02/2016 for Margaret Jewell for the following area at Lat, Long From : -31.4698, 152.8716 - Lat, Long To : -31.4243, 152.8941 with a Buffer of 1000 meters. Additional Info : Preliminary Environmental Assessment. Number of Aboriginal sites and Aboriginal objects found is 6

This information is not guaranteed to be free from error omission. Office of Environment and Heritage (NSW) and its employees disclaim liability for any act done or omission made on the information and consequences of such acts or omission.

Search Results

16 results found.

Church Hill Hay St	Port Macquarie, NSW, Australia	(Place not included in NHL) National Heritage List
Douglas Vale Oxley Hwy	Port Macquarie, NSW, Australia	(Indicative Place) Register of the National Estate (Non-statutory archive)
Indigenous Place	Port Macquarie, NSW, Australia	(Registered) Register of the National Estate (Non-statutory archive)
Lady Nelson Wharf Horton St	Port Macquarie, NSW, Australia	(Indicative Place) Register of the National Estate (Non-statutory archive)
Lake Innes Nature Reserve and Adjacent Areas Oxley Hwy	Port Macquarie, NSW, Australia	(Indicative Place) Register of the National Estate (Non-statutory archive)
Limeburners Creek Nature Reserve Maria River Rd	Port Macquarie, NSW, Australia	(Registered) Register of the National Estate (Non-statutory archive)
Macquarie Nature Reserve Lord St	Port Macquarie, NSW, Australia	(Registered) Register of the National Estate (Non-statutory archive)
PS Ballina	Port Macquarie, NSW, Australia	(Indicative Place) Register of the National Estate (Non-statutory archive)
Port Macquarie Coastal Rocks Pacific Dr	Port Macquarie, NSW, Australia	(Registered) Register of the National Estate (Non-statutory archive)
Port Macquarie Courthouse Clarence St	Port Macquarie, NSW, Australia	(Registered) Register of the National Estate (Non-statutory archive)
Port Macquarie Government House Site 2 Clarence St	Port Macquarie, NSW, Australia	(Registered) Register of the

			National Estate (Non-statutory archive)
Port Macquarie Historic Settlement Area		Port Macquarie, NSW, Australia	(Indicative Place) Register of the National Estate (Non-statutory archive)
Port Macquarie Rifle Range	Lady Nelson Dr	Port Macquarie, NSW, Australia	(Indicative Place) Register of the National Estate (Non-statutory archive)
Sea Acres Area	Pacific Dr	Port Macquarie, NSW, Australia	(Registered) Register of the National Estate (Non-statutory archive)
St Thomas the Apostle Anglican Church	Hay St	Port Macquarie, NSW, Australia	(Registered) Register of the National Estate (Non-statutory archive)
Wesleyan Methodist Church	Horton St	Port Macquarie, NSW, Australia	(Indicative Place) Register of the National Estate (Non-statutory archive)

Report Produced: Fri Feb 26 16:53:15 2016

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Office of Environment & Heritage

Home > Topics > Heritage places and items > Search for heritage

Search for NSW heritage

Return to search page where you can refine/broaden your search.

Statutory listed items

Information and items listed in the State Heritage Inventory come from a number of sources. This means that there may be several entries for the same heritage item in the database. For clarity, the search results have been divided into three sections.

- **Section 1** - contains Aboriginal Places declared by the **Minister for the Environment** under the National Parks and Wildlife Act. This information is provided by the Heritage Division.
- **Section 2** - contains heritage items listed by the **Heritage Council of NSW** under the NSW Heritage Act. This includes listing on the State Heritage Register, an Interim Heritage Order or protected under section 136 of the NSW Heritage Act. This information is provided by the Heritage Division.
- **Section 3** - contains items listed by **local councils** on Local Environmental Plans under the Environmental Planning and Assessment Act, 1979 and **State government agencies** under s.170 of the Heritage Act. This information is provided by local councils and State government agencies.

Section 1. Aboriginal Places listed under the National Parks and Wildlife Act.

Your search returned 1 record.

Aboriginal place name	Local government area	Local Aboriginal Land Council	Latitude	Longitude	Gazettal date and page numbers	Comments
Three Brothers Mountains Middle and North	Port Macquarie-Hastings	Purfleet/Taree	-31.677729224	152.72583454	12/21/2001 p. 10766-1076	Located completely inside Dooragan National Park (Dooragan - North Mountain) and Middle Brother National Park

Section 2. Items listed under the NSW Heritage Act.

Your search returned 11 records.

Item name	Address	Suburb	LGA	SHR
Archaeological Remains of Overseers' Cottages	30-44 Clarence Street	Port Macquarie	Port Macquarie-Hastings	01813
Courthouse and Norfolk Island pines (former)	Clarence Street (cnr)	Port Macquarie	Port Macquarie-Hastings	00554
Hastings Historical Society Museum	22 Clarence Street	Port Macquarie	Port Macquarie-Hastings	00326
Kendall School of Arts	Comboyne Street	Kendall	Port Macquarie-Hastings	00479
Lake Innes House ruins and environs	The Ruins Way	Port Macquarie	Port Macquarie-Hastings	00997

Laurieton School of Arts	Cnr Laurie and Bold Sts	Laurieton	Port Macquarie-Hastings	00476
Port Macquarie First (Allman Hill) Burying Ground 1822 - 1824	Clarence Street	Port Macquarie	Port Macquarie-Hastings	01730
Port Macquarie Government House Site	2 Clarence Street	Port Macquarie	Port Macquarie-Hastings	01517
Port Macquarie Second Burying Ground 1824 - 1886	Gordon Street	Port Macquarie	Port Macquarie-Hastings	01731
St. Thomas' Anglican Church	Hay Street	Port Macquarie	Port Macquarie-Hastings	01653
Wauchope Railway Station group	North Coast railway	Wauchope	Port Macquarie-Hastings	01283

Section 3. Items listed by Local Government and State Agencies.

Your search returned 143 records.

Item name	Address	Suburb	LGA	Information source
All Saints Anglican Church	Comboyne Street	Kendall	Port Macquarie -Hastings	LGOV
ANZAC War Memorial	Albert Street	Kendall	Port Macquarie -Hastings	LGOV
ANZAC War Memorial (monument and artillery piece)	Bold Street	Laurieton	Port Macquarie -Hastings	LGOV
Ballina paddlesteamer wreck		Port Macquarie	Port Macquarie -Hastings	LGOV
Brick stormwater drain	Clarence Street	Port Macquarie	Port Macquarie -Hastings	LGOV
Butter factory, Former	Old Butter Factory Road	Telegraph Point	Port Macquarie -Hastings	LGOV
Cemetery	off Rollands Plains Road	Rollands Plains	Port Macquarie -Hastings	LGOV
Cemetery	Farawells Road	Telegraph Point	Port Macquarie -Hastings	LGOV
Cemetery	Ocean Drive	Laurieton	Port Macquarie -Hastings	LGOV
Cemetery	Kendall Forest Road	Kendall	Port Macquarie -Hastings	LGOV

Cemetery	Oxley Highway	Wauchope	Port Macquarie -Hastings	LGOV
Cemetery	O'Sullivans Lane	Comboyne	Port Macquarie -Hastings	LGOV
Cemetery	off Oxley Highway	Ellenborough	Port Macquarie -Hastings	LGOV
Cemetery	Hibbard Drive	Port Macquarie	Port Macquarie -Hastings	LGOV
Cemetery	Oxley Highway	Port Macquarie	Port Macquarie -Hastings	LGOV
Cemetery	Pappinbarra Road	Beechwood	Port Macquarie -Hastings	LGOV
Central School building (built 1880)	Comboyne Street	Kendall	Port Macquarie -Hastings	LGOV
Cheese and butter factory	Randall Street	Wauchope	Port Macquarie -Hastings	LGOV
Colonial Chapel of Christ the Healer building	Hay Street	Port Macquarie	Port Macquarie -Hastings	LGOV
Convict Well	158 Horton Street	Port Macquarie	Port Macquarie -Hastings	LGOV
Coolenberg dwelling-house	60 Lake Road	Port Macquarie	Port Macquarie -Hastings	LGOV
Courthouse building (excluding additions)	41 Hastings Street	Wauchope	Port Macquarie -Hastings	LGOV
Courthouse building, Former and mature Norfolk pine trees	Clarence Street	Port Macquarie	Port Macquarie -Hastings	LGOV
Crossroads Cemetery	off Quarry Road	Rosewood	Port Macquarie -Hastings	LGOV
Davis Memorial Church building	39 Campbell Street	Wauchope	Port Macquarie -Hastings	LGOV
Double-sided railway goods shed	Wallace Street	Wauchope	Port Macquarie -Hastings	LGOV
Douglas Vale dwelling-house and grounds	Oxley Highway	Port Macquarie	Port Macquarie	LGOV

			-Hastings	
Dwelling-house	6 William Street	Port Macquarie	Port Macquarie -Hastings	LGOV
Dwelling-house	2 William Street	Port Macquarie	Port Macquarie -Hastings	LGOV
Dwelling-house	4 William Street	Port Macquarie	Port Macquarie -Hastings	LGOV
Dwelling-house	628 Fernbank Creek Road	Fernbank Creek	Port Macquarie -Hastings	LGOV
Dwelling-house	9 Laurel Street	Kendall	Port Macquarie -Hastings	LGOV
Dwelling-house	23 Railway Street	Kendall	Port Macquarie -Hastings	LGOV
Dwelling-house	34-36 Comboyne Street	Kendall	Port Macquarie -Hastings	LGOV
Dwelling-house	639 Ocean Drive	North Haven	Port Macquarie -Hastings	LGOV
Dwelling-house	623 Ocean Drive	North Haven	Port Macquarie -Hastings	LGOV
Dwelling-house and graves (Bellangry House)	1415 off Bellangry Road	Mortons Creek	Port Macquarie -Hastings	LGOV
Dwelling-house, Former	98 William Street	Port Macquarie	Port Macquarie -Hastings	LGOV
Ellenborough Police Station and Official Residence	46 Ellenborough Road (Old Oxley Highway)	Ellenborough	Port Macquarie -Hastings	SGOV
Ellenborough RMS Sub-depot	Oxley Highway	Ellenborough	Port Macquarie -Hastings	SGOV
Garrison Building	26 Clarence Street	Port Macquarie	Port Macquarie -Hastings	LGOV
Goldmine, Former		Cells Creek	Port Macquarie -Hastings	LGOV
Grantham dwelling-house	Grantham Lane	Port Macquarie	Port Macquarie -Hastings	LGOV
Graves	Clarence Street	Port	Port	LGOV

		Macquarie	Macquarie -Hastings	
Graves	Camden Head Road	Camden Head	Port Macquarie -Hastings	LGOV
Hamilton House and Art Society (former school buildings)	198 Hastings River Drive	Port Macquarie	Port Macquarie -Hastings	LGOV
Hamilton House and Art Society (former school buildings)	198 Hastings River Drive	Port Macquarie	Port Macquarie -Hastings	LGOV
Hastings District Historical Society Museum building	22 Clarence Street	Port Macquarie	Port Macquarie -Hastings	LGOV
Hayward House building	104 Horton Street	Port Macquarie	Port Macquarie -Hastings	LGOV
Hibbard Slipway	Boundary Street	Port Macquarie	Port Macquarie -Hastings	LGOV
Hibbard slipway, comprising timber slipway, engine house	Boundary Street	Hibbard	Port Macquarie -Hastings	GAZ
Historic Cemetery	Gordon Street	Port Macquarie	Port Macquarie -Hastings	LGOV
Historic well	Smiths Creek Road	Ballengarra	Port Macquarie -Hastings	LGOV
Holy Trinity Church	56 Bold Street	Laurieton	Port Macquarie -Hastings	LGOV
Kendall Railway Station	Railway Street	Kendall	Port Macquarie -Hastings	LGOV
Kendall Railway Station	Comboyne Street	Kendall	Port Macquarie -Hastings	SGOV
Kendall, Camden Haven River Underbridge	433.363km North Coast Railway	Kendall	Port Macquarie -Hastings	SGOV
Kew Police Station and Official Residence	Old Pacific Highway	Kew	Port Macquarie -Hastings	SGOV
Kindee Road	Kindee Crossing	Kindee	Port Macquarie -Hastings	LGOV
Kindee Suspension Bridge	Oxley Highway	Ellenborough	Port Macquarie -Hastings	GAZ
Lake Innes House ruins and environs	The Ruins Way	Port	Port	LGOV

(including boathouse and corduroy road site)		Macquarie	Macquarie -Hastings	
Lake Innes House ruins and environs (including boathouse and corduroy road sites	The Ruins Way	Port Macquarie	Port Macquarie -Hastings	LGOV
Lincol Hall dwelling-house	20 Guy Street	Wauchope	Port Macquarie -Hastings	LGOV
Lindel Hostel building	2 Hastings River Drive	Port Macquarie	Port Macquarie -Hastings	LGOV
Macquarie Hotel	8 Horton Street	Port Macquarie	Port Macquarie -Hastings	LGOV
Macquarie Hotel	Horton Street	Port Macquarie	Port Macquarie -Hastings	LGOV
Memorial Gates	Oxley Lane	Wauchope	Port Macquarie -Hastings	LGOV
Obelisk	off Pacific Drive	Port Macquarie	Port Macquarie -Hastings	LGOV
Old General Cemetery	Horton Street	Port Macquarie	Port Macquarie -Hastings	GAZ
Oxley Highway route, Former	from Ralfes Creek on the Oxley Highway	Yarras	Port Macquarie -Hastings	LGOV
Part of original Gordon Street bridge abutments	Gordon St, at Kooloonbung Creek	Port Macquarie	Port Macquarie -Hastings	LGOV
Pedestrian suspension bridge	off Forbes River Road	Yarras	Port Macquarie -Hastings	LGOV
Pilot Station	off Camden Head Road	Camden Head	Port Macquarie -Hastings	LGOV
Pilot Station cottages	2,4,6 William Street	Port Macquarie	Port Macquarie -Hastings	GAZ
Pilots boatshed building, Former	79 Clarence Street	Port Macquarie	Port Macquarie -Hastings	LGOV
Pilots Boatshed, Former	79 Clarence Street	Port Macquarie	Port Macquarie -Hastings	GAZ
Pilot's Memorial	William Street	Port Macquarie	Port Macquarie -Hastings	LGOV

Police dwelling-house, Former	41 Young Street	Wauchope	Port Macquarie -Hastings	LGOV
Police Station building	20 Tathra Road	Kew	Port Macquarie -Hastings	LGOV
Police Station building and associated mature trees	off Oxley Highway	Ellenborough	Port Macquarie -Hastings	LGOV
Port Macquarie Police Station , Former	2 Hay Street	Port Macquarie	Port Macquarie -Hastings	SGOV
Post Office and dwelling-house buildings, Former	5 Laurie Street	Laurieton	Port Macquarie -Hastings	LGOV
Post Office and dwelling-house buildings, Former	5 Laurie Street	Laurieton	Port Macquarie -Hastings	LGOV
Post Office building, Former	489 Rawdon Island Road	Rawdon Island	Port Macquarie -Hastings	LGOV
Presbyterian Church Manse, Former	Hay Street	Port Macquarie	Port Macquarie -Hastings	LGOV
Primary School buildings	Waugh Street	Wauchope	Port Macquarie -Hastings	LGOV
Railway Bridge	off Graham Street	Kendall	Port Macquarie -Hastings	LGOV
Railway Bridge		Wauchope	Port Macquarie -Hastings	LGOV
Railway bridge		Telegraph Point	Port Macquarie -Hastings	LGOV
Railway station water tower	River Street	Telegraph Point	Port Macquarie -Hastings	LGOV
Rawdon Island church building, Former	High Street	Wauchope	Port Macquarie -Hastings	LGOV
Remains of former Tacking Point Lighthouse Keeper's dwelling-house	Lighthouse Road	Port Macquarie	Port Macquarie -Hastings	LGOV
Remnants of stone swale and kerbing	William Street	Port Macquarie	Port Macquarie -Hastings	LGOV
Ritz Theatre	28 Horton Street	Port Macquarie	Port Macquarie -Hastings	LGOV

Ritz Theatre Complex	Horton Street	Port Macquarie	Port Macquarie -Hastings	LGOV
Road bridge	Rollands Plains Road	Rollands Plains	Port Macquarie -Hastings	LGOV
Road Bridge	Oxley Highway	Mount Seaview	Port Macquarie -Hastings	LGOV
Road bridge over railway line	off Old Pacific Highway	Telegraph Point	Port Macquarie -Hastings	LGOV
Roman Catholic Church building	Laurel Street	Kendall	Port Macquarie -Hastings	LGOV
Roto House building	Macquarie Nature Reserve, Lord Street	Port Macquarie	Port Macquarie -Hastings	LGOV
Royal Bank building - original street façade	49 Horton Street	Port Macquarie	Port Macquarie -Hastings	LGOV
Royal Hotel	Pacific Highway	Kew	Port Macquarie -Hastings	LGOV
Royal Hotel Incorporating convict built Cellars	2 Horton Street	Port Macquarie	Port Macquarie -Hastings	LGOV
Rudders Creek Weir	Rudders Creek	Wauchope	Port Macquarie -Hastings	SGOV
School Building	Pappinbarra Road	Beechwood	Port Macquarie -Hastings	LGOV
School of Arts (Community) Hall	19 Comboyne Street	Kendall	Port Macquarie -Hastings	LGOV
School of Arts building	58 Bold Street	Laurieton	Port Macquarie -Hastings	LGOV
Schoolbuilding and teacher's dwelling-house, Former	479 Rawdon Island Road	Rawdon Island	Port Macquarie -Hastings	LGOV
Sheather's Tractor Shop building	87 High Street	Wauchope	Port Macquarie -Hastings	LGOV
Shop (1 of 2)	54 Rollands Plains Road	Telegraph Point	Port Macquarie -Hastings	LGOV
Shop (2 of 2)	50 Rollands Plains Road	Telegraph Point	Port Macquarie -Hastings	LGOV

Single-storey Methodist Church building, Former	Horton Street	Port Macquarie	Port Macquarie -Hastings	LGOV
St Agnes Church Roman Catholic Church building and grounds	Hay Street	Port Macquarie	Port Macquarie -Hastings	LGOV
St. Josephs Convent building	King Street	Wauchope	Port Macquarie -Hastings	LGOV
St. Mary the Virgin Anglican Church	49 Blackbutt Forest Road	Herons Creek	Port Macquarie -Hastings	LGOV
St. Thomas the Apostle Anglican Church	Hay Street	Port Macquarie	Port Macquarie -Hastings	GAZ
St. Thomas The Apostle Anglican Church building	Hay Street	Port Macquarie	Port Macquarie -Hastings	LGOV
Station Master's dwelling-house	59 Randall Street	Wauchope	Port Macquarie -Hastings	LGOV
Stone Pitched Embankment	Oxley Highway	Yarras	Port Macquarie -Hastings	LGOV
Sugar plantation, Yadillah, Former	Rollands Plains Road	Ballengarra	Port Macquarie -Hastings	LGOV
Tacking Point Lighthouse	Lighthouse Road	Port Macquarie	Port Macquarie -Hastings	GAZ
Tacking Point Lighthouse building	Lighthouse Road	Port Macquarie	Port Macquarie -Hastings	LGOV
Telegraph Point, Wilson River Underbridge	472.000km North Coast Railway	Telegraph Point	Port Macquarie -Hastings	SGOV
The Cross navigational marker	off Park Street	Port Macquarie	Port Macquarie -Hastings	LGOV
Thone River Bridge	Oxley Highway	22.02 km west of Wauchope	Port Macquarie -Hastings	SGOV
Thone River Bridge	Oxley Highway	Bagnoo	Port Macquarie -Hastings	LGOV
Timber mill	320 Cooperabung Drive	Telegraph Point	Port Macquarie -Hastings	LGOV
Timber tramway earthworks, Former	vicinity of Kew - Comboyne Road	Camden Haven, Kendall	Port Macquarie -Hastings	LGOV

Tin mine, Former	Bobs Ridge Road	Upper Rollands Plains	Port Macquarie -Hastings	LGOV
Training wall		Camden Head & North Haven	Port Macquarie -Hastings	LGOV
Training walls and breakwalls	Mouth of Hastings River	Port Macquarie	Port Macquarie -Hastings	LGOV
Uniting Church building	5 Laurel Street	Kendall	Port Macquarie -Hastings	LGOV
Uniting Church building	621 Pappinbarra Road	Beechwood	Port Macquarie -Hastings	LGOV
Uniting Church building (excluding extensions)	41 Hastings Street	Wauchope	Port Macquarie -Hastings	LGOV
War Memorial	Town Green	Port Macquarie	Port Macquarie -Hastings	LGOV
Wauchope Courthouse	Hastings Street (Cnr Young St)	Wauchope	Port Macquarie -Hastings	SGOV
Wauchope Official Residence 2	39 Hastings Street and Young Street, corner of	Wauchope	Port Macquarie -Hastings	SGOV
Wauchope Railway Precinct		Wauchope	Port Macquarie -Hastings	SGOV
Wauchope Station Master's Residence	59 Randall Street	Wauchope	Port Macquarie -Hastings	SGOV
Wauchope, Hastings River Underbridge	455.363km North Coast Railway	Wauchope	Port Macquarie -Hastings	SGOV
Well	1 Stewart Street	Port Macquarie	Port Macquarie -Hastings	LGOV
Well	Munster Street	Port Macquarie	Port Macquarie -Hastings	LGOV
Westpac Bank building	35 Horton Street	Port Macquarie	Port Macquarie -Hastings	LGOV

There was a total of 155 records matching your search criteria.

Key:
LGA = Local Government Area
GAZ= NSW Government Gazette (statutory listings prior to 1997), HGA = Heritage Grant Application, HS = Heritage Study,

LGOV = Local Government, SGOV = State Government Agency.

Note: While the Heritage Division seeks to keep the Inventory up to date, it is reliant on State agencies and local councils to provide their data. Always check with the relevant State agency or local council for the most up-to-date information.

Suburb	Site Name	Address	Contamination Activity Type	Management Class	Latitude	Longitude
PORT KEMBLA	Port Kembla, Former Electricity Commission Site	Old Port Road/Christie Drive ROAD	Other Industry	Regulation under CLM Act not required	-34.46899143	150.8982854
PORT KEMBLA	BHP Area 21	Springhill ROAD	Metal Industry	Contamination formerly regulated under the CLM Act	-34.45244614	150.8676517
PORT KEMBLA	Port Kembla Steelworks Recycling Area	Springhill ROAD	Unclassified	Under assessment	-34.44334412	150.8828278
PORT MACQUARIE	Caltex Service Station	100 Hastings River DRIVE	Service Station	Under assessment	-31.42934052	152.8830188
PORT MACQUARIE	Caltex Service Station	112-114 Gordon STREET	Service Station	Under assessment	-31.43491709	152.9047618
PORT MACQUARIE	Shell Coles Express Service Station	121 Gordon STREET	Service Station	Under assessment	-31.4343131	152.9046869
PORT MACQUARIE	Caltex Service Station	12-14 Bolwarra ROAD	Service Station	Under assessment	-31.45015286	152.8854769
PORT MACQUARIE	Mobil Depot	211 Lake ROAD	Other Petroleum	Under assessment	-31.44688513	152.8864499
PORT MACQUARIE	Car park	28 Hayward STREET	Other Industry	Regulation under CLM Act not required	-31.43385131	152.9072399
PORT MACQUARIE	Caltex Service Station	29 Lord STREET	Service Station	Under assessment	-31.43326436	152.9169873
PORT MACQUARIE	Coles Myer	43 John Oxley DRIVE	Service Station	Regulation under CLM Act not required	-31.45741442	152.8739626
PORT MACQUARIE	Port Macquarie Airport	99 Boundary STREET	Other Petroleum	Under assessment	-31.43555856	152.868776
PORT MACQUARIE	Former Mobil Service Station	Corner Oxley Highway and Major Innes DRIVE	Service Station	Under assessment	-31.45738931	152.873956
PORT MACQUARIE	Port Macquarie Council Depot	Koala STREET	Unclassified	Regulation under CLM Act not required	-31.45341586	152.9032764
PORTLAND	Mt Piper Power Station	350 Boulder ROAD	Other Petroleum	Under assessment	-33.35581541	150.0350801
PORTLAND	Ivanhoe Colliery	Pipers Flat ROAD	Other Industry	Under assessment	-33.36595748	150.0099577
PRAIRIEWOOD	Caltex Service Station	485-487 Smithfield ROAD	Service Station	Under assessment	-33.87102509	150.9031383
PROSPECT	7-Eleven (former Mobil) Service Station	354 Flushcombe ROAD	Service Station	Under assessment	-33.79541624	150.9049417
PUNCHBOWL	Caltex Service Station	1285-1289 Canterbury ROAD	Service Station	Under assessment	-33.93146308	151.0596348
PUNCHBOWL	Former BP Service Station	1375 Corner Canterbury & Victoria ROADS	Service Station	Under assessment	-33.93170424	151.0537302
PUNCHBOWL	Punchbowl Laundry	42-44 Belmore ROAD	Chemical Industry	Under assessment	-33.93582701	151.0562638
PUTNEY	Putney Marina	20 Waterview STREET	Other Industry	Under assessment	-33.82608091	151.1003966
PYMBLE	Caltex Service Station	1117 Pacific HIGHWAY	Service Station	Regulation under CLM Act not required	-33.74102977	151.1385257
PYMBLE	Shell Coles Express Service Station	21 Ryde ROAD	Service Station	Under assessment	-33.75198512	151.1438115
PYMBLE	Former 3M site	950 Pacific HIGHWAY	Gasworks	Regulation under CLM Act not required	-33.75050288	151.1460578
PYRMONT	Fig and Wattle Depot Site	14-26 Wattle STREET	Unclassified	Under assessment	-33.8752655	151.1942645
QUAKERS HILL	Caltex Service Station	450 Quakers Hill PARKWAY	Service Station	Under assessment	-33.72998613	150.9023617
QUAKERS HILL	Mobil Service Station	83 Lalor ROAD	Service Station	Under assessment	-33.72759077	150.8966764

Healthy Environment, Healthy Community, Healthy Business

Home Contaminated land Record of notices

Search results

Your search for:LGA: Port Macquarie-Hastings Council

Search Again
Refine Search

did not find any records in our database.

If a site does not appear on the record it may still be affected by contamination. For example:

- Contamination may be present but the site has not been regulated by the EPA under the Contaminated Land Management Act 1997 or the Environmentally Hazardous Chemicals Act 1985.
- The EPA may be regulating contamination at the site through a licence or notice under the Protection of the Environment Operations Act 1997 (POEO Act).
- Contamination at the site may be being managed under the planning process.

Search TIP

To search for a specific site, search by LGA (local government area) and carefully review all sites listed.

... more search tips

More information about particular sites may be available from:

- The POEO public register
- The appropriate planning authority: for example, on a planning certificate issued by the local council under section 149 of the Environmental Planning and Assessment Act.

See What's in the record and What's not in the record.

If you want to know whether a specific site has been the subject of notices issued by the EPA under the CLM Act, we suggest that you search by Local Government Area only and carefully review the sites that are listed.
This public record provides information about sites regulated by the EPA under the Contaminated Land Management Act 1997, including sites currently and previously regulated under the Environmentally Hazardous Chemicals Act 1985. Your inquiry using the above search criteria has not matched any record of current or former regulation. You should consider searching again using different criteria. The fact that a site does not appear on the record does not necessarily mean that it is not affected by contamination. The site may have been notified to the EPA but not yet assessed, or contamination may be present but the site is not yet being regulated by the EPA. Further information about particular sites may be available from the appropriate planning authority, for example, on a planning certificate issued by the local council under section 149 of the Environmental Planning and Assessment Act. In addition the EPA may be regulating contamination at the site through a licence under the Protection of the Environment Operations Act 1997. You may wish to search the POEO public register

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26 February 2016

Location Name	Premise Address	Suburb	Fee-Based Activity
PORT MACQUARIE SEWAGE TREATMENT PLANT	OCEAN DRIVE	PORT MACQUARIE	Sewage treatment processing by small plants
PORT MACQUARIE SEWAGE TREATMENT PLANT	OCEAN DRIVE	PORT MACQUARIE	Sewage treatment processing by small plants
PORT MACQUARIE SLIPWAYS	4 GLENEWAN ROAD	PORT MACQUARIE	Boat construction/maintenance (dry/floating docks)
B & M CROWE PTY LTD	KINGFISHER ROAD	PORT MACQUARIE	Waste storage - hazardous, restricted solid, liquid, clinical and related waste and asbestos waste
J.R. RICHARDS & SONS (AQUEOUS WASTE TREATMENT PLANT)	KINGFISHER ROAD	PORT MACQUARIE	Non-thermal treatment of hazardous and other waste
J.R. RICHARDS & SONS (AQUEOUS WASTE TREATMENT PLANT)	KINGFISHER ROAD	PORT MACQUARIE	Waste storage - hazardous, restricted solid, liquid, clinical and related waste and asbestos waste
Bridle Concrete Resources Pty Ltd	Kingfisher Road	PORT MACQUARIE	Non-thermal treatment of general waste
Sancrox Road Interchange	Intersection of Pacific Highway and Sancrox Road	PORT MACQUARIE	Crushing, grinding or separating
Sancrox Road Interchange	Intersection of Pacific Highway and Sancrox Road	PORT MACQUARIE	Land-based extractive activity
Pacific Highway Upgrade - Oxley Highway to Kundabung		PORT MACQUARIE	Crushing, grinding or separating
Pacific Highway Upgrade - Oxley Highway to Kundabung		PORT MACQUARIE	Land-based extractive activity
Pacific Highway Upgrade - Oxley Highway to Kundabung		PORT MACQUARIE	Road construction
			Transport of category 2 trackable waste

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Appendix C – Multicriteria Analysis Report

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Port Macquarie Outer Orbital Link Road Corridor:

Engineering Feasibility Investigation.

Multi Criteria Constraints Analysis Report.

Port Macquarie Outer Orbital Link Road Corridor:

Engineering Feasibility Investigation.

Multi Criteria Constraints Analysis Report.

Prepared By

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Date: 1 November 2016
Reference:
Status: Final

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7 **Conclusion** 13

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1 Introduction

Port Macquarie Council required Opus to conduct a Multi Criteria Analysis of the proposed orbital road design options in order to assess the relative impact on various types of constraints identified by Council and the Opus project team. This report represents the method used for gathering route constraint information and summarising findings spatially to assist the planning process. Mapping where constraints intersect with proposed route options and allowing stakeholders to decide on the relative impact each constraint has provides a meaningful way of assessing proposed route options.

Opus used ArcGIS software throughout the project for spatial analysis, mapping and sharing spatial information via an online map hosted by ArcGIS Online.

Figure 1 shows a simple representation of the steps involved in the multi criteria constraint analysis process.

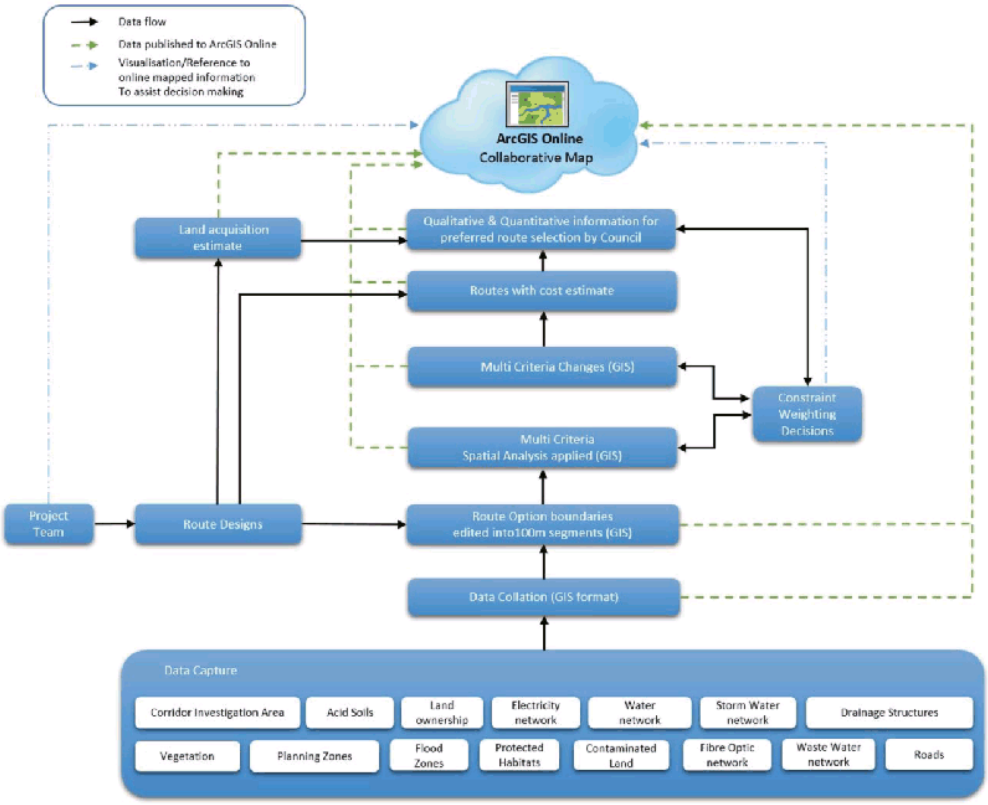


Figure 1: Multi criteria constraint analysis process diagram

2 Data Capture & Collation

This section summarises the type of constraint data provided by Council and sourced by Opus. Constraints covering existing utilities, land use and ownership, protected areas and features are described in figure 2.

2.1 Constraints data provided by Council

Land ownership status	Water, Waste Water and Storm water network assets	Acid Sulfate Soils Risk Data
LiDAR terrain surface	Electricity network	Contaminated land classes
Council supplied Fibre Optic network	Protected Fish habitat	Historic 100 year flood area
Road hierarchy	Protected Koala habitat	Watercourses & Wetlands
Planning zones	Heritage sites/areas	Vegetation cover

Figure 2: Example spatial datasets sourced from Council GIS team.

- Aerial photography tile (.ecw format) provided by Council for ArcGIS Desktop use.
- Imagery data service for use in ArcGIS Online: Imagery map of NSW showing satellite imagery, 50cm standard coverage imagery and high resolution urban and project imagery. NSW © Land and Property Information 2015. https://sdi.nsw.gov.au/catalog/search/resource/details.page?uuid=%7BA9550CB1-5908-4A47-936F-64AE50405DF7%7D

2.2 Constraint data captured by Opus

- Indicative broader Fibre Optic network, georeferenced and digitised, not available in spatial data format.
- Drainage crossings and structures
- Port Macquarie Hastings LGA Vegetation and EEC Maps 2014 VIS IDs 4205 and 4206 (to compare with data provided by Council).

Data collation is the process of ensuring that all constraint and context data is in a common spatial projection and where necessary clipped to a manageable area for minimising online web map data storage.

All spatial data was stored in GDA 1994 MGA Zone 56, WKID: 28356 Authority: EPSG, Transverse Mercator projection, stored in ArcGIS Geodatabase format.

2.3 Converting detailed routes into segments for analysis

Six route options were designed by Opus and provided in AutoCAD format for integration with the constraint GIS data. The Route option data was detailed including proposed route cut and fill areas and carriageway area (see figure 3). In order to use this route data for multi criteria constraint analysis it was necessary to create a simple representation of each routes' footprint. The outer boundary line of each route was extracted and ArcGIS was used to transform the line into a route polygon with all detailed design lines within removed.

Figure 3: Example of part of a detailed route design produced in AutoCAD including cut and fill areas.

Figure 4 shows the resulting route polygon which was then segmented in ArcGIS to form approximately 100m length segments for spatial analysis use. These segments were further refined at the end of the route design stage and multi criteria values were recalculated to ensure that design changes were included in the constraint analysis.

Figure 4: Simplified route using the outline of the detailed route design, segmented for constraint analysis purposes.

3 Multi Criteria Analysis

ArcGIS was used to perform analysis to measure and record the presence of each constraint dataset that intersects with each route segment. This analysis was performed on each route separately. The presence or not approach produced a binary table (see figure 5), where columns represent constraint type and rows represent the sequential route segment reference number.

Presence of an intersecting constraint =1, no presence =0. This is a simple way of assessing which route segments require a weighted factor to be applied in the following stage. It is acknowledged that this approach does not reflect the quantity of constraint features but is enough to provide a high level indication of where constraints are clustered to assist route selection decision making.

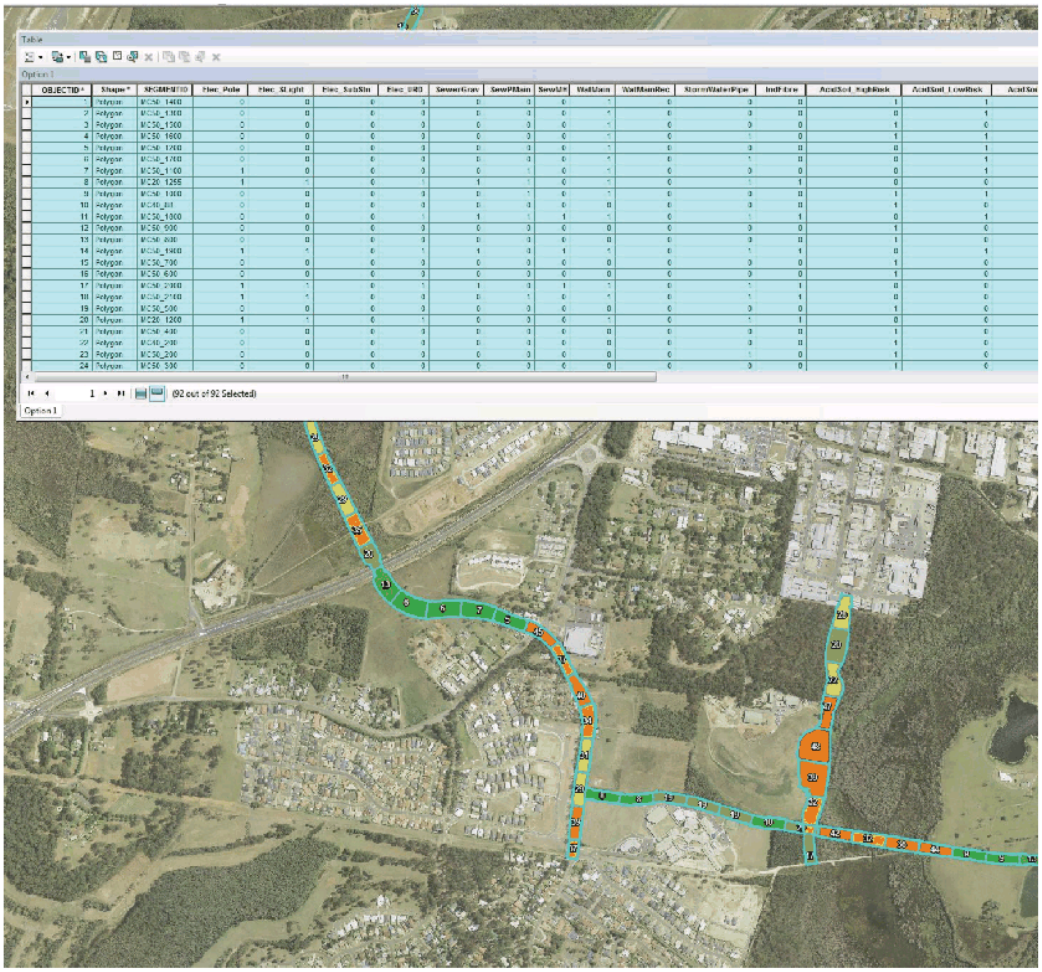


Figure 5: Example of a selected route attribute table in ArcGIS recording the presence of constraints per segment. The map shows summed constraint values per segment.

Following the initial constraint and route intersection analysis, a workshop was held at Port Macquarie Hastings Council on the 8th of July 2016. Present: Cameron Hawkins (Council Project Manager), Duncan Clarke (Council Project Director) and James Wallis (Opus Project Manager). The workshop determined relative constraint weighted values which were then recorded against segments with a constraint presence value of 1. Figure 6 shows the preliminary constraint weighted values on the left and revised values following Council review on the right. The final weighted values were multiplied by the constraint presence values per route segment to produce a total weighted value for each route (figure 9).

Port Macquarie Orbital - Multi Criteria Analysis

Preliminary Weighted Criteria Summary

Constriant Subject	Item (Sub-set)	Weighting (out of 10)
Utilities		
	Electric Pole	3
	Electric Street Light	3
	Electric Sub Station	3
	Electric URD	3
	Sewer Gravity	2
	Sewer Pressure Main	1
	Sewer Manhole	2
	Water Main	1
	Water Main Reclaimed	1
	Storm Water Pipe	1
	Fibre Optic Network	7
Land quality		
	AcidSoil HighRisk	4
	AcidSoil LowRisk	2
	AcidSoil Distrurbed Land	1
	Contaminated land type A	5
	Contaminated land type B	3
Flood zones		
	Flood 100year	3
Protected Habitat		
	Fish Habitat	3
	Koala PoM	5
	Koala Site Records	5
Land ownership		
	Freehold Urban	5
	Freehold Rural	3
	Council	1
	Government Agency	3
	Crown	3
	State Forest	10
Road Hierarchy		
	Local	2
	Collector	4
	Sub Arterial	5
	Arterial	6
	Major	7
Electric Hierarchy		
	Low Voltage	1
	11kV	3
	33kV	3
	132kV	5
Protected Vegetation Areas		
	EEC Vegetation Cover	7
	SEPP14 Vegetation Cover	7

Revised Weighted Criteria Summary

Constriant Subject	Item (Sub-set)	Weighting (out of 10)
Utilities		
	Electric Pole	2
	Electric Street Light	2
	Electric Sub Station	3
	Electric URD	3
	Sewer Gravity	3
	Sewer Pressure Main	1
	Sewer Manhole	2
	Water Main	1
	Water Main Reclaimed	1
	Storm Water Pipe	1
	Fibre Optic Network	6
Land quality		
	AcidSoil HighRisk	4
	AcidSoil LowRisk	2
	AcidSoil Distrurbed Land	1
	Contaminated land type A	5
	Contaminated land type B	3
Flood zones		
	Flood 100year	3
Protected Habitat		
	Fish Habitat	3
	Koala PoM	3
	Koala Site Records	5
Land ownership		
	Freehold Urban	5
	Freehold Rural	3
	Council	1
	Government Agency	3
	Crown	3
	National Park	10
Road Hierarchy		
	Local	2
	Collector	4
	Sub Arterial	5
	Arterial	6
	State Highway	7
Electric Hierarchy		
	Low Voltage	1
	11kV	3
	33kV	3
	132kV	5
Protected Vegetation Areas		
	EEC Vegetation Cover	7
	SEPP14 Vegetation Cover	7

Figure 6: Constraint criteria with allocated relative weighted values (preliminary and revised versions)

4 ArcGIS Online Collaboration

ArcGIS Online provided a central hub for the project's spatial data to be published and shared by all Stakeholders in any location. ArcGIS Online can be accessed by tablet, mobile phone or PC browsers such as Google Chrome or Firefox (webGL enabled).

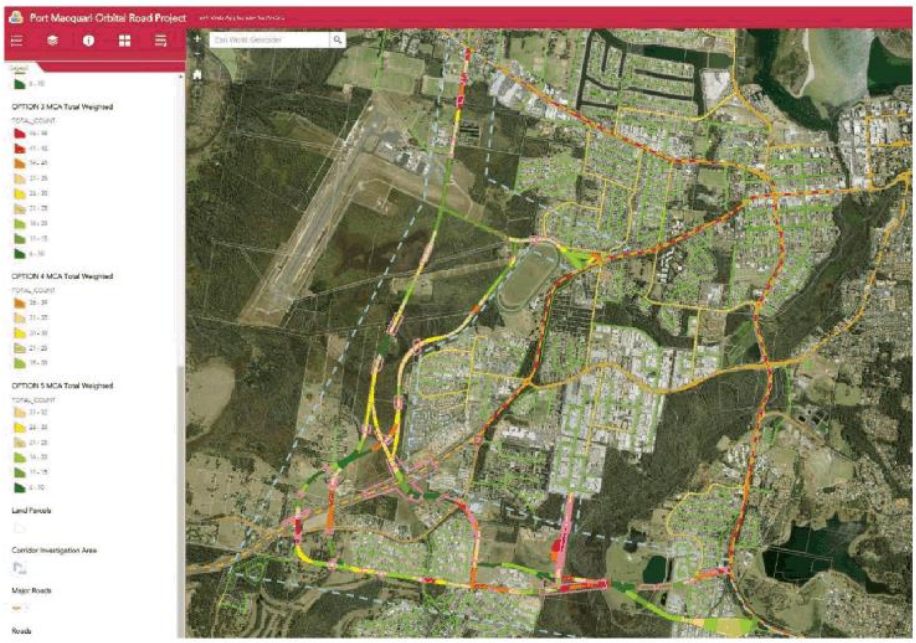


Figure 7: ArcGIS Online web map showing the full extent of the study area with proposed route options.

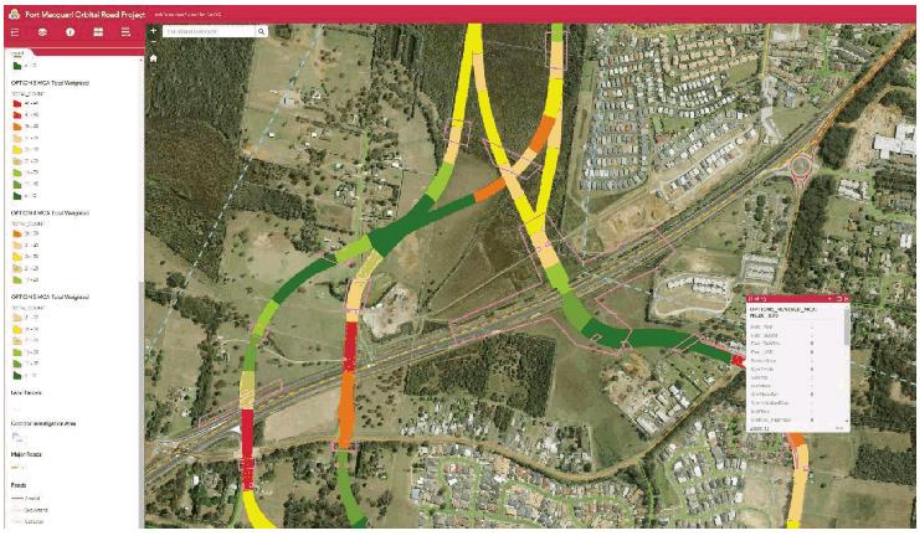


Figure 8: ArcGIS Online web allows users to interact and inspect feature attributes, and turn layers on and off.

5 Results

Figure 9 represents a summary of total weighted constraint values for each of the multi criteria route options shown in figures 11 to 15. Route 1 has the least total weighted constraints and route 2b has the largest total weighted constraints.

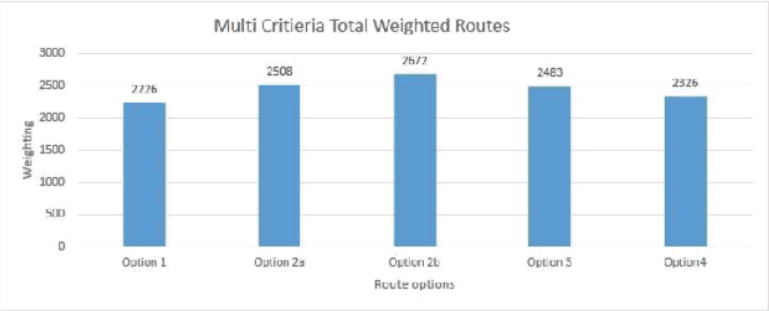


Figure 9: Summary of total weighted constraint values per route option

Figure 10 shows general hot spots where clusters of route segments contain high constraint scores. Cluster A shows constraints along Boundary Street, passing through and adjoining a number of planning zones including residential, public and private recreation, environmental conservation areas and primary production zones.

Clusters B is located along Major Innes Road between residential and primary production zones. Cluster C represents the proposed route crossing the current waste resource management facility land (Plan No DP0875998) and part of the neighbouring National Park.

Cluster D shows a concentration of constraints cutting through the existing mainly residential area between the intersection of Kyla Crescent and Braeroy Drive and the Philip Charley Drive/John Oxley Drive intersection. Cluster E includes Nature Reserve and high voltage powerline constraints

Figures 11-to 15 show the mapped results of individual route option constraint analysis.

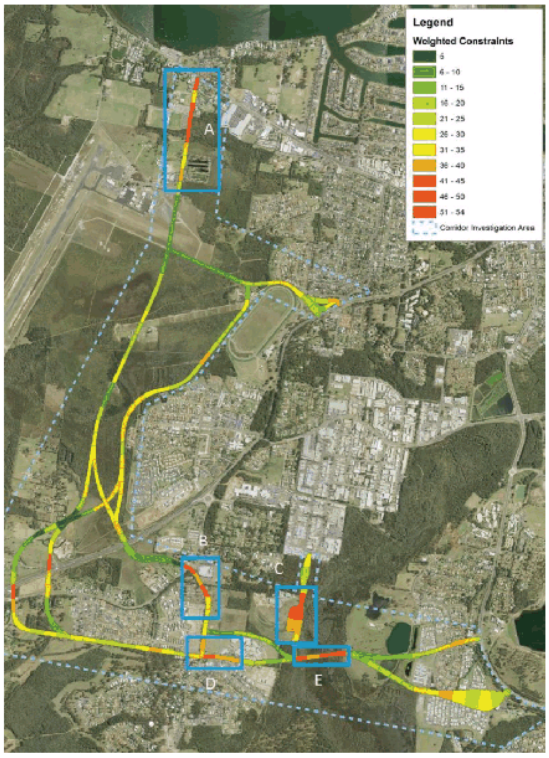


Figure 10: Constraint hotspots

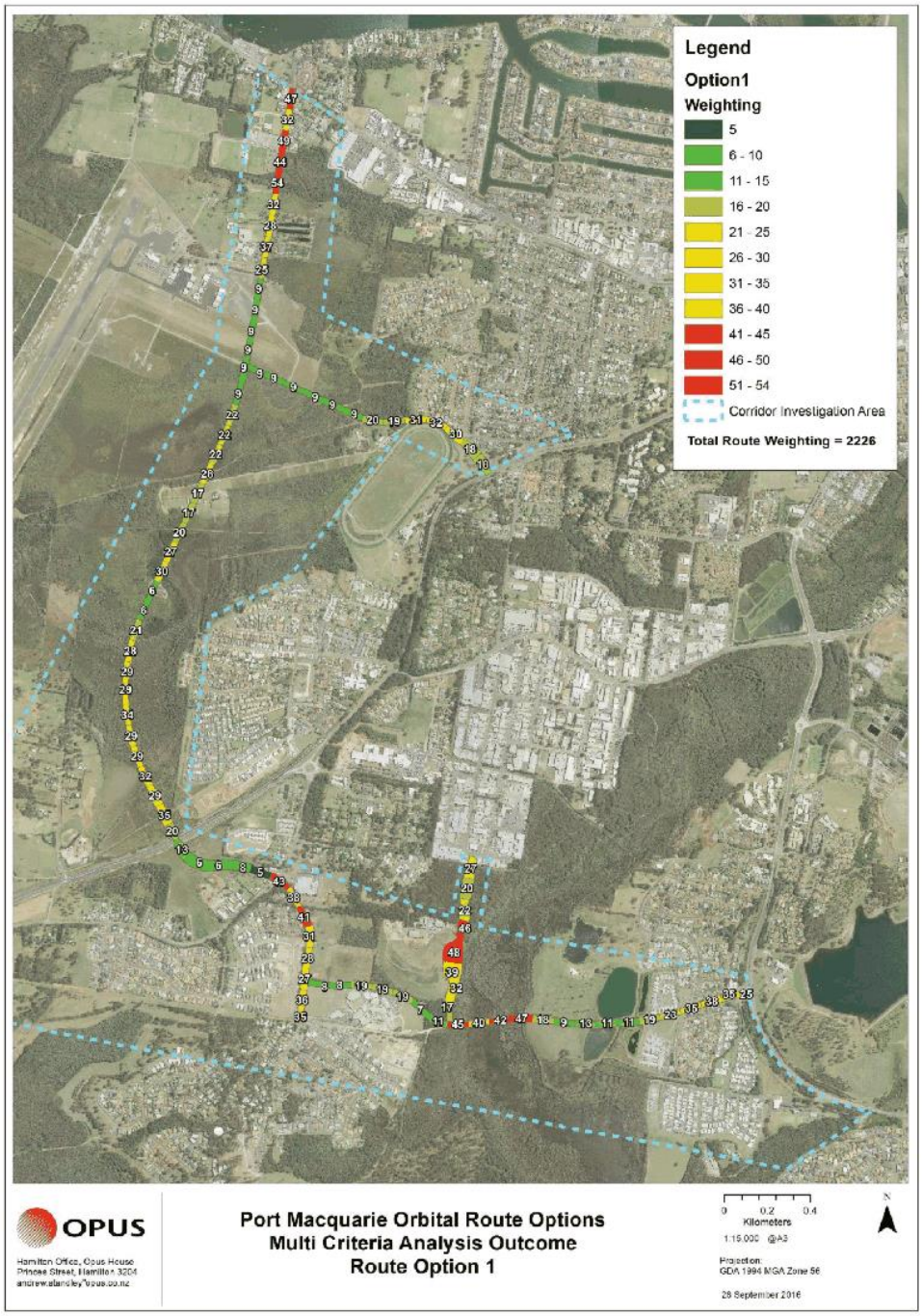


Figure 11: Route Option 1 Multi Criteria Constraint Weighting

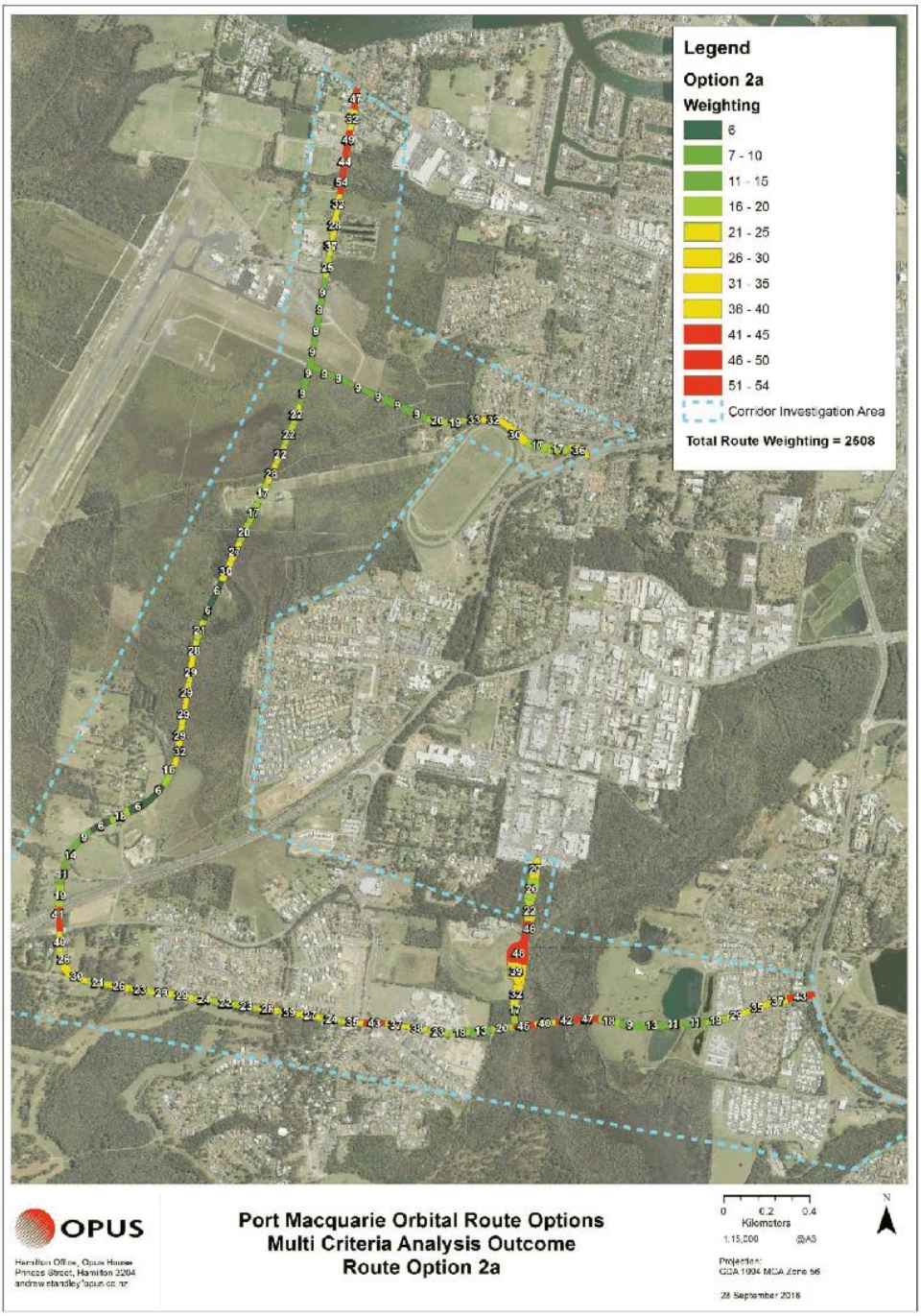


Figure 12: Route Option 2a Multi Criteria Constraint Weighting

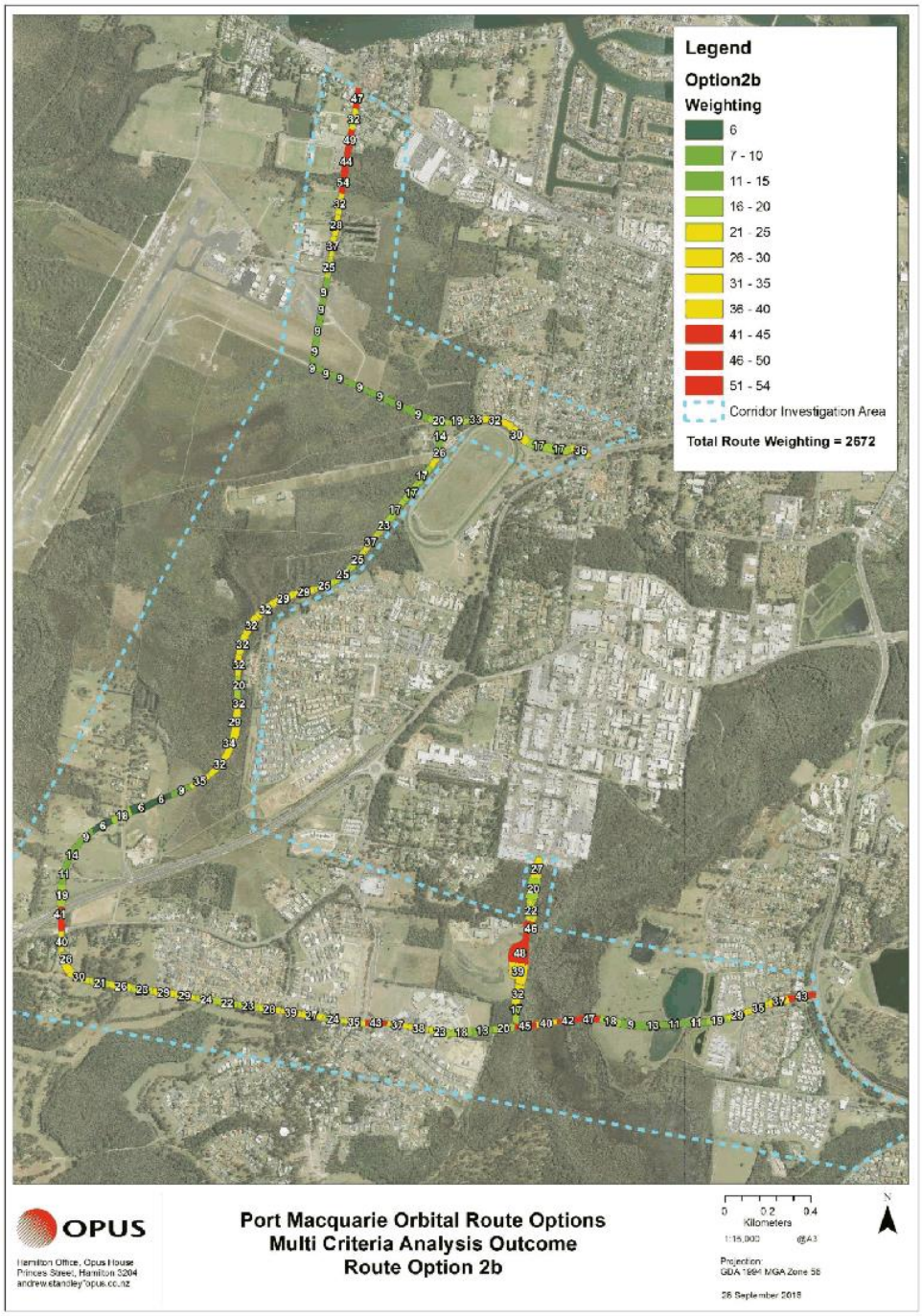


Figure 13: Route Option 2b Multi Criteria Constraint Weighting

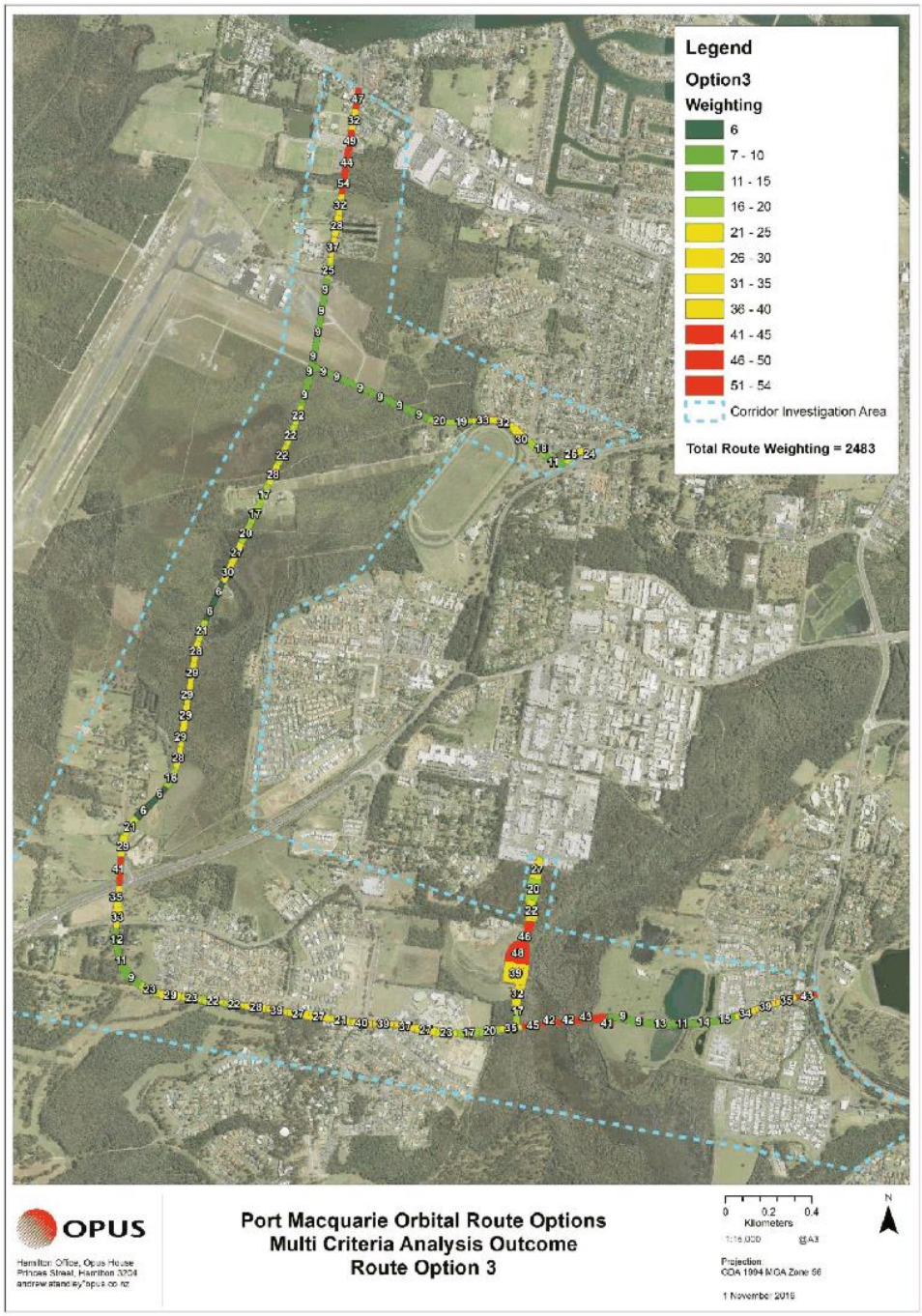


Figure 14: Route Option 3 Multi Criteria Constraint Weighting

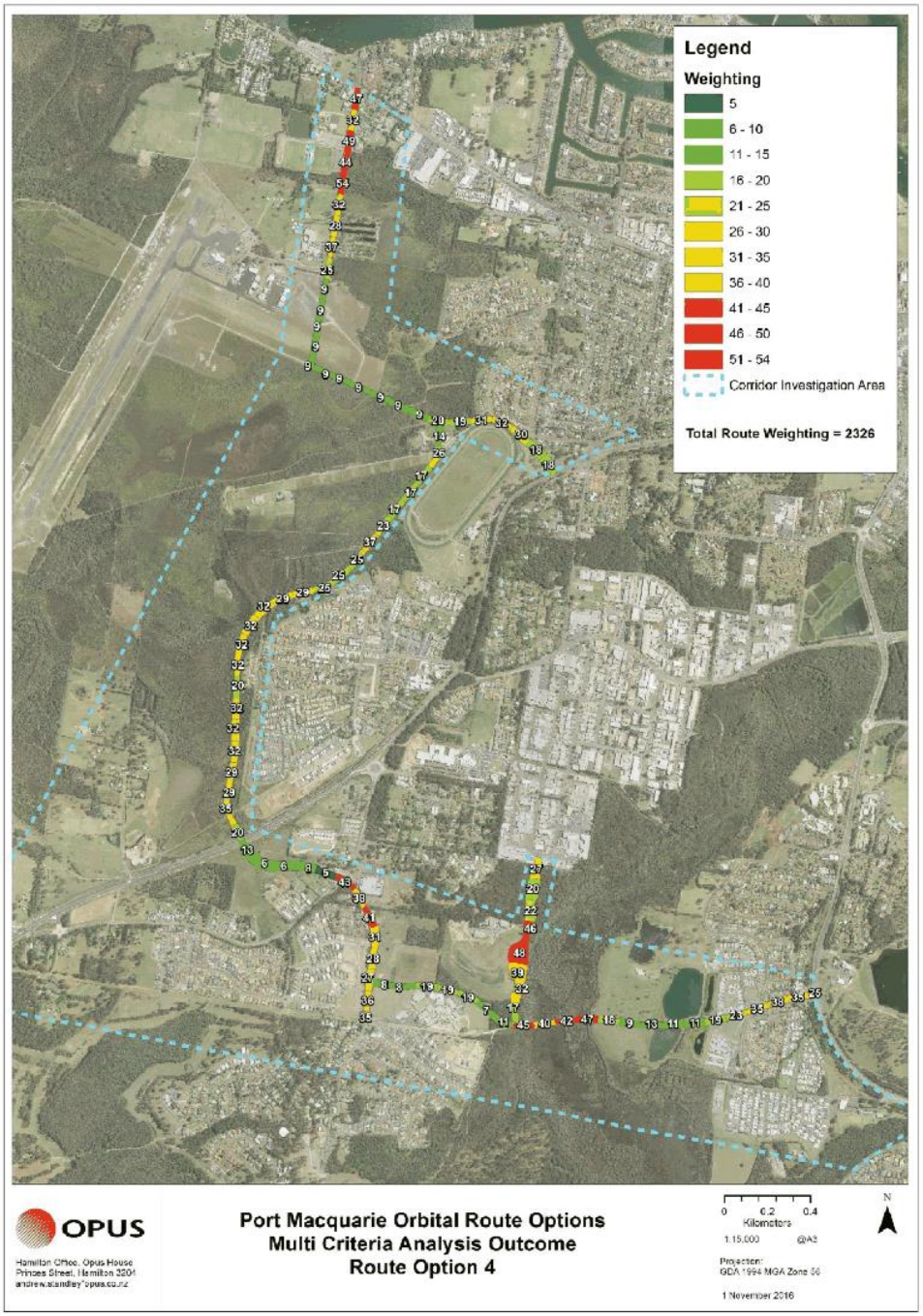


Figure 15: Route Option 4 Multi Criteria Constraint Weighting

6 Connection to Ocean Drive

A brief comparison of the two route options connecting to Ocean Drive are provided below. Figure 16 shows the Northern and Southern routes with total weighted constraint values labelled. Figure 17 shows the routes with their unique segment references (see also figures 18 and 19 for constraint distribution related to these references).

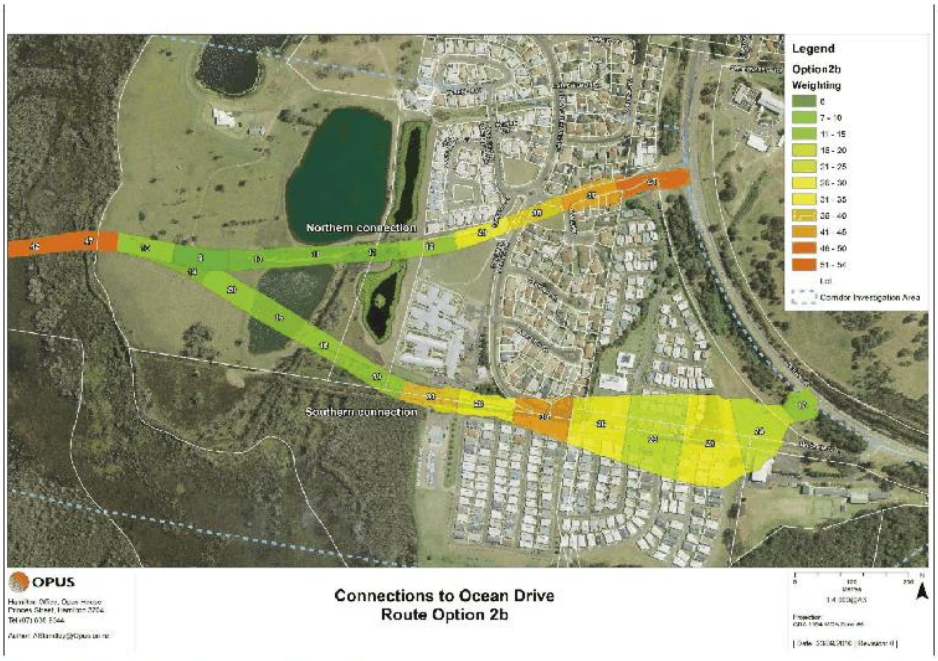


Figure 16: Connection Options to Ocean Drive

Figure 17: Northern and Southern routes shown with unique route segment reference.

The Northern connection to Ocean Drive has an increasing number of cumulative constraints from west to east. The Northern route intersects with slightly more street lights, water utility assets and roads.

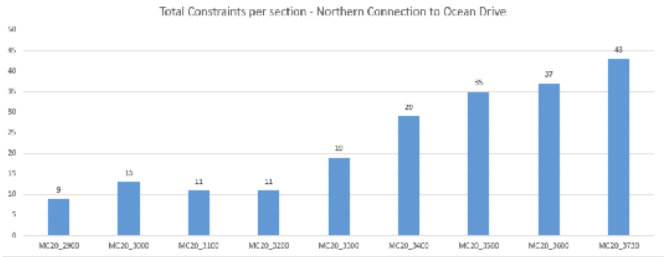


Figure 18: Northern Ocean Drive Connection - Constraint Distribution

The Southern connection route has a more even constraint distribution than the Northern route. However, the Southern route encounters more significant infrastructure including more 11Kv and 33Kv high voltage network, fibre optic, more street electricity poles as well as additional land ownership constraints.

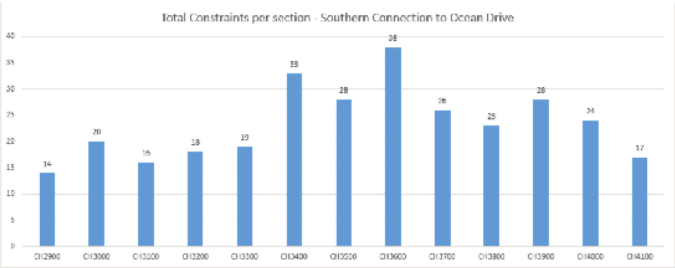


Figure 19: Southern Ocean Drive Connection - Constraint Distribution

Figure 20 highlights the main differences in constraint content for each route. The Southern route contains constraints with higher weighted values than the Northern route option.

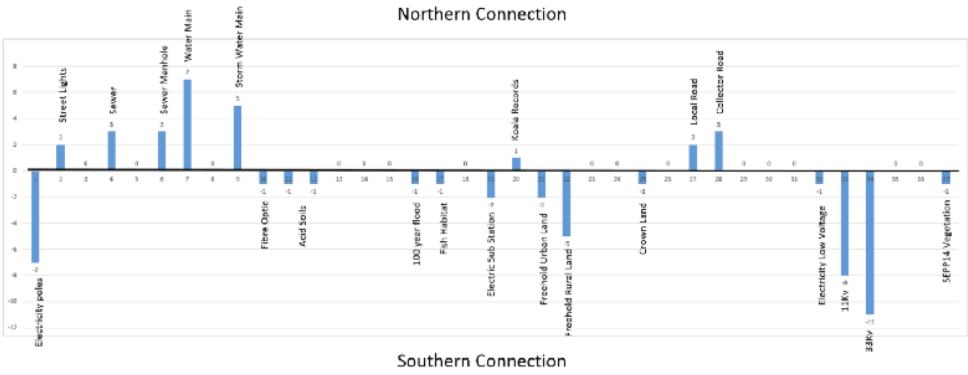


Figure 20: A comparison of constraint differences between Northern and Southern routes

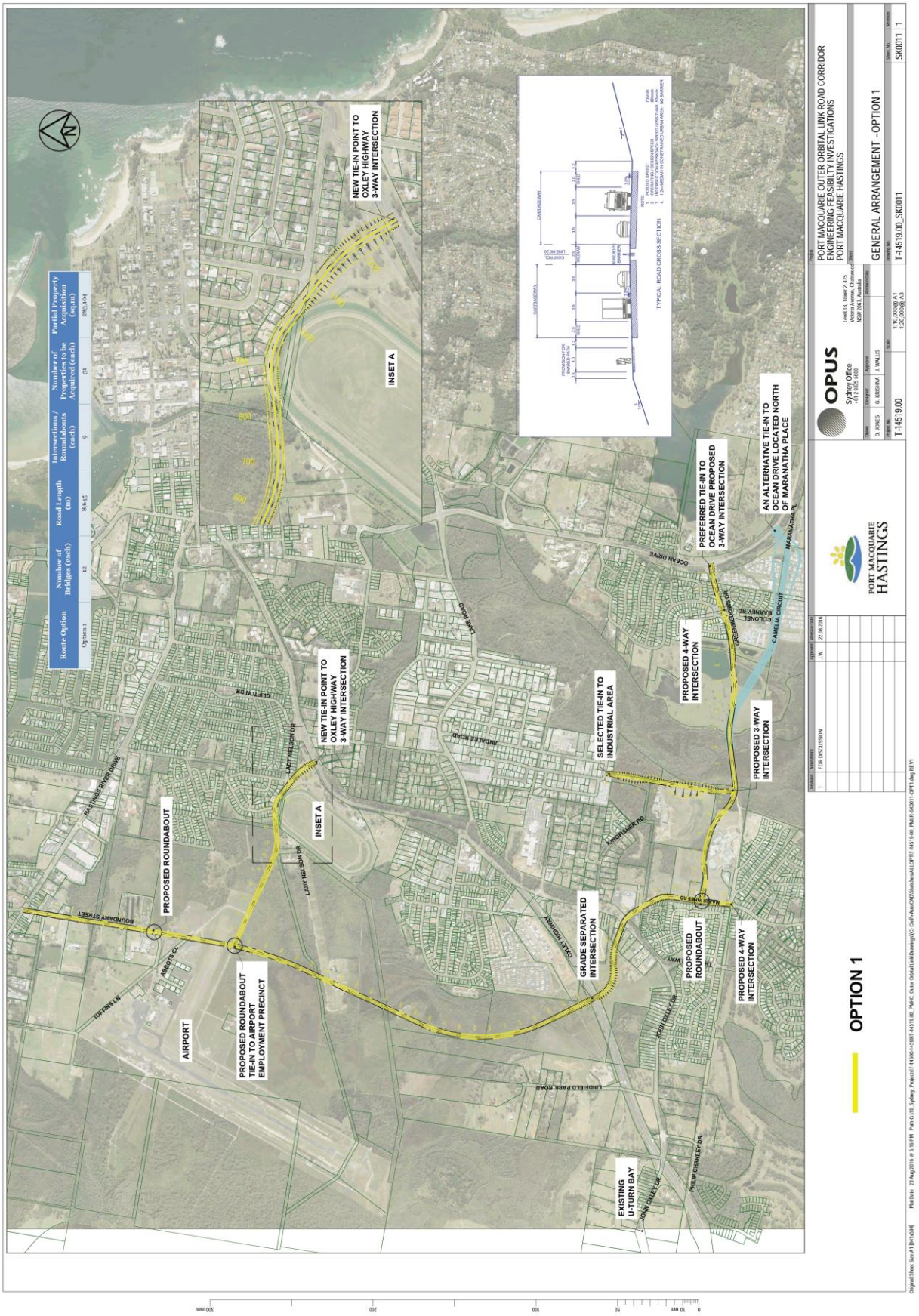
7 Conclusion

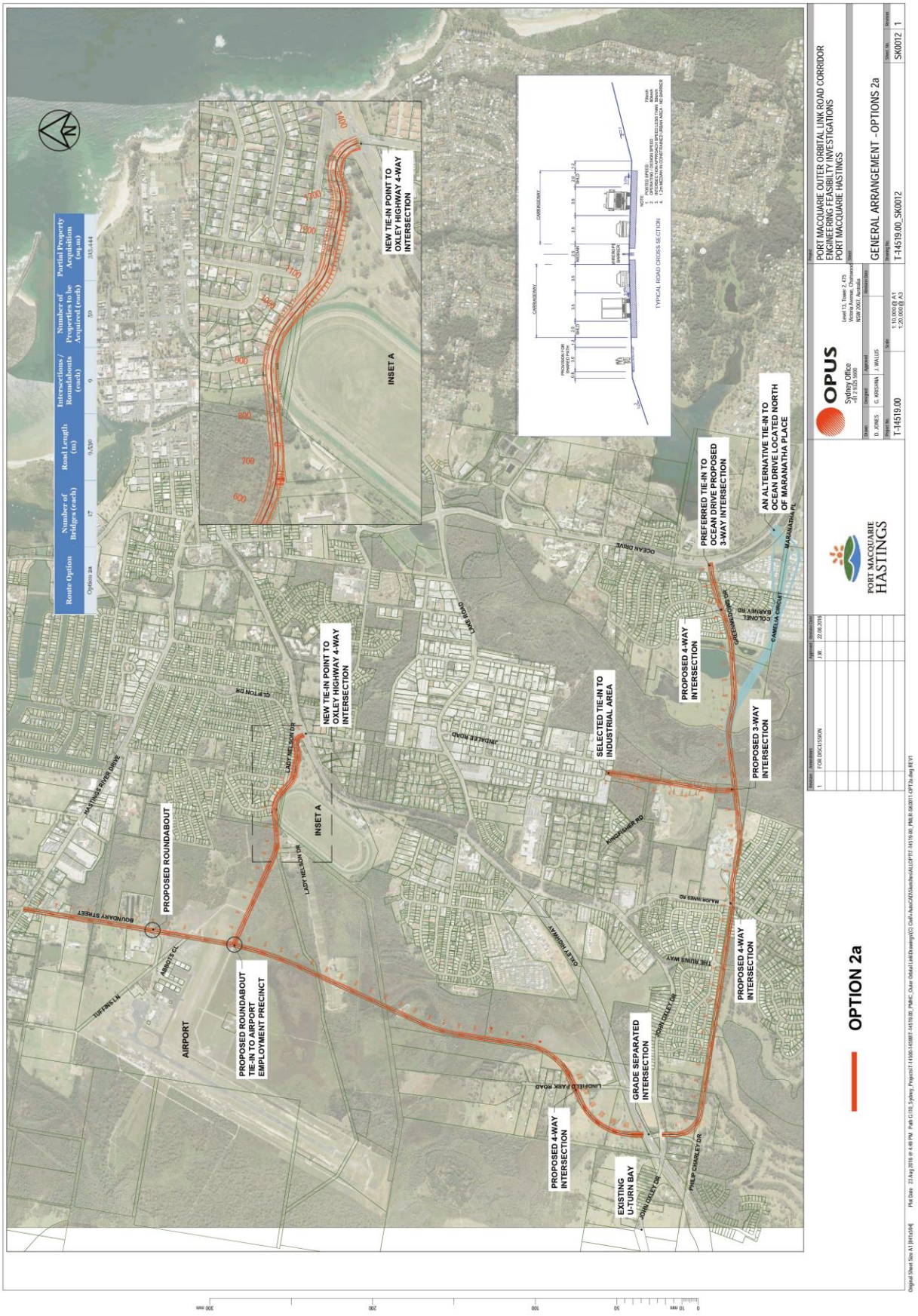
GIS has been utilised to collate and spatially represent known environmental and utility constraints that may impact proposed route options. The multi criteria constraints analysis required a simplified route polygon per route option which was based on cut and fill outer boundaries designed in AutoCAD to provide a route footprint. The route footprints were segmented into smaller areas to allow the intersection of routes and constraints to be measured and recorded.

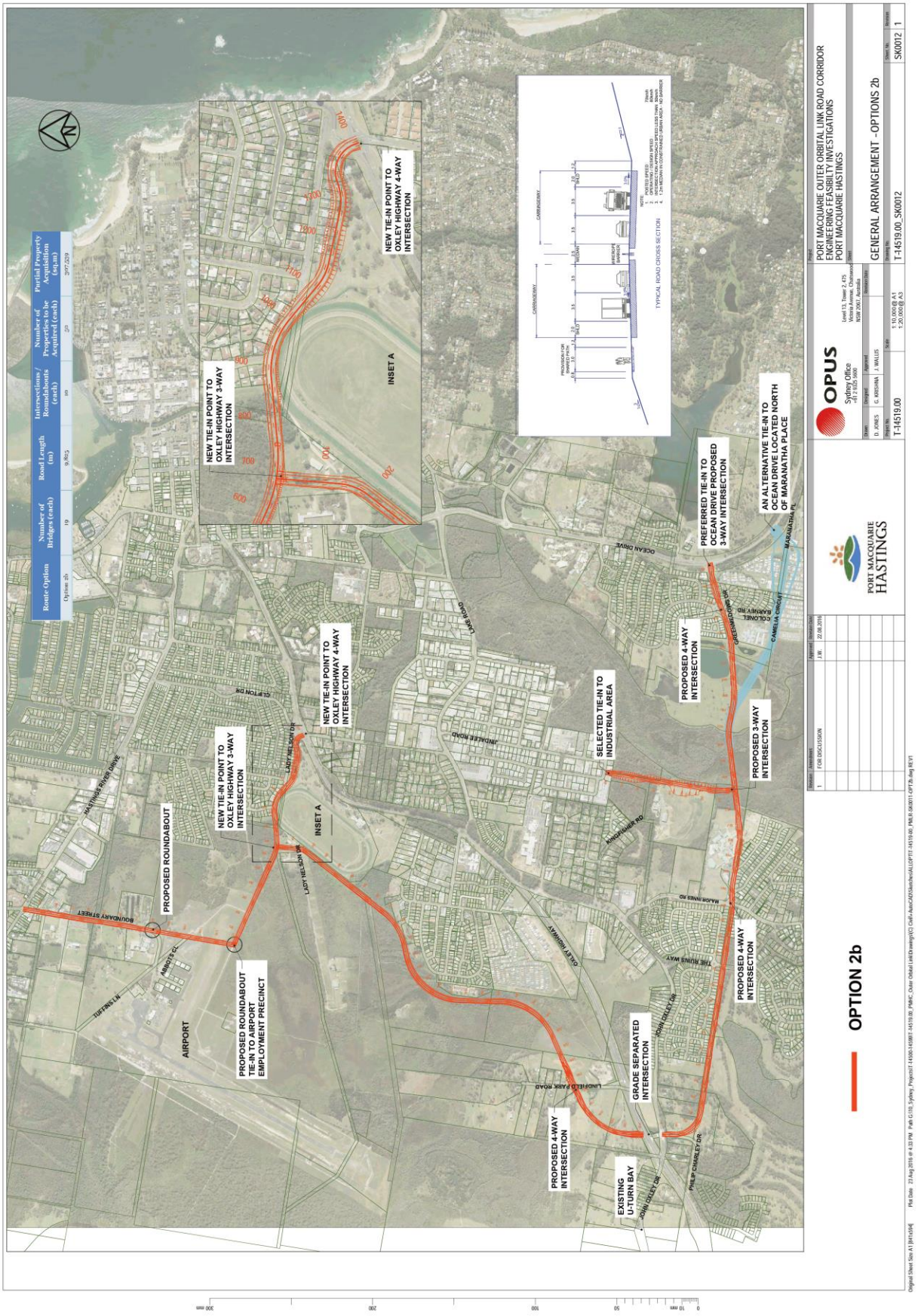
Once constraint presence was recorded for each route segment, constraint consequence was determined by Council providing relative weighted values for each type of constraint. GIS provided an efficient means of applying these consequence values and summing weighted constraint values per route segment and for whole routes.

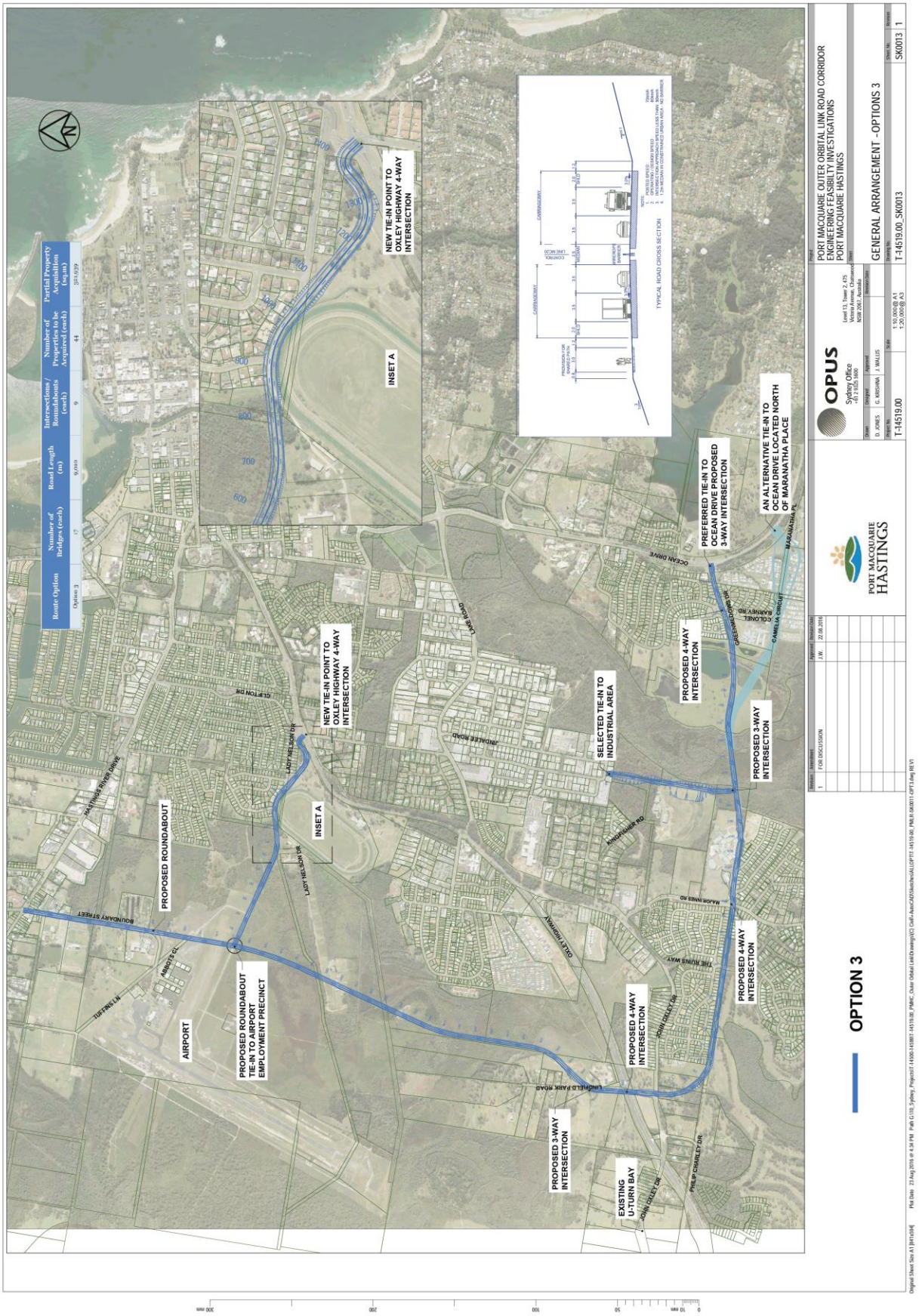
The method described in this report provides a qualitative assessment of the relative impact of each proposed route for comparison with the quantitative costed route information. Additional maps in the Appendices section show the detailed route options used for route cost estimates.

8 Appendices

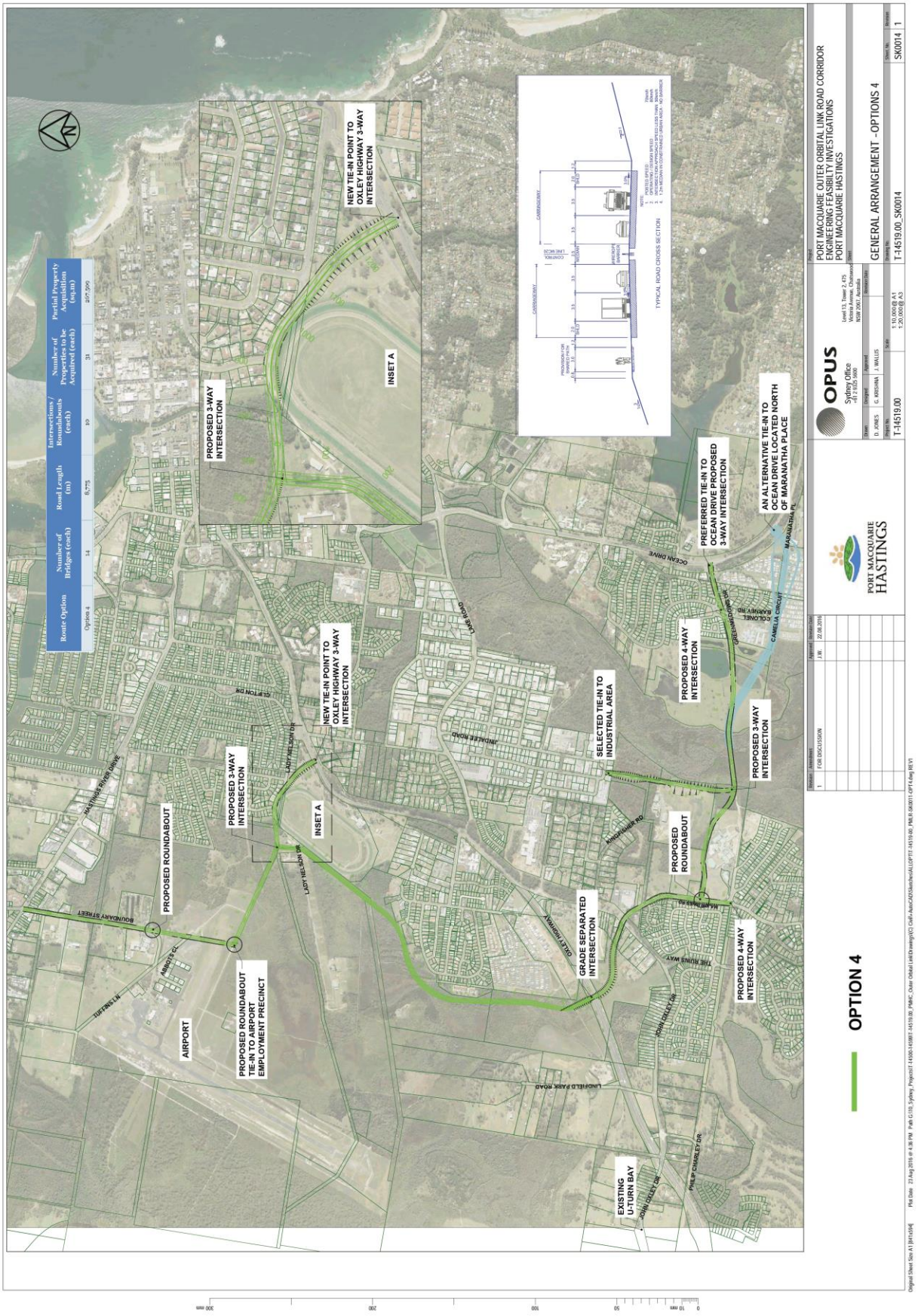

Route Option | Number of Bridges (each) | Road Length (m) | Intersections / Roundabouts (each) | Number of Properties to be Acquired (each) | Partial Property Acquisition (sq.m)
Option 1 | 12 | 8,615 | 9 | 23 | 283,104
NEW TIE-IN POINT TO OLD PACIFIC HIGHWAY 3-WAY INTERSECTION
INSET A
TYPICAL ROAD CROSS SECTION
PROPOSED ROUNDABOUT
PROPOSED ROUNDABOUT TIE-IN TO AIRPORT EMPLOYMENT PRECINCT
AIRPORT
NEW TIE-IN POINT TO OLD PACIFIC HIGHWAY 3-WAY INTERSECTION
SELECTED TIE-IN TO INDUSTRIAL AREA
GRADE SEPARATED INTERSECTION
PROPOSED ROUNDABOUT
PROPOSED 4-WAY INTERSECTION
PROPOSED 3-WAY INTERSECTION
PROPOSED 4-WAY INTERSECTION
PREFERRED TIE-IN TO OCEAN DRIVE PROPOSED 3-WAY INTERSECTION
AN ALTERNATIVE TIE-IN TO OCEAN DRIVE LOCATED NORTH OF MARANATHA PLACE
EXISTING U-TURN BAY
OPTION 1
OPUS
Sydney Office
+61 2 8625 1800
Level 13, Tower 2, 475 Victoria Ave, Chatswood NSW 2067, Australia
D. JONES
G. KRISHNA
J. WALLIS
T-14519.00
1:10,000@A1
1:20,000@A3
PORT MACQUARIE OUTER ORBITAL LINK ROAD CORRIDOR
ENGINEERING FEASIBILITY INVESTIGATIONS
PORT MACQUARE HASTINGS
GENERAL ARRANGEMENT - OPTION 1
T-14519.00_SK0011
SK0011
1
FOR DISCUSSION
PORT MACQUARIE HASTINGS


Route Option | Number of Bridges (each) | Road Length (m) | Intersections / Roundabouts (each) | Number of Properties to be Acquired (each) | Partial Property Acquisition (sq.m)
Option 2a | 17 | 9,830 | 9 | 30 | 333,444
NEW TIE-IN POINT TO OXLEY HIGHWAY 4-WAY INTERSECTION
INSET A
PROPOSED ROUNDABOUT
PROPOSED ROUNDABOUT TIE-IN TO AIRPORT EMPLOYMENT PRECINCT
AIRPORT
SELECTED TIE-IN TO INDUSTRIAL AREA
PROPOSED 4-WAY INTERSECTION
PROPOSED 3-WAY INTERSECTION
PREFERRED TIE-IN TO OCEAN DRIVE PROPOSED 3-WAY INTERSECTION
AN ALTERNATIVE TIE-IN TO OCEAN DRIVE LOCATED NORTH OF MARANATHA PLACE
GRADE SEPARATED INTERSECTION
EXISTING U-TURN BAY
OPTION 2a
TYPICAL ROAD CROSS SECTION
PORT MACQUARIE OUTER ORBITAL LINK ROAD CORRIDOR
ENGINEERING FEASIBILITY INVESTIGATIONS
PORT MACQUARIE HASTINGS
GENERAL ARRANGEMENT - OPTIONS 2a
T-14519.00_SK0012
SK0012
OPUS
Sydney Office
PORT MACQUARIE HASTINGS


Route Option | Number of Bridges (each) | Road Length (m) | Intersections/ Roundabouts (each) | Number of Properties to be Acquired (each) | Partial Property Acquisition (sq.m)
Option 2b | 19 | 9,825 | 10 | 22 | 397,639
NEW TIE-IN POINT TO OXLEY HIGHWAY 3-WAY INTERSECTION
NEW TIE-IN POINT TO OXLEY HIGHWAY 4-WAY INTERSECTION
INSET A
TYPICAL ROAD CROSS SECTION
PROPOSED ROUNDABOUT
PROPOSED ROUNDABOUT TIE-IN TO AIRPORT EMPLOYMENT PRECINCT
AIRPORT
SELECTED TIE-IN TO INDUSTRIAL AREA
PREFERRED TIE-IN TO OCEAN DRIVE PROPOSED 3-WAY INTERSECTION
AN ALTERNATIVE TIE-IN TO OCEAN DRIVE LOCATED NORTH OF MARANATHA PLACE
PROPOSED 4-WAY INTERSECTION
PROPOSED 3-WAY INTERSECTION
GRADE SEPARATED INTERSECTION
EXISTING U-TURN BAY
OPTION 2b
OPUS
PORT MACQUARIE HASTINGS
PORT MACQUARIE OUTER ORBITAL LINK ROAD CORRIDOR
PRELIMINARY FEASIBILITY INVESTIGATIONS
PORT MACQUARIE HASTINGS
GENERAL ARRANGEMENT - OPTIONS 2b
T-14519.00_SK0012



Route Option	Number of Bridges (each)	Road Length (m)	Intersections / Roundabouts (each)	Number of Properties to be Acquired (each)	Partial Property Acquisition (sqm)
Option 3	17	9,013	9	44	5,919,939


Route Option | Number of Bridges (each) | Road Length (m) | Intersections / Roundabouts (each) | Number of Properties to be Acquired (each) | Partial Property Acquisition (sq.m)
Option 4 | 14 | 8,775 | 19 | 31 | 267,990
PROPOSED 3-WAY INTERSECTION
NEW TIE-IN POINT TO OXLEY HIGHWAY 3-WAY INTERSECTION
INSET A
TYPICAL ROAD CROSS SECTION
PROPOSED ROUNDABOUT
PROPOSED ROUNDABOUT TIE-IN TO AIRPORT EMPLOYMENT PRECINCT
AIRPORT
PROPOSED 3-WAY INTERSECTION
INSET A
NEW TIE-IN POINT TO OXLEY HIGHWAY 3-WAY INTERSECTION
SELECTED TIE-IN TO INDUSTRIAL AREA
GRADE SEPARATED INTERSECTION
PROPOSED ROUNDABOUT
PROPOSED 4-WAY INTERSECTION
PROPOSED 3-WAY INTERSECTION
PREFERRED TIE-IN TO OCEAN DRIVE PROPOSED 3-WAY INTERSECTION
AN ALTERNATIVE TIE-IN TO OCEAN DRIVE LOCATED NORTH OF MARANATHA PLACE
PROPOSED 4-WAY INTERSECTION
EXISTING U-TURN BAY
OPTION 4
OPUS
PORT MACQUARIE HASTINGS
PORT MACQUARIE OUTER ORBITAL LINK ROAD CORRIDOR
ENGINEERING FEASIBILITY INVESTIGATIONS
PORT MACQUARIE HASTINGS
GENERAL ARRANGEMENT - OPTIONS 4
T-14519.00_SK0014

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Appendix D – Strategic Cost Estimation Report

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Port Macquarie Hasting Council

Port Macquarie Outer Orbital Link Road Corridor: Engineering Feasibility Investigation

Strategic Cost Estimations Report

OPUS

Port Macquarie Hasting Council

Port Macquarie Outer Orbital Link Road Corridor: Engineering Feasibility Investigation

Strategic Cost Estimations Report

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Status: FINAL V1.1

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Appendix A - Options Corridors – General Arrangement and individual route plans.

Appendix B - Option segmentation sketch and Estimate "areas" sketches.

Appendix C - RMS Spreadsheet Summary Outputs.

1 Executive Summary

As part of the Port Macquarie Outer Orbital Link Road Corridor - Engineering Feasibility Investigation this document presents the outcomes of the strategic cost estimations of the proposed route options. The options are represented as four distinct routes (refer Appendix A for general arrangement and individual route plans) which can then subsequently be segmented further for a more detailed review. For the purpose of identification of each option, and section thereof, refer to the General Arrangement Option Breakup drawings located within Appendix B.

The cost estimates have been prepared in accordance with the guidelines contained in the RMS document, *Project Estimating*, for the "strategic" stage of the planning process.

A summary of the strategic cost estimates for each option is provided in Table 1.1. The cost estimates for the Project (including Ocean Rd tie-in via Greenmeadows Dr) are:

Route Option	Estimated Costs ($M) (incl contingency, Ex-GST)
Option 1	$875 M
Option 2a	$1,025 M
Option 2b	$1,000 M
Option 3	$950 M
Option 4	$850 M

Table 1.1

It is also noted that in Table 1.2 a direct comparison of Ocean Drive tie-in points is also presented:

Route Option	Estimated Costs ($M) (incl contingency, Ex-GST)
Ocean Drive tie-in: North of **Maranatha Pl** (Cyan route for comparison)	$400 M
Ocean Drive tie-in: **Greenmeadows Dr** (All other routes for comparison)	$300 M

Table 1.2

The project costs summarised above include the following items;

- Concept Development costs;
- Detail Design and Documentation costs;
- Property Acquisition costs;
- Utility Adjustment costs;
- Infrastructure Construction costs; and
- Finalisation costs.

It should be noted also that the above estimated costs have been rounded to the nearest $25M as per RMS Project Estimating manual and exclude GST. Further details of costs can be found in Appendix C.

The following sections of this report outline the development of the strategic cost estimates and provide further explanation on their validity and appropriation of use.

2 Introduction

As part of Port Macquarie Hastings Council's future road network strategy the concept of an outer orbital link road has long been recognised as an important component. As such Council resolved to conduct an engineering feasibility investigation of such a link.

Port Macquarie Hastings Council (PMHC) commissioned Opus International Consultants to undertake the Engineering Feasibility Investigations Report and as part of the report prepare preliminary cost estimates (strategic estimates) for the various route options. It is the strategic cost estimation of proposed routes/corridors that forms the basis of this report.

Project route options are identified in Figure 2.1 below. Refer also to Appendix A for large scale drawings.

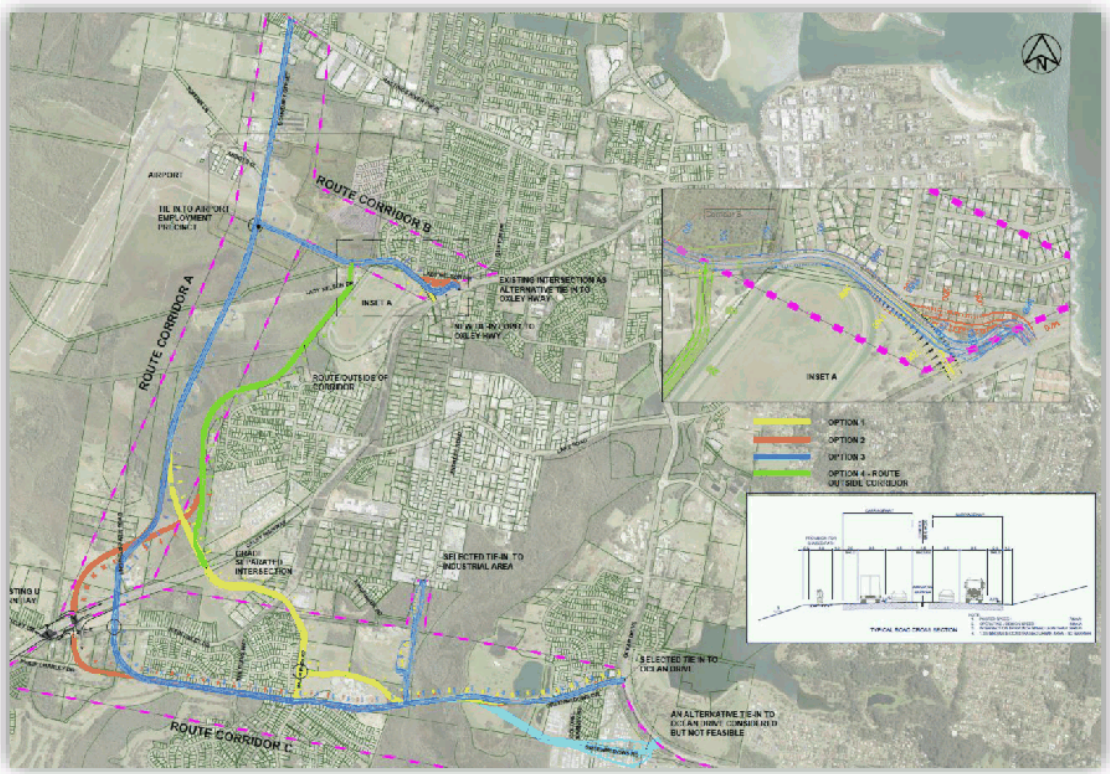


Figure 2-1 – Alignment Options

It is noted that the cost estimate has been further split into subsections and segments. These are referenced on the option drawings located within Appendix B

2.1 Assumptions

- No specific delivery or procurement option has been considered;
- The estimates were prepared by undertaking a desktop study using PMHC GIS data and aerial imagery to development the cost estimates. No data has been verified with on-site studies etc; and
- Reasonably adopted percent based costs have been used to estimate management and other unquantifiable components such as utility adjustments. Despite these limitations, the methodology used is considered suitable for this stage of design and for a comparative assessment of the options.

2.2 Definitions

EIS	Environmental Impact Statement - describes the project and presents a detailed description of the construction work needed to build it, and how it would function once it is built. The EIS also provides an assessment of all potential environmental impacts of the project that could occur as a result of its construction and operation.
PA Insurance	Principal Arranged Insurance (PAI) and was introduced by the RMS, removing part of the obligation from the contractor for obtaining the insurance for the works by requiring the RMS to insure and pay for the works.
Project Management	Project management includes all costs associated with project managing the project through its lifecycle as well as site-supervision and contract management costs.
Sponsor	The person (organisation) who requests the project, who is responsible for project sign-offs and is the person (organisation)to whom the project is handed over.

3 Project Cost

The estimated project costs were calculated using the following:

- Review of the Engineering Feasibility Investigations Port Macquarie Hastings - Route Options Drawings refer to Appendix A.

A summary of the key designs elements for each option is provided in Table 3.1. The elements for the options (including Ocean Rd tie-in via Geenmeadows Dr) are:

Route Option	Number of Bridges (each)	Road Length (m)	Intersections / Roundabouts (each)	Number of Properties to be Acquired (each)	Partial Property Acquisition (sq.m)
Option 1	12	8,645	9	31	283,104
Option 2a	17	9,530	9	50	313,444
Option 2b	19	9,825	10	50	307,539
Option 3	17	9,010	9	44	321,939
Option 4	14	8,775	10	31	267,509

Table 3.1

It is also noted that in Table 3.2 a direct comparison of Ocean Drive tie-in points is also presented:

Route Option	Number of Bridges (each)	Road Length (m)	Intersections / Roundabouts (each)	Number of Properties to be Acquired (each)	Partial Property Acquisition (sq.m)
Ocean Drive tie-in: North of **Maranatha Pl** (Cyan route for comparison)	3	1,520	2	3	100,450
Ocean Drive tie-in: **Greenmeadows Dr** (All other routes for comparison)	3	1,325	2	10	63,455

Table 3.2

- Quantities used were determined from the plans. The quantities were;
  - Length of road and pavement
  - Length and area of bridges
  - Property acquisition areas based on extents of batters for each option. Full property acquisition has been assumed if the proposed design cuts a building, runs across a property (resulting with the property being cut into two), removes the primary access point to a property or building or has a significant change on a properties open space (ie removes a backyard).

- RMS standard summary items were used as a basis of the estimates.

- Global estimating has been used for the preparation of the estimate. The global rates used are based on quantities prepared by Opus based on publicly available strategic estimates prepared for Roads and Maritime Services for projects of a similar size.
- Project Contingency was calculated using the RMS Project Estimating Contingency for strategic estimates.
- The RMS estimate summary sheet was completed for each estimate option.
- Output Summary Sheets have been included in this report and included within Appendix C.

4 Strategic Estimate Items

The following sections outline the basis on which the major elements of the project have been estimated.

4.1 Concept Development

From the RMS Project Estimating manual this cost includes concept design, design development including route and EIS development with community liaison. The following allowances have been made for project concept phase;

- Route/Concept/EIS 1% of construction costs
- Project Management 3% of project development costs
- Sponsor 10% of project management costs
- Community Liaison 1% of route/concept/EIS

4.2 Detail Design & Documentation

For this estimate it has been assumed the project will be design and construct. This section includes all activities in the detail design from the end of the project development phase to design approval and the start of tendering (with the exception of public acquisition and utility adjustments). The following allowances have been made for investigation and design phase:

- Investigation and Design 2% of construction costs
- Project Management 3% of investigation and design costs
- Sponsor 10% of project management costs

4.3 Property Acquisition

Property acquisition costs have been developed reviewing property sales prices and publicly available acquisition rates. Acquisition rates have been adjusted for the various types of property use/zoning i.e. residential, council, rural.
Rates for Council managed property and acquisitions can be revised in consultation with PMHC to further refine the project estimates including prospects of potential purchased property reuse.

Areas for property acquisition have been measured from aerial photos and plans with areas based on the extents of batters for each option.

The following allowances have been made for property acquisition:

- Professional Services for Property 7% of acquisition costs
- Project Management 3% of acquisition costs
- Sponsor 10% of project management costs

A summary of the property acquisition for each option is provided in Table 4.1. The areas for the options (including Ocean Rd tie-in via Geenmeadows Dr) are:

Property Acquisition											
Route Options	Residential		National Park	Crown	Freehold				Council		
					Commercial		Vacant	Rural	Built-up	Vacant	Rural
	Part (sq.m)	Whole* (each)	Part (sq.m)	Part (sq.m)	Part (sq.m)	Whole (each)	Part (sq.m)	Part (sq.m)	Part (sq.m)	Part (sq.m)	Part (sq.m)
Option 1	1,340	36	17,240	25,350	10,475	3	50,425	52,483	55,426	61,970	8,395
Option 2a	17,470	55	17,795	21,730	10,475	3	34,570	46,458	62,706	85,945	16,295
Option 2b	15,570	55	17,795	11,195	10,475	3	34,570	68,083	62,706	70,850	16,295
Option 3	20,030	58	17,795	30,435	10,475	3	32,295	46,838	62,706	92,005	9,360
Option 4	1,085	36	17,240	14,815	10,475	3	50,425	62,518	55,426	46,875	8,395
Rate Adopted ($)	1,250	500,000	600	300	875	1,000,000	425	325	725	325	300

Table 4.1

It is also noted that in Table 4.2 a direct comparison of Ocean Drive tie-in points is also presented:

Property Acquisition											
Ocean Drive **Tie-ins**	Residential		National Park	Crow-n	Freehold				Council		
					Commercial		Vacant	Rural	Builtup	Vacant	Rural
	Part (sq.m)	Whole* (each)	Part (sq.m)	Part (sq.m)	Part (sq.m)	Whole (each)	Part (sq.m)	Part (sq.m)	Part (sq.m)	Part (sq.m)	Part (sq.m)
Maranatha Pl	48,290	4	10,625	1,140	1,630	0	23,365	0	13,610	1,790	10,625
Green-meadows Dr	1,085	10	10,625	0	3,320	0	21,420	0	25,525	1,480	10,625
Rate Adopted ($)	1,250	500,000	600	300	875	1,000,000	425	325	725	325	300

Table 4.2

*Note an average rate for the purchase of residential properties was used. Some of the larger properties were estimated as being subdivided (the larger properties were divided into the average residential block sizes) to be able to use the average purchase price rate.

4.4 Utility Adjustments

It is often difficult to ascertain potential costs of utilities on a project. Utility costs have been developed reviewing publicly available project estimates.
The following allowances have been made for utility adjustments:

- Adjust Utilities 3% of construction costs
- Project Management 3% of utility adjustment costs
- Sponsor 10% of project management costs

4.5 Infrastructure Construction

Infrastructure construction includes the production or construction of base infrastructure, environmental works, general activities and property adjustment.

For each option quantities were determined from the plans. The following allowances have been made for infrastructure construction:

- Length of road and pavement is the length of each option with the length of bridge structures removed. A cost per linear metre was developed reviewing publicly available strategic estimates prepared for Roads and Maritime Services for projects of a similar size.

- Length and area of bridges, the length of the bridges was measured from the planes based overlayed on aerial photography. Bridge widths are assumed to be 24m wide. A cost per square metre was developed reviewing publicly available strategic estimates prepared for Roads and Maritime Services for projects of a similar size.

- Intersections costs were based on the above road pavement rates with assumptions based on additional lanes per intersection for turning lanes and signal or roundabout configurations.

- Project Management 3% of construction costs
- Sponsor 10% of project management costs
- PA Insurance 1% of construction and utility adjustment costs

A summary of the infrastructure construction rates used for the designs elements for options is provided in Table 4.3.

Element	Unit	Rate $
Road (4 lane wide)	liner m	12,500
Intersections – 3-Way Junction	each	3,162,500
Intersection – 4 Way junction	each	4,100,000
Roundabout – 3 Way Junction	each	2,812,500
Roundabout – 4 Way Junction	each	3,750,000
Grade Separated Interchange	each	40,600,000
Bridge – Culverts	sq.m	2,500
Bridge – Structure	sq.m	4,205
Bridge - Viaduct	sq.m	7,250

Table 4.3

Summary Table 4.4 below provides a segmented breakdown (as per the segments shown in Appendix B) for the combination of construction and property acquisition costs. These combined costs exclude contingency and management fees i.e. are equivalent to the sum of line items 3(a), 5(a).1, 5(a).2 and 5(a).3 of the estimate summary sheet outputs.

Estimate Section	Option 1	Option 2a	Option 2b	Option 3	Option 4		Ocean Drive tie-in Maranatha Pl	Ocean Drive tie-in Greenmeadows Dr
A	41,727,625	41,727,625	41,727,625	41,727,625	41,727,625			
B	48,727,875	48,727,875		48,727,875				
C-1	28,359,000							
C-2			27,059,000					
C-3		19,009,750		19,009,750				
C-4			48,792,875		48,792,875			
C-5					16,546,500			
D		15,387,500						
E-1	74,359,500				74,359,500			
E-2		103,500,125	103,500,125					
E-3				75,329,000				
F-1	30,733,075				30,733,075			
		74,624,325	74,624,325					
F-3				79,292,950				
G-1	149,530,625				149,530,625			149,530,625
G-2		148,701,875	148,701,875					
G-3				148,763,500				
H-1	25,900,750				25,900,750			25,900,750

Table 4.4 – Continues on next page.

Estimate Section	Option 1	Option 2a	Option 2b	Option 3	Option 4		Ocean Drive tie-in Maranatha Pl	Ocean Drive tie-in Greenmeadows Dr
H-2		26,900,750	26,900,750					
H-3				24,400,750				
I-1	65,809,875	65,809,875	65,809,875		65,809,875			
I-3				68,068,875				
J	25,838,500	25,838,500	25,838,500	25,838,500	25,838,500			
K	13,076,000	13,076,000	13,076,000	13,076,000	13,076,000			
L-1	9,899,500				9,899,500			
L-2		15,501,000	15,501,000					
L-3				14,237,500				
M							225,027,375	
Total	**513,962,325**	**598,805,200**	**591,531,950**	**558,472,325**	**502,214,825**		**225,027,375**	**175,431,375**

Table 4.4

4.6 Finalisation

Finalisation costs includes all costs associated with the refurbishing the old route and project data and post completion review.

The "Refurbish old route" item makes allowance for items such as: new road site facilities, change/new signage for allowance of new works and tie–ins.

For this estimate "Project data and completion review" costs such as; preparation of maintenance manuals, satisfaction surveys as well as any documentation of project design/outputs/permits/ approvals that Council need to be recorded/managed is combined within the "Refurbish old route" item.

The following allowances have been made for finalisation:

- Refurbish old route — 1% of construction costs
- Project data and post completion review — 3% of refurbish old route costs
- Project Management — 3% of refurbish old route costs
- Sponsor — 10% of project management costs

4.7 Subsection and Segmental Costs

As noted in section 4.5 the cost estimate has been further split into subsections and segments, which are referenced on the option drawings located within Appendix B.

Summary Table 4.5 below provides a segmented breakdown (as per the segments shown in Appendix B) for the overall project costs i.e. all items excluding contingency, listed on the Estimate Summary Sheets;

- 1. Concept Development
- 2. Detail Design & Documentation
- 3. Property Acquisitions
- 4. Utility Adjustments
- 5. Infrastructure Construction
- 6. Finalisation

Estimate Section	Option 1	Option 2a	Option 2b	Option 3	Option 4		Ocean Drive tie-in Maranatha Pl	Ocean Drive tie-in Greenmeadows Dr
A	46,284,114	46,284,114	46,284,114	46,284,114	46,284,114			
B	54,022,524	54,022,524		54,022,524				
C-1	31,477,015							
C-2			29,976,787					
C-3		21,097,340		21,097,340				
C-4			54,167,039		54,167,039			
C-5					18,364,112			
D		17,024,575						
E-1	82,410,649				82,410,649			
E-2		114,659,527	114,659,527					
E-3				83,382,687				

Table 4.5 – Continues on next page.

Estimate Section	Option 1	Option 2a	Option 2b	Option 3	Option 4		Ocean Drive tie-in Maranatha Pl	Ocean Drive tie-in Greenmeadows Dr
F-1	34,064,425				34,064,425			
F-2		82,666,900	82,666,900					
F-3				87,816,393				
G-1	165,493,190				165,493,190			165,493,190
G-2		164,579,079	164,579,079					
G-3				164,647,051				
H-1	28,688,208				28,688,208			28,688,208
H-2		29,791,208	29,791,208					
H-3				27,033,708				
I-1	72,863,233	72,863,233	72,863,233		72,863,233			
I-3				75,354,910				
J	28,627,547	28,627,547	28,627,547	28,627,547	28,627,547			
K	14,485,202	14,485,202	14,485,202	14,485,202	14,485,202			
L-1	10,983,676				10,983,676			
L-2		17,183,184	17,183,184					
L-3				15,798,237				
M							248,919,692	
Total	**569,399,784**	**663,284,433**	**655,283,820**	**618,549,714**	**556,431,396**		**248,919,692**	**194,181,398**

Table 4.5

5 Contingency

From the RMS Project Estimating manual Contingency is generally defined as an unforeseen event (or risk). For estimating purposed, however, the RMS refers to contingency as 'the sum of money allocated for dealing with unforeseen events, including those such as quantities are more than anticipated.

Current RMS guidelines state that contingency allowance applied to Strategic Estimates is in the range of 35% to 70% and is dependent on the degree of certainty in items rate, quantity and design which would result in a reduction in the contingency applied to the Strategic Estimate.

A contingency sum (%) based on the assessment of risk involved with the major elements used for creating the strategic cost estimates has been incorporated i.e. property acquisition areas are more certain than utility adjustment costs and have a 40% contingency compared to 50%. Bridges have a contingency of 60% as they were measured using GIS data aerial imagery (length and longitudinal investigations have not been undertaken).

The average contingency for each option for the Project (including Ocean Rd tie-in via Greenmeadows Dr is 51%).

The contingency for the direct comparison of Ocean Drive tie-in North of Maranatha Pl and the Ocean Drive tie-in via Greenmeadows Dr is 50%-53%.

6 Conclusion

The strategic cost estimates for each option are provided based on the ultimate choice of a single complete option. These are outlined in Table 6.1 below. It is also noted that the cost estimates have been segmented further, parts of which can be reviewed in the Cost Estimating Spreadsheet.
Full estimate breakdowns have been rounded up to the nearest $25M as per RMS Project Estimating manual and further details of costs can be found in the spreadsheet outputs located in Appendix C.

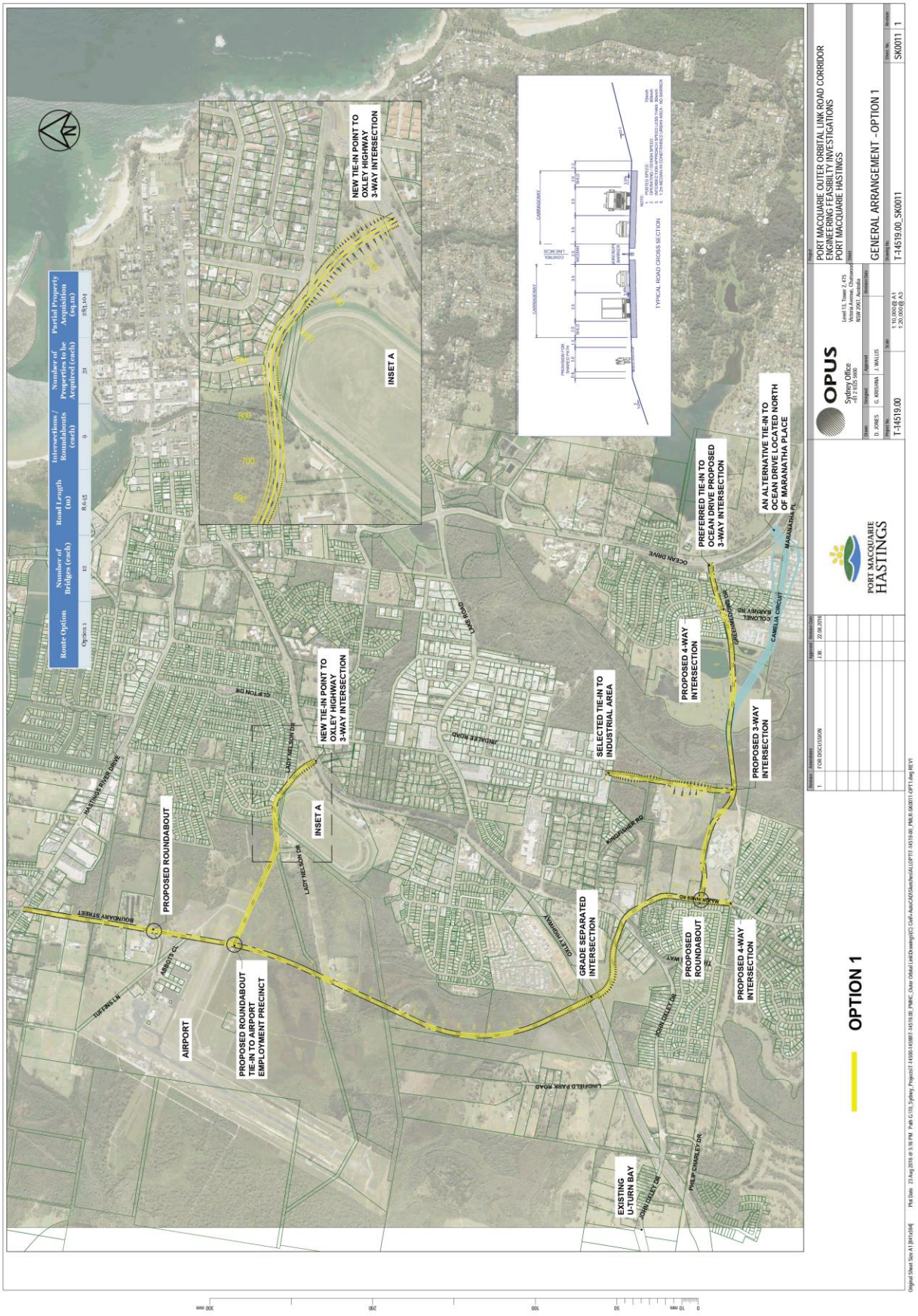
Route Option	Estimated Costs ($M) (incl contingency, Ex-GST)
Option 1	$875 M
Option 2a	$1,025 M
Option 2b	$1,000 M
Option 3	$950 M
Option 4	$850 M

Table 6.1

The cost estimates have been prepared in accordance with the guidelines contained in the RMS document, *Project Estimating*, for the "strategic" stage of the planning process.

Appendix A

Options Corridors – General Arrangement and individual route plans.


Route Option | Number of Bridges (each) | Road Length (m) | Intersections / Roundabouts (each) | Number of Properties to be Acquired (each) | Partial Property Acquisition (sq.m)
Option 1 | 12 | 8,615 | 9 | 23 | 283,104
PROPOSED ROUNDABOUT
PROPOSED ROUNDABOUT TIE-IN TO AIRPORT EMPLOYMENT PRECINCT
AIRPORT
NEW TIE-IN POINT TO OLD PACIFIC HIGHWAY 3-WAY INTERSECTION
INSET A
NEW TIE-IN POINT TO OLD PACIFIC HIGHWAY 3-WAY INTERSECTION
INSET A
GRADE SEPARATED INTERSECTION
SELECTED TIE-IN TO INDUSTRIAL AREA
PROPOSED 4-WAY INTERSECTION
PROPOSED 3-WAY INTERSECTION
PREFERRED TIE-IN TO OCEAN DRIVE PROPOSED 3-WAY INTERSECTION
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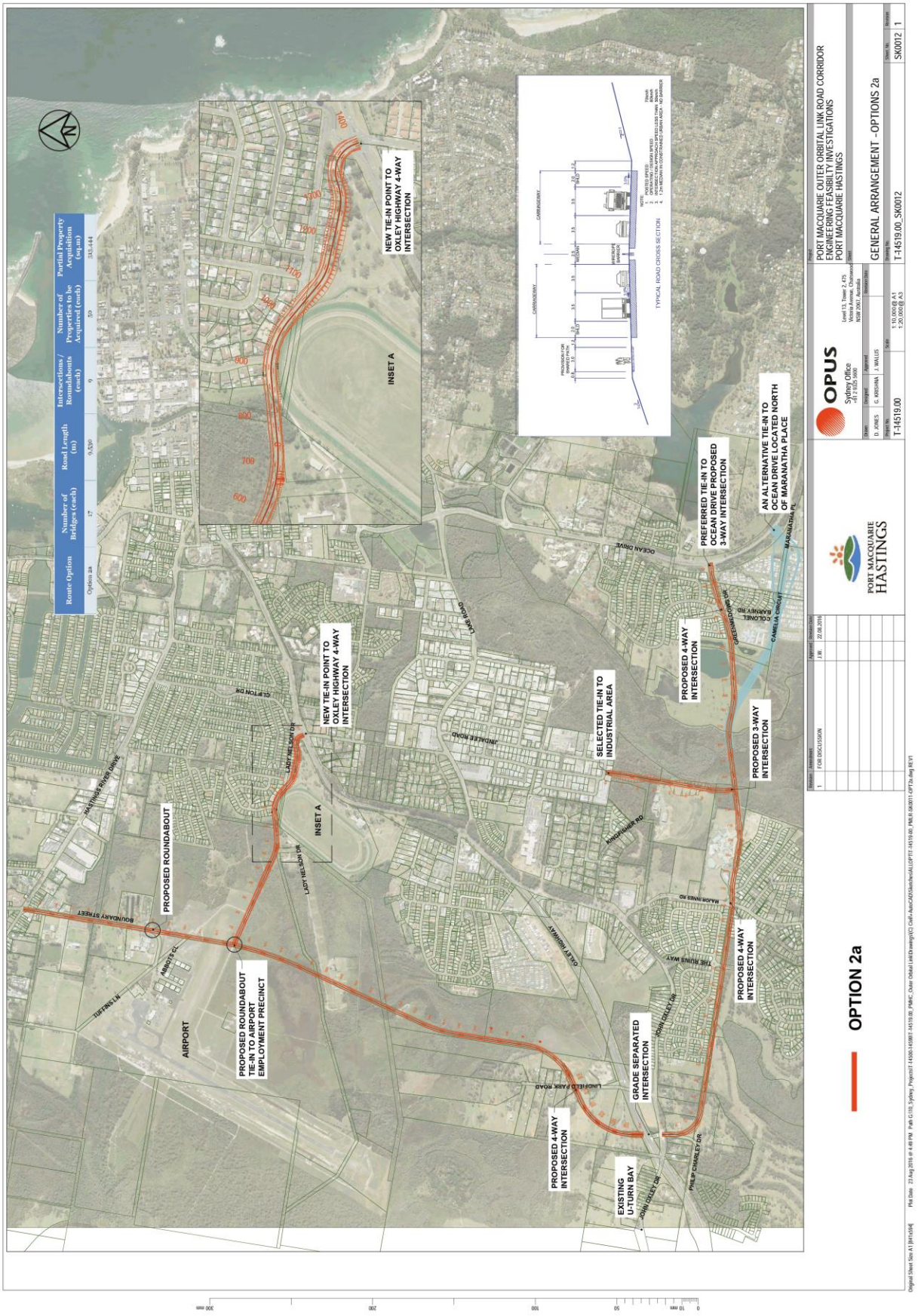
PORT MACQUARIE HASTINGS
PORT MACQUARIE OUTER ORBITAL LINK ROAD CORRIDOR
ENGINEERING FEASIBILITY INVESTIGATIONS
PORT MACQUARIE HASTINGS
GENERAL ARRANGEMENT - OPTION 1
T-14519.00
T-14519.00_SK0011
SK0011
OPTION 1


Route Option | Number of Bridges (each) | Road Length (m) | Intersections / Roundabouts (each) | Number of Properties to be Acquired (each) | Partial Property Acquisition (sq.m)
Option 2a | 17 | 9,830 | 9 | 30 | 333,444
NEW TIE-IN POINT TO OXLEY HIGHWAY 4-WAY INTERSECTION
INSET A
PROPOSED ROUNDABOUT
PROPOSED ROUNDABOUT TIE-IN TO AIRPORT EMPLOYMENT PRECINCT
AIRPORT
SELECTED TIE-IN TO INDUSTRIAL AREA
PROPOSED 4-WAY INTERSECTION
PROPOSED 3-WAY INTERSECTION
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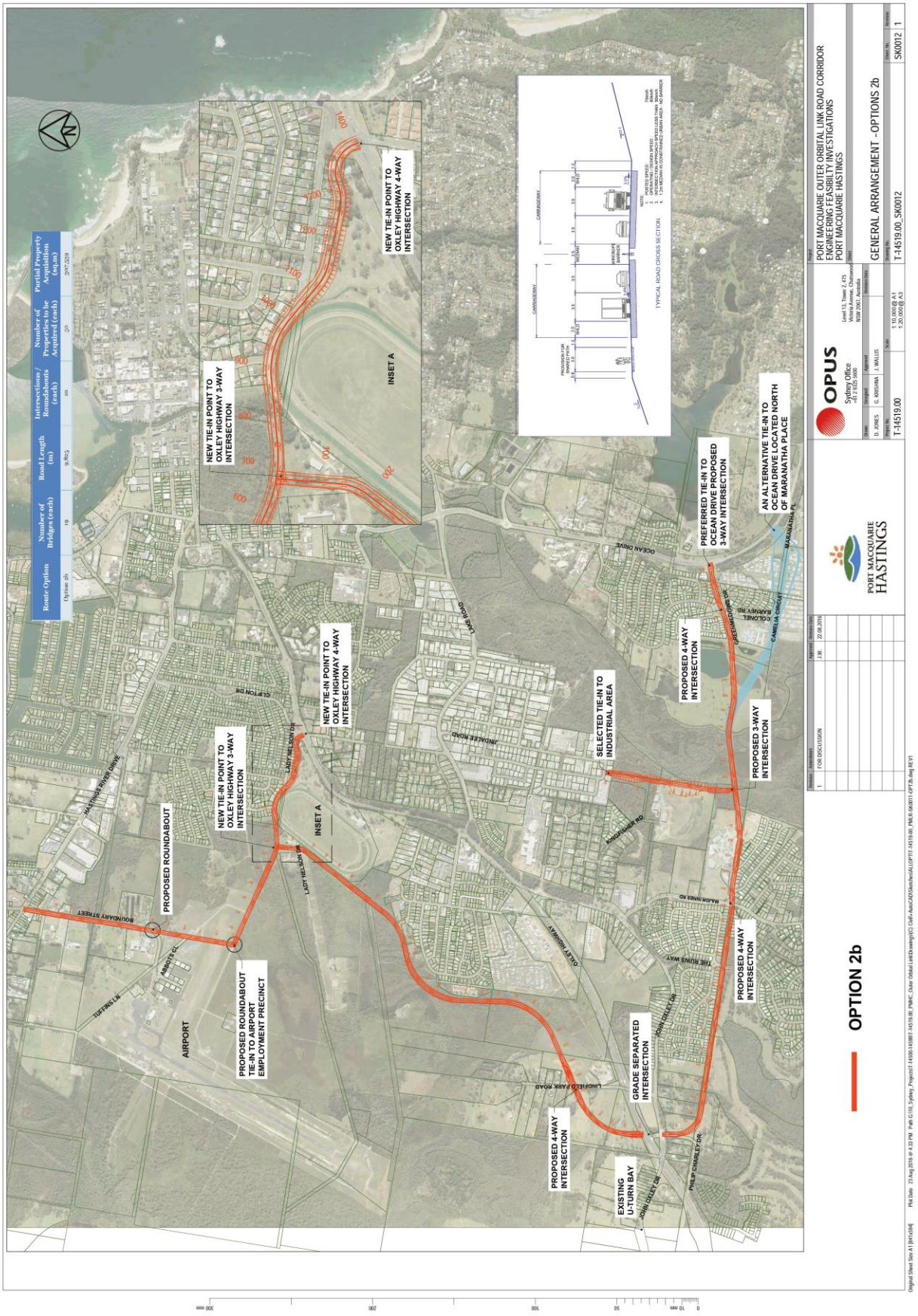
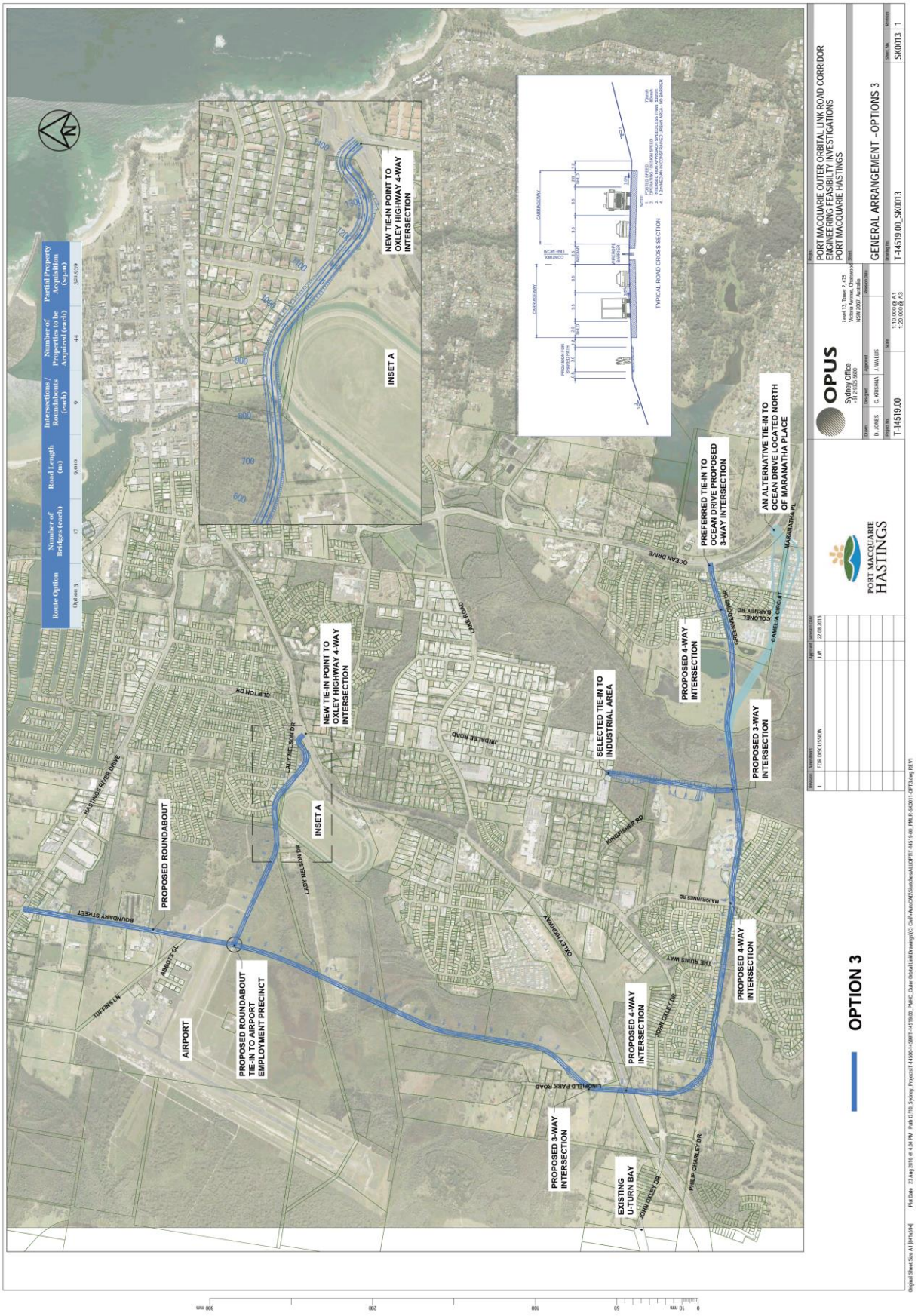
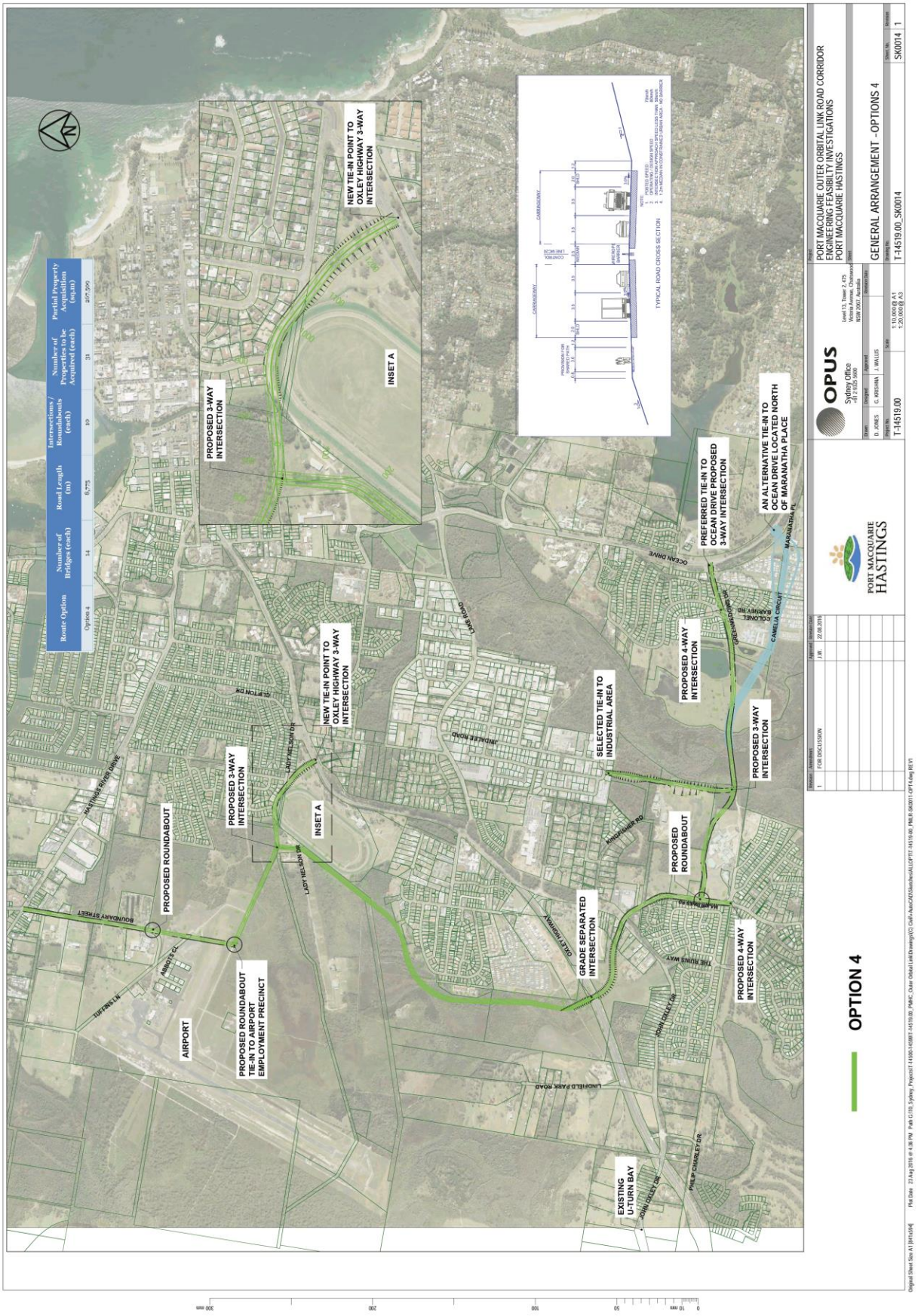
GRADE SEPARATED INTERSECTION
EXISTING U-TURN BAY
OPTION 2a
TYPICAL ROAD CROSS SECTION
PORT MACQUARIE OUTER ORBITAL LINK ROAD CORRIDOR
ENGINEERING FEASIBILITY INVESTIGATIONS
PORT MACQUARIE HASTINGS
GENERAL ARRANGEMENT - OPTIONS 2a
T-14519.00_SK0012
SK0012
OPUS
Sydney Office
PORT MACQUARIE HASTINGS


Route Option
Number of Bridges (each)
Road Length (m)
Intersections / Roundabouts (each)
Number of Properties to be Acquired (each)
Partial Property Acquisition (sq.m)
Option 2b
19
9,865
10
50
397,539
NEW TIE-IN POINT TO OXLEY HIGHWAY 4-WAY INTERSECTION
NEW TIE-IN POINT TO OXLEY HIGHWAY 3-WAY INTERSECTION
INSET A
PROPOSED ROUNDABOUT
PROPOSED ROUNDABOUT TIE-IN TO AIRPORT EMPLOYMENT PRECINCT
AIRPORT
PREFERRED TIE-IN TO OCEAN DRIVE PROPOSED 3-WAY INTERSECTION
AN ALTERNATIVE TIE-IN TO OCEAN DRIVE LOCATED NORTH OF MARANATHA PLACE
PROPOSED 4-WAY INTERSECTION
SELECTED TIE-IN TO INDUSTRIAL AREA
PROPOSED 3-WAY INTERSECTION
GRADE SEPARATED INTERSECTION
EXISTING U-TURN BAY
OPTION 2b
TYPICAL ROAD CROSS SECTION
PORT MACQUARIE OUTER ORBITAL LINK ROAD CORRIDOR
ENGINEERING FEASIBILITY INVESTIGATIONS
PORT MACQUARIE HASTINGS
GENERAL ARRANGEMENT - OPTIONS 2b
OPUS
Sydney Office
T-14519.00
T-14519.00_SK0012
SK0012
1
FOR DISCUSSION
J.W.
22.08.2016



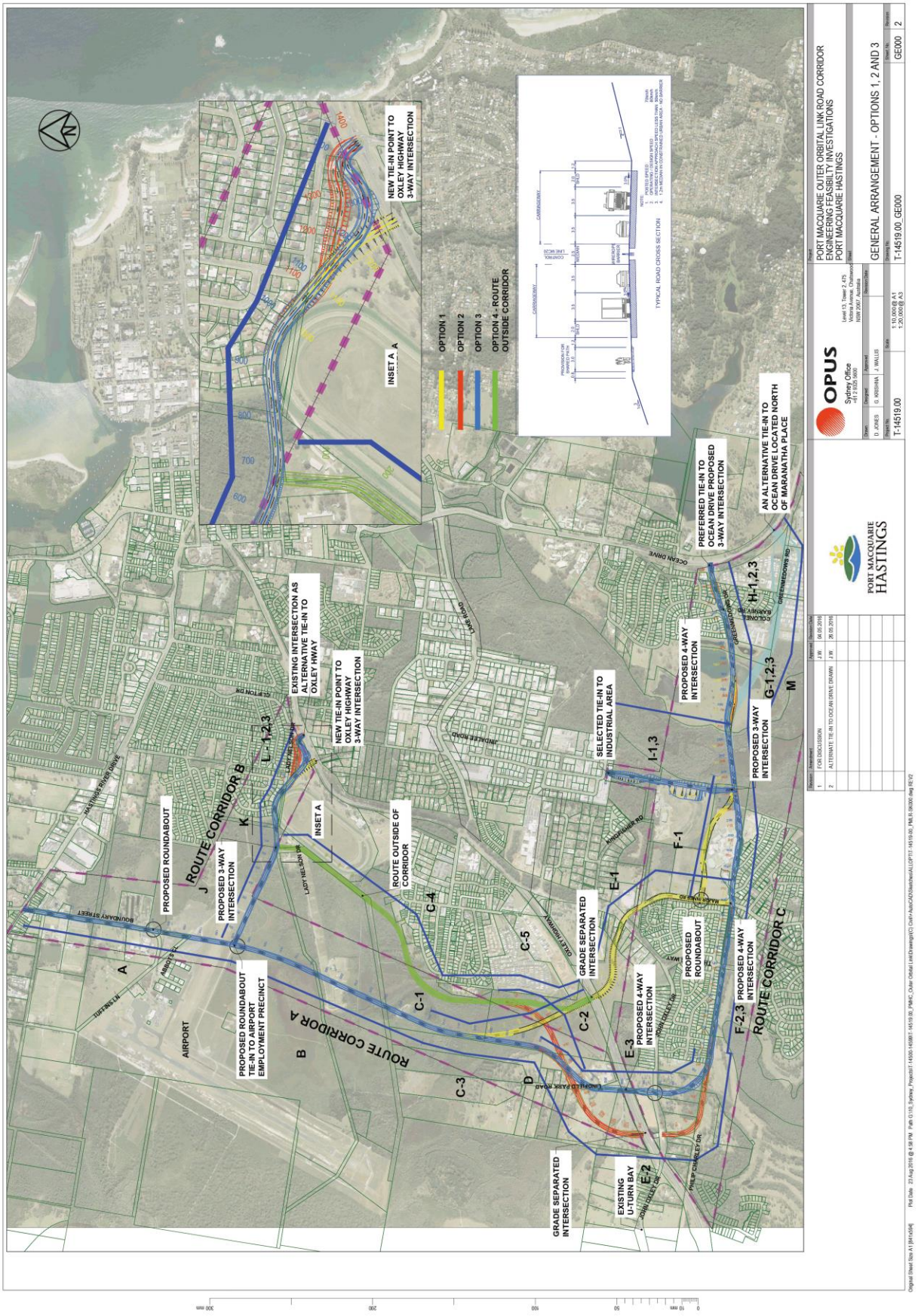
Route Option	Number of Bridges (each)	Road Length (m)	Intersections / Roundabouts (each)	Number of Properties to be Acquired (each)	Partial Property Acquisition (sqm)
Option 3	17	9,013	9	44	5,815,939

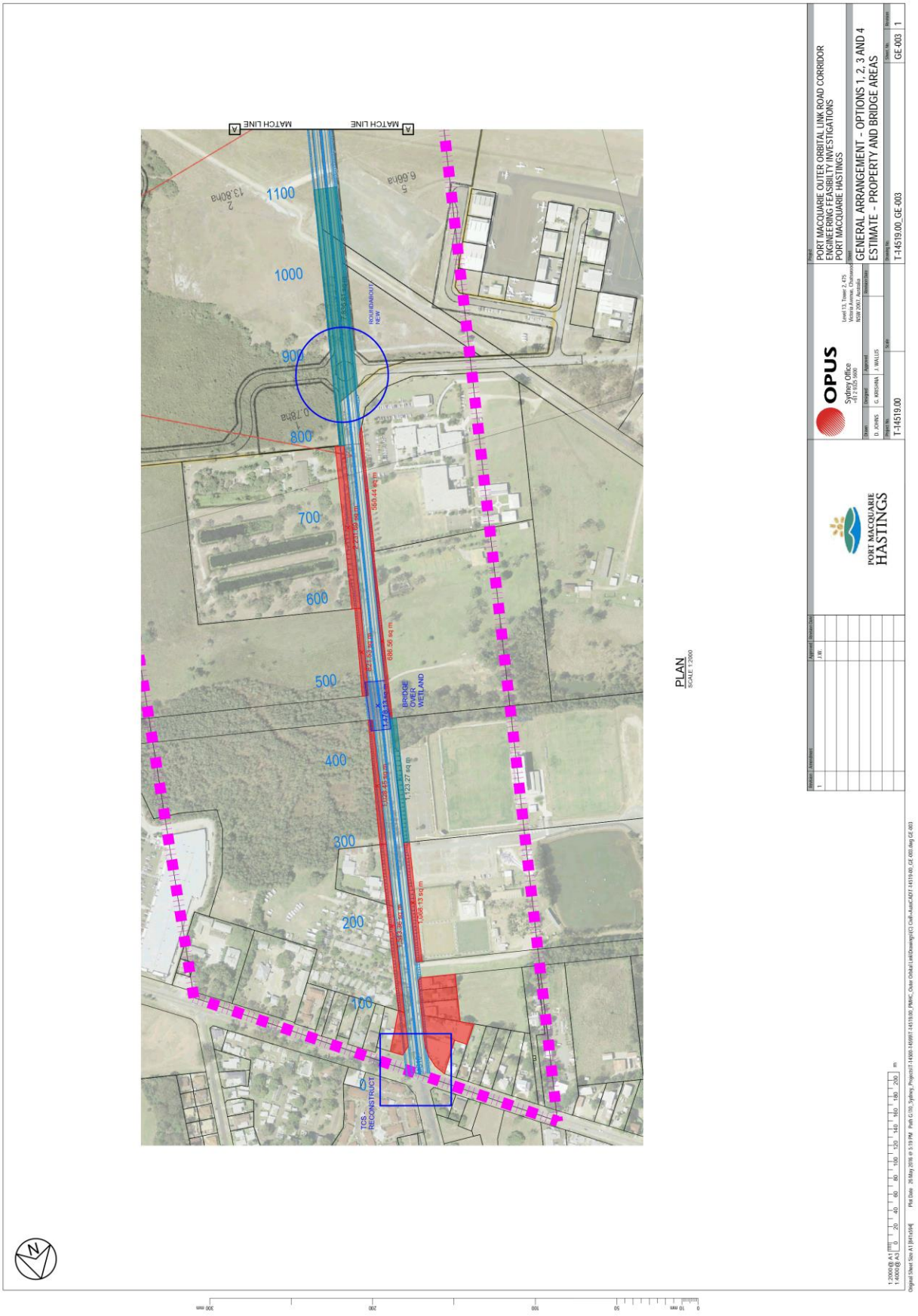

Route Option | Number of Bridges (each) | Road Length (m) | Intersections / Roundabouts (each) | Number of Properties to be Acquired (each) | Partial Property Acquisition (sq.m)
Option 4 | 14 | 8,775 | 19 | 31 | 267,990
PROPOSED 3-WAY INTERSECTION
NEW TIE-IN POINT TO OXLEY HIGHWAY 3-WAY INTERSECTION
INSET A
TYPICAL ROAD CROSS SECTION
PROPOSED ROUNDABOUT
PROPOSED ROUNDABOUT TIE-IN TO AIRPORT EMPLOYMENT PRECINCT
AIRPORT
PROPOSED 3-WAY INTERSECTION
INSET A
NEW TIE-IN POINT TO OXLEY HIGHWAY 3-WAY INTERSECTION
SELECTED TIE-IN TO INDUSTRIAL AREA
GRADE SEPARATED INTERSECTION
PROPOSED ROUNDABOUT
PROPOSED 4-WAY INTERSECTION
PROPOSED 3-WAY INTERSECTION
PROPOSED 4-WAY INTERSECTION
PREFERRED TIE-IN TO OCEAN DRIVE PROPOSED 3-WAY INTERSECTION
AN ALTERNATIVE TIE-IN TO OCEAN DRIVE LOCATED NORTH OF MARANATHA PLACE
EXISTING U-TURN BAY
OPTION 4
OPUS
PORT MACQUARIE HASTINGS
PORT MACQUARIE OUTER ORBITAL LINK ROAD CORRIDOR
ENGINEERING FEASIBILITY INVESTIGATIONS
PORT MACQUARIE HASTINGS
GENERAL ARRANGEMENT - OPTIONS 4
T-14519.00_SK0014

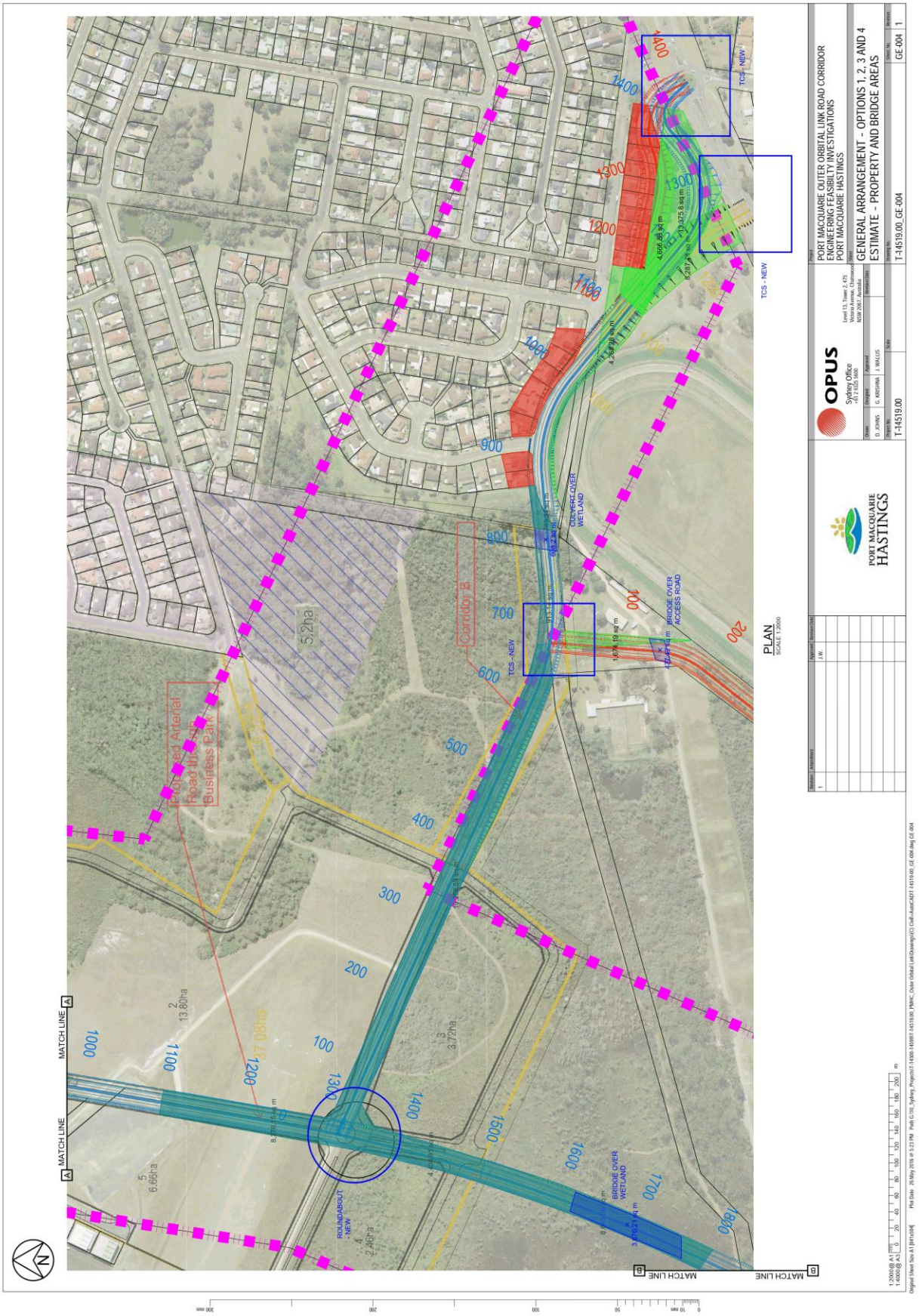
Appendix B

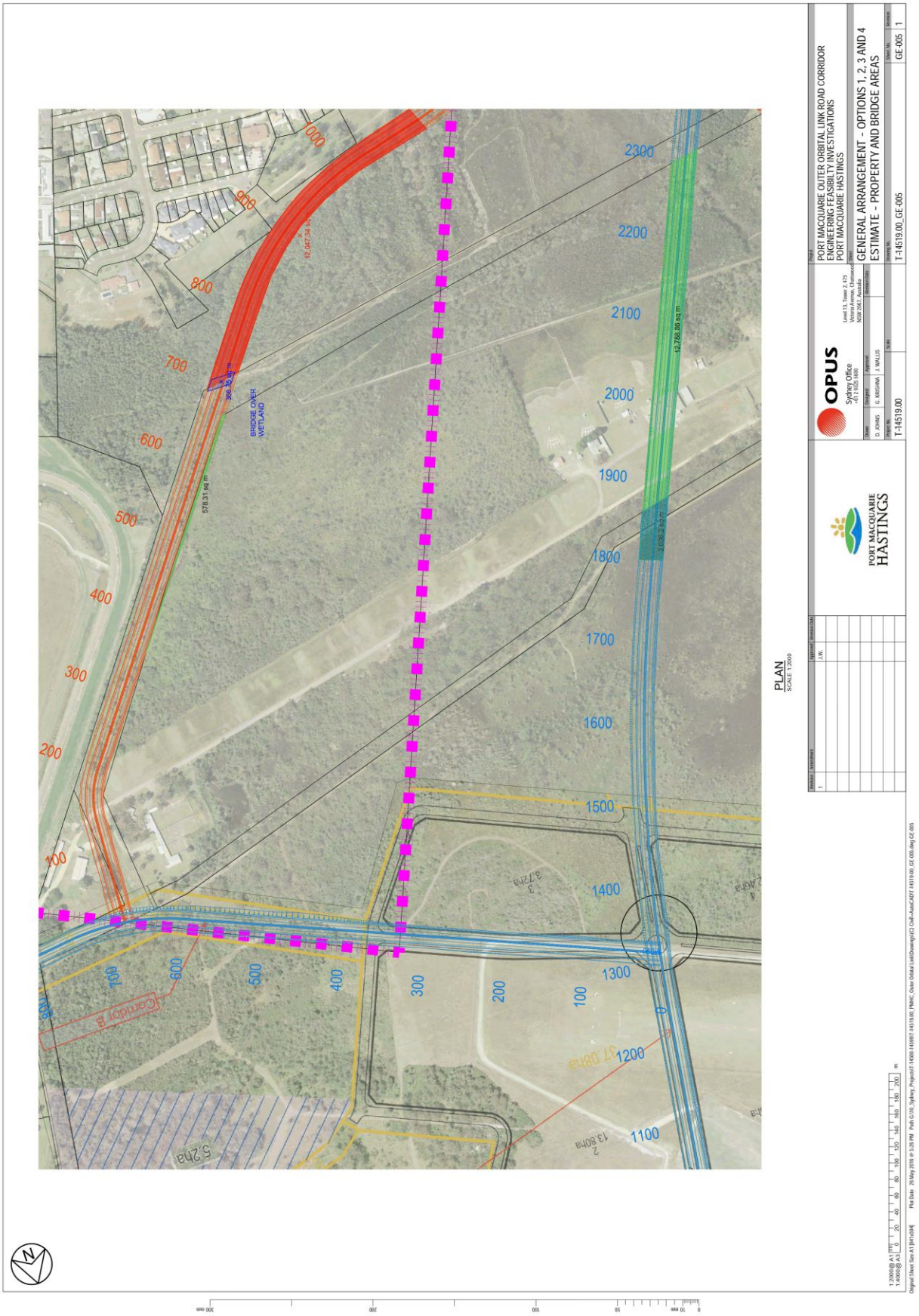
Corridor segmentation sketch

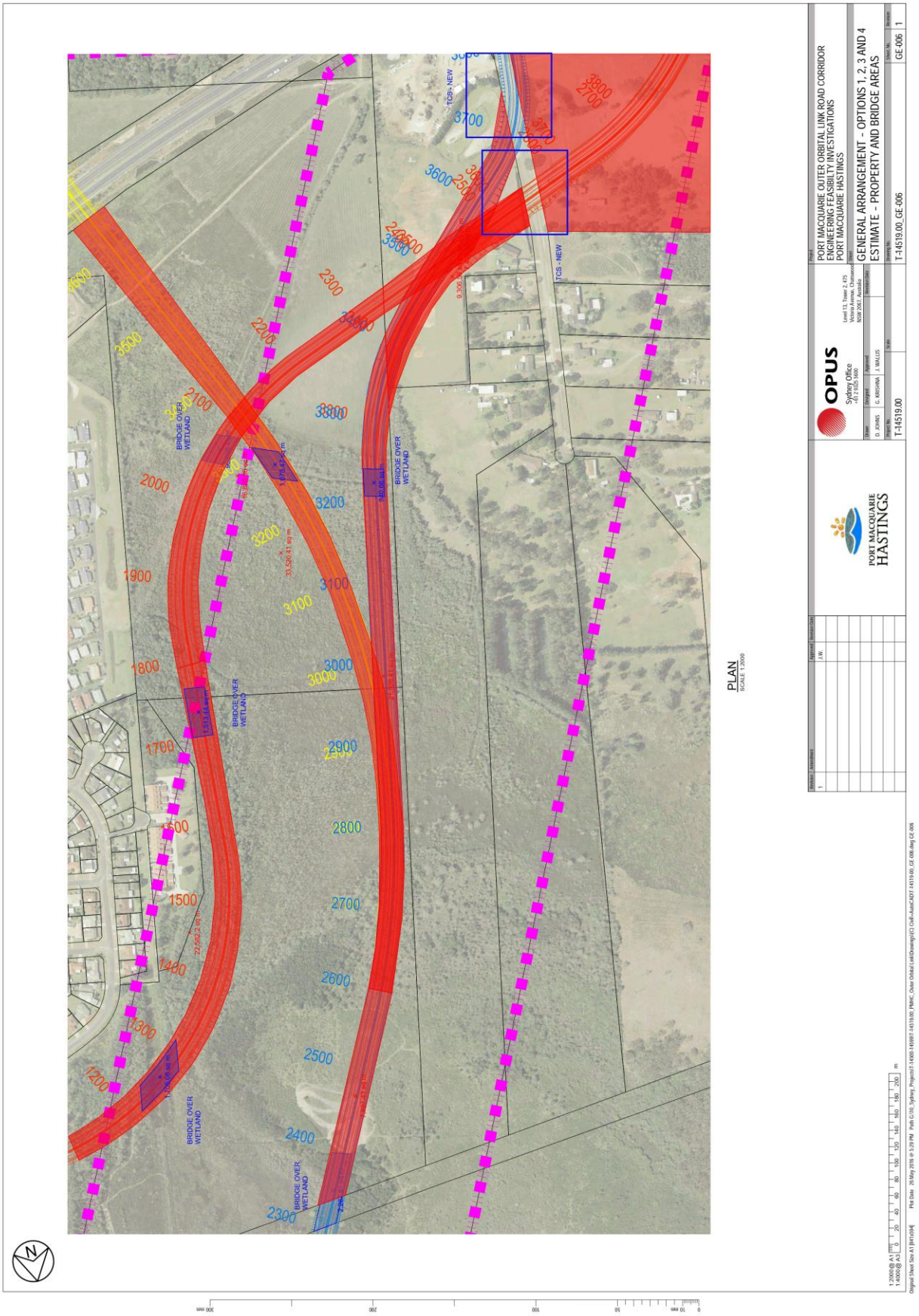
Estimate "areas" sketches.

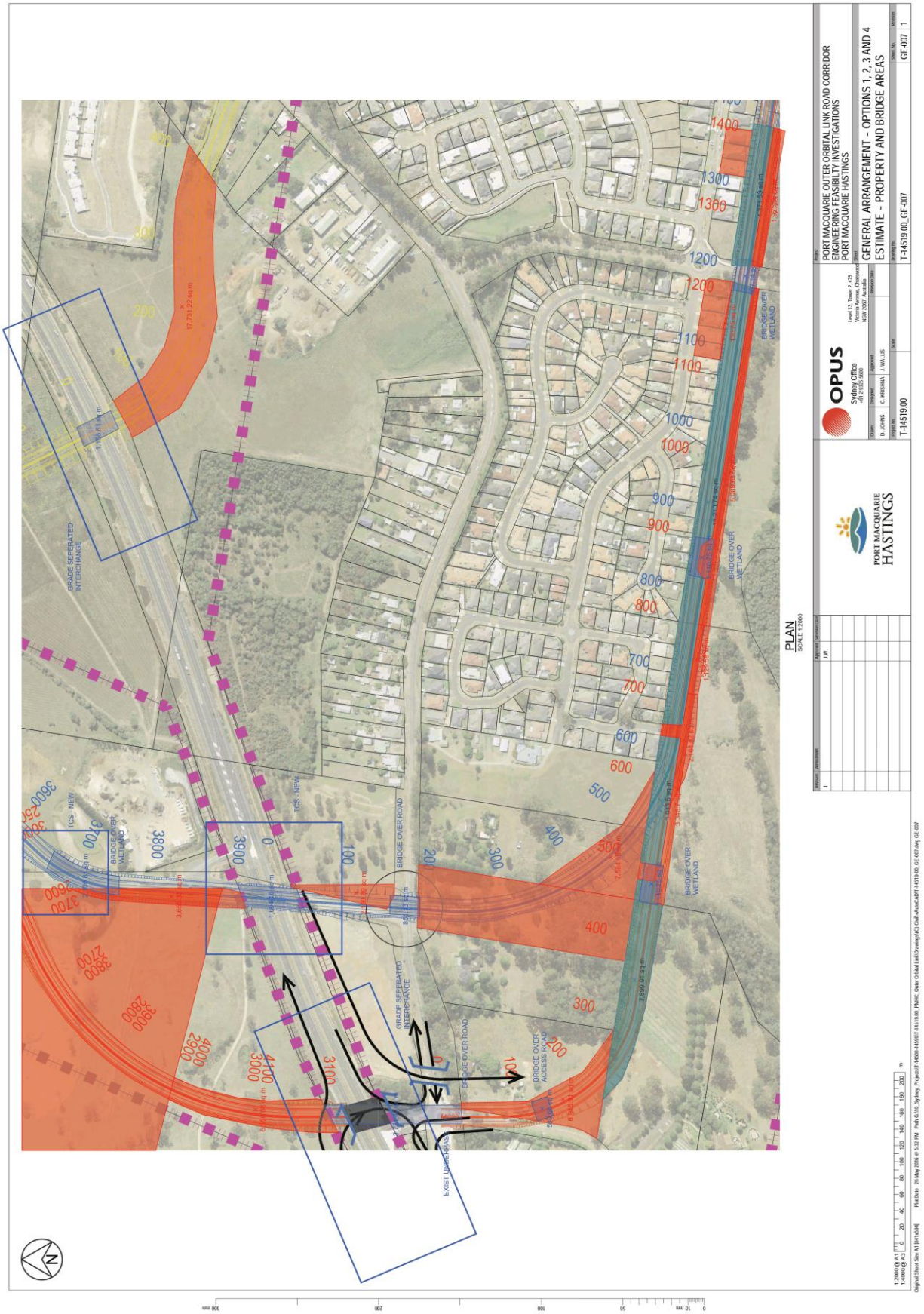

PORT MACQUARIE OUTER ORBITAL LINK ROAD CORRIDOR
ENGINEERING FEASIBILITY INVESTIGATIONS
PORT MACQUARIE HASTINGS
GENERAL ARRANGEMENT - OPTIONS 1, 2 AND 3
T-14519.00_GE000
GE000
OPUS
Sydney Office
PORT MACQUARIE HASTINGS
OPTION 1
OPTION 2
OPTION 3
OPTION 4 - ROUTE OUTSIDE CORRIDOR
INSET A
NEW TIE-IN POINT TO OXLEY HIGHWAY 3-WAY INTERSECTION
EXISTING INTERSECTION AS ALTERNATIVE TIE-IN TO OXLEY HWAY
PROPOSED ROUNDABOUT
PROPOSED 3-WAY INTERSECTION
ROUTE CORRIDOR B
ROUTE CORRIDOR A
ROUTE CORRIDOR C
ROUTE OUTSIDE OF CORRIDOR
PROPOSED ROUNDABOUT TIE-IN TO AIRPORT EMPLOYMENT PRECINCT
AIRPORT
GRADE SEPARATED INTERSECTION
EXISTING U-TURN BAY
PROPOSED 4-WAY INTERSECTION
PREFERRED TIE-IN TO OCEAN DRIVE PROPOSED 3-WAY INTERSECTION
AN ALTERNATIVE TIE-IN TO OCEAN DRIVE LOCATED NORTH OF MARANATHA PLACE
SELECTED TIE-IN TO INDUSTRIAL AREA
TYPICAL ROAD CROSS SECTION

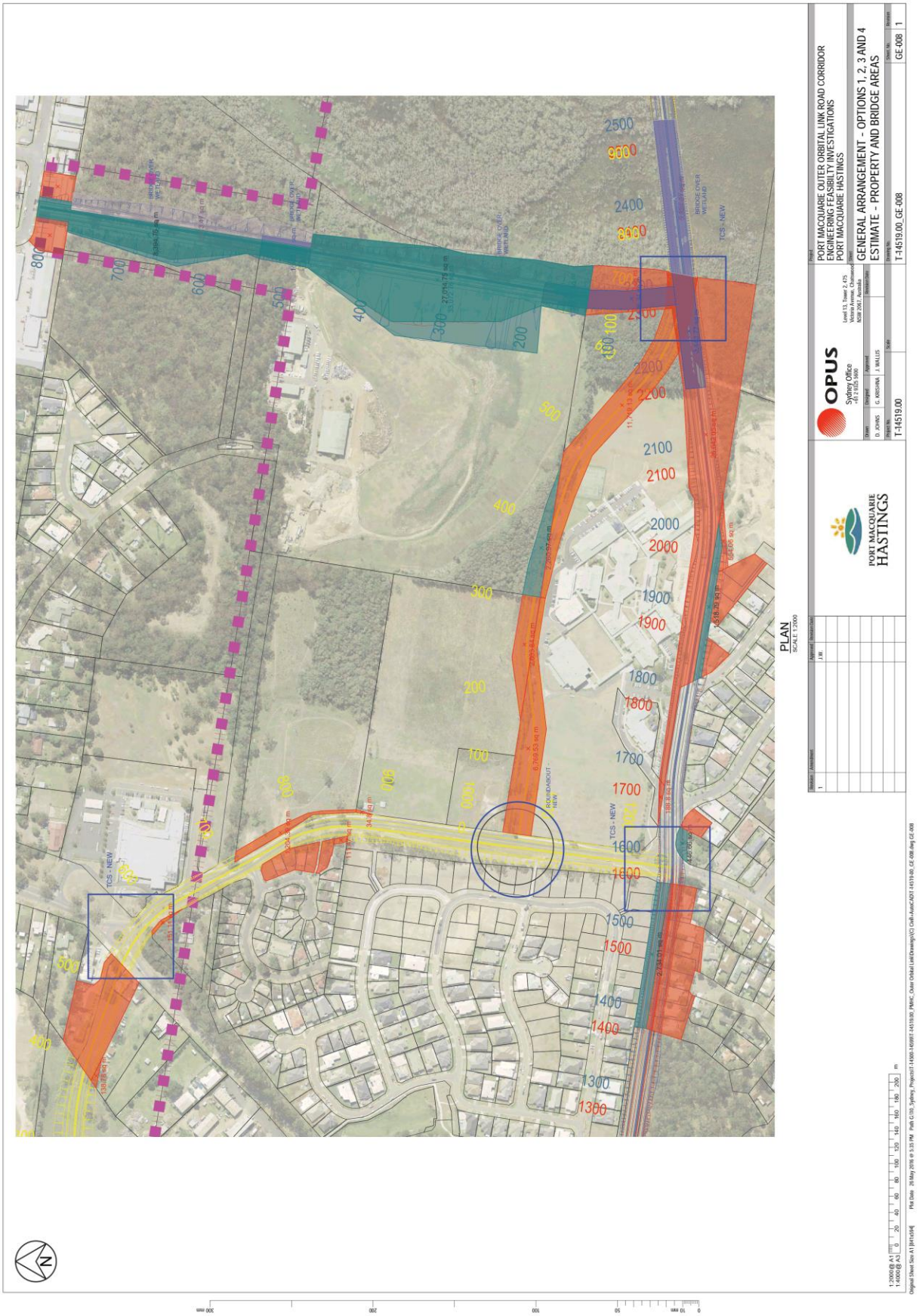

PORT MACQUARIE OUTER ORBITAL LINK ROAD CORRIDOR
ENGINEERING FEASIBILITY INVESTIGATIONS
PORT MACQUARIE HASTINGS
GENERAL ARRANGEMENT - OPTIONS 1, 2, 3 AND 4
ESTIMATE - PROPERTY AND BRIDGE AREAS
T-14519.00_GE-003
GE-003
1
OPUS
Sydney Office
PORT MACQUARIE HASTINGS
PLAN
SCALE 1:2000
MATCH LINE
BRIDGE OVER WETLAND
ROUNDABOUT NEW
TCS - RECONSTRUCT
1100
1000
900
800
700
600
500
400
300
200
100
0

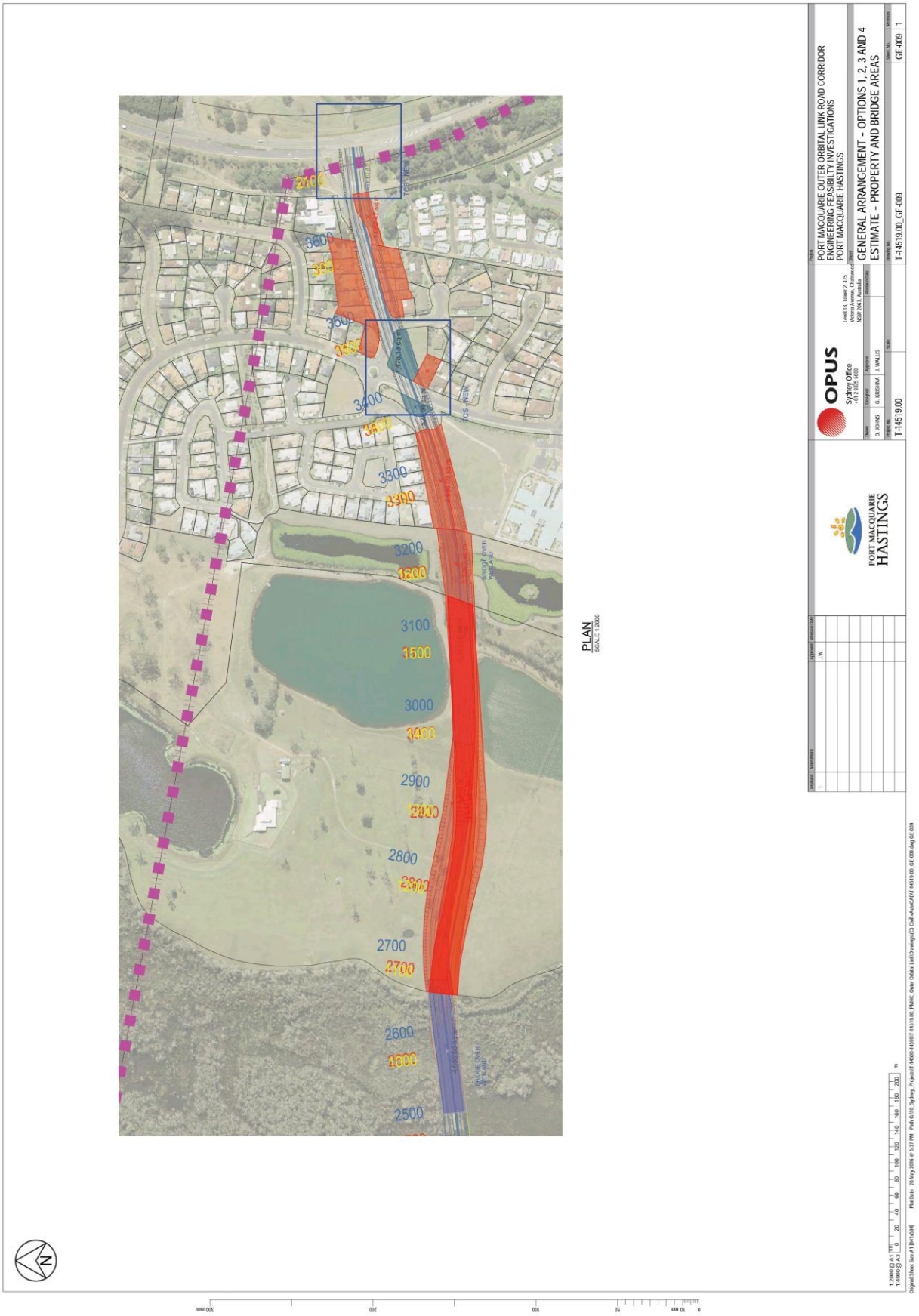

PORT MACQUARIE OUTER ORBITAL LINK ROAD CORRIDOR
ENGINEERING FEASIBILITY INVESTIGATIONS
PORT MACQUARIE HASTINGS
GENERAL ARRANGEMENT - OPTIONS 1, 2, 3 AND 4
ESTIMATE - PROPERTY AND BRIDGE AREAS
T-14519.00_GE-004
GE-004
OPUS
Sydney Office
PORT MACQUARIE HASTINGS
PLAN
SCALE 1:2000
Corridor B
Proposed Arterial Road through Business Park
5.2ha
CULVERT OVER WETLAND
BRIDGE OVER ACCESS ROAD
BRIDGE OVER WETLAND
ROUNDABOUT NEW
TCS - NEW
MATCH LINE


PORT MACQUARIE OUTER ORBITAL LINK ROAD CORRIDOR
ENGINEERING FEASIBILITY INVESTIGATIONS
PORT MACQUARIE HASTINGS
GENERAL ARRANGEMENT - OPTIONS 1, 2, 3 AND 4
ESTIMATE - PROPERTY AND BRIDGE AREAS
T-14519.00_GE-005
GE-005
OPUS
Sydney Office
PORT MACQUARIE HASTINGS
PLAN
SCALE 1:2000
BRIDGE OVER WETLAND
Corridor B
578.31 sq m
12,788.88 sq m
2,038.2 sq m
12,047.34 sq m
3.72ha
37.08ha
13.80ha
5.2ha


PORT MACQUARIE OUTER ORBITAL LINK ROAD CORRIDOR
ENGINEERING FEASIBILITY INVESTIGATIONS
PORT MACQUARIE HASTINGS
GENERAL ARRANGEMENT - OPTIONS 1, 2, 3 AND 4
ESTIMATE - PROPERTY AND BRIDGE AREAS
T-14519.00_GE-006
GE-006
OPUS
Sydney Office
PORT MACQUARIE HASTINGS
PLAN
SCALE 1:2000
BRIDGE OVER WETLAND
TCS - NEW


PORT MACQUARIE OUTER ORBITAL LINK ROAD CORRIDOR
ENGINEERING FEASIBILITY INVESTIGATIONS
PORT MACQUARIE HASTINGS
GENERAL ARRANGEMENT - OPTIONS 1, 2, 3 AND 4
ESTIMATE - PROPERTY AND BRIDGE AREAS
T-14519.00_GE-007
GE-007
OPUS
Sydney Office
PORT MACQUARIE HASTINGS
PLAN
SCALE 1:2000
GRADE SEPERATED INTERCHANGE
BRIDGE OVER WETLAND
BRIDGE OVER ROAD
BRIDGE OVER ACCESS ROAD
EXIST UNDERPASS
TCS - NEW


PORT MACQUARIE OUTER ORBITAL LINK ROAD CORRIDOR
ENGINEERING FEASIBILITY INVESTIGATIONS
PORT MACQUARIE HASTINGS
GENERAL ARRANGEMENT - OPTIONS 1, 2, 3 AND 4
ESTIMATE - PROPERTY AND BRIDGE AREAS
T-14519.00_GE-008
GE-008
1
OPUS
Sydney Office
PORT MACQUARIE HASTINGS
PLAN
SCALE 1:2000
TCS - NEW
ROUNDABOUT - NEW
BRIDGE OVER WETLAND


PLAN
SCALE 1:2000
2100
3600
3500
3400
3300
3200
3100
3000
2900
2800
2700
2600
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1500
1600
1700
1800
1900
2000
2100
2200
2300
2400
2500
2600
2700
2800
2900
3000
3100
3200
3300
3400
3500
3600
PORT MACQUARIE OUTER ORBITAL LINK ROAD CORRIDOR
ENGINEERING FEASIBILITY INVESTIGATIONS
PORT MACQUARIE HASTINGS
GENERAL ARRANGEMENT - OPTIONS 1, 2, 3 AND 4
ESTIMATE - PROPERTY AND BRIDGE AREAS
OPUS
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Level 13, Tower 2, 475
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NSW 2067, Australia
D. JOHNS
G. KRISHNA
J. WALLIS
T-14519.00
T-14519.00_GE-009
GE-009
1
PORT MACQUARIE
HASTINGS
J.W.

Appendix C

RMS Spreadsheet Summary Outputs.

Estimate Summary Sheet

Project: Port macquarie Hastings Council - Outer Orbital Link - Option 1 (Yellow)

Project No: T-14519.00

Estimate Prepared by: S.G
Quantities Prepared by: S.G
Design Prepared by: G.K
Date: 25/08/2016
Estimate Type: Strategic

Item	Base Estimate (excluding contingency)	Contingency %	Amount	Estimate (including contingency)	% of Total Estimate	Comments/ Assumptions
1. Concept Development						
1 (a) Route/Concept/EIS	$3,628,425	50%	$1,814,213	$5,442,638		
1 (b) Project Management Services	$108,853	40%	$43,541	$152,394		
1 (c) Sponsor	$10,885	40%	$4,354	$15,239		
1 (d) Community Liaison	$362,843	50%	$181,421	$544,264		
Sub total	$4,111,006	50%	$2,043,529	$6,154,534	0.72%	
2. Detail Design & Documentation						
2 (a) Investigation and Design	$7,256,850	50%	$3,628,425	$10,885,275		
2 (b) Project Management Services	$217,706	40%	$87,082	$304,788		
2 (c) Sponsor	$21,771	40%	$8,708	$30,479		
Sub total	$7,496,326	50%	$3,724,215	$11,220,541	1.31%	
3. Property Acquisitions						
3 (a) Acquire Property	$151,119,825	40%	$60,447,930	$211,567,755		
3 (b) Professional Services for Property	$10,578,388	40%	$4,231,355	$14,809,743		
3 (c) Project Management Services	$4,533,595	40%	$1,813,438	$6,347,033		
3 (d) Sponsor	$453,359	40%	$181,344	$634,703		
Sub total	$166,685,167	40%	$66,674,067	$233,359,234	27.14%	
4. Utility Adjustments						
4 (a) Adjust Utilities	$10,885,275	50%	$5,442,638	$16,327,913		
4 (b) Project Management Services	$326,558	40%	$130,623	$457,182		
4 (c) Sponsor	$32,656	40%	$13,062	$45,718		
Sub total	$11,244,489	50%	$5,586,323	$16,830,812	1.96%	
5. Infrastructure Construction						
5(a).1 Infrastructure - Road	$108,062,500	55%	$59,434,375	$167,496,875		
5(a).2 Infrastructure - Bridges	$186,180,000	60%	$111,708,000	$297,888,000		
5(a).3 Infrastructure - Intersections	$68,600,000	50%	$34,300,000	$102,900,000		
5(d) Project Management Services	$10,885,275	40%	$4,354,110	$15,239,385		
5(e) Sponsor	$1,088,528	30%	$326,558	$1,415,086		
5(f) PA Insurance	$1,189,478	50%	$594,739	$1,784,217		
Sub total	$376,005,780	56%	$210,717,782	$586,723,562	68.25%	
6. Finalisation						
6 (a) Refurbish old route	$3,628,425	40%	$1,451,370	$5,079,795		
6 (b) Project data and post completion review	$108,853	40%	$43,541	$152,394		
6 (c) Project Management Services	$108,853	40%	$43,541	$152,394		
6 (d) Sponsor	$10,885	40%	$4,354	$15,239		
Sub total	$3,857,016	40%	$1,542,806	$5,399,822	0.63%	
TOTAL	**$569,399,784**	**51%**	**$290,288,723**	**$859,688,506**	100.00%	

Project Management:	$16,180,839	40	$6,472,336	$22,653,174.60	3%
Sponsor:	$1,618,084	33%	$538,381	$2,156,464.71	0.25%

Length of the Project:	8.6	km
	34.6	lane-km
Deck Area	1,285	m
	30,840.0	sq.m

Estimate Summary Sheet

Project: Port macquarie Hastings Council - Outer Orbital Link - Option 2a (Red) (Based on Blue Option)

Project No: T-14519.00

Estimate Prepared by: S.G
Quantities Prepared by: S.G
Design Prepared by: G.K
Date: 25/08/2016
Estimate Type: Strategic

Item	Base Estimate (excluding contingency)	Contingency %	Amount	Estimate (including contingency)	% of Total Estimate	Comments/ Assumptions
1. Concept Development						
1 (a) Route/Concept/EIS	$4,120,325	50%	$2,060,163	$6,180,488		
1 (b) Project Management Services	$123,610	40%	$49,444	$173,054		
1 (c) Sponsor	$12,361	40%	$4,944	$17,305		
1 (d) Community Liaison	$412,033	50%	$206,016	$618,049		
Sub total	$4,668,328	50%	$2,320,567	$6,988,895	0.70%	
2. Detail Design & Documentation						
2 (a) Investigation and Design	$8,240,650	50%	$4,120,325	$12,360,975		
2 (b) Project Management Services	$247,220	40%	$98,888	$346,107		
2 (c) Sponsor	$24,722	40%	$9,889	$34,611		
Sub total	$8,512,591	50%	$4,229,102	$12,741,693	1.27%	
3. Property Acquisitions						
3 (a) Acquire Property	$186,772,700	40%	$74,709,080	$261,481,780		
3 (b) Professional Services for Property	$13,074,089	40%	$5,229,636	$18,303,725		
3 (c) Project Management Services	$5,603,181	40%	$2,241,272	$7,844,453		
3 (d) Sponsor	$560,318	40%	$224,127	$784,445		
Sub total	$206,010,288	40%	$82,404,115	$288,414,403	28.82%	
4. Utility Adjustments						
4 (a) Adjust Utilities	$12,360,975	50%	$6,180,488	$18,541,463		
4 (b) Project Management Services	$370,829	40%	$148,332	$519,161		
4 (c) Sponsor	$37,083	40%	$14,833	$51,916		
Sub total	$12,768,887	50%	$6,343,652	$19,112,540	1.91%	
5. Infrastructure Construction						
5(a).1 Infrastructure - Road	$119,125,000	55%	$65,518,750	$184,643,750		
5(a).2 Infrastructure - Bridges	$223,020,000	60%	$133,812,000	$356,832,000		
5(a).3 Infrastructure - Intersections	$69,887,500	50%	$34,943,750	$104,831,250		
5(d) Project Management Services	$12,360,975	40%	$4,944,390	$17,305,365		
5(e) Sponsor	$1,236,098	30%	$370,829	$1,606,927		
5(f) PA Insurance	$1,314,860	50%	$657,430	$1,972,290		
Sub total	$426,944,432	56%	$240,247,149	$667,191,581	66.68%	
6. Finalisation						
6 (a) Refurbish old route	$4,120,325	40%	$1,648,130	$5,768,455		
6 (b) Project data and post completion review.	$123,610	40%	$49,444	$173,054		
6 (c) Project Management Services	$123,610	40%	$49,444	$173,054		
6 (d) Sponsor	$12,361	40%	$4,944	$17,305		
Sub total	$4,379,905	40%	$1,751,962	$6,131,868	0.61%	
TOTAL	**$663,284,433**	**51%**	**$337,296,548**	**$1,000,580,980**	100.00%	

Project Management:	$18,829,424	40	$7,531,770	$26,361,193.95	3%
Sponsor:	$1,882,942	33%	$629,567	$2,512,509.65	0.25%

Length of the Project: 9.5 km
38.1 lane-km

Estimate Summary Sheet

Project: Port macquarie Hastings Council - Outer Orbital Link - Option 2 (Red) (Based on Green Option)

Project No: T-14519.00

Estimate Prepared by: S.G
Quantities Prepared by: S.G
Design Prepared by: G.K
Date: 25/08/2016
Estimate Type: Strategic

Item	Base Estimate (excluding contingency)	Contingency %	Amount	Estimate (including contingency)	% of Total Estimate	Comments/ Assumptions
1. Concept Development						
1 (a) Route/Concept/EIS	$4,081,725	50%	$2,040,863	$6,122,588		
1 (b) Project Management Services	$122,452	40%	$48,981	$171,432		
1 (c) Sponsor	$12,245	40%	$4,898	$17,143		
1 (d) Community Liaison	$408,173	50%	$204,086	$612,259		
Sub total	$4,624,594	50%	$2,298,828	$6,923,422	0.70%	
2. Detail Design & Documentation						
2 (a) Investigation and Design	$8,163,450	50%	$4,081,725	$12,245,175		
2 (b) Project Management Services	$244,904	40%	$97,961	$342,865		
2 (c) Sponsor	$24,490	40%	$9,796	$34,286		
Sub total	$8,432,844	50%	$4,189,483	$12,622,326	1.28%	
3. Property Acquisitions						
3 (a) Acquire Property	$183,359,450	40%	$73,343,780	$256,703,230		
3 (b) Professional Services for Property	$12,835,162	40%	$5,134,065	$17,969,226		
3 (c) Project Management Services	$5,500,784	40%	$2,200,313	$7,701,097		
3 (d) Sponsor	$550,078	40%	$220,031	$770,110		
Sub total	$202,245,473	40%	$80,898,189	$283,143,663	28.66%	
4. Utility Adjustments						
4 (a) Adjust Utilities	$12,245,175	50%	$6,122,588	$18,367,763		
4 (b) Project Management Services	$367,355	40%	$146,942	$514,297		
4 (c) Sponsor	$36,736	40%	$14,694	$51,430		
Sub total	$12,649,266	50%	$6,284,224	$18,933,490	1.92%	
5. Infrastructure Construction						
5(a).1 Infrastructure - Road	$122,812,500	55%	$67,546,875	$190,359,375		
5(a).2 Infrastructure - Bridges	$212,310,000	60%	$127,386,000	$339,696,000		
5(a).3 Infrastructure - Intersections	$73,050,000	50%	$36,525,000	$109,575,000		
5(d) Project Management Services	$12,245,175	40%	$4,898,070	$17,143,245		
5(e) Sponsor	$1,224,518	30%	$367,355	$1,591,873		
5(f) PA Insurance	$1,350,577	50%	$675,288	$2,025,865		
Sub total	$422,992,769	56%	$237,398,589	$660,391,358	66.84%	
6. Finalisation						
6 (a) Refurbish old route	$4,081,725	40%	$1,632,690	$5,714,415		
6 (b) Project data and post completion review.	$122,452	40%	$48,981	$171,432		
6 (c) Project Management Services	$122,452	40%	$48,981	$171,432		
6 (d) Sponsor	$12,245	40%	$4,898	$17,143		
Sub total	$4,338,874	40%	$1,735,549	$6,074,423	0.61%	
TOTAL	**$655,283,820**	**51%**	**$332,804,861**	**$988,088,682**	100.00%	

Project Management:	$18,603,121	40	$7,441,248	$26,044,369.05	3%
Sponsor:	$1,860,312	33%	$621,673	$2,481,985.16	0.25%

Length of the Project: 9.8 km
39.3 lane-km

Estimate Summary Sheet

Project: Port macquarie Hastings Council - Outer Orbital Link - Option 3 (Blue)

Project No: T-14519.00

Estimate Prepared by: S.G
Quantities Prepared by: S.G
Design Prepared by: G.K
Date: 25/08/2016
Estimate Type: Strategic

Item	Base Estimate (excluding contingency)	Contingency %	Amount	Estimate (including contingency)	% of Total Estimate	Comments/ Assumptions
1. Concept Development						
1 (a) Route/Concept/EIS	$3,653,425	50%	$1,826,713	$5,480,138		
1 (b) Project Management Services	$109,603	40%	$43,841	$153,444		
1 (c) Sponsor	$10,960	40%	$4,384	$15,344		
1 (d) Community Liaison	$365,343	50%	$182,671	$548,014		
Sub total	$4,139,331	50%	$2,057,609	$6,196,939	0.66%	
2. Detail Design & Documentation						
2 (a) Investigation and Design	$7,306,850	50%	$3,653,425	$10,960,275		
2 (b) Project Management Services	$219,206	40%	$87,682	$306,888		
2 (c) Sponsor	$21,921	40%	$8,768	$30,689		
Sub total	$7,547,976	50%	$3,749,875	$11,297,851	1.21%	
3. Property Acquisitions						
3 (a) Acquire Property	$193,129,825	40%	$77,251,930	$270,381,755		
3 (b) Professional Services for Property	$13,519,088	40%	$5,407,635	$18,926,723		
3 (c) Project Management Services	$5,793,895	40%	$2,317,558	$8,111,453		
3 (d) Sponsor	$579,389	40%	$231,756	$811,145		
Sub total	$213,022,197	40%	$85,208,879	$298,231,076	31.99%	
4. Utility Adjustments						
4 (a) Adjust Utilities	$10,960,275	50%	$5,480,138	$16,440,413		
4 (b) Project Management Services	$328,808	40%	$131,523	$460,332		
4 (c) Sponsor	$32,881	40%	$13,152	$46,033		
Sub total	$11,321,964	50%	$5,624,813	$16,946,777	1.82%	
5. Infrastructure Construction						
5(a).1 Infrastructure - Road	$112,625,000	55%	$61,943,750	$174,568,750		
5(a).2 Infrastructure - Bridges	$219,330,000	60%	$131,598,000	$350,928,000		
5(a).3 Infrastructure - Intersections	$33,387,500	50%	$16,693,750	$50,081,250		
5(d) Project Management Services	$10,960,275	40%	$4,384,110	$15,344,385		
5(e) Sponsor	$1,096,028	30%	$328,808	$1,424,836		
5(f) PA Insurance	$1,235,853	50%	$617,926	$1,853,779		
Sub total	$378,634,655	57%	$215,566,345	$594,201,000	63.73%	
6. Finalisation						
6 (a) Refurbish old route	$3,653,425	40%	$1,461,370	$5,114,795		
6 (b) Project data and post completion review.	$109,603	40%	$43,841	$153,444		
6 (c) Project Management Services	$109,603	40%	$43,841	$153,444		
6 (d) Sponsor	$10,960	40%	$4,384	$15,344		
Sub total	$3,883,591	40%	$1,553,436	$5,437,027	0.58%	
TOTAL	**$618,549,714**	**51%**	**$313,760,957**	**$932,310,671**	100.00%	

Project Management:	$17,521,389	40	$7,008,556	$24,529,944.60	3%
Sponsor:	$1,752,139	34%	$591,253	$2,343,391.71	0.25%

Length of the Project: 9.0 km
36.0 lane-km

Estimate Summary Sheet

Project: Port macquarie Hastings Council - Outer Orbital Link - Option 4 (Green)

Project No: T-14519.00

Estimate Prepared by: S.G
Quantities Prepared by: S.G
Design Prepared by: G.K
Date: 25/08/2016
Estimate Type: Strategic

Item	Base Estimate (excluding contingency)	Contingency %	Contingency Amount	Estimate (including contingency)	% of Total Estimate	Comments/ Assumptions
1. Concept Development						
1 (a) Route/Concept/EIS	$3,559,000	50%	$1,779,500	$5,338,500		
1 (b) Project Management Services	$106,770	40%	$42,708	$149,478		
1 (c) Sponsor	$10,677	40%	$4,271	$14,948		
1 (d) Community Liaison	$355,900	50%	$177,950	$533,850		
Sub total	$4,032,347	50%	$2,004,429	$6,036,776	0.72%	
2. Detail Design & Documentation						
2 (a) Investigation and Design	$7,118,000	50%	$3,559,000	$10,677,000		
2 (b) Project Management Services	$213,540	40%	$85,416	$298,956		
2 (c) Sponsor	$21,354	40%	$8,542	$29,896		
Sub total	$7,352,894	50%	$3,652,958	$11,005,852	1.31%	
3. Property Acquisitions						
3 (a) Acquire Property	$146,314,825	40%	$58,525,930	$204,840,755		
3 (b) Professional Services for Property	$10,242,038	40%	$4,096,815	$14,338,853		
3 (c) Project Management Services	$4,389,445	40%	$1,755,778	$6,145,223		
3 (d) Sponsor	$438,944	40%	$175,578	$614,522		
Sub total	$161,385,252	40%	$64,554,101	$225,939,353	26.91%	
4. Utility Adjustments						
4 (a) Adjust Utilities	$10,677,000	50%	$5,338,500	$16,015,500		
4 (b) Project Management Services	$320,310	40%	$128,124	$448,434		
4 (c) Sponsor	$32,031	40%	$12,812	$44,843		
Sub total	$11,029,341	50%	$5,479,436	$16,508,777	1.97%	
5. Infrastructure Construction						
5(a).1 Infrastructure - Road	$109,687,500	55%	$60,328,125	$170,015,625		
5(a).2 Infrastructure - Bridges	$174,450,000	60%	$104,670,000	$279,120,000		
5(a).3 Infrastructure - Intersections	$71,762,500	50%	$35,881,250	$107,643,750		
5(d) Project Management Services	$10,677,000	40%	$4,270,800	$14,947,800		
5(e) Sponsor	$1,067,700	30%	$320,310	$1,388,010		
5(f) PA Insurance	$1,203,645	50%	$601,823	$1,805,468		
Sub total	$368,848,345	56%	$206,072,308	$574,920,653	68.47%	
6. Finalisation						
6 (a) Refurbish old route	$3,559,000	40%	$1,423,600	$4,982,600		
6 (b) Project data and post completion review.	$106,770	40%	$42,708	$149,478		
6 (c) Project Management Services	$106,770	40%	$42,708	$149,478		
6 (d) Sponsor	$10,677	40%	$4,271	$14,948		
Sub total	$3,783,217	40%	$1,513,287	$5,296,504	0.63%	
TOTAL	**$556,431,396**	**51%**	**$283,276,518**	**$839,707,914**	100.00%	

Project Management:	$15,813,835	40	$6,325,534	$22,139,368.65	3%
Sponsor:	$1,581,383	33%	$525,783	$2,107,166.87	0.25%

Length of the Project: 8.8 km
35.1 lane-km

Estimate Summary Sheet

Project: Port macquarie Hastings Council - Outer Orbital Link - Ocean Drive tie-in: North of Maranatha Pl (Cyan route for comparison)

Project No: T-14519.00

Estimate Prepared by: S.G
Quantities Prepared by: S.G
Design Prepared by: G.K
Date: 25/08/2016
Estimate Type: Strategic

Item	Base Estimate (excluding contingency)	Contingency %	Amount	Estimate (including contingency)	% of Total Estimate	Comments/ Assumptions
1. Concept Development						
1 (a) Route/Concept/EIS	$1,341,425	50%	$670,713	$2,012,138		
1 (b) Project Management Services	$40,243	40%	$16,097	$56,340		
1 (c) Sponsor	$4,024	40%	$1,610	$5,634		
1 (d) Community Liaison	$134,143	50%	$67,071	$201,214		
Sub total	$1,519,835	50%	$755,491	$2,275,325	0.61%	
2. Detail Design & Documentation						
2 (a) Investigation and Design	$2,682,850	50%	$1,341,425	$4,024,275		
2 (b) Project Management Services	$80,486	40%	$32,194	$112,680		
2 (c) Sponsor	$8,049	40%	$3,219	$11,268		
Sub total	$2,771,384	50%	$1,376,839	$4,148,223	1.11%	
3. Property Acquisitions						
3 (a) Acquire Property	$90,884,875	40%	$36,353,950	$127,238,825		
3 (b) Professional Services for Property	$6,361,941	40%	$2,544,777	$8,906,718		
3 (c) Project Management Services	$2,726,546	40%	$1,090,619	$3,817,165		
3 (d) Sponsor	$272,655	40%	$109,062	$381,716		
Sub total	$100,246,017	40%	$40,098,407	$140,344,424	37.48%	
4. Utility Adjustments						
4 (a) Adjust Utilities	$4,024,275	50%	$2,012,138	$6,036,413		
4 (b) Project Management Services	$120,728	40%	$48,291	$169,020		
4 (c) Sponsor	$12,073	40%	$4,829	$16,902		
Sub total	$4,157,076	50%	$2,065,258	$6,222,334	1.66%	
5. Infrastructure Construction						
5(a).1 Infrastructure - Road	$19,000,000	55%	$10,450,000	$29,450,000		
5(a).2 Infrastructure - Bridges	$107,880,000	60%	$64,728,000	$172,608,000		
5(a).3 Infrastructure - Intersections	$7,262,500	50%	$3,631,250	$10,893,750		
5(d) Project Management Services	$4,024,275	40%	$1,609,710	$5,633,985		
5(e) Sponsor	$402,428	30%	$120,728	$523,156		
5(f) PA Insurance	$230,243	50%	$115,121	$345,364		
Sub total	$138,799,445	58%	$80,654,810	$219,454,255	58.61%	
6. Finalisation						
6 (a) Refurbish old route	$1,341,425	40%	$536,570	$1,877,995		
6 (b) Project data and post completion review.	$40,243	40%	$16,097	$56,340		
6 (c) Project Management Services	$40,243	40%	$16,097	$56,340		
6 (d) Sponsor	$4,024	40%	$1,610	$5,634		
Sub total	$1,425,935	40%	$570,374	$1,996,309	0.53%	
TOTAL	**$248,919,692**	**50%**	**$125,521,177**	**$374,440,869**	100.00%	

Project Management:	$7,032,521	40	$2,813,008	$9,845,528.70	3%
Sponsor:	$703,252	34%	$241,058	$944,310.12	0.25%

Length of the Project: 1.5 km
6.1 lane-km

Estimate Summary Sheet

Project: Port macquarie Hastings Council - Outer Orbital Link - Ocean Drive tie-in: Greenmeadows Dr
(All other routes for comparison)

Project No: T-14519.00

Estimate Prepared by: S.G
Quantities Prepared by: S.G
Design Prepared by: G.K
Date: 25/08/2016
Estimate Type: Strategic

Item	Base Estimate (excluding contingency)	Contingency %	Contingency Amount	Estimate (including contingency)	% of Total Estimate	Comments/ Assumptions
1. Concept Development						
1 (a) Route/Concept/EIS	$1,317,050	50%	$658,525	$1,975,575		
1 (b) Project Management Services	$39,512	40%	$15,805	$55,316		
1 (c) Sponsor	$3,951	40%	$1,580	$5,532		
1 (d) Community Liaison	$131,705	50%	$65,853	$197,558		
Sub total	$1,492,218	50%	$741,763	$2,233,980	0.75%	
2. Detail Design & Documentation						
2 (a) Investigation and Design	$2,634,100	50%	$1,317,050	$3,951,150		
2 (b) Project Management Services	$79,023	40%	$31,609	$110,632		
2 (c) Sponsor	$7,902	40%	$3,161	$11,063		
Sub total	$2,721,025	50%	$1,351,820	$4,072,845	1.37%	
3. Property Acquisitions						
3 (a) Acquire Property	$43,726,375	40%	$17,490,550	$61,216,925		
3 (b) Professional Services for Property	$3,060,846	40%	$1,224,339	$4,285,185		
3 (c) Project Management Services	$1,311,791	40%	$524,717	$1,836,508		
3 (d) Sponsor	$131,179	40%	$52,472	$183,651		
Sub total	$48,230,192	40%	$19,292,077	$67,522,268	22.70%	
4. Utility Adjustments						
4 (a) Adjust Utilities	$3,951,150	50%	$1,975,575	$5,926,725		
4 (b) Project Management Services	$118,535	40%	$47,414	$165,948		
4 (c) Sponsor	$11,853	40%	$4,741	$16,595		
Sub total	$4,081,538	50%	$2,027,730	$6,109,268	2.05%	
5. Infrastructure Construction						
5(a).1 Infrastructure - Road	$16,562,500	55%	$9,109,375	$25,671,875		
5(a).2 Infrastructure - Bridges	$107,880,000	60%	$64,728,000	$172,608,000		
5(a).3 Infrastructure - Intersections	$7,262,500	50%	$3,631,250	$10,893,750		
5(d) Project Management Services	$3,951,150	40%	$1,580,460	$5,531,610		
5(e) Sponsor	$395,115	30%	$118,535	$513,650		
5(f) PA Insurance	$205,137	50%	$102,568	$307,705		
Sub total	$136,256,402	58%	$79,270,188	$215,526,589	72.46%	
6. Finalisation						
6 (a) Refurbish old route	$1,317,050	40%	$526,820	$1,843,870		
6 (b) Project data and post completion review.	$39,512	40%	$15,805	$55,316		
6 (c) Project Management Services	$39,512	40%	$15,805	$55,316		
6 (d) Sponsor	$3,951	40%	$1,580	$5,532		
Sub total	$1,400,024	40%	$560,010	$1,960,034	0.66%	
TOTAL	**$194,181,398**	**53%**	**$103,243,587**	**$297,424,985**	100.00%	

Project Management:	$5,539,522	40	$2,215,809	$7,755,330.45	3%
Sponsor:	$553,952	33%	$182,069	$736,021.55	0.25%

Length of the Project: 1.3 km
5.3 lane-km

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Appendix E – Preliminary Economic Appraisal

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Port Macquarie Orbital

Preliminary Economic Appraisal

Port Macquarie Orbital

Preliminary Economic Appraisal

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Executive Summary

This report is prepared for Port Macquarie Hastings Council (PMHC) and sets out details of an economic appraisal carried out in relation to the Engineering Feasibility Study for an Outer Orbital Link Road around Port Macquarie.

Following initial sensitivity analysis of the four proposed alignments, two alignments (Option 1 and Option 4) were progressed for Benefit Cost Analysis (BCA). Given subsequent constraints associated with the available traffic modelling data, this analysis has been limited to the assessment of one alignment (Option 1) which will be segmented so as to review the impact of implements separate stages of the orbital. The appraisal measures the economic benefits generated and compares them to the expenditure required to implement the Options.

The alignment was broken down into three segments and seven model cases; comprising a Base Case , East-West link, North-South link and an Airport Access Link.

All benefits have been established from traffic modelling output for each of the seven model cases, which was undertaken using a mesoscopic traffic model using the AIMSUN software. All traffic modelling data was provided to Opus by PMHC based on analysis undertaken by GHD for the Areas Wide Traffic Study, and the model output provided was used as direct input into this economic appraisal

The economic appraisal has been carried out according to New South Wales (NSW) Government guidelines, principally the document "Principles and Guidelines for Economic Appraisal of Transport Investment and Initiative, March 2016" (PGEATII). Project benefits and costs have been estimated for each of seven model cases, for the following elements:

- Travel time savings
- Vehicle operating cost savings
- Crash cost savings
- Avoided environment externality cost savings
- Capital construction and maintenance costs

The economic evaluation has shown that, compared to the do minimum Base Case all options tested have positive Benefit Cost Ratios (BCR) ratings, from 31.6 for Option 4 (New Airport Access Road link only) to 7.8 for Option 7 (full Orbital route plus New Airport Access Road link)

An incremental analysis has shown that when all links of the Orbital were incorporated, the greatest economic benefits for the capital cost invested was achieved. A number of sensitivity tests have also been undertaken, that all show positive BCR ratings (>1.0) and significantly positive NPV ratings are forecast under all sensitivity parameters tested.

It was noted that there appeared to be some unexpected trends when each scenario was compared to the base case individually, however this is likely a result of the constrained traffic modelling data available.

Consequently, it is recommended that the next stage of the project would require a more detailed traffic impact analysis to be carried out. This would enable a more robust basis for providing output for a further cost-benefit analysis exercise which may provide different results to those presented in this economic appraisal.

1 Introduction

1.1 Background

This report is prepared for Port Macquarie Hastings Council (PMHC) and sets out details of an economic appraisal carried out in relation to the Engineering Feasibility Study for an Outer Orbital Link Road around Port Macquarie.

This report presents the methodology, assumptions and results of this economic appraisal.

The economic appraisal has been carried out according to New South Wales (NSW) Government guidelines, principally the document "Principles and Guidelines for Economic Appraisal of Transport Investment and Initiative, March 2016" (PGEATII).

1.2 Report Format

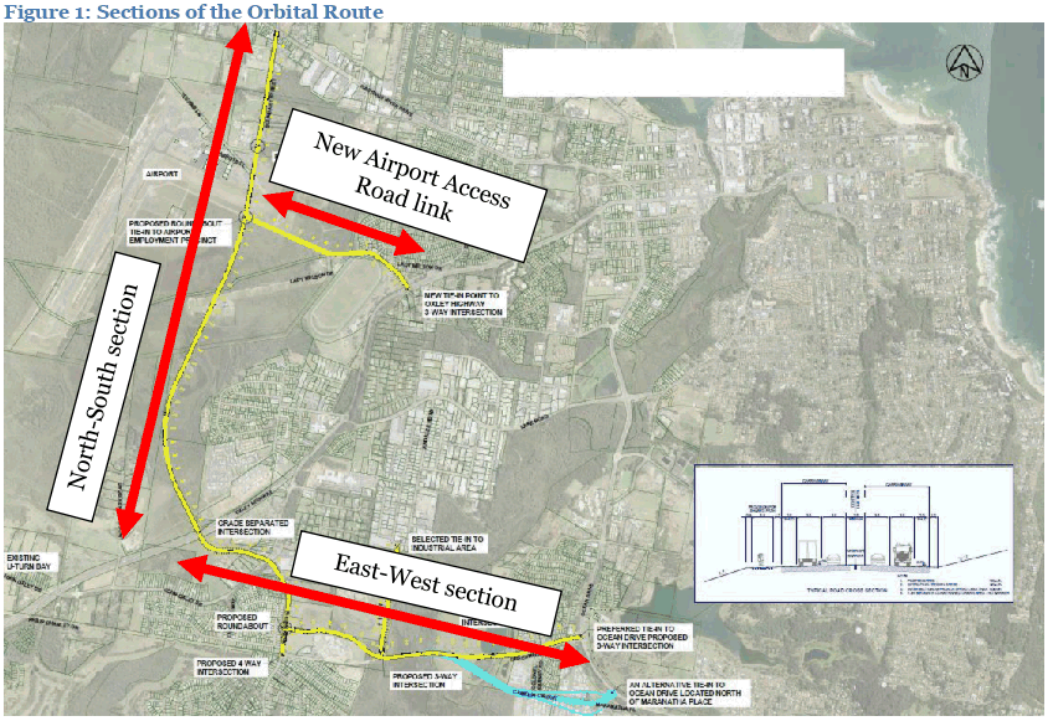
The report is divided into the following sections:

- Chapter 1 – Introduction
- Chapter 2 – Description of Options
- Chapter 3 – Economic Parameters and Methodology
- Chapter 4 – Economic Appraisal
- Chapter 5 – Recommendations and Conclusions

2 Description of Options

The Port Macquarie Orbital Project considers the introduction of several sections of new link road between Hastings River Drive and Ocean Drive, around the South-East quadrant of the City. Figure 1 shows a schematic of the sections of the Orbital route.

Figure 1: Sections of the Orbital Route



Originally, four alignment options were considered for the Orbital route – with alignments 1 and 4 preferred by PMHC. Due to the sensitivity of the traffic models available, and the relatively minor difference in the North-South route between alignments 1 and 4, it was established that economic analysis for both options may not give practical differing results, and so for comparison no discerning value would be gained. As such a single alignment ("Option 1" or "Yellow Option") was established as the preferred alignment on which has been assumed as the basis for the economic appraisal. It is assumed that more detailed economic evaluation between different alignments of this section may be undertaken at a later stage of the project. Appendix A shows the various alternatives considered.

Therefore, this appraisal concentrates on investigation of a single route alignment ("Yellow Option"), but split into various sub-options for implementation of sections of the route in different combinations (and consideration for economic appraisal), as set out below.

- Economic Appraisal Option 1 – Base Case (BC/Do Minimum)
- Economic Appraisal Option 2 – Base Case + East-West (EW) section of Orbital (Ocean Drive to Oxley Highway)

- Economic Appraisal Option 3 – Base Case + North-South (NS) section of Orbital (Hastings River Drive to Oxley Highway)
- Economic Appraisal Option 4 – Base Case + New Airport Access Road link section of Orbital (Old Oxley Highway to Airport)
- Economic Appraisal Option 5 – Base Case + East-West + New Airport Access Road link sections of Orbital
- Economic Appraisal Option 6 – Base Case + East-West + North-South sections of Orbital
- Economic Appraisal Option 7 – Base Case + East-West + North-South + New Airport Access Road link sections of Orbital

From cross-reference with Appendix A, which sets out the breakdown of sections for cost estimate purposes, each of the seven economic appraisal Options identified above contain the links set out in Table 1 below.

Table 1: Sections of the Orbital route, included within each appraisal Option

Option	Links Included
Option 1	None
Option 2	E-1, F-1, G-1, H-1
Option 3	A, B, C-1
Option 4	A, J, K, L-1
Option 5	A, E-1, F-1, G-1, H-1, J, K, L-1
Option 6	A, B, C-1, E-1, F-1, G-1, H-1
Option 7	A, B, C-1, E-1, F-1, G-1, H-1, J, K, L-1

The aims of the identified Options are to increase capacity for through traffic and reduce through traffic movements from central and residential areas of Port Macquarie, particularly heavy vehicles, and also improve access to Port Macquarie airport. Note that section I (link to industrial area and Jindalee Road) has not been included in this assessment, either as a construction cost or within the any of the traffic model scenarios.

3 Economic Parameters and Methodology

3.1 Parameters

Key parameters used in this economic appraisal, and agreed with the Council, are set out in Table 2, together with an indication of the impact of each parameter:

Table 2: Key Parameter Assumptions

Parameter / Item	Description	Impact
Discount Rate	7% as standard, 4% and 10% as sensitivities	Discount rate of 4% increases benefits by approximately 80%; rate of 10% decreases benefits by around 40%
Price Year	2016 prices	-
Assessment Period	30-year period, assuming 2026 construction completion (all options)	5-year earlier construction would increase NPV by approximately 40% - no impact on BCR
Vehicle Occupancy	PGEATII, Appendix 4, Table 1; split by Urban and non-Urban	Occupancy directly proportional to benefits
Expansion Factor	PGEATII, Appendix 4, Table 69; value of 347 used for Roads (non-Sydney)	Expansion factor directly proportional to benefits
Traffic Composition	As per 7-day classified count on Lake Road (South of Hill Street), provided by traffic model consultant	Composition not directly proportional to benefits, but higher heavy vehicle proportion results in more benefits
Value of Time	PGEATII, Appendix 4, Table 1; split by Urban and non-Urban	Values of time directly proportional to benefits
Vehicle Operating Cost	PGEATII, Appendix 4, Table 11; split by Stop-start (non-urban) and Free-flow (urban)	Vehicle operating costs directly proportional to benefits
Crash Costs	Austroads Technical Report, Road Safety Engineering Risk Assessment, Part 7: Crash Rates Database (AP-T152/10), Table 2.1 and PGEATII, Appendix 4, Table 52	Crash costs directly proportional to benefits
Crash Rates	Austroads Technical Report, Road Safety Engineering Risk Assessment, Part 7: Crash Rates Database (AP-T152/10), Appendix B, Table B1 and Port Macquarie crash statistics (last 5 years) as supplied by Council	Crash rates directly proportional to benefits
Avoided Environmental Externality Costs	PGEATII, Appendix 4, Table 58 and Table 60	Environmental Externality Costs directly proportional to benefits

3.2 Methodology

A number of economic indicators were calculated as outputs of the economic appraisal to evaluate the attractiveness of each Option:

- **Net Present Value (NPV)**: NPV is the difference between the present value of benefits and the present value of costs. A positive net present value indicates that the project has economic merit. The use of NPV as the main reporting criterion of a project's economic worth is recommended because this enables economic benefits to be maximised
- **Net Present Value per dollar of capital Investment (NPVI)**: NPVI is defined as the NPV divided by present value of the investment costs.
- **Benefit-Cost Ratio (BCR)**: The BCR is calculated by dividing the present value of all benefits by the present value of all costs. A BCR greater than 1 indicates that the project is economically worthwhile and has economic merit. It should be noted that if projects are mutually exclusive, the use of the BCR removes the effects of different scales of the alternative initiatives thus is not preferable to use – and therefore is not the key assessment criteria when considering the various toolkit of Options appraised here
- **Incremental Benefit-Cost Ratio (IBCR)**: The IBCR seeks an optimal solution for analysis of mutually exclusive options under funding constraints. This approach determines if the additional or incremental costs of higher cost options are justified by the additional benefits gained, and therefore is useful for consideration of the toolkit of Options appraised here
- **Internal Rate of Return (IRR)**: IRR is the discount rate at which the present value of benefits equals the present value of costs. It provides an indication of the economic worth of an initiative without requiring specification of a discount rate
- **First Year Rate of Return (FYRR)**: The FYRR is a measure of the benefits achieved in the first full year of a scheme's operation divided by the capital costs incurred to achieve this

4 Economic Appraisal

4.1 Traffic Modelling

Traffic modelling has been undertaken for the Project by GHD using a mesoscopic AIMSUN traffic model. GHD modelled all seven Options set out in Chapter 2, and provided:

- Total Vehicle Kilometres Travelled (VKT) – split by vehicle class, peak period (AM and PM), model year (2016, 2026, 2036), and model link type
- Total Vehicle Hours Travelled (VHT) – split by vehicle class, peak period (AM and PM), model year (2016, 2026, 2036)
- Conversion to Weekday Total – to convert 3-hour AM and 4-hour PM peak periods to weekday totals, a **1.88** factor was provided based on link count profiles within the model area

These model results have been converted to annual values through the application of an expansion factor of **347** (PGEATII, Appendix 4, Table 69, Rural). Table 3 shows a summary of the overall vehicle kilometre figures.

Table 3: Annual Vehicle Kilometres (millions)

Option	Description	2016	2026	2036
Option 1	BC	666	876	995
Option 2	BC + EW	536	617	776
Option 3	BC + NS	477	659	736
Option 4	BC + NAAR	428	548	732
Option 5	BC + EW + NAAR	558	600	654
Option 6	BC + EW + NS	530	601	739
Option 7	BC + EW + NS + NAAR	544	579	627

The above table shows that there is a significant drop in vehicle-kilometres from Option 1 (Base Case) to any of the other Options 2-7. In addition, the differential total vehicle-kilometres between each of Options 2-7 is less than the differential between each of these Options and the Base Case. This suggests there is a fundamental change in traffic re-assignment within the network as a result of the implementation of any of the Options (2-7), but that adding subsequent additional sections of the Orbital have a much smaller impact.

This effect appears somewhat unexpected, particularly for Option 4, where we might expect a limited re-assignment, compared to the Options with longer sections of the Orbital. This is discussed in more detail in Section 4.5.3.

Table 4 shows a summary of the overall vehicle hours for each Option.

Table 4: Annual Vehicle Hours (millions)

Option	Description	2016	2026	2036
Option 1	BC	11.2	14.8	17.4
Option 2	BC + EW	8.8	10.6	12.8
Option 3	BC + NS	7.3	10.8	12.1
Option 4	BC + NAAR	6.8	9.1	12.7
Option 5	BC + EW + NAAR	9.3	10.0	11.3
Option 6	BC + EW + NS	8.4	9.5	11.9
Option 7	BC + EW + NS + NAAR	8.6	9.2	10.0

As for the vehicle-kilometres, the output shows a significant reduction in travel times in all Options 2-7 compared to the Base Case. This suggests a level of congestion in the Base Case model that is not forecast in the Option 2-7 models – again, this level of impact is considered somewhat counterintuitive, given that the Orbital link will only provide alternative routes for a limited proportion of Origin-Destination journeys

4.2 Project Costs

The cost estimates were prepared in accordance with the guidelines contained in the RMS document, Project Estimating, for the "strategic" stage of the planning process, and are set out in the document "Port Macquarie Orbital Link Road Corridor - Strategic Cost Estimations Report", as provided by Opus, dated 25/8/16.

The costs include the following items:

- Concept Development costs;
- Detail Design and Documentation costs;
- Property Acquisition costs;
- Utility Adjustment costs;
- Infrastructure Construction costs; and
- Finalisation costs.

In addition, a contingency was applied to each element, which averages at an allowance of 51%. The capital cost estimates are shown in Table 5.

Operation and Maintenance costs for each Option are predicted to be 1% of the capital expenditure required to implement that Option. O&M costs are incurred from the year of opening until the end of the appraisal.

Table 5: Capital Costs

Option	Description	Total Cost ($m, 2016 prices)
Option 1	BC	-
Option 2	BC + EW	469
Option 3	BC + NS	199
Option 4	BC + NAAR	152
Option 5	BC + EW + NAAR	620
Option 6	BC + EW + NS	668
Option 7	BC + EW + NS + NAAR	750

4.3 Project Benefits

Project Benefits have been estimated for each Option, for the following elements:

- Travel time savings
- Vehicle operating cost savings
- Crash cost savings
- Avoided environment externality cost savings

Parameters and values have been obtained from PGEATII Appendix 4 ("Economic Parameters Values and Valuation Methodologies", 2016), and other sources to convert the vehicle-kilometres and hours-travelled presented in Table 3 and Table 4 to associated economic values.

It should be noted that no allowance has been made within the analysis to include any benefits of induced trips. It would be expected that a significant infrastructure improvement such as the orbital would result in an increase in trips within the network, due to the overall decrease in the generalised cost of travel (from increased capacity in the network). However, it is understood that the modelling process and output provided does not include any element of induced trips, and so the impact of induced trips has not been incorporated into the analysis.

4.3.1 Travel Time Savings

Values of travel time (VOT) parameters have been obtained from PGEATII, Appendix 4, Tables 1 and 8 for various vehicle types, and summarised in Table 6 below.

The VOT values were escalated to June 2016 values by using Average Weekly earnings indices in NSW between November 2015 and June 2016 using information from the Australian Bureau of Statistics.

Travel time savings of Options 2 to 7 were calculated by taking the difference between travel time costs between each of these options and the Base Case (Option 1).

Table 6: Value of Time Parameters

Vehicle Type		Proportion[1]	Occupancy[2]		VOT ($/h)[2]
			Urban	Rural	
Light	Car – Private	84.7%	1.5	1.7	16.26
	Car – Business	14.3%	1.1	1.3	52.76
	Taxi – Passenger	1.0%	2.1	2.1	52.76
Heavy	Small Rigid	85.5%	1.2	1.3	27.57
	Large Rigid	4.3%	1.2	1.1	28.16
	Articulated	5.7%	1.2	1.0	29.09
	Bus	4.5%	21.2	21.2	16.92

1 Proportion from traffic modelling output (GHD) except for car private/business split assumed from PGEATII, Appendix 4, Table 8
2 Occupancy and VOT parameters from PGEATII, Appendix 4, Table 1, the latter at November 2015 values

4.3.2 Vehicle Operating Costs

Vehicle operating costs (VOC) estimates have been obtained by using the Urban Stop-Start Model and Freeway Model, as set out in PGEATII, Appendix 4, Section 2, using the coefficients for A, B, C_0, C_1 and C_2 from Table 11 of this guidance document. Using this method applies these coefficients and formulae to both the average speed and vehicle kilometres travelled output from the traffic model to obtain total vehicle operating costs.

Since the coefficients are set at June 2013 prices, these have been escalated to June 2016 using the Consumer Price Index – Private Motoring for Sydney category.

4.3.3 Crash Cost Savings

Crash costs will reduce as a result of providing section of the Orbital, due to a re-assignment of traffic movements from mixed traffic urban links to the new link road with higher standard of safety. To calculate the crash cost savings, we have used the Austroads Technical Report, Road Safety Engineering Risk Assessment, Part 7: Crash Rates Database (AP-T152/10) to provide crash rates per different link type.

It should be noted that the crash costs have been calculated on the Willingness-to-Pay approach, as recommended by PGEATII (Appendix 4, Chapter 4).

Table 7 shows the assumptions and parameters used in the crash cost analysis.

Table 7: Crash cost parameters and statistics

		Crash Cost ($)[1]		Total Crashes (per annum)		
		Urban	Rural	NSW (2016)[2]	Port Macquarie (2017)[3]	Resultant Proportions
Injury Type	Fatal	$7,663,434	$8,985,668	356	24	2%
	Serious	$476,777	$683,392	5553	803	17%
	Moderate	$80,546	$111,497	6107		18%
	Minor	$75,391	$107,367	5765		17%
	Non-injury	$9,743	$9,743	-	681	46%
Average Crash Cost[4]		$303,215	$234,305	-	-	-
Crash Rate (per 100 million VKT)[5]		69.45	27.38	-	-	-

1 Crash costs set out in PGEATII, Appendix 4, Table 52, March 2016 prices
2 Road traffic casualty crashes in NSW 2016, Transport for NSW
3 Road traffic crashes in Port Macquarie-Hastings area in last 5 years, provided by Port Macquarie-Hastings Council
4 As calculated from Resultant Proportions for Port Macquarie
5 Crash rates from AP-T152/10, Appendix B, Table B.1 NSW

4.3.4 Avoided Environmental Externality Costs

Avoided environmental externality costs will accrue as a result of traffic diverting from urban links onto the Orbital route. Environmental benefits have been calculated for the following elements:

- Air pollution – due to reduced congestion
- Greenhouse gases – due to reduced congestion
- Noise – due to reduced noise in urban areas
- Water pollution – due to reduction in pollutants in urban areas
- Nature and Landscape – amenity/visual improvements in urban areas, balanced with impacts on the natural environment in rural areas
- Urban Separation – reduction in separation due to reduced traffic volumes in urban areas
- Upstream and Downstream Costs – indirect transport costs associated with energy generation, vehicle production and infrastructure construction

Externality unit costs have been obtained from PGEATII, Appendix 4, Section 5, Tables 58 and 60. These unit costs are applied to both vehicle-kilometres travelled and tonne-kilometres travelled obtain total environmental impact costs for each Option. Since the coefficients are set at June 2012 prices, these have been escalated to June 2016 using the Consumer Price Index – Private Motoring for Sydney category.

4.4 Summary of Costs and Benefits

Table 8 provides a summary of undiscounted travel time benefits, compared to the Base Case.

Table 8: Summary of travel time benefits by future modelled year ($millions, 2016 prices, undiscounted)

Option	Description	2016	2026	2036
Option 2	BC + EW	73.4	132.1	143.7
Option 3	BC + NS	120.9	121.5	164.7
Option 4	BC + NAAR	140.0	186.1	148.0
Option 5	BC + EW + NAAR	55.7	151.6	199.7
Option 6	BC + EW + NS	83.8	167.2	172.2
Option 7	BC + EW + NS + NAAR	77.7	177.7	238.5

Table 9 provides a summary of undiscounted vehicle operating benefits, compared to the Base Case.

Table 9: Summary of vehicle operating benefits by future modelled year ($millions, 2016 prices, undiscounted)

Option	Description	2016	2026	2036
Option 2	BC + EW	79.5	125.9	140.4
Option 3	BC + NS	108.9	128.4	157.7
Option 4	BC + NAAR	109.9	143.1	147.2
Option 5	BC + EW + NAAR	69.3	133.1	153.7
Option 6	BC + EW + NS	90.3	148.7	158.0
Option 7	BC + EW + NS + NAAR	88.7	150.9	183.3

Table 10 provides a summary of undiscounted crash cost savings, compared to the Base Case.

Table 10: Summary of crash savings by future modelled year ($millions, 2016 prices, undiscounted)

Option	Description	2016	2026	2036
Option 2	BC + EW	35.3	58.2	57.8
Option 3	BC + NS	46.4	55.7	65.6
Option 4	BC + NAAR	49.5	65.0	63.5
Option 5	BC + EW + NAAR	31.4	60.1	68.6
Option 6	BC + EW + NS	38.4	63.6	64.4
Option 7	BC + EW + NS + NAAR	37.1	65.5	77.4

Table 11 provides a summary of undiscounted environmental externality cost savings, compared to the Base Case.

Table 11: Summary of avoided environmental externality cost savings by future modelled year ($millions, 2016 prices, undiscounted)

Option	Description	2016	2026	2036
Option 2	BC + EW	26.6	44.2	43.8
Option 3	BC + NS	34.6	41.6	49.2
Option 4	BC + NAAR	37.9	50.3	48.5
Option 5	BC + EW + NAAR	23.8	45.8	53.7
Option 6	BC + EW + NS	28.7	48.1	48.6
Option 7	BC + EW + NS + NAAR	27.7	49.6	59.2

Table 12 shows the present value of total costs, over the 2026 to 2056 economic analysis period, at 2016 discounted prices.

Table 12: Summary of costs ($millions, 2016 prices, discounted)

Option	Description	Capital	O&M
Option 2	BC + EW	238.4	31.7
Option 3	BC + NS	101.1	13.4
Option 4	BC + NAAR	77.0	10.2
Option 5	BC + EW + NAAR	315.5	41.9
Option 6	BC + EW + NS	339.6	45.1
Option 7	BC + EW + NS + NAAR	381.1	50.6

Table 13 shows the relative size of each of the four main benefits types for each option.

Table 13: Proportion of Benefits

Option	Description	Travel Time	VOC	Crashes	External
Option 2	BC + EW	38%	36%	15%	11%
Option 3	BC + NS	38%	36%	15%	11%
Option 4	BC + NAAR	36%	36%	16%	12%
Option 5	BC + EW + NAAR	43%	32%	14%	11%
Option 6	BC + EW + NS	38%	36%	15%	11%
Option 7	BC + EW + NS + NAAR	42%	33%	14%	11%

4.5 Economic Appraisal

Economic indicators are calculated in terms of discounted cash flows over the evaluation period. Three economic indicators were calculated as outputs of the economic appraisal (as described in Section 3.2), to evaluate the relative attractiveness of the Options against the Base Case:

- Net Present Value (NPV)
- Net Present Value per Dollar of Investment (NPVI)
- Benefit Cost Ratio (BCR)
- First Year Rate of Return (FYRR)

Internal Rate of Return (IRR) values are not shown, as the results demonstrate that the discount rate would need to be >1000% for all options, to be financially uneconomic.

4.5.1 Main Results

The results, using a 7 per cent discount rate, for the Options are shown in Table 14.

Table 14: Economic Appraisal Results

Option	Description	NPV ($millions)	NPVI (%)	BCR	FYRR (%)
Option 2	BC + EW	2,328	862%	9.6	125%
Option 3	BC + NS	2,821	2462%	25.6	301%
Option 4	BC + NAAR	2,668	3057%	31.6	339%
Option 5	BC + EW + NAAR	2,839	795%	8.9	90%
Option 6	BC + EW + NS	2,604	677%	7.8	79%
Option 7	BC + EW + NS + NAAR	3,318	769%	8.7	69%

The economic appraisal shows all 6 options produce highly positive results (compared to Option 1, the Base Case), with economic benefits heavily outweighing construction and operational costs, due to the poor operation of the Base Case scenario. As a result, the most positive BCR is given by Option 4 (due to the lowest cost of all the Options), and the most positive NPV is given by Option 7 (due to the highest benefits of all the Options).

These results are a direct result of the traffic modelling output as set out in section 4.1, and as discussed in that section, the poor comparative performance of the Base Case model results in high levels of benefits for all of the Options considered.

4.5.2 Sensitivity Analysis

A sensitivity analysis has been undertaken to assess the possible impacts of uncertainty. It tests the main assumptions of the model to identify how the outcome would vary if key variables change. Sensitivity tests were conducted on the following parameters:

- Discount rate: 4 per cent and 10 per cent
- Capital expenditure: plus 25 and 50 per cent
- Travel time benefits: plus and minus 25 per cent
- Total benefits: plus and minus 25 per cent
- Not including avoided environmental externality cost savings

The results of the sensitivity analysis are shown in Table 15. For simplicity, only the BCR values have been presented.

The table shows that although the BCRs are relatively sensitive to the different sensitivity parameters, all BCR estimates are still highly positive (above a BCR of 5) for all Options, under all sensitivity tests.

Table 15: Sensitivity Analysis

Sensitivity Parameter	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7
Main Results	**9.6**	**25.6**	**31.6**	**8.9**	**7.8**	**8.7**
4% Discount Rate	12.7	34.6	40.3	12.0	10.2	11.7
10% Discount Rate	7.6	19.9	25.7	7.0	6.2	6.7
Capital + 25%	7.7	20.5	25.3	7.2	6.2	6.9
Capital +50%	6.4	17.1	21.0	6.0	5.2	5.8
Travel Time -25%	8.7	23.2	28.7	8.0	7.0	7.8
Travel Time +25%	10.5	28.0	34.4	9.9	8.5	9.6
Benefits -25%	7.2	19.2	23.7	6.7	5.8	6.5
Benefits +25%	12.0	32.0	39.5	11.2	9.7	10.9
Without environmental externality cost savings	8.5	22.7	27.8	7.9	6.9	7.8

4.5.3 Incremental Assessment

Whilst the project alternatives are only partly mutually exclusive, an incremental cost-benefit analysis of the Options has been used to identify the optimal economic solution. The incremental BCR indicates whether the incremental cost of higher-cost project alternatives is justified by the incremental benefits gained. Conversely, incremental analysis will identify whether a lower-cost alternative or option that realises proportionally more benefits is a more optimal solution.

The process is defined by ranking the Options in order of cost (lowest cost option first), and then determining if the incremental benefits and costs between the next highest option and the lowest option is equal or greater than the target BCR. If the incremental BCR is higher than the target, then this option is taken forward for comparison with the next highest cost option – if not then the

next highest cost option is compared against the lowest cost option, and so on until all options have been analysed.

Table 16 shows the results of the incremental assessment. For the purposes of the analysis, the target BCR has been set to 1.0 (the break-even rate of present value benefits to cost).

Table 16: Incremental Benefit Cost Ratio (IBCR) Assessment

Option	Description	Benefits	Cost	IBCR	Better than target	Current Preferred Option
Option 4	BC + NAAR	2,755	87	-	-	-
Option 3	BC + NS	2,935	115	6.6	Above	Option 3
Option 2	BC + EW	2,598	270	-2.2	Below	Option 3
Option 5	BC + EW + NAAR	3,197	357	12.4	Above	Option 5
Option 6	BC + EW + NS	2,989	385	-7.6	Below	Option 5
Option 7	BC + EW + NS + NAAR	3,750	432	8.7	Above	Option 7

The analysis shows that Option 7 (the full Orbital route plus New Airport Access Road link) is the highest cost option with an IBCR higher than the target BCR of 1.0, demonstrating it to be the optimum economic solution. Therefore, although Option 4 has the highest BCR (ref Table12), there are sufficient additional benefits in providing Option 7 to offset the additional cost.

It is also interesting that Options 2 and 6 show negative IBCR values – demonstrating that the additional cost of the option is forecast to result in a reduction in benefits compared to the next cheapest option. Whilst this is not impossible, as the options are not mutually exclusive, it seems unlikely that Option 6 should have less benefits than Option 5, as it would seem logical that the implementation of the North-South link would have greater economic benefits than the implementation of the Airport link section (through higher travel time and vehicle operating cost savings).

It should be noted that we have not provided a detailed examination of the differential benefits between Options 2 to 7, as this is intrinsically linked to the traffic model operation and output. It is only through more detailed analysis of the traffic model that greater insight could be established as to the relative performance of each Option.

4.5.4 Commentary of Results

Although Option 4 (New Airport Access Road link only) has been assessed as yielding the highest BCR, the incremental assessment has shown that Option 7 (the full Orbital route plus New Airport Access Road link) has the greatest economic value.

However, the comparison of traffic model output between Options, has shown a significant change in vehicle-kilometres and vehicle-hours on the network, when comparing the Base Case to the other Options. Whilst we might expect a re-assignment of trips onto the new Orbital link, this level of change appears to be out of scale with the infrastructure provided (in any of the Options).

As a further analysis, Table 17 shows the percentage of vehicle-kilometres travelled in each option, along links classified as Urban or Rural in the model.

Table 17: Percentage of Vehicle Kilometres by Link Type

Option	Description	2016		2026		2036	
		Urban	Rural	Urban	Rural	Urban	Rural
Option 1	BC	87%	13%	89%	11%	88%	12%
Option 2	BC + EW	51%	49%	54%	46%	49%	51%
Option 3	BC + NS	41%	59%	49%	51%	44%	56%
Option 4	BC + NAAR	48%	52%	58%	42%	48%	52%
Option 5	BC + EW + NAAR	54%	46%	55%	45%	57%	43%
Option 6	BC + EW + NS	45%	55%	47%	53%	45%	55%
Option 7	BC + EW + NS + NAAR	45%	55%	49%	51%	46%	54%

The analysis shows that the majority of trips are undertaken on urban links in Base Case, whereas there is a relativity equal split between the two link types in all other Options. Despite the Orbital links being classified as rural, it is considered unlikely that this level of trip transfer would occur in Options 2-7.

Consequently, it is considered that the current (mesoscopic) traffic model used to provide the traffic modelling output for this study does not appear to be sufficiently detailed to allow and robust findings to be developed from the economic evaluation. Consequently, it is recommended that the next phase of economic analysis would require the development of a micro simulation model for the Port Macquarie area, to provide an improved basis to test the Orbital route and section options. This may, therefore, result in significantly different results to those presented in this economic appraisal.

5 Recommendations and Conclusions

This report sets out the method, parameters used and results of an economic appraisal carried out for various Options for the Port Macquarie Orbital project.

The economic evaluation has shown that:

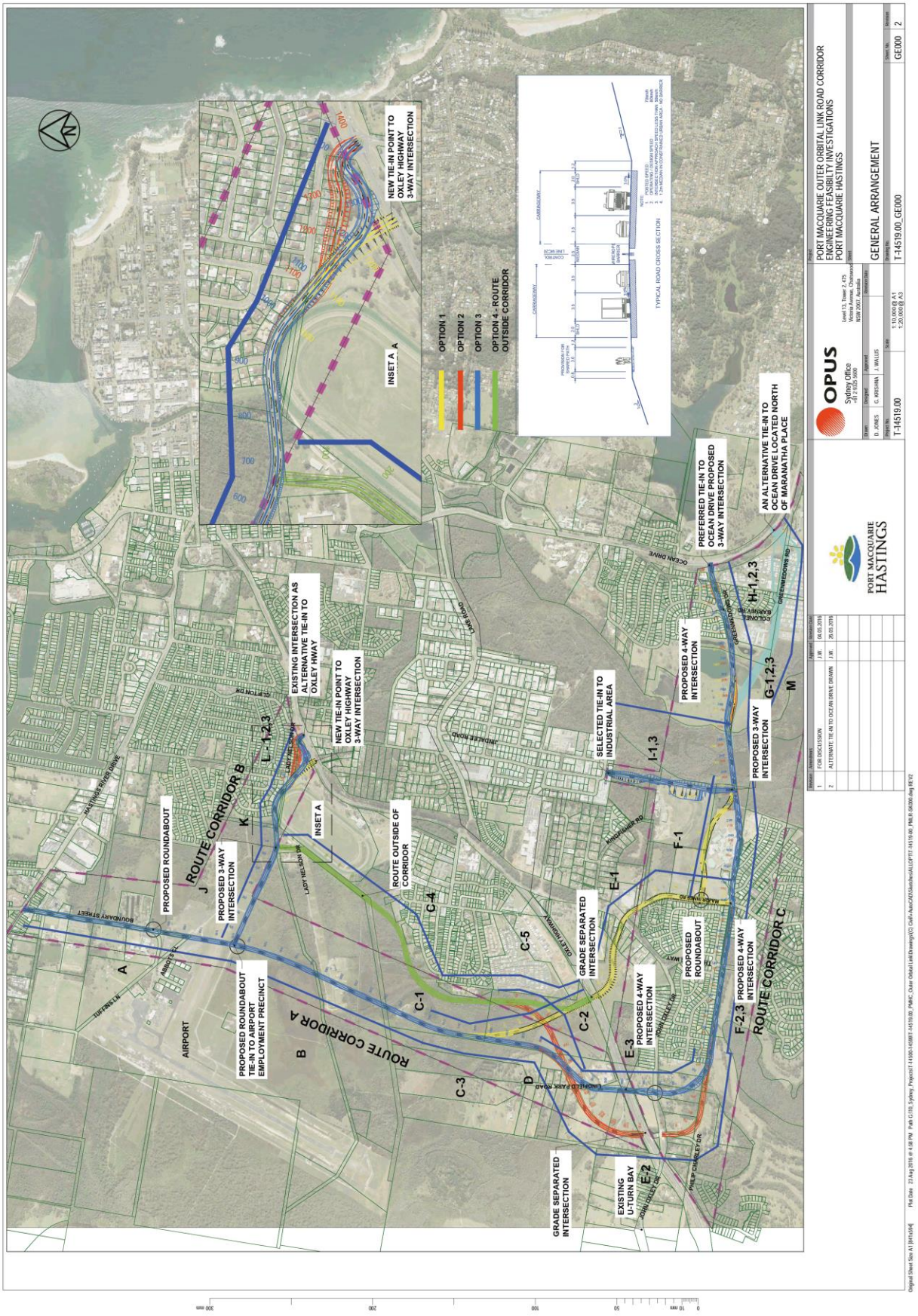
- All 6 Options tested have positive BCR ratings, from 31.6 for Option 4 (New Airport Access Road link only) to 7.8 for Option 7 (full Orbital route plus New Airport Access Road link)
- All 6 Options tested have positive Net Present Value (NPV) ratings, from $2.3 billion for Option 2 (East-West section only) to $3.3 billion for Option 7 (full Orbital route plus New Airport Access Road link)
- An incremental analysis has shown that Option 7 (i.e. all phases and links of the orbital constructed) has the greatest economic benefits for the capital cost invested

The traffic modelling output obtained for the Base Case (Option 1) shows a fundamentally higher level of both vehicle-kilometres and vehicle-hours on the network when compared to the model output for any of the 6 Orbital link road options. There would be expected to be a re-assignment of trips from urban to rural links within the network as a result of the implementation of one or more sections of the Orbital route, with a resultant traffic congestion reduction. However, the level of change is significant, and beyond what might be reasonably expected.

The differential benefits obtained between each of Options 2 and 7 have not been assessed, as this would require more detailed knowledge of the operation of the traffic model under each option scenario. It is only through more detailed analysis of the traffic model that greater insight could be established as to the relative performance of each Option.

Consequently, it is recommended that the next stage of the project would require a more detailed traffic impact analysis to be carried out, so as to provide a more robust basis for providing output for a further cost-benefit analysis exercise. This would most likely involve the development of a micro simulation model of the Port Macquarie area, to provide an improved basis to test the Orbital route and section options – and therefore may provide significantly different results to those presented in this economic appraisal.

A Orbital Route – Identified Sections for Cost Estimates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2
FOR DISCUSSION
ALTERNATE TIE-IN TO OCEAN DRIVE
OPTION 1
OPTION 2
OPTION 3
OPTION 4 - ROUTE OUTSIDE CORRIDOR
NEW TIE-IN POINT TO OXLEY HIGHWAY 3-WAY INTERSECTION
INSET A
TYPICAL ROAD CROSS SECTION
PROPOSED ROUNDABOUT
PROPOSED 3-WAY INTERSECTION
ROUTE CORRIDOR B
ROUTE CORRIDOR A
ROUTE CORRIDOR C
EXISTING INTERSECTION AS ALTERNATIVE TIE-IN TO OXLEY HWAY
NEW TIE-IN POINT TO OXLEY HIGHWAY 3-WAY INTERSECTION
ROUTE OUTSIDE OF CORRIDOR
SELECTED TIE-IN TO INDUSTRIAL AREA
PROPOSED 4-WAY INTERSECTION
PREFERRED TIE-IN TO OCEAN DRIVE PROPOSED 3-WAY INTERSECTION
AN ALTERNATIVE TIE-IN TO OCEAN DRIVE LOCATED NORTH OF MARANATHA PLACE
PROPOSED ROUNDABOUT TIE-IN TO AIRPORT EMPLOYMENT PRECINCT
GRADE SEPARATED INTERSECTION
PROPOSED 4-WAY INTERSECTION
PROPOSED ROUNDABOUT
EXISTING U-TURN BAY
AIRPORT
OCEAN DRIVE
LAKE ROAD
JINDALEE ROAD
OLD PACIFIC HWY
LAKEWOOD DRIVE
GREENMEADOWS RD
PHILIP CARDLES DR
JOHN CARDLES DR
LINDSELL PARK ROAD
HASTINGS RIVER DRIVE
BOUNDARY STREET
A
B
C-1
C-2
C-3
C-4
C-5
D
E-1
E-2
E-3
F-1
F-2,3
G-1,2,3
H-1,2,3
I-1,3
J
K
L - 1,2,3
M

B Traffic Model Output

Year	Scenario	Speed (daily, weekday average)																											
		Car														Truck													
		LOCAL	SART (Commercial)	Sub-ART (Non-Commercial)	ART (Divided)	Roundabout	ART (Undivided)	SchoolZone (60kph original)	SchoolZone (50kph original)	MAJOR SART	SH(D) Divided	FWAY	FWAY RAMP	SH(UD) Undivided	EXP RAMP	LOCAL	SART (Commercial)	Sub-ART (Non-Commercial)	ART (Divided)	Roundabout	ART (Undivided)	SchoolZone (60kph original)	SchoolZone (50kph original)	MAJOR SART	SH(D) Divided	FWAY	FWAY RAMP	SH(UD) Undivided	EXP RAMP
2016	1	62.1	46.5	57.5	43.8	63.1	54.5	51.2	57.4	58.7	54.8	53.4	65.5	67.2	0.0	79.5	59.7	71.5	54.0	73.6	56.5	60.0	70.0	69.2	55.7	57.4	72.6	77.3	0.0
2016	2	46.9	39.2	50.2	46.5	52.9	56.1	43.5	41.6	75.1	83.7	91.5	81.5	74.8	42.1	56.1	42.4	53.9	51.8	58.4	57.5	45.4	41.7	77.4	84.7	93.9	82.3	76.9	0.0
2016	3	47.0	40.4	50.9	48.4	54.7	53.9	42.8	41.5	75.3	83.2	91.8	81.6	74.6	41.4	55.8	43.3	53.7	54.8	59.9	57.5	44.7	41.6	78.1	86.0	94.0	82.4	76.4	45.3
2016	4	47.8	40.6	50.7	46.7	54.6	52.8	43.4	41.7	75.2	83.2	91.7	80.9	74.4	41.9	56.8	43.8	54.2	51.8	59.7	55.7	46.5	42.1	78.3	84.5	94.2	82.6	75.8	46.7
2016	5	46.5	38.9	49.8	46.2	54.0	56.4	43.6	41.5	75.0	84.9	91.5	80.9	74.4	44.0	55.3	41.7	54.8	52.3	59.3	56.9	46.8	41.9	77.9	86.1	94.1	83.0	75.5	0.0
2016	6	45.8	38.4	50.2	47.2	54.6	56.5	43.2	41.4	75.3	84.1	91.9	82.2	75.1	41.1	54.8	43.6	53.8	53.6	59.6	58.0	47.3	41.5	77.5	86.5	93.7	82.0	77.0	43.6
2016	7	45.8	39.9	50.4	47.9	55.0	56.6	42.6	41.4	75.2	83.6	91.8	82.0	74.7	41.7	53.8	43.2	53.9	54.2	60.1	57.7	44.3	41.5	77.3	86.8	94.0	83.0	76.2	46.0
2026	1	61.3	57.5	53.3	45.8	58.1	54.1	49.1	57.9	51.2	33.1	61.1	75.3	72.8	0.0	78.4	81.3	61.6	49.4	67.2	56.3	51.7	61.0	56.4	32.8	63.4	88.2	83.9	0.0
2026	2	45.3	38.6	42.7	45.3	51.2	55.6	42.0	41.0	74.0	81.2	90.3	78.9	73.2	45.1	50.3	41.7	41.5	50.4	54.3	55.4	44.4	40.5	74.6	79.8	92.2	80.4	74.7	0.0
2026	3	46.0	34.9	49.9	41.1	49.6	55.4	43.6	40.7	74.6	78.7	91.4	78.7	72.9	40.2	54.1	38.7	53.4	42.7	55.1	57.2	45.5	39.5	76.9	80.8	93.1	81.5	73.6	44.6
2026	4	49.0	39.4	50.1	46.8	54.1	54.8	42.4	41.4	74.7	83.8	90.2	77.9	73.5	48.1	56.5	42.0	55.3	52.6	59.2	54.8	45.0	41.3	75.1	84.0	92.8	80.9	74.4	0.0
2026	5	46.7	38.6	48.8	44.7	51.2	55.1	42.9	41.2	74.2	83.3	90.5	78.6	73.4	45.2	53.6	41.9	51.8	49.5	56.0	52.5	44.7	41.0	76.1	81.5	92.1	79.9	74.4	0.0
2026	6	46.2	39.5	50.6	46.7	54.3	56.6	43.3	41.0	75.0	81.2	91.6	80.0	73.2	41.9	53.1	43.4	53.9	52.8	58.8	58.6	45.1	40.8	77.2	82.8	93.3	83.0	74.1	44.5
2026	7	47.0	38.8	50.3	47.4	54.1	55.4	43.1	41.3	74.8	81.8	91.6	78.9	73.1	41.2	54.8	41.6	54.0	54.1	58.4	57.9	45.7	41.4	77.0	83.7	93.5	82.2	74.0	42.2
2036	1	60.0	57.3	51.5	44.6	50.4	53.9	42.5	58.2	51.0	28.1	57.7	74.7	68.2	0.0	75.1	79.8	61.4	49.4	59.3	56.6	47.0	60.1	56.9	27.4	58.5	86.6	81.6	0.0
2036	2	46.7	37.9	49.2	46.0	50.9	54.3	42.7	40.2	74.1	79.8	90.2	71.7	71.6	40.6	52.7	42.0	52.6	50.4	55.7	54.7	44.1	38.8	77.9	77.4	91.9	77.5	72.3	41.6
2036	3	44.6	35.4	49.4	41.5	46.6	55.9	44.0	40.9	74.4	75.3	91.1	73.5	72.0	22.9	49.2	36.7	52.8	43.9	52.2	57.5	45.5	40.2	76.7	75.1	92.6	77.9	73.1	19.2
2036	4	45.7	34.7	46.6	38.5	44.2	55.7	43.0	40.4	74.7	56.9	90.2	67.8	71.4	38.6	52.2	37.1	51.1	40.1	51.2	56.5	43.0	39.1	75.4	62.4	91.9	76.4	72.7	40.4
2036	5	47.0	37.2	48.8	44.7	51.2	53.7	43.2	41.0	74.0	83.6	88.8	79.4	73.0	44.2	53.3	39.9	53.1	50.2	56.0	52.6	44.9	39.7	74.9	81.4	91.9	83.5	74.2	0.0
2036	6	46.0	38.7	49.4	47.6	51.3	54.8	43.4	40.5	74.7	79.8	90.9	69.1	71.7	40.5	51.5	42.0	52.6	53.4	56.0	56.4	43.8	40.0	78.2	79.3	92.7	76.6	72.3	41.9
2036	7	47.3	39.6	50.0	47.7	52.4	55.9	43.6	41.3	74.7	80.0	90.7	71.7	71.8	41.4	53.6	43.0	52.8	53.4	56.0	57.9	45.1	40.9	78.1	80.3	92.7	78.6	72.5	45.9

Year	Scenario	VHT (daily, weekday average)																											
		Car														Truck													
		LOCAL	SART (Commercial)	Sub-ART (Non-Commercial)	ART (Divided)	Roundabout	ART (Undivided)	SchoolZone (60kph original)	SchoolZone (50kph original)	MAJOR SART	SH(D) Divided	FWAY	FWAY RAMP	SH(UD) Undivided	EXP RAMP	LOCAL	SART (Commercial)	Sub-ART (Non-Commercial)	ART (Divided)	Roundabout	ART (Undivided)	SchoolZone (60kph original)	SchoolZone (50kph original)	MAJOR SART	SH(D) Divided	FWAY	FWAY RAMP	SH(UD) Undivided	EXP RAMP
2016	1	15566	1016	3028	3176	2984	590	128	117	649	430	1431	556	795	0	1026	40	158	102	175	15	5	8	19	11	54	39	91	0
2016	2	7878	937	3554	2455	165	709	55	193	1359	332	4997	135	985	0	263	35	167	85	8	19	2	8	19	37	778	16	66	0
2016	3	5574	658	2827	1650	134	278	45	180	789	615	5499	144	1177	5	180	30	115	65	7	8	2	6	10	67	838	17	89	0
2016	4	6288	624	2946	1503	118	268	39	165	755	277	4466	124	872	0	214	21	129	49	6	9	1	5	10	32	675	13	56	0
2016	5	8378	1127	3611	3054	178	1047	62	199	1497	376	4812	127	938	0	257	35	148	98	8	29	2	8	23	39	725	14	66	0
2016	6	7045	733	3160	2127	154	728	41	184	1301	665	5321	150	1195	5	197	26	122	72	7	20	1	6	15	65	805	17	83	0
2016	7	6988	756	3209	2326	157	647	56	179	1327	642	5612	151	1239	3	171	28	107	82	7	15	2	5	15	70	839	16	83	0
2026	1	21108	2397	3763	3720	3921	721	165	216	780	365	1730	214	1285	0	1275	233	175	102	216	20	4	9	20	12	68	21	124	0
2026	2	9789	1093	4332	2865	200	999	55	213	1813	362	5686	154	1090	0	379	37	222	98	12	36	2	9	46	35	869	19	72	0
2026	3	8797	1238	3801	3371	217	819	60	219	1430	904	6528	180	1663	10	305	47	159	124	12	25	2	8	19	86	1010	21	102	0
2026	4	9626	882	3454	2236	156	618	50	191	1268	348	4831	154	817	0	394	29	155	73	8	19	2	8	18	34	677	17	54	0
2026	5	9167	1041	3811	2919	194	988	57	200	1783	349	5463	153	1032	0	315	34	204	109	11	39	2	10	36	34	834	19	61	0
2026	6	8035	759	3500	2175	166	712	45	196	1480	700	6239	163	1466	4	239	28	137	77	9	19	2	6	22	75	958	18	91	0
2026	7	8070	745	3388	2183	162	609	52	176	1370	667	5787	164	1436	5	282	29	137	78	9	15	2	6	17	71	905	19	95	0
2036	1	24377	2844	4308	4065	5124	752	210	265	840	508	2039	250	1762	0	1611	264	193	108	284	19	4	10	22	19	88	25	185	0
2036	2	11013	1191	4548	4016	254	1114	82	243	1653	1123	7235	233	1852	5	422	39	208	130	14	35	3	11	22	79	1137	27	92	0
2036	3	9342	1399	4163	3752	253	863	65	218	1494	1252	7440	223	2067	20	315	59	185	140	15	28	2	7	23	111	1252	28	112	0
2036	4	10022	1559	4640	4451	280	1016	80	228	1808	1402	6919	231	1682	8	345	55	219	154	14	32	2	10	33	97	1044	25	97	0
2036	5	10817	1324	4328	3755	223	1270	74	224	2075	312	5417	159	773	0	390	42	206	122	11	44	2	11	49	30	795	19	43	0
2036	6	9503	1099	4307	3415	235	930	70	237	1492	1228	7231	237	2056	11	328	43	178	115	14	25	2	8	19	111	1207	28	112	0
2036	7	8802	760	3782	2310	174	661	55	181	1377	726	6234	206	1594	5	327	29	158	79	12	19	2	6	18	73	1086	24	91	0

Year	Scenario	VKT (daily, weekday average)																												
		Car														Truck														
		LOCAL	SART (Commercial)	Sub-ART (Non-Commercial)	ART (Divided)	Roundabout	ART (Undivided)	SchoolZone (60kph original)	SchoolZone (50kph original)	MAJOR SART	SH(D) Divided	FWAY	FWAY RAMP	SH(UD) Undivided	EXP RAMP	LOCAL	SART (Commercial)	Sub-ART (Non-Commercial)	ART (Divided)	Roundabout	ART (Undivided)	SchoolZone (60kph original)	SchoolZone (50kph original)	MAJOR SART	SH(D) Divided	FWAY	FWAY RAMP	SH(UD) Undivided	EXP RAMP
2016	1	966705	47310	173975	139226	188311	32177	6549	6689	38087	23577	76497	36410	53402	0	81628	2400	11276	5513	12902	867	271	535	1341	635	3099	2855	7009	0
2016	2	369130	36694	178352	114212	8723	39786	2414	8004	102072	27782	457017	10973	73727	8	14736	1475	9015	4418	445	1114	94	316	1467	3098	73020	1279	5045	0
2016	3	261707	26584	143792	79936	7330	14967	1913	7476	59475	51206	504870	11768	87811	222	10035	1279	6185	3563	410	468	81	247	754	5754	78769	1372	6800	5
2016	4	300323	25305	149481	70145	6449	14163	1687	6881	56827	23063	409560	10002	64865	5	12154	918	6991	2553	342	526	59	225	763	2663	63573	1099	4244	0
2016	5	389294	43814	179891	141202	9594	59013	2684	8269	112215	31921	440492	10307	69779	2	14232	1458	8114	5102	457	1658	99	352	1803	3380	68224	1148	4971	0
2016	6	322971	28183	158484	100429	8432	41115	1783	7622	97926	55962	489195	12363	89749	195	10797	1139	6543	3877	426	1176	71	259	1151	5588	75435	1365	6390	6
2016	7	320267	30146	161825	111534	8661	36608	2400	7424	99733	53671	515235	12406	92510	122	9211	1193	5761	4422	417	861	95	217	1174	6111	78888	1303	6335	1
2026	1	1292947	137762	200515	170181	227727	39009	8084	12499	39959	12093	105650	16122	93594	0	99938	18936	10793	5019	14517	1119	209	578	1134	395	4292	1824	10371	0
2026	2	443934	42229	184787	129948	10224	55567	2295	8747	134213	29361	513637	12126	79850	2	19055	1553	9211	4932	639	2007	68	378	3431	2831	80055	1494	5354	0
2026	3	404715	43196	189576	138411	10751	45360	2596	8904	106731	71186	596588	14174	121242	410	16497	1825	8470	5312	655	1448	80	298	1472	6918	94042	1703	7514	9
2026	4	471707	34755	172956	104720	8413	33881	2115	7902	94674	29141	435901	12019	60075	1	22250	1208	8569	3850	465	1063	72	323	1384	2864	62819	1337	4007	0
2026	5	428216	40198	185967	130349	9912	54406	2454	8264	132295	29021	494373	12053	75773	1	16884	1439	10593	5415	627	2064	93	405	2768	2735	76840	1555	4553	0
2026	6	370820	30000	177050	101473	9003	40320	1931	8043	111029	56835	571172	13040	107301	155	12697	1214	7395	4077	513	1127	80	264	1694	6192	89320	1533	6752	3
2026	7	379490	28875	170429	103434	8741	33724	2220	7296	102457	54626	529934	12951	105061	202	15448	1210	7384	4226	521	873	83	235	1306	5917	84640	1553	7011	2
2036	1	1462300	162912	221968	181428	258165	40536	8911	15402	42847	14273	117660	18715	120208	0	120933	21083	11837	5326	16824	1085	200	593	1263	518	5159	2125	15127	0
2036	2	514497	45191	223726	184627	12923	60565	3483	9785	122560	89656	652853	16724	132598	191	22235	1629	10952	6543	770	1915	111	425	1688	6136	104527	2082	6614	6
2036	3	416669	49569	205784	155792	11794	48219	2860	8901	111225	94277	677994	16424	148868	462	15488	2163	9767	6144	804	1621	94	296	1764	8305	116007	2157	8146	8
2036	4	457598	54144	216112	171217	12376	56621	3428	9222	135089	79750	624156	15678	120148	316	17994	2028	11206	6198	725	1786	96	378	2522	6076	95934	1902	7029	12
2036	5	508035	49266	211259	167683	11403	68220	3181	9200	153643	26089	481040	12646	56393	2	20770	1669	10918	6133	623	2291	93	455	3692	2424	73089	1581	3160	0
2036	6	436821	42589	212756	162548	12052	50984	3037	9579	111477	98012	657515	16369	147380	440	16902	1798	9331	6136	798	1391	102	323	1515	8770	111849	2118	8118	8
2036	7	416070	30111	188940	110295	9102	36924	2380	7489	102868	58095	565326	14744	114474	200	17548	1229	8327	4224	647	1090	80	250	1391	5829	100683	1886	6628	1

C Benefit Calculations

VOC

CPI - Sydney transport	
Jun-13	101.1
Jun-16	98.9

Scenario			VKT																Speed				Cents/km												Total ($)	Total ($)
			Urban								Rural								Urban		Rural		Urban						Rural						Year	Year
	Option	Year	Car	HGV	Car	Taxis	Small Rigid	Large Rigid	Artic	Buses	Car	HGV	Cars	Taxis	Small Rigid	Large Rigid	Artic	Buses	Car	HGV	Car	HGV	Car	Taxis	Small Rigid	Large Rigid	Artic	Buses	Cars	Taxis	Small Rigid	Large Rigid	Artic	Buses	347	347
					99%	1%	85%	4%	6%	4%			99%	1%	85%	4%	6%	4%																		
Do Minimum	1	2016	1560941	115392	1545331	15609	98590	4983	6630	5189	227974	14938	225694	2280	12763	645	858	672	59	76	60	71	35	35	54	91	140	65	29	29	46	70	105	54	$ 220,372,847	$211,217,892
Option 2	2	2016	757314	31614	749941	7573	27011	1365	1816	1422	671978	83909	664862	6716	71691	3624	4821	3773	48	54	87	92	40	40	62	104	159	78	29	29	50	76	113	57	$ 137,461,189	$131,750,636
Option 3	3	2016	543705	22268	538268	5437	19026	962	1279	1001	715351	93454	708198	7154	79846	4036	5369	4202	48	54	88	92	40	40	62	104	159	77	29	29	50	76	113	57	$ 106,743,402	$102,308,958
Option 4	4	2016	574434	23767	568889	5744	20306	1026	1366	1069	564322	72343	558679	5643	61809	3124	4156	3253	48	55	88	92	40	40	62	104	158	77	29	29	50	77	113	57	$ 105,697,990	$101,306,976
Option 5	5	2016	833761	31472	825424	8338	26889	1359	1808	1415	664715	79526	658068	6647	67946	3434	4569	3576	47	54	86	92	40	40	63	104	159	78	29	29	50	76	113	57	$ 148,031,348	$141,881,678
Option 6	6	2016	669018	24288	662328	6690	20752	1049	1395	1092	745389	89934	737935	7454	76839	3884	5167	4044	47	54	87	92	40	40	63	105	160	78	29	29	50	76	113	57	$ 126,139,618	$120,899,397
Option 7	7	2016	678865	22177	672077	6789	18948	958	1274	997	773677	93812	765940	7737	80152	4051	5390	4219	48	53	87	92	40	40	63	105	160	78	29	29	50	76	113	57	$ 127,810,178	$122,500,557
Do Minimum	1	2026	2088724	151110	2067837	20887	129108	6526	8682	6795	267418	18017	264744	2674	15393	778	1035	810	58	75	63	77	35	35	54	91	140	66	29	29	47	71	107	55	$ 295,749,091	$283,462,778
Option 2	2	2026	877731	37843	868954	8777	32333	1634	2174	1702	769188	93163	761496	7692	79998	4023	5353	4189	45	48	85	90	42	42	66	110	168	83	29	29	49	75	112	57	$ 164,377,505	$157,548,765
Option 3	3	2026	843509	34585	835074	8435	29549	1494	1987	1555	910332	111659	901228	9103	95400	4822	6415	5021	46	51	86	91	41	41	64	107	163	80	29	29	50	76	112	57	$ 161,811,533	$155,089,392
Option 4	4	2026	836445	37801	828064	8364	32297	1632	2172	1700	631812	72410	625493	6318	61867	3127	4160	3256	49	55	86	91	40	40	62	103	158	77	29	29	50	76	113	57	$ 146,400,819	$140,318,886
Option 5	5	2026	859768	37520	851170	8598	32057	1620	2156	1687	743517	88452	736082	7435	75572	3820	5082	3977	47	52	85	90	41	41	64	106	162	79	29	29	49	76	112	57	$ 156,898,625	$150,380,581
Option 6	6	2026	738640	27368	731253	7386	23383	1182	1572	1231	859532	105493	850937	8595	90133	4556	6061	4744	48	53	86	91	40	40	63	105	161	78	29	29	50	76	113	57	$ 140,576,830	$134,736,843
Option 7	7	2026	734209	29981	726867	7342	25615	1295	1723	1348	805231	100430	797179	8052	85807	4337	5770	4516	48	54	86	91	40	40	63	104	159	78	29	29	50	76	113	57	$ 138,276,930	$132,532,488
Do Minimum	1	2036	2351622	177880	2328105	23516	151980	7682	10220	7999	313704	24193	310567	3137	20670	1045	1390	1088	57	72	60	75	36	36	55	93	142	67	29	29	47	71	106	55	$ 341,813,165	$327,613,212
Option 2	2	2036	1054798	44579	1044250	10548	38088	1925	2561	2005	1014582	121053	1004436	10146	103427	5228	6955	5444	47	52	85	90	41	41	64	106	162	79	29	29	49	75	112	57	$ 195,377,878	$187,261,290
Option 3	3	2036	899588	36377	890593	8996	31081	1571	2090	1636	1049250	136386	1038758	10493	116527	5890	7836	6133	45	49	85	90	42	42	66	109	167	82	29	29	49	75	112	57	$ 177,241,926	$169,878,760
Option 4	4	2036	980718	40410	970910	9807	34526	1745	2322	1817	975136	113476	965385	9751	96953	4900	6520	5103	45	49	83	88	42	42	65	109	166	82	29	29	49	75	111	56	$ 188,180,850	$180,363,248
Option 5	5	2036	1028248	42952	1017965	10282	36698	1855	2468	1931	729813	83944	722515	7298	71721	3625	4823	3775	47	52	84	90	41	41	64	106	162	79	29	29	49	76	112	57	$ 181,454,902	$173,916,716
Option 6	6	2036	930365	36781	921062	9304	31425	1588	2113	1654	1031194	132378	1020882	10312	113103	5717	7606	5953	47	52	85	90	41	41	64	107	162	79	29	29	49	76	112	57	$ 176,971,940	$169,619,990
Option 7	7	2036	801310	33396	793297	8013	28533	1442	1919	1502	855705	116417	847148	8557	99466	5027	6689	5235	48	53	85	91	40	40	63	105	161	78	29	29	50	76	112	57	$ 150,552,986	$144,298,559

	Urban						Rural					
	Car	Taxis	Small Rigid	Large Rigid	Articulated	Buses	Cars	Taxis	Small Rigid	Large Rigid	Articulated	Buses
A	12.6514	12.6514	33.9697	57.16	91.1303	35.8038	12.6514	12.6514	33.9697	57.16	91.1303	35.8038
B	1,315.52	1315.518	1,543.55	2556.077	3688.61	2259.905	1315.518	13 15.518	1543.555	2556.077	3688.61	2259.905
C0	35.05	35.047	51.5092	82.29	119.8994	62.6793	35.047	35.047	51.5092	82.29	119.8994	62.6793
C1	-0.18	-0.1751	-0.2481	-0.5525	-0.68	-0.3002	-0.1751	-0.1751	-0.2481	-0.5525	-0.68	-0.3002
C2	0.0012	0.0012	0.0025	0.0053	0.0066	0.0026	0.0012	0.0012	0.0025	0.0053	0.0066	0.0026

Table 11 Coefficients for urban stop-start and freeway vehicle operating models

Vehicle Type	Stop-start			Free flow	
	A	B	C_0	C_1	C_2
Car (all types):					
Small car	12.6514	1315.5518	35.0470	-0.1751	0.0012
Medium car	12.6514	1315.5518	35.0470	-0.1751	0.0012
Large car	12.6514	1315.5518	35.0470	-0.1751	0.0012
Utility vehicles					
Other utility	15.9354	1,357.1233	37.4925	-0.1840	0.0014
4WD mid size 4WD	21.0761	1,528.7911	45.0080	-0.1918	0.0013
Rigid trucks					
Light Rigid	33.9697	1,543.5545	51.5092	-0.2481	0.0025
Medium Rigid	46.4034	2,016.0894	67.0133	-0.3652	0.0035
Heavy Rigid	57.1600	2,556.0769	82.2900	-0.5525	0.0053
Rigid - heavy tow	64.2000	4,602.1080	104.1014	-0.7467	0.0047
Articulated trucks					
4-Axle	84.0711	3,323.0192	111.0921	-0.7240	0.0072
5-axle	91.5163	3,688.6895	119.8994	-0.6800	0.0066
6-axle	98.9614	3,861.5764	128.6876	-0.6359	0.0060
Combination vehicles					
Rigid + 4-Axle Dog	102.1815	3,759.9858	136.1878	-0.8403	0.0085
B-Double	127.8635	4,580.1035	151.4718	-0.7525	0.0065
Road train + 5-Axle Dog	137.8000	5,310.0918	163.8181	-0.7377	0.0064
A-Double	143.6635	5,600.0035	183.4354	-0.8330	0.0074
B-Triple	144.4123	6,267.2475	216.7429	-0.9973	0.0092
A/B combination	151.4123	6,267.8475	224.3871	-1.0011	0.0089
A-Triple	155.9452	7,34.8021	237.9552	-1.0111	0.0089
D-Triple [illegible]	159.1424	8,915.2143	249.7248	-0.9936	0.0085

NB: Coefficient values are in units SI. Optional additional factors for the cubic term are given in the manual derived from coefficients.

TTC

Average Weekly Earnings NSW	
Nov-15	1176.3
May-16	1199.2

Flow Period Description			VHT				Average Weekday							Average Weekday							Year	Year
							Total VHT - Urban							Total VHT - Rural							Total VHT	Total VHT
		Type	Car		HGV		Cars	Taxis	Small Rigid	Large Rigid	Artic	Buses	Total ($)	Cars	Taxis	Small Rigid	Large Rigid	Artic	Buses	Total ($)	Total ($)	Total ($)
		Occupancy	Urban	Rural	Urban	Rural	1.4	2.1	1.2	1.2	1.2	21.2	-	1.6	2.1	1.3	1.1	1	21.2	-	-	-
		TTC ($/h)					21.55	52.76	27.57	28.155	29.09	16.92	-	21.55	52.76	27.57	28.155	29.09	16.92	-	347	347
		Composition					99%	1%	85%	4%	6%	4%		99%	1%	85%	4%	6%	4%			
Do Minimum	1	2016	26,605	3,861	1,529	215	26,339	266	1,306	66	88	69	921,162	3,823	39	183	9	12	10	150,230	$371,773,013	$379,010,624
Option 2	2	2016	15,946	7,808	587	914	15,787	159	501	25	34	26	536,337	7,730	78	781	39	53	41	327,677	$299,812,758	$305,649,460
Option 3	3	2016	11,346	8,231	412	1,020	11,233	113	352	18	24	19	381,370	8,149	82	872	44	59	46	348,218	$253,166,953	$258,095,562
Option 4	4	2016	11,951	6,495	435	785	11,831	120	372	19	25	20	401,715	6,430	65	671	34	45	35	273,788	$234,399,506	$238,962,754
Option 5	5	2016	17,654	7,750	585	867	17,478	177	500	25	34	26	590,694	7,673	78	741	37	50	39	323,258	$317,141,281	$323,315,331
Option 6	6	2016	14,173	8,638	452	985	14,031	142	386	20	26	20	473,375	8,551	86	841	43	57	44	361,154	$289,581,592	$295,219,116
Option 7	7	2016	14,319	8,973	417	1,023	14,176	143	356	18	24	19	476,329	8,884	90	874	44	59	46	375,217	$295,486,549	$301,239,029
Do Minimum	1	2026	36,010	4,375	2,034	244	35,650	360	1,737	88	117	91	1,245,052	4,331	44	209	11	14	11	170,242	$491,107,266	$500,668,056
Option 2	2	2026	19,547	9,105	794	1,040	19,351	195	679	34	46	36	661,024	9,014	91	889	45	60	47	380,796	$361,511,828	$368,549,676
Option 3	3	2026	18,521	10,716	682	1,238	18,336	185	583	29	39	31	622,947	10,609	107	1,058	53	71	56	448,881	$371,924,230	$379,164,785
Option 4	4	2026	17,213	7,419	687	800	17,041	172	587	30	39	31	581,499	7,345	74	684	35	46	36	307,927	$308,630,940	$314,639,312
Option 5	5	2026	18,377	8,780	726	985	18,193	184	620	31	42	33	620,443	8,692	88	841	43	57	44	366,284	$342,394,176	$349,059,845
Option 6	6	2026	15,587	10,052	518	1,164	15,431	156	442	22	30	23	521,560	9,951	101	994	50	67	52	421,176	$327,129,574	$333,498,075
Option 7	7	2026	15,385	9,430	557	1,107	15,231	154	476	24	32	25	517,017	9,336	94	946	48	64	50	395,865	$316,770,329	$322,937,158
Do Minimum	1	2036	41,944	5,399	2,493	339	41,524	419	2,130	108	143	112	1,456,167	5,345	54	290	15	19	15	211,993	$578,851,586	$590,120,566
Option 2	2	2036	22,462	12,102	861	1,357	22,237	225	736	37	49	39	757,134	11,981	121	1,159	59	78	61	504,873	$437,916,599	$446,441,882
Option 3	3	2036	20,054	12,496	752	1,525	19,853	201	642	32	43	34	675,158	12,371	125	1,303	66	88	69	527,517	$417,328,111	$425,452,581
Option 4	4	2036	22,278	12,050	831	1,297	22,055	223	710	36	48	37	749,804	11,930	121	1,108	56	75	58	500,035	$433,694,250	$442,137,333
Option 5	5	2036	22,015	8,737	828	936	21,795	220	707	36	48	37	741,297	8,649	87	799	40	54	42	362,304	$382,949,422	$390,404,614
Option 6	6	2036	19,796	12,255	713	1,477	19,598	198	609	31	41	32	665,083	12,132	123	1,262	64	85	66	516,371	$409,964,508	$417,945,625
Option 7	7	2036	16,724	10,141	631	1,292	16,557	167	539	27	36	28	563,236	10,039	101	1,104	56	74	58	430,781	$344,923,938	$351,638,856

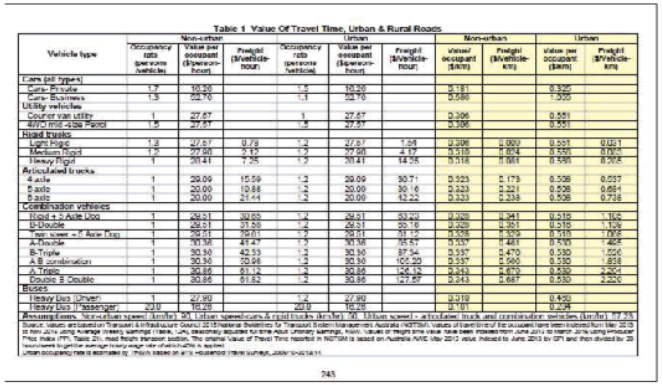

Table 1 Value Of Travel Time, Urban & Rural Roads

Vehicle type	Occupancy ratio (persons /vehicle)	Non-urban Value per occupant ($/person-hour)	Non-urban Freight ($/vehicle-hour)	Urban Occupancy ratio (persons /vehicle)	Urban Value per occupant ($/person-hour)	Urban Freight ($/vehicle-hour)	Non-urban value/ occupant ($/km)	Non-urban Freight ($/vehicle-km)	Urban value per occupant ($/km)	Urban Freight ($/vehicle-km)
Cars (all types)										
Cars- Private	1.2	18.30		1.5	18.30		0.381		0.325	
Cars- Business	1.3	52.76		1.1	52.76		0.580		1.320	
Utility vehicles										
Courier van utility	1	27.57		1	27.57		0.306		0.551	
4WD mid -size Pickup	1.5	27.57		1.5	27.57		0.306		0.551	
Road trucks										
Light Rigid	1.2	27.57	0.78	1.2	27.57	1.56	0.306	0.000	0.551	0.031
Medium Rigid	1.2	27.90	2.12	1.2	27.90	4.17	0.310	0.024	0.558	0.083
Heavy Rigid	1	20.41	7.25	1.2	20.41	14.25	0.318	0.081	0.408	0.285
Articulated trucks										
4 axle	1	29.09	15.59	1.2	29.09	30.71	0.323	0.173	0.582	0.037
5 axle	1	20.00	19.88	1.2	20.00	39.16	0.333	0.221	0.508	0.684
6 axle	1	20.00	21.41	1.2	20.00	42.22	0.333	0.238	0.508	0.738
Combination vehicles										
Road + 2 Axle Dog	1	29.21	30.65	1.2	29.21	60.23	0.325	0.341	0.515	1.106
D-Double	1	29.21	31.50	1.2	29.21	62.16	0.325	0.351	0.515	1.136
Road trailer + 5 Axle Dog	1	29.51	39.01	1.2	29.51	81.12	0.328	0.434	0.519	1.465
A-Double	1	30.36	41.47	1.2	30.36	85.57	0.337	0.461	0.530	1.565
B-Triple	1	30.30	42.53	1.2	30.30	87.94	0.337	0.470	0.530	1.606
A B combination	1	30.30	50.98	1.2	30.30	105.20	0.337	0.560	0.530	1.898
A Triple	1	30.86	61.12	1.2	30.86	126.13	0.343	0.679	0.530	2.302
Double B Double	1	30.86	61.82	1.2	30.86	127.57	0.343	0.687	0.530	2.326
Buses										
Heavy Bus (Driver)	1	27.90		1.2	27.90		0.310		0.465	
Heavy Bus (Passenger)	20.0	16.26		20.0	16.26		0.181		0.014	

Assumptions: Non-urban speed (km/hr) 90, Urban speed-cars & rigid trucks (km/hr) 60, Urban speed - articulated truck and combination vehicles (km/hr) 77.25

Source: values are based on Transport & Infrastructure Council 2016 National Guidelines for Transport System Management in Australia (NGTSM). Values of travel time of for passenger cars have been indexed from Mar 2013 to Nov 2016 using Average Weekly earnings (Table, ...) seasonally adjusted full-time Adult Ordinary earnings, from. Values of freight time value have been indexed from June 2013 to March 2016 using wholesaler Price Index (PPI, Table 20, road freight transport section. The original Value of Travel Time reported in NGTSM is based on Australia AWE Mar 2013 value. Indexed to June 2013 by CPI and then divided by 38 hours/week to get the average hourly wage rate of vehicle drivers is applied.

Urban occupancy rate is estimated by ... which based on a's household travel surveys, ...

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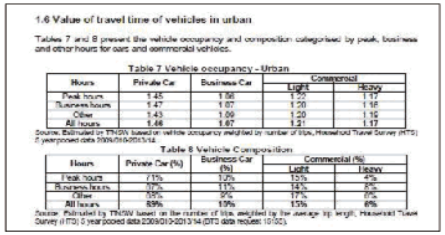


1.6 Value of travel time of vehicles in urban

Tables 7 and 8 present the vehicle occupancy and composition categorised by peak, business and other hours for cars and commercial vehicles.

Table 7 Vehicle occupancy - Urban

Hours	Private Car	Business Car	Commercial	
			Light	Heavy
Peak hours	1.45	1.56	1.22	1.17
Business hours	1.47	1.67	1.20	1.18
Other	1.43	1.09	1.20	1.16
All hours	1.46	1.67	1.21	1.17

Source: Estimated by TfNSW based on vehicle occupancy weighted by number of trips, Household Travel Survey (HTS) 5 year pooled data 2009/10-2013/14.

Table 8 Vehicle Composition

Hours	Private Car (%)	Business Car (%)	Commercial (%)	
			Light	Heavy
Peak hours	71%	12%	15%	4%
Business hours	72%	13%	14%	5%
Other	79%	9%	17%	5%
All hours	73%	13%	15%	5%

Source: Estimated by TfNSW based on the number of trips weighted by the average trip weight, Household Travel Survey (HTS) 5 year pooled data 2009/10-2013/14 (DTS data request 10100).

Crashes

WTP Approach (per crash)			Fatal	Serious	Moderate	Minor	Non-injury	Average
Total (from Port Maq 2017 data, 5 years)			24	251	276	260	681	
		%	2%	17%	18%	17%	46%	
Crash Rate	27.38	Cost (rural)	$ 8,985,668	$ 683,392	$111,497	$ 107,367	$ 9,743	$ 303,215
	69.45	Cost (urban	$ 7,563,434	$ 476,777	$ 80,546	$ 75,391	$ 9,743	$ 234,305

Average Weekly Earnings NSW

May-16	1199.2
May-16	1199.2

http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/6302.0Nov%202017?OpenDocument

Road Traffic Casualty Crashes in NSW (2016)

Fatal	Serious	Moderate	Minor
356	5553	6107	5765
2%	31%	34%	32%

http://roadsafety.transport.nsw.gov.au/statistics/interactivecrashstats/index.html

Flow Period Description			VKT						Day	Total ($)	Total ($)
			Urban			Rural			Total Cost	Year	Year
	Option	Year	Car	HGV	Total	Car	HGV	Total			
									1	347	347
Do Minimum	1	2016	1,560,941	115,392	1,676,333	227,974	14,938	242,912	$ 292,947	$ 101,652,603	$ 101,652,603
Option 2	2	2016	757,314	31,614	788,928	671,578	83,909	755,487	$ 191,099	$ 66,311,214	$ 66,311,214
Option 3	3	2016	543,705	22,268	565,973	715,351	93,454	808,805	$ 159,245	$ 55,257,968	$ 55,257,968
Option 4	4	2016	574,434	23,767	598,201	564,322	72,343	636,665	$ 150,198	$ 52,118,709	$ 52,118,709
Option 5	5	2016	833,761	31,472	865,233	664,715	79,526	744,241	$ 202,582	$ 70,295,847	$ 70,295,847
Option 6	6	2016	669,018	24,288	693,307	745,389	89,934	835,323	$ 182,167	$ 63,211,826	$ 63,211,826
Option 7	7	2016	678,865	22,177	701,042	773,677	93,812	867,489	$ 186,096	$ 64,575,254	$ 64,575,254
Do Minimum	1	2026	2,088,724	151,110	2,239,834	267,418	18,017	285,434	$ 388,173	$ 134,695,930	$ 134,695,930
Option 2	2	2026	877,731	37,843	915,574	769,188	93,163	862,351	$ 220,579	$ 76,540,872	$ 76,540,872
Option 3	3	2026	843,509	34,585	878,094	910,332	111,659	1,021,990	$ 227,733	$ 79,023,444	$ 79,023,444
Option 4	4	2026	836,448	37,801	874,249	631,812	72,410	704,222	$ 200,726	$ 69,652,083	$ 69,652,083
Option 5	5	2026	859,788	37,520	897,287	743,517	88,452	831,969	$ 215,081	$ 74,633,060	$ 74,633,060
Option 6	6	2026	738,640	27,368	766,007	859,532	105,493	965,025	$ 204,765	$ 71,053,378	$ 71,053,378
Option 7	7	2026	734,209	29,981	764,189	805,231	100,430	905,661	$ 199,541	$ 69,240,566	$ 69,240,566
Do Minimum	1	2036	2,351,622	177,880	2,529,502	313,704	24,193	337,897	$ 439,664	$ 152,563,449	$ 152,563,449
Option 2	2	2036	1,054,798	44,579	1,099,377	1,014,582	121,053	1,135,635	$ 273,176	$ 94,792,160	$ 94,792,160
Option 3	3	2036	899,588	36,377	935,966	1,049,250	136,386	1,185,636	$ 250,736	$ 87,005,519	$ 87,005,519
Option 4	4	2036	980,718	40,410	1,021,127	975,136	113,476	1,088,612	$ 256,539	$ 89,019,118	$ 89,019,118
Option 5	5	2036	1,028,248	42,952	1,071,199	729,813	83,944	813,758	$ 241,869	$ 83,928,432	$ 83,928,432
Option 6	6	2036	930,365	36,781	967,146	1,031,194	132,378	1,163,572	$ 253,978	$ 88,130,494	$ 88,130,494
Option 7	7	2036	801,310	33,396	834,706	855,705	116,417	972,122	$ 216,533	$ 75,136,903	$ 75,136,903

The crash costs for each crash severity were obtained from Austroads (2008) and are shown in Table 2.1.

Table 2.1: Estimated average crash costs by severity category, dollars per crash at June 2007

Jurisdiction	Rural					Urban				
	Fatal	Serious injury	Minor injury	Average casualty	Property damage only	Fatal	Serious injury	Minor injury	Average casualty	Property damage only
New South Wales	2,260,000	191,000		191,000	7,500	1,727,000	168,000		169,000	7,500
Victoria	2,129,000	490,000	20,800	220,000	7,500	1,929,000	467,000	20,600	150,000	7,500
Queensland	2,102,000	502,000	20,200	259,000	7,500	1,958,000	471,000	20,600	183,000	7,500
South Australia	2,356,000	522,000	20,100	220,000	7,500	1,946,000	488,000	19,200	74,000	7,500
Western Australia	2,004,000	529,000	21,700	318,000	7,500	1,848,000	488,000	21,200	163,000	7,500
Tasmania	2,155,000	455,000	21,700	167,000	7,500	1,724,000	430,000	20,100	96,000	7,500
Northern Territory	2,203,000	587,000	15,100	357,000	7,500	1,936,000	476,000	13,200	243,000	7,500
ACT	2,057,000	494,000	17,000		7,500	2,057,000	494,000	17,000		7,500

Source: Austroads (2008).

Table 52 Costs per casualty and per crash
Inclusive Willingness to Pay Approach, March 2016$

	Urban	Rural	Average
Inclusive WTP costs per casualty			
Fatality	$9,969,123	$7,629,169	$7,272,032
Serious injury (injury requiring hospitalisation)	$418,780	$554,152	$465,010
Moderate injury (attendance at emergency department)	$64,437	$82,590	$72,804
Minor injury (not requiring attendance at emergency department or hospital)	$64,437	$82,590	$72,804
Unknown injury type prevention	$169,081	$236,030	$203,623
Inclusive WTP costs per crash			
Fatal crash (at least one person killed)	$7,563,434	$8,985,668	$8,143,060
Serious injury crash (at least one person hospitalised, but no fatalities)	$476,777	$683,392	$540,132
Moderate injury crash (at least one person attended emergency, but no serious injuries or fatalities)	$80,546	$111,497	$91,733
Minor injury crash (at least one person received a minor injury, but no moderate injuries, serious injuries or fatalities)	$75,391	$107,367	$86,637
Unknown injury type crash	$201,029	$345,665	$234,015
Property damage only	$9,743	$9,743	$9,743

Source: Values from the Economic Valuation of Safety Benefits, Serious Injuries, Final Report, PWC for Roads and Traffic Authority (now Roads & Maritime Services) and Indexed from Dec 2007 to March 2016 using Sydney CPI, all groups. Unknown injury type crash is non fatal casualty crash where injury severity is unknown.

[1] In previous years, the category labelled "serious injury" in fact represented "severe permanent injuries requiring hospitalisation" (and hence was a higher value) which is not the nationally accepted definition of serious injury.

APPENDIX B OUTPUTS FROM THE CRASH RATES DATABASE FOR EACH JURISDICTION

B.1 New South Wales

Table B 1: New South Wales – road sections – single attributes

Carriageway	100 million VKT (8 years)	Fatal	Fatal CR	Injury	Injury CR	Fatal + Injury	Fatal + Injury CR	All crashes	Total CR
Divided	905.88	339	0.37	17,386	19.19	17,725	19.57	24,990	27.59
Single	947.45	763	0.81	19,902	21.01	20,665	21.81	26,623	28.24
Environment									
Rural	791.00	625	0.79	9,519	12.03	10143	12.82	21,687	27.38
Urban	1,194.65	642	0.54	34,446	28.83	35088	29.37	32,964	69.45
Road rank									
1	23.17	29	1.25	490	21.15	519	22.4	886	38.23
2	153.02	145	0.94	2,664	17.32	2809	18.26	5,690	36.99
3	232.31	164	0.71	6,310	27.16	6474	27.87	14,264	61.4
4	724.17	462	0.64	20,482	28.28	20944	28.92	48,058	66.36
5	260.01	171	0.6	7,381	28.01	7552	29.04	17,505	63.15
6	568.37	296	0.52	6,637	11.68	6933	12.2	17,788	31.3
Surface									
Asphaltic concrete	1,151.24	623	0.54	32,097	27.88	32,720	28.42	77,689	67.49
Concrete	183.34	83	0.45	2,521	13.75	2,604	14.2	6,361	34.69
Spray seal	647.71	599	0.86	9322	14.39	9681	15.25	20525	31.69
Unsealed	3.35	2	0.6	24	7.16	26	7.76	36	10.75

EXTERNALITIES

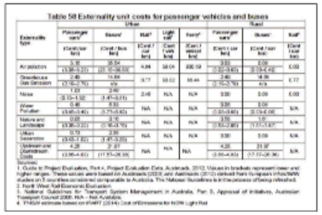
CPI - Sydney transport	
Jun-12	100.9
Jun-16	96.9

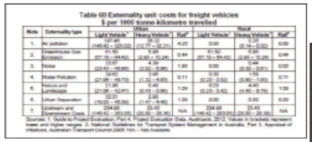
Flow Period Description – VKT

Description	Option	Year	Urban Car	Urban HGV	Urban Car 99%	Urban Taxis 1%	Urban Small Rigid 85%	Urban Large Rigid 4%	Urban Artic 6%	Urban Buses 4%	Rural Car	Rural HGV	Rural Cars 99%	Rural Taxis 1%	Rural Small Rigid 85%	Rural Large Rigid 4%	Rural Artic 6%	Rural Buses 4%
Do Minimum	1	2016	1560941	115392	1545331	15609	98590	4983	6630	5189	227974	14938	225694	2280	12763	645	858	672
Option 2	2	2016	757314	31614	749741	7573	27011	1365	1816	1422	671578	83909	664862	6716	71691	3624	4821	3773
Option 3	3	2016	543705	22268	538268	5437	19026	962	1279	1001	715351	93454	708198	7154	79846	4036	5369	4202
Option 4	4	2016	574434	23767	568689	5744	20306	1026	1366	1069	564322	72343	558679	5643	61809	3124	4156	3253
Option 5	5	2016	833761	31472	825424	8338	26889	1359	1808	1415	664715	79526	658068	6647	67946	3434	4569	3576
Option 6	6	2016	669018	24288	662328	6690	20752	1049	1395	1092	745389	89934	737935	7454	76839	3884	5167	4044
Option 7	7	2016	678865	22177	672077	6789	18948	958	1274	997	773677	93812	765940	7737	80152	4051	5390	4219
Do Minimum	1	2026	2088724	151110	2067837	20887	129108	6526	8682	6795	267418	18017	264744	2674	15393	778	1035	810
Option 2	2	2026	877731	37843	868954	8777	32333	1634	2174	1702	769188	93163	761496	7692	79598	4023	5353	4189
Option 3	3	2026	843509	34585	835074	8435	29549	1494	1987	1555	910332	111659	901228	9103	95400	4822	6415	5021
Option 4	4	2026	836448	37801	828084	8364	32297	1632	2172	1700	631812	72410	625493	6318	61867	3127	4160	3256
Option 5	5	2026	859768	37520	851170	8598	32057	1620	2156	1687	743517	88452	736082	7435	75572	3820	5082	3977
Option 6	6	2026	738640	27368	731253	7386	23383	1182	1572	1231	859532	105493	850937	8595	90133	4556	6061	4744
Option 7	7	2026	734209	29981	726867	7342	25615	1295	1723	1348	805231	100430	797179	8052	85807	4337	5770	4516
Do Minimum	1	2036	2351622	177880	2328105	23516	151980	7682	10220	7999	313704	24193	310567	3137	20670	1045	1390	1088
Option 2	2	2036	1054798	44579	1044250	10548	38088	1925	2561	2005	1014582	121053	1004436	10146	103427	5228	6955	5444
Option 3	3	2036	899588	36377	890593	8996	31081	1571	2090	1636	1049250	136386	1038758	10493	116527	5890	7836	6133
Option 4	4	2036	980718	40410	970910	9807	34526	1745	2322	1817	975136	113476	965385	9751	96953	4900	6520	5103
Option 5	5	2036	1028248	42952	1017965	10282	36698	1855	2468	1931	729813	83944	722515	7298	71721	3625	4823	3775
Option 6	6	2036	930365	36781	921062	9304	31425	1588	2113	1654	1031194	132378	1020882	10312	113103	5717	7606	5953
Option 7	7	2036	801310	33396	793297	8013	28533	1442	1919	1502	855705	116417	847148	8557	99466	5027	6689	5235

Total cents

Description	Option	Year	Urban Car	Urban Taxis	Urban Small Rigid	Urban Large Rigid	Urban Artic	Urban Buses	Rural Cars	Rural Taxis	Rural Small Rigid	Rural Large Rigid	Rural Artic	Rural Buses	Total ($) Year 347	Total ($) Year 347
Do Minimum	1	2016	18853042	190435	1674619	151976	1074252	427986	1670134	16870	99510	10514	74317	25714	$ 84,214,712	$ 80,876,170
Option 2	2	2016	9146836	92392	458801	41638	294316	117257	4919978	49697	558955	59057	417445	144439	$ 56,563,811	$ 54,321,440
Option 3	3	2016	6566866	66332	323169	29328	207310	82593	5240662	52936	622538	65775	464931	160869	$ 48,175,079	$ 46,265,264
Option 4	4	2016	6938011	70081	344916	31302	221260	88151	4134226	41760	481909	50916	359904	124530	$ 44,717,773	$ 42,945,017
Option 5	5	2016	10070169	101719	456733	41450	292990	116728	4869705	49189	529756	55972	395639	136894	$ 59,395,793	$ 57,041,153
Option 6	6	2016	8080405	81620	352480	31989	226113	90084	5460720	55159	599087	63297	447417	154810	$ 54,281,839	$ 52,129,933
Option 7	7	2016	8199333	82822	321842	29208	206458	82254	5667958	57252	624921	66026	466711	161485	$ 55,402,960	$ 53,206,608
Do Minimum	1	2026	25227607	254824	2192979	199019	1406775	560464	1959103	19789	120017	12680	89632	31013	$ 111,296,442	$ 106,884,293
Option 2	2	2026	10601233	107083	549195	49841	352303	140359	5635068	56920	620603	65570	463486	160370	$ 65,243,052	$ 62,656,608
Option 3	3	2026	10187900	102908	501916	45550	321974	128276	6669089	67365	743807	78587	555498	192207	$ 67,994,920	$ 65,299,383
Option 4	4	2026	10102624	102047	548584	49786	351911	140203	4628652	46754	482358	50964	360240	124646	$ 58,951,025	$ 56,614,017
Option 5	5	2026	10384275	104892	544501	49415	349292	139159	5447006	55020	589215	62254	440044	152259	$ 63,561,146	$ 61,041,378
Option 6	6	2026	8921291	90114	397170	36044	254781	101506	6296932	63605	702737	74248	524826	181594	$ 61,227,626	$ 58,800,367
Option 7	7	2026	8867773	89573	435092	39486	279108	111197	5899126	59587	669008	70684	499636	172878	$ 59,660,224	$ 57,295,101
Do Minimum	1	2036	28402886	286898	2581471	234276	1655989	659751	2298195	23214	161159	17027	120358	41645	$ 126,595,557	$ 121,576,903
Option 2	2	2036	12739851	128685	646954	58713	415015	165343	7432825	75079	806388	85199	602236	208378	$ 81,075,387	$ 77,861,299
Option 3	3	2036	10865229	109750	527925	47911	338659	134923	7686806	77645	908529	95991	678518	234772	$ 75,322,102	$ 72,336,092
Option 4	4	2036	11845107	119648	586445	53222	376199	149879	7143848	72160	755912	79866	564539	195335	$ 76,139,289	$ 73,120,883
Option 5	5	2036	12419176	125446	623331	56569	399861	159306	5346613	54006	559189	59081	417620	144500	$ 70,665,502	$ 67,864,095
Option 6	6	2036	11236953	113505	533781	48442	342415	136419	7554526	76308	881826	93170	658576	227872	$ 76,006,165	$ 72,993,036
Option 7	7	2036	9678218	97760	484656	43984	310902	123864	6268894	63322	775508	81937	579174	200399	$ 64,918,905	$ 62,345,311





	Urban (c/km) Car	Urban (c/km) Buses	Urban (c/km) Light	Urban (c/km) Rigid	Urban (c/km) Artic	$/1000tonne-km Light	$/1000tonne-km Heavy	Rural (c/km) Car	Rural (c/km) Buses	Rural (c/km) Light	Rural (c/km) Rigid	Rural (c/km) Artic	$/1000tonne-km Light	$/1000tonne-km Heavy
Air pollution	3.16	35.54	5.77	11.93	63.36	197.46	26.32	0.03	0	0.00	0.12	0.63	0	0.26
Greenhouse	2.49	14.64	1.80	2.66	14.11	61.50	5.86	2.49	14.64	1.80	2.66	14.11	61.5	5.86
Noise	1.03	2.49	0.98	1.99	10.57	33.67	4.39	0	0	0.00	0.20	1.06	0	0.44
Water pollution	0.48	5.33	0.87	1.79	9.51	29.92	3.95	0.05	0.06	0.01	0.72	3.80	0.3	1.58
Nature and Landscape	0.06	0.16	0.64	0.19	1.04	21.96	0.43	0.58	1.61	0.01	1.99	10.59	0.23	4.4
Urban Separation	0.73	2.35	0.94	1.33	7.05	32.21	2.93	0	0	0.00	0.00	0.00	0	0
Upstream and Downstream Costs	4.25	21.97	5.99	10.62	56.40	204.98	23.43	4.25	21.97	5.99	10.62	56.40	204.98	23.43
TOTAL	**12.2**	**82.48**	**16.99**	**30.50**	**162.04**	-	-	**7.4**	**38.28**	**7.80**	**16.30**	**86.59**	267.01	35.97
Load per trip (kg)	-	-	292	4531	24073	-	-	-	-	292	4531	24073	-	-

Australian Bureau of Statistics

92080DO001_1231201610 Survey of Motor Vehicle Use, Australia, 12 months ended 30 June 2016

D Discounting Calculations

Discounted Costs and Benefits

			COSTS				BENEFITS											
Do Minimum		7%	Construction		Maintenance		Travel Time			VOC and CO2			External Environmental			Crashes		
Year (from 1 July of)	Year	Discount factor	Money of the Day	Present Value	Annual Costs (Money of the Day)	Annual Costs (Present Value)	Annual Benefits (Money of the Day)	Interpolated Annual Benefits (Money of the Day)	Annual Benefits (Present Value)	Annual Benefits (Money of the Day)		Annual Benefits (Present Value)	Annual Benefits (Money of the Day)		Annual Benefits (Present Value)	Annual Benefits (Money of the Day)	Interpolated Annual Benefits (Money of the Day)	Annual Benefits (Present Value)
2016	0	1			$ -	$0	$ 379,010,624	$ 379,010,624	$379,010,624	$ 211,217,892	$ 211,217,892	$211,217,892	$ 80,876,170	$ 80,876,170	$80,876,170	$ 101,652,603	$101,652,603	$101,652,603
2017	1	0.9346			$ -	$0		$391,176,367	$365,585,390		$218,442,381	$204,151,758		$83,476,982	$78,015,871		$104,956,936	$98,090,594
2018	2	0.8734			$ -	$0		$403,342,110	$352,294,620		$225,666,869	$197,106,183		$86,077,795	$75,183,680		$108,261,268	$94,559,585
2019	3	0.8163			$ -	$0		$415,507,854	$339,178,179		$232,891,358	$190,108,721		$88,678,607	$72,388,159		$111,565,601	$91,070,763
2020	4	0.7629			$ -	$0		$427,673,597	$326,270,139		$240,115,846	$183,183,230		$91,279,419	$69,636,632		$114,869,934	$87,633,722
2021	5	0.7130			$ -	$0		$439,839,340	$313,599,371		$247,340,335	$176,350,241		$93,880,232	$66,935,308		$118,174,266	$84,256,619
2022	6	0.6663			$ -	$0		$452,005,083	$301,190,072		$254,564,824	$169,627,291		$96,481,044	$64,289,393		$121,478,599	$80,946,320
2023	7	0.6227			$ -	$0		$464,170,826	$289,062,262		$261,789,312	$163,029,227		$99,081,856	$61,703,200		$124,782,932	$77,708,539
2024	8	0.5820			$ -	$0		$476,336,569	$277,232,220		$269,013,801	$156,568,481		$101,682,669	$59,180,239		$128,087,265	$74,547,954
2025	9	0.5439			$ -	$0		$488,502,313	$265,712,891		$276,238,290	$150,255,327		$104,283,481	$56,723,304		$131,391,597	$71,468,323
2026	10	0.5083	$ -	$ -	$ -	$0	$500,668,056	$500,668,056	$254,514,252	$ 283,462,778	$283,462,778	$144,098,103	$ 106,884,293	$106,884,293	$54,334,555	$ 134,695,930	$134,695,930	$68,472,581
2027	11	0.4751			$ -	$0		$509,613,307	$242,113,611		$287,877,822	$136,768,679		$108,353,554	$51,477,993		$136,482,682	$64,841,939
2028	12	0.4440			$ -	$0		$518,558,558	$230,246,201		$292,292,865	$129,781,528		$109,822,815	$48,762,643		$138,269,434	$61,393,282
2029	13	0.4150			$ -	$0		$527,503,809	$218,895,327		$296,707,908	$123,123,233		$111,292,076	$46,182,255		$140,056,186	$58,118,338
2030	14	0.3878			$ -	$0		$536,449,060	$208,044,194		$301,122,952	$116,780,672		$112,761,337	$43,730,791		$141,842,938	$55,009,137
2031	15	0.3624			$ -	$0		$545,394,311	$197,675,997		$305,537,995	$110,741,030		$114,230,598	$41,402,426		$143,629,690	$52,058,009
2032	16	0.3387			$ -	$0		$554,339,562	$187,773,989		$309,953,038	$104,991,818		$115,699,859	$39,191,545		$145,416,442	$49,257,580
2033	17	0.3166			$ -	$0		$563,284,813	$178,321,546		$314,368,082	$99,520,884		$117,169,120	$37,092,743		$147,203,193	$46,600,761
2034	18	0.2959			$ -	$0		$572,230,064	$169,302,228		$318,783,125	$94,316,424		$118,638,381	$35,100,816		$148,989,945	$44,080,749
2035	19	0.2765			$ -	$0		$581,175,315	$160,699,818		$323,198,169	$89,366,987		$120,107,642	$33,210,764		$150,776,697	$41,691,013
2036	20	0.2584			$ -	$0	$590,120,566	$590,120,566	$152,498,368	$ 327,613,212	$327,613,212	$84,661,480	$ 121,576,903	$121,576,903	$31,417,782	$ 152,563,449	$152,563,449	$39,425,294
2037	21	0.2415			$ -	$0		$599,065,817	$144,682,235		$332,028,255	$80,189,169		$123,046,164	$29,717,259		$154,350,201	$37,277,593
2038	22	0.2257			$ -	$0		$608,011,068	$137,236,103		$336,443,299	$75,939,682		$124,515,424	$28,104,771		$156,136,953	$35,242,166
2039	23	0.2109			$ -	$0		$616,956,319	$130,145,013		$340,858,342	$71,903,005		$125,984,685	$26,576,077		$157,923,705	$33,313,513
2040	24	0.1971			$ -	$0		$625,901,570	$123,394,379		$345,273,385	$68,069,481		$127,453,946	$25,127,115		$159,710,457	$31,486,377
2041	25	0.1842			$ -	$0		$634,846,821	$116,970,005		$349,688,429	$64,429,805		$128,923,207	$23,753,995		$161,497,209	$29,755,728
2042	26	0.1722			$ -	$0		$643,792,072	$110,858,093		$354,103,472	$60,975,022		$130,392,468	$22,452,995		$163,283,961	$28,116,762
2043	27	0.1609			$ -	$0		$652,737,323	$105,045,257		$358,518,515	$57,696,516		$131,861,729	$21,220,557		$165,070,712	$26,564,890
2044	28	0.1504			$ -	$0		$661,682,574	$99,518,523		$362,933,559	$54,586,010		$133,330,990	$20,053,276		$166,857,464	$25,095,732
2045	29	0.1406			$ -	$0		$670,627,825	$94,265,335		$367,348,602	$51,635,554		$134,800,251	$18,947,903		$168,644,216	$23,705,106
2046	30	0.1314			$ -	$0		$679,573,076	$89,273,556		$371,763,646	$48,837,518		$136,269,512	$17,901,333		$170,430,968	$22,389,025
2047	31	0.1228			$ -	$0		$688,518,327	$84,531,465		$376,178,689	$46,184,589		$137,738,773	$16,910,603		$172,217,720	$21,143,687
2048	32	0.1147			$ -	$0		$697,463,578	$80,027,758		$380,593,732	$43,669,754		$139,208,034	$15,972,887		$174,004,472	$19,965,469
2049	33	0.1072			$ -	$0		$706,408,830	$75,751,538		$385,008,776	$41,286,300		$140,677,295	$15,085,487		$175,791,224	$18,850,919
2050	34	0.1002			$ -	$0		$715,354,081	$71,692,317		$389,423,819	$39,027,800		$142,146,556	$14,245,835		$177,577,976	$17,796,748
2051	35	0.0937			$ -	$0		$724,299,332	$67,840,004		$393,838,862	$36,888,105		$143,615,817	$13,451,479		$179,364,728	$16,799,828
2052	36	0.0875			$ -	$0		$733,244,583	$64,184,900		$398,253,906	$34,861,338		$145,085,077	$12,700,089		$181,151,480	$15,857,178
2053	37	0.0818			$ -	$0		$742,189,834	$60,717,688		$402,668,949	$32,941,879		$146,554,338	$11,989,440		$182,938,232	$14,965,964
2054	38	0.0765			$ -	$0		$751,135,085	$57,429,429		$407,083,992	$31,124,363		$148,023,599	$11,317,419		$184,724,983	$14,123,492
2055	39	0.0715			$ -	$0		$760,080,336	$54,311,546		$411,499,036	$29,403,667		$149,492,860	$10,682,013		$186,511,735	$13,327,197
2056	40	0.0668			$ -	$0		$769,025,587	$51,355,822		$415,914,079	$27,774,901		$150,962,121	$10,081,308		$188,298,487	$12,574,645
2057	41	0.0624			$ -	$0		$777,970,838	$48,554,382		$420,329,122	$26,233,401		$152,431,382	$9,513,482		$190,085,239	$11,863,518
				$0		**$0**			**$3,967,960,674**			**$2,203,800,395**			**$818,114,844**			**$1,026,726,058**

Discounted Costs and Benefits

Maintenance		1%	COSTS				BENEFITS											
Option 2		7%	Construction		Maintenance		Travel Time			VOC and CO2			External Environmental			Crashes		
Year (from 1 July of)	Year	Discount factor	Money of the Day	Present Value	Annual Costs (Money of the Day)	Annual Costs (Present Value)	Annual Benefits (Money of the Day)	Interpolated Annual Benefits (Money of the Day)	Annual Benefits (Present Value)	Annual Benefits (Money of the Day)		Annual Benefits (Present Value)	Annual Benefits (Money of the Day)		Annual Benefits (Present Value)	Annual Benefits (Money of the Day)	Interpolated Annual Benefits (Money of the Day)	Annual Benefits (Present Value)
2016	0	1			$ -	$0	$ 305,649,460	$ 305,649,460	$305,649,460	$ 131,750,636	$ 131,750,636	$131,750,636	$ 54,321,440	$ 54,321,440	$54,321,440	$ 66,311,214	$66,311,214	$66,311,214
2017	1	0.9346			$ -	$0		$311,939,482	$291,532,226		$134,330,449	$125,542,475		$55,154,956	$51,546,688		$67,334,180	$62,929,140
2018	2	0.8734			$ -	$0		$318,229,503	$277,953,973		$136,910,262	$119,582,725		$55,988,473	$48,902,501		$68,357,145	$59,705,778
2019	3	0.8163			$ -	$0		$324,519,525	$264,904,599		$139,490,075	$113,865,452		$56,821,990	$46,383,670		$69,380,111	$56,634,838
2020	4	0.7629			$ -	$0		$330,809,547	$252,373,019		$142,069,888	$108,384,437		$57,655,507	$43,985,110		$70,403,077	$53,710,170
2021	5	0.7130			$ -	$0		$337,099,568	$240,347,333		$144,649,701	$103,133,237		$58,489,024	$41,701,865		$71,426,043	$50,925,782
2022	6	0.6663			$ -	$0		$343,389,590	$228,814,983		$147,229,514	$98,105,241		$59,322,540	$39,529,113		$72,449,009	$48,275,834
2023	7	0.6227			$ -	$0		$349,679,612	$217,762,888		$149,809,327	$93,293,719		$60,156,057	$37,462,169		$73,471,975	$45,754,653
2024	8	0.5820			$ -	$0		$355,969,633	$207,177,567		$152,389,140	$88,691,867		$60,989,574	$35,496,487		$74,494,941	$43,356,734
2025	9	0.5439			$ -	$0		$362,259,655	$197,045,250		$154,968,953	$84,292,842		$61,823,091	$33,627,665		$75,517,906	$41,076,737
2026	10	0.5083	$ 469,033,895	$ 238,433,049	$ 4,690,338.95	$2,384,330	$368,549,676	$368,549,676	$187,351,967	$ 157,548,765	$157,548,765	$80,089,803	$ 62,656,608	$62,656,608	$31,851,442	$ 76,540,872	$76,540,872	$38,909,498
2027	11	0.4751			$ 4,690,338.95	$2,228,346		$376,338,897	$178,795,899		$160,520,018	$76,261,904		$64,177,077	$30,490,067		$78,366,001	$37,231,123
2028	12	0.4440			$ 4,690,338.95	$2,082,567		$384,128,118	$170,557,478		$163,491,270	$72,592,079		$65,697,546	$29,170,496		$80,191,130	$35,605,821
2029	13	0.4150			$ 4,690,338.95	$1,946,324		$391,917,338	$162,631,762		$166,462,523	$69,076,029		$67,218,015	$27,893,086		$82,016,259	$34,033,832
2030	14	0.3878			$ 4,690,338.95	$1,818,994		$399,706,559	$155,013,095		$169,433,775	$65,709,339		$68,738,484	$26,657,969		$83,841,387	$32,515,136
2031	15	0.3624			$ 4,690,338.95	$1,699,995		$407,495,779	$147,695,223		$172,405,028	$62,487,516		$70,258,953	$25,465,078		$85,666,516	$31,049,488
2032	16	0.3387			$ 4,690,338.95	$1,588,780		$415,285,000	$140,671,397		$175,376,280	$59,406,014		$71,779,422	$24,314,174		$87,491,645	$29,636,447
2033	17	0.3166			$ 4,690,338.95	$1,484,841		$423,074,220	$133,934,463		$178,347,532	$56,460,261		$73,299,891	$23,204,868		$89,316,774	$28,275,403
2034	18	0.2959			$ 4,690,338.95	$1,387,702		$430,863,441	$127,476,945		$181,318,785	$53,645,686		$74,820,360	$22,136,645		$91,141,903	$26,965,600
2035	19	0.2765			$ 4,690,338.95	$1,296,918		$438,652,661	$121,291,116		$184,290,037	$50,957,731		$76,340,829	$21,108,875		$92,967,031	$25,706,159
2036	20	0.2584			$ 4,690,338.95	$1,212,073	$446,441,882	$446,441,882	$115,369,066	$ 187,261,290	$187,261,290	$48,391,876	$ 77,861,299	$77,861,299	$20,120,839	$ 94,792,160	$94,792,160	$24,496,096
2037	21	0.2415			$ 4,690,338.95	$1,132,778		$454,231,102	$109,702,756		$190,232,542	$45,943,648		$79,381,768	$19,171,736		$96,617,289	$23,334,340
2038	22	0.2257			$ 4,690,338.95	$1,058,671		$462,020,323	$104,284,069		$193,203,794	$43,608,640		$80,902,237	$18,260,700		$98,442,418	$22,219,750
2039	23	0.2109			$ 4,690,338.95	$989,412		$469,809,543	$99,104,859		$196,175,047	$41,382,515		$82,422,706	$17,386,813		$100,267,547	$21,151,126
2040	24	0.1971			$ 4,690,338.95	$924,684		$477,598,764	$94,156,982		$199,146,299	$39,261,020		$83,943,175	$16,549,113		$102,092,675	$20,127,226
2041	25	0.1842			$ 4,690,338.95	$864,191		$485,387,984	$89,432,337		$202,117,552	$37,239,993		$85,463,644	$15,746,606		$103,917,804	$19,146,770
2042	26	0.1722			$ 4,690,338.95	$807,655		$493,177,205	$84,922,892		$205,088,804	$35,315,368		$86,984,113	$14,978,272		$105,742,933	$18,208,456
2043	27	0.1609			$ 4,690,338.95	$754,818		$500,966,425	$80,620,711		$208,060,056	$33,483,181		$88,504,582	$14,243,075		$107,568,062	$17,310,968
2044	28	0.1504			$ 4,690,338.95	$705,437		$508,755,646	$76,517,975		$211,031,309	$31,739,576		$90,025,051	$13,539,967		$109,393,191	$16,452,978
2045	29	0.1406			$ 4,690,338.95	$659,287		$516,544,867	$72,607,001		$214,002,561	$30,080,802		$91,545,521	$12,867,896		$111,218,319	$15,633,160
2046	30	0.1314			$ 4,690,338.95	$616,156		$524,334,087	$68,880,257		$216,973,814	$28,503,224		$93,065,990	$12,225,811		$113,043,448	$14,850,192
2047	31	0.1228			$ 4,690,338.95	$575,847		$532,123,308	$65,330,378		$219,945,066	$27,003,317		$94,586,459	$11,612,664		$114,868,577	$14,102,761
2048	32	0.1147			$ 4,690,338.95	$538,175		$539,912,528	$61,950,172		$222,916,318	$25,577,670		$96,106,928	$11,027,417		$116,693,706	$13,389,567
2049	33	0.1072			$ 4,690,338.95	$502,967		$547,701,749	$58,732,632		$225,887,571	$24,222,986		$97,627,397	$10,469,045		$118,518,835	$12,709,332
2050	34	0.1002			$ 4,690,338.95	$470,063		$555,490,969	$55,670,941		$228,858,823	$22,936,081		$99,147,866	$9,936,534		$120,343,963	$12,060,793
2051	35	0.0937			$ 4,690,338.95	$439,311		$563,280,190	$52,758,478		$231,830,076	$21,713,886		$100,668,335	$9,428,892		$122,169,092	$11,442,716
2052	36	0.0875			$ 4,690,338.95	$410,571		$571,069,410	$49,988,822		$234,801,328	$20,553,442		$102,188,804	$8,945,144		$123,994,221	$10,853,891
2053	37	0.0818			$ 4,690,338.95	$383,711		$578,858,631	$47,355,752		$237,772,580	$19,451,899		$103,709,273	$8,484,335		$125,819,350	$10,293,135
2054	38	0.0765			$ 4,690,338.95	$358,609		$586,647,851	$44,853,252		$240,743,833	$18,406,517		$105,229,742	$8,045,535		$127,644,479	$9,759,296
2055	39	0.0715			$ 4,690,338.95	$335,148		$594,437,072	$42,475,506		$243,715,085	$17,414,663		$106,750,212	$7,627,837		$129,469,607	$9,251,252
2056	40	0.0668			$ 4,690,338.95	$313,223		$602,226,292	$40,216,901		$246,686,338	$16,473,808		$108,270,681	$7,230,357		$131,294,736	$8,767,913
2057	41	0.0624			$ 4,690,338.95	$292,731		$610,015,513	$38,072,027		$249,657,590	$15,581,522		$109,791,150	$6,852,238		$133,119,865	$8,308,220
				$238,433,049		**$31,658,363**			**$3,000,134,183**			**$1,258,916,666**			**$522,960,932**			**$636,722,310**

Discounted Costs and Benefits

Maintenance		1%	COSTS				BENEFITS											
Option 3		7%	Construction		Maintenance		Travel Time			VOC and CO2			External Environmental			Crashes		
Year (from 1 July of)	Year	Discount factor	Money of the Day	Present Value	Annual Costs (Money of the Day)	Annual Costs (Present Value)	Annual Benefits (Money of the Day)	Interpolated Annual Benefits (Money of the Day)	Annual Benefits (Present Value)	Annual Benefits (Money of the Day)		Annual Benefits (Present Value)	Annual Benefits (Money of the Day)		Annual Benefits (Present Value)	Annual Benefits (Money of the Day)	Interpolated Annual Benefits (Money of the Day)	Annual Benefits (Present Value)
2016	0	1			$ -	$0	$ 258,095,562	$ 258,095,562	$258,095,562	$ 102,308,958	$ 102,308,958	$102,308,958	$ 46,265,264	$ 46,265,264	$46,265,264	$ 55,257,968	$55,257,968	$55,257,968
2017	1	0.9346			$ -	$0		$270,202,484	$252,525,686		$107,587,002	$100,548,600		$48,168,676	$45,017,454		$57,634,516	$53,864,033
2018	2	0.8734			$ -	$0		$282,309,407	$246,579,969		$112,865,045	$98,580,702		$50,072,088	$43,734,901		$60,011,063	$52,415,987
2019	3	0.8163			$ -	$0		$294,416,329	$240,331,424		$118,143,089	$96,439,952		$51,975,500	$42,427,490		$62,387,611	$50,926,874
2020	4	0.7629			$ -	$0		$306,523,251	$233,845,121		$123,421,132	$94,157,391		$53,878,911	$41,103,964		$64,764,158	$49,408,266
2021	5	0.7130			$ -	$0		$318,630,174	$227,178,910		$128,699,175	$91,760,733		$55,782,323	$39,772,026		$67,140,706	$47,870,395
2022	6	0.6663			$ -	$0		$330,737,096	$220,384,092		$133,977,219	$89,274,678		$57,685,735	$38,438,441		$69,517,254	$46,322,281
2023	7	0.6227			$ -	$0		$342,844,018	$213,506,024		$139,255,262	$86,721,179		$59,589,147	$37,109,126		$71,893,801	$44,771,846
2024	8	0.5820			$ -	$0		$354,950,941	$206,584,679		$144,533,306	$84,119,700		$61,492,559	$35,789,229		$74,270,349	$43,226,019
2025	9	0.5439			$ -	$0		$367,057,863	$199,655,157		$149,811,349	$81,487,448		$63,395,971	$34,483,208		$76,646,897	$41,690,833
2026	10	0.5083	$ 198,968,976	$ 101,145,738	$ 1,989,689.76	$1,011,457	$379,164,785	$379,164,785	$192,748,150	$ 155,089,392	$155,089,392	$78,839,583	$ 65,299,383	$65,299,383	$33,194,895	$ 79,023,444	$79,023,444	$40,171,512
2027	11	0.4751			$ 1,989,689.76	$945,287		$383,793,565	$182,337,558		$156,568,329	$74,384,485		$66,003,054	$31,357,575		$79,821,652	$37,922,692
2028	12	0.4440			$ 1,989,689.76	$883,446		$388,422,344	$172,464,166		$158,047,266	$70,174,876		$66,706,724	$29,618,583		$80,619,859	$35,796,182
2029	13	0.4150			$ 1,989,689.76	$825,651		$393,051,124	$163,102,243		$159,526,203	$66,197,703		$67,410,395	$27,972,918		$81,418,067	$33,785,603
2030	14	0.3878			$ 1,989,689.76	$771,636		$397,679,904	$154,227,123		$161,005,139	$62,440,569		$68,114,066	$26,415,809		$82,216,274	$31,884,889
2031	15	0.3624			$ 1,989,689.76	$721,155		$402,308,683	$145,815,181		$162,484,076	$58,891,707		$68,817,737	$24,942,715		$83,014,482	$30,088,268
2032	16	0.3387			$ 1,989,689.76	$673,977		$406,937,463	$137,843,798		$163,963,013	$55,539,945		$69,521,408	$23,549,306		$83,812,689	$28,390,257
2033	17	0.3166			$ 1,989,689.76	$629,885		$411,566,242	$130,291,332		$165,441,949	$52,374,684		$70,225,079	$22,231,462		$84,610,896	$26,785,643
2034	18	0.2959			$ 1,989,689.76	$588,677		$416,195,022	$123,137,089		$166,920,886	$49,385,867		$70,928,750	$20,985,258		$85,409,104	$25,269,472
2035	19	0.2765			$ 1,989,689.76	$550,166		$420,823,801	$116,361,288		$168,399,823	$46,563,954		$71,632,421	$19,806,961		$86,207,311	$23,837,040
2036	20	0.2584			$ 1,989,689.76	$514,174	$425,452,581	$425,452,581	$109,945,032	$ 169,878,760	$169,878,760	$43,899,900	$ 72,336,092	$72,336,092	$18,693,021	$ 87,005,519	$87,005,519	$22,483,879
2037	21	0.2415			$ 1,989,689.76	$480,536		$430,081,360	$103,870,277		$171,357,696	$41,385,126		$73,039,763	$17,640,059		$87,803,726	$21,205,749
2038	22	0.2257			$ 1,989,689.76	$449,099		$434,710,140	$98,119,802		$172,836,633	$39,011,503		$73,743,434	$16,644,864		$88,601,934	$19,998,623
2039	23	0.2109			$ 1,989,689.76	$419,719		$439,338,919	$92,677,176		$174,315,570	$36,771,326		$74,447,105	$15,704,385		$89,400,141	$18,858,681
2040	24	0.1971			$ 1,989,689.76	$392,261		$443,967,699	$87,526,731		$175,794,506	$34,657,293		$75,150,776	$14,815,722		$90,198,349	$17,782,300
2041	25	0.1842			$ 1,989,689.76	$366,599		$448,596,478	$82,653,532		$177,273,443	$32,662,486		$75,854,447	$13,976,119		$90,996,556	$16,766,041
2042	26	0.1722			$ 1,989,689.76	$342,616		$453,225,258	$78,043,347		$178,752,380	$30,780,354		$76,558,118	$13,182,963		$91,794,764	$15,806,645
2043	27	0.1609			$ 1,989,689.76	$320,202		$457,854,037	$73,682,618		$180,231,316	$29,004,692		$77,261,789	$12,433,768		$92,592,971	$14,901,021
2044	28	0.1504			$ 1,989,689.76	$299,254		$462,482,817	$69,558,439		$181,710,253	$27,329,624		$77,965,460	$11,726,178		$93,391,179	$14,046,240
2045	29	0.1406			$ 1,989,689.76	$279,676		$467,111,597	$65,658,521		$183,189,190	$25,749,588		$78,669,131	$11,057,955		$94,189,386	$13,239,525
2046	30	0.1314			$ 1,989,689.76	$261,380		$471,740,376	$61,971,173		$184,668,127	$24,259,319		$79,372,802	$10,426,976		$94,987,594	$12,478,246
2047	31	0.1228			$ 1,989,689.76	$244,280		$476,369,156	$58,485,274		$186,147,063	$22,853,835		$80,076,473	$9,831,229		$95,785,801	$11,759,911
2048	32	0.1147			$ 1,989,689.76	$228,299		$480,997,935	$55,190,246		$187,626,000	$21,528,419		$80,780,144	$9,268,805		$96,584,009	$11,082,158
2049	33	0.1072			$ 1,989,689.76	$213,364		$485,626,715	$52,076,034		$189,104,937	$20,278,611		$81,483,815	$8,737,892		$97,382,216	$10,442,753
2050	34	0.1002			$ 1,989,689.76	$199,405		$490,255,494	$49,133,084		$190,583,873	$19,100,191		$82,187,486	$8,236,776		$98,180,424	$9,839,578
2051	35	0.0937			$ 1,989,689.76	$186,360		$494,884,274	$46,352,316		$192,062,810	$17,989,167		$82,891,157	$7,763,829		$98,978,631	$9,270,629
2052	36	0.0875			$ 1,989,689.76	$174,168		$499,513,053	$43,725,103		$193,541,747	$16,941,765		$83,594,828	$7,317,511		$99,776,839	$8,734,011
2053	37	0.0818			$ 1,989,689.76	$162,774		$504,141,833	$41,243,258		$195,020,684	$15,954,416		$84,298,499	$6,896,362		$100,575,046	$8,227,928
2054	38	0.0765			$ 1,989,689.76	$152,125		$508,770,612	$38,899,003		$196,499,620	$15,023,744		$85,002,170	$6,498,999		$101,373,253	$7,750,680
2055	39	0.0715			$ 1,989,689.76	$142,173		$513,399,392	$36,684,957		$197,978,557	$14,146,559		$85,705,841	$6,124,112		$102,171,461	$7,300,663
2056	40	0.0668			$ 1,989,689.76	$132,872		$518,028,171	$34,594,119		$199,457,494	$13,319,847		$86,409,512	$5,770,460		$102,969,668	$6,876,354
2057	41	0.0624			$ 1,989,689.76	$124,180		$522,656,951	$32,619,841		$200,936,430	$12,540,758		$87,113,183	$5,436,871		$103,767,876	$6,476,316
				$101,145,738		**$13,429,801**			**$2,863,823,850**			**$1,144,121,292**			**$487,053,007**			**$585,906,818**

Discounted Costs and Benefits

Maintenance		1%	COSTS				BENEFITS											
Option 4		7%	Construction		Maintenance		Travel Time			VOC and CO2			External Environmental			Crashes		
Year (from 1 July of)	Year	Discount factor	Money of the Day	Present Value	Annual Costs (Money of the Day)	Annual Costs (Present Value)	Annual Benefits (Money of the Day)	Interpolated Annual Benefits (Money of the Day)	Annual Benefits (Present Value)	Annual Benefits (Money of the Day)		Annual Benefits (Present Value)	Annual Benefits (Money of the Day)		Annual Benefits (Present Value)	Annual Benefits (Money of the Day)	Interpolated Annual Benefits (Money of the Day)	Annual Benefits (Present Value)
2016	0	1			$ -	$0	$ 238,962,754	$ 238,962,754	$238,962,754	$ 101,306,976	$ 101,306,976	$101,306,976	$ 42,945,017	$ 42,945,017	$42,945,017	$ 52,118,709	$52,118,709	$52,118,709
2017	1	0.9346			$ -	$0		$246,530,410	$230,402,252		$105,208,167	$98,325,390		$44,311,917	$41,413,006		$53,872,046	$50,347,707
2018	2	0.8734			$ -	$0		$254,098,066	$221,939,091		$109,109,358	$95,300,339		$45,678,817	$39,897,648		$55,625,383	$48,585,364
2019	3	0.8163			$ -	$0		$261,665,722	$213,597,173		$113,010,549	$92,250,271		$47,045,717	$38,403,319		$57,378,721	$46,838,128
2020	4	0.7629			$ -	$0		$269,233,377	$205,396,855		$116,911,740	$89,191,407		$48,412,617	$36,933,754		$59,132,058	$45,111,564
2021	5	0.7130			$ -	$0		$276,801,033	$197,355,311		$120,812,931	$86,137,950		$49,779,517	$35,492,108		$60,885,396	$43,410,446
2022	6	0.6663			$ -	$0		$284,368,689	$189,486,865		$124,714,122	$83,102,285		$51,146,417	$34,081,017		$62,638,733	$41,738,833
2023	7	0.6227			$ -	$0		$291,936,345	$181,803,283		$128,615,313	$80,095,153		$52,513,317	$32,702,655		$64,392,071	$40,100,145
2024	8	0.5820			$ -	$0		$299,504,001	$174,314,055		$132,516,504	$77,125,812		$53,880,217	$31,358,777		$66,145,408	$38,497,230
2025	9	0.5439			$ -	$0		$307,071,656	$167,026,635		$136,417,695	$74,202,187		$55,247,117	$30,050,771		$67,898,746	$36,932,419
2026	10	0.5083	$ 151,556,074	$ 77,043,423	$ 1,515,560.74	$770,434	$314,639,312	$314,639,312	$159,946,672	$ 140,318,886	$140,318,886	$71,331,006	$ 56,614,017	$56,614,017	$28,779,696	$ 69,652,083	$69,652,083	$35,407,587
2027	11	0.4751			$ 1,515,560.74	$720,032		$327,389,114	$155,540,210		$144,323,322	$68,566,971		$58,264,704	$27,681,141		$71,588,787	$34,011,317
2028	12	0.4440			$ 1,515,560.74	$672,927		$340,138,916	$151,025,747		$148,327,758	$65,859,299		$59,915,390	$26,603,150		$73,525,490	$32,646,197
2029	13	0.4150			$ 1,515,560.74	$628,904		$352,888,719	$146,436,272		$152,332,195	$63,212,445		$61,566,077	$25,547,733		$75,462,194	$31,314,127
2030	14	0.3878			$ 1,515,560.74	$587,761		$365,638,521	$141,800,922		$156,336,631	$60,630,041		$63,216,764	$24,516,551		$77,398,897	$30,016,627
2031	15	0.3624			$ 1,515,560.74	$549,309		$378,388,323	$137,145,341		$160,341,067	$58,114,982		$64,867,450	$23,510,949		$79,335,601	$28,754,873
2032	16	0.3387			$ 1,515,560.74	$513,373		$391,138,125	$132,492,015		$164,345,503	$55,669,508		$66,518,137	$22,531,994		$81,272,304	$27,529,741
2033	17	0.3166			$ 1,515,560.74	$479,788		$403,887,927	$127,860,574		$168,349,939	$53,295,279		$68,168,823	$21,580,504		$83,209,007	$26,341,841
2034	18	0.2959			$ 1,515,560.74	$448,400		$416,637,729	$123,268,070		$172,354,376	$50,993,441		$69,819,510	$20,657,074		$85,145,711	$25,191,544
2035	19	0.2765			$ 1,515,560.74	$419,065		$429,387,531	$118,729,230		$176,358,812	$48,764,681		$71,470,197	$19,762,105		$87,082,414	$24,079,013
2036	20	0.2584			$ 1,515,560.74	$391,650	$442,137,333	$442,137,333	$114,256,689	$ 180,363,248	$180,363,248	$46,609,291	$ 73,120,883	$73,120,883	$18,895,826	$ 89,019,118	$89,019,118	$23,004,232
2037	21	0.2415			$ 1,515,560.74	$366,028		$454,887,135	$109,861,196		$184,367,684	$44,527,209		$74,771,570	$18,058,313		$90,955,821	$21,967,021
2038	22	0.2257			$ 1,515,560.74	$342,082		$467,636,937	$105,551,813		$188,372,121	$42,518,068		$76,422,256	$17,249,509		$92,892,525	$20,967,066
2039	23	0.2109			$ 1,515,560.74	$319,703		$480,386,740	$101,336,086		$192,376,557	$40,581,235		$78,072,943	$16,469,244		$94,829,228	$20,003,930
2040	24	0.1971			$ 1,515,560.74	$298,788		$493,136,542	$97,220,202		$196,380,993	$38,715,849		$79,723,630	$15,717,244		$96,765,932	$19,077,076
2041	25	0.1842			$ 1,515,560.74	$279,241		$505,886,344	$93,209,143		$200,385,429	$36,920,851		$81,374,316	$14,993,151		$98,702,635	$18,185,879
2042	26	0.1722			$ 1,515,560.74	$260,973		$518,636,146	$89,306,807		$204,389,865	$35,195,014		$83,025,003	$14,296,531		$100,639,339	$17,329,641
2043	27	0.1609			$ 1,515,560.74	$243,900		$531,385,948	$85,516,136		$208,394,302	$33,536,972		$84,675,689	$13,626,890		$102,576,042	$16,507,600
2044	28	0.1504			$ 1,515,560.74	$227,944		$544,135,750	$81,839,221		$212,398,738	$31,945,240		$86,326,376	$12,983,678		$104,512,746	$15,718,948
2045	29	0.1406			$ 1,515,560.74	$213,031		$556,885,552	$78,277,401		$216,403,174	$30,418,239		$87,977,063	$12,366,304		$106,449,449	$14,962,834
2046	30	0.1314			$ 1,515,560.74	$199,095		$569,635,354	$74,831,354		$220,407,610	$28,954,312		$89,627,749	$11,774,139		$108,386,153	$14,238,376
2047	31	0.1228			$ 1,515,560.74	$186,070		$582,385,156	$71,501,177		$224,412,047	$27,551,742		$91,278,436	$11,206,528		$110,322,856	$13,544,669
2048	32	0.1147			$ 1,515,560.74	$173,897		$595,134,958	$68,286,456		$228,416,483	$26,208,765		$92,929,122	$10,662,792		$112,259,560	$12,880,788
2049	33	0.1072			$ 1,515,560.74	$162,521		$607,884,761	$65,186,339		$232,420,919	$24,923,587		$94,579,809	$10,142,237		$114,196,263	$12,245,802
2050	34	0.1002			$ 1,515,560.74	$151,889		$620,634,563	$62,199,589		$236,425,355	$23,694,394		$96,230,496	$9,644,157		$116,132,967	$11,638,770
2051	35	0.0937			$ 1,515,560.74	$141,952		$633,384,365	$59,324,641		$240,429,792	$22,519,361		$97,881,182	$9,167,839		$118,069,670	$11,058,752
2052	36	0.0875			$ 1,515,560.74	$132,665		$646,134,167	$56,559,650		$244,434,228	$21,396,662		$99,531,869	$8,712,568		$120,006,374	$10,504,813
2053	37	0.0818			$ 1,515,560.74	$123,986		$658,883,969	$53,902,532		$248,438,664	$20,324,478		$101,182,555	$8,277,627		$121,943,077	$9,976,021
2054	38	0.0765			$ 1,515,560.74	$115,875		$671,633,771	$51,351,008		$252,443,100	$19,301,006		$102,833,242	$7,862,307		$123,879,781	$9,471,459
2055	39	0.0715			$ 1,515,560.74	$108,294		$684,383,573	$48,902,633		$256,447,536	$18,324,461		$104,483,929	$7,465,900		$125,816,484	$8,990,218
2056	40	0.0668			$ 1,515,560.74	$101,210		$697,133,375	$46,554,832		$260,451,973	$17,393,082		$106,134,615	$7,087,710		$127,753,188	$8,531,407
2057	41	0.0624			$ 1,515,560.74	$94,589		$709,883,177	$44,304,924		$264,456,409	$16,505,140		$107,785,302	$6,727,050		$129,689,891	$8,094,150
				$77,043,423		**$10,229,575**			**$2,962,665,128**			**$1,210,604,387**			**$490,743,680**			**$597,566,763**

Discounted Costs and Benefits

Maintenance		1%	COSTS				BENEFITS											
Option 5		7%	Construction		Maintenance		Travel Time			VOC and CO2			External Environmental			Crashes		
Year (from 1 July of)	Year	Discount factor	Money of the Day	Present Value	Annual Costs (Money of the Day)	Annual Costs (Present Value)	Annual Benefits (Money of the Day)	Interpolated Annual Benefits (Money of the Day)	Annual Benefits (Present Value)	Annual Benefits (Money of the Day)		Annual Benefits (Present Value)	Annual Benefits (Money of the Day)		Annual Benefits (Present Value)	Annual Benefits (Money of the Day)	Interpolated Annual Benefits (Money of the Day)	Annual Benefits (Present Value)
2016	0	1			$ -	$0	$ 323,315,331	$ 323,315,331	$323,315,331	$ 141,881,678	$ 141,881,678	$141,881,678	$ 57,041,153	$ 57,041,153	$57,041,153	$ 70,295,847	$70,295,847	$70,295,847
2017	1	0.9346			$ -	$0		$325,889,783	$304,569,890		$142,731,568	$133,393,989		$57,441,175	$53,683,342		$70,729,568	$66,102,400
2018	2	0.8734			$ -	$0		$328,464,234	$286,893,383		$143,581,459	$125,409,607		$57,841,198	$50,520,742		$71,163,290	$62,156,773
2019	3	0.8163			$ -	$0		$331,038,686	$270,226,176		$144,431,349	$117,899,003		$58,241,221	$47,542,185		$71,597,011	$58,444,488
2020	4	0.7629			$ -	$0		$333,613,137	$254,511,865		$145,281,239	$110,834,362		$58,641,243	$44,737,124		$72,030,732	$54,951,901
2021	5	0.7130			$ -	$0		$336,187,588	$239,697,104		$146,131,129	$104,189,476		$59,041,266	$42,095,606		$72,464,454	$51,666,154
2022	6	0.6663			$ -	$0		$338,762,040	$225,731,451		$146,981,020	$97,939,660		$59,441,288	$39,608,240		$72,898,175	$48,575,132
2023	7	0.6227			$ -	$0		$341,336,491	$212,567,212		$147,830,910	$92,061,661		$59,841,311	$37,266,161		$73,331,896	$45,667,420
2024	8	0.5820			$ -	$0		$343,910,943	$200,159,300		$148,680,800	$86,533,579		$60,241,333	$35,061,004		$73,765,618	$42,932,261
2025	9	0.5439			$ -	$0		$346,485,394	$188,465,097		$149,530,691	$81,334,788		$60,641,356	$32,984,880		$74,199,339	$40,359,524
2026	10	0.5083	$ 620,589,969	$ 315,476,472	$ 6,205,899.69	$3,154,765	$349,059,845	$349,059,845	$177,444,325	$ 150,380,581	$150,380,581	$76,445,862	$ 61,041,378	$61,041,378	$31,030,341	$ 74,633,060	$74,633,060	$37,939,663
2027	11	0.4751			$ 6,205,899.69	$2,948,378		$353,194,322	$167,800,078		$152,734,194	$72,562,916		$61,723,650	$29,324,461		$75,562,597	$35,899,246
2028	12	0.4440			$ 6,205,899.69	$2,755,494		$357,328,799	$158,658,260		$155,087,808	$68,860,841		$62,405,922	$27,708,976		$76,492,135	$33,963,423
2029	13	0.4150			$ 6,205,899.69	$2,575,228		$361,463,276	$149,994,409		$157,441,421	$65,332,593		$63,088,193	$26,179,357		$77,421,672	$32,127,241
2030	14	0.3878			$ 6,205,899.69	$2,406,755		$365,597,753	$141,785,112		$159,795,035	$61,971,270		$63,770,465	$24,731,286		$78,351,209	$30,385,950
2031	15	0.3624			$ 6,205,899.69	$2,249,304		$369,732,229	$134,007,975		$162,148,648	$58,770,132		$64,452,736	$23,360,638		$79,280,746	$28,734,991
2032	16	0.3387			$ 6,205,899.69	$2,102,153		$373,866,706	$126,641,588		$164,502,262	$55,722,608		$65,135,008	$22,063,481		$80,210,283	$27,169,998
2033	17	0.3166			$ 6,205,899.69	$1,964,629		$378,001,183	$119,665,494		$166,855,875	$52,822,297		$65,817,280	$20,836,065		$81,139,820	$25,686,789
2034	18	0.2959			$ 6,205,899.69	$1,836,102		$382,135,660	$113,060,153		$169,209,489	$50,062,982		$66,499,551	$19,674,818		$82,069,357	$24,281,362
2035	19	0.2765			$ 6,205,899.69	$1,715,983		$386,270,137	$106,806,912		$171,563,102	$47,438,627		$67,181,823	$18,576,334		$82,998,895	$22,949,886
2036	20	0.2584			$ 6,205,899.69	$1,603,722	$390,404,614	$390,404,614	$100,887,971	$ 173,916,716	$173,916,716	$44,943,384	$ 67,864,095	$67,864,095	$17,537,372	$ 83,928,432	$83,928,432	$21,688,702
2037	21	0.2415			$ 6,205,899.69	$1,498,806		$394,539,090	$95,286,354		$176,270,330	$42,571,591		$68,546,366	$16,554,844		$84,857,969	$20,494,310
2038	22	0.2257			$ 6,205,899.69	$1,400,753		$398,673,567	$89,985,873		$178,623,943	$40,317,776		$69,228,638	$15,625,815		$85,787,506	$19,363,370
2039	23	0.2109			$ 6,205,899.69	$1,309,115		$402,808,044	$84,971,101		$180,977,557	$38,176,652		$69,910,909	$14,747,488		$86,717,043	$18,292,690
2040	24	0.1971			$ 6,205,899.69	$1,223,472		$406,942,521	$80,227,342		$183,331,170	$36,143,121		$70,593,181	$13,917,207		$87,646,580	$17,279,227
2041	25	0.1842			$ 6,205,899.69	$1,143,432		$411,076,998	$75,740,599		$185,684,784	$34,212,269		$71,275,453	$13,132,444		$88,576,117	$16,320,077
2042	26	0.1722			$ 6,205,899.69	$1,068,628		$415,211,474	$71,497,545		$188,038,397	$32,379,364		$71,957,724	$12,390,796		$89,505,655	$15,412,470
2043	27	0.1609			$ 6,205,899.69	$998,718		$419,345,951	$67,485,498		$190,392,011	$30,639,856		$72,639,996	$11,689,981		$90,435,192	$14,553,769
2044	28	0.1504			$ 6,205,899.69	$933,381		$423,480,428	$63,692,393		$192,745,624	$28,989,368		$73,322,267	$11,027,831		$91,364,729	$13,741,457
2045	29	0.1406			$ 6,205,899.69	$872,319		$427,614,905	$60,106,755		$195,099,238	$27,423,698		$74,004,539	$10,402,286		$92,294,266	$12,973,142
2046	30	0.1314			$ 6,205,899.69	$815,251		$431,749,382	$56,717,672		$197,452,851	$25,938,812		$74,686,811	$9,811,391		$93,223,803	$12,246,542
2047	31	0.1228			$ 6,205,899.69	$761,917		$435,883,858	$53,514,772		$199,806,465	$24,530,840		$75,369,082	$9,253,289		$94,153,340	$11,559,489
2048	32	0.1147			$ 6,205,899.69	$712,072		$440,018,335	$50,488,200		$202,160,078	$23,196,075		$76,051,354	$8,726,218		$95,082,877	$10,909,917
2049	33	0.1072			$ 6,205,899.69	$665,488		$444,152,812	$47,628,593		$204,513,692	$21,930,964		$76,733,626	$8,228,507		$96,012,414	$10,295,862
2050	34	0.1002			$ 6,205,899.69	$621,951		$448,287,289	$44,927,058		$206,867,305	$20,732,106		$77,415,897	$7,758,570		$96,941,952	$9,715,459
2051	35	0.0937			$ 6,205,899.69	$581,263		$452,421,766	$42,375,152		$209,220,919	$19,596,246		$78,098,169	$7,314,904		$97,871,489	$9,166,931
2052	36	0.0875			$ 6,205,899.69	$543,236		$456,556,243	$39,964,859		$211,574,532	$18,520,273		$78,780,440	$6,896,082		$98,801,026	$8,648,593
2053	37	0.0818			$ 6,205,899.69	$507,697		$460,690,719	$37,688,573		$213,928,146	$17,501,213		$79,462,712	$6,500,752		$99,730,563	$8,158,842
2054	38	0.0765			$ 6,205,899.69	$474,484		$464,825,196	$35,539,074		$216,281,759	$16,536,224		$80,144,984	$6,127,634		$100,660,100	$7,696,155
2055	39	0.0715			$ 6,205,899.69	$443,443		$468,959,673	$33,509,517		$218,635,373	$15,622,592		$80,827,255	$5,775,512		$101,589,637	$7,259,088
2056	40	0.0668			$ 6,205,899.69	$414,432		$473,094,150	$31,593,408		$220,988,986	$14,757,729		$81,509,527	$5,443,237		$102,519,174	$6,846,270
2057	41	0.0624			$ 6,205,899.69	$387,320		$477,228,627	$29,784,588		$223,342,600	$13,939,163		$82,191,798	$5,129,719		$103,448,712	$6,456,397
				$315,476,472		**$41,887,938**			**$2,628,099,207**			**$1,169,892,552**			**$456,904,681**			**$564,914,639**

Discounted Costs and Benefits

Maintenance		1%	COSTS				BENEFITS											
Option 6		7%	Construction		Maintenance		Travel Time			VOC and CO2			External Environmental			Crashes		
Year (from 1 July of)	Year	Discount factor	Money of the Day	Present Value	Annual Costs (Money of the Day)	Annual Costs (Present Value)	Annual Benefits (Money of the Day)	Interpolated Annual Benefits (Money of the Day)	Annual Benefits (Present Value)	Annual Benefits (Money of the Day)		Annual Benefits (Present Value)	Annual Benefits (Money of the Day)		Annual Benefits (Present Value)	Annual Benefits (Money of the Day)	Interpolated Annual Benefits (Money of the Day)	Annual Benefits (Present Value)
2016	0	1			$ -	$0	$ 295,219,116	$ 295,219,116	$295,219,116	$ 120,899,397	$ 120,899,397	$120,899,397	$ 52,129,933	$ 52,129,933	$52,129,933	$ 63,211,826	$63,211,826	$63,211,826
2017	1	0.9346			$ -	$0		$299,047,012	$279,483,188		$122,283,141	$114,283,310		$52,796,976	$49,342,968		$63,995,981	$59,809,328
2018	2	0.8734			$ -	$0		$302,874,908	$264,542,674		$123,666,886	$108,015,448		$53,464,019	$46,697,545		$64,780,136	$56,581,480
2019	3	0.8163			$ -	$0		$306,702,803	$250,360,847		$125,050,631	$102,078,564		$54,131,063	$44,187,072		$65,564,291	$53,519,992
2020	4	0.7629			$ -	$0		$310,530,699	$236,902,384		$126,434,375	$96,456,180		$54,798,106	$41,805,213		$66,348,447	$50,616,912
2021	5	0.7130			$ -	$0		$314,358,595	$224,133,334		$127,818,120	$91,132,553		$55,465,150	$39,545,885		$67,132,602	$47,864,617
2022	6	0.6663			$ -	$0		$318,186,491	$212,021,094		$129,201,865	$86,092,658		$56,132,193	$37,403,250		$67,916,757	$45,255,803
2023	7	0.6227			$ -	$0		$322,014,387	$200,534,377		$130,585,609	$81,322,154		$56,799,237	$35,371,710		$68,700,912	$42,783,475
2024	8	0.5820			$ -	$0		$325,842,283	$189,643,175		$131,969,354	$76,807,365		$57,466,280	$33,445,898		$69,485,068	$40,440,942
2025	9	0.5439			$ -	$0		$329,670,179	$179,318,734		$133,353,099	$72,535,250		$58,133,323	$31,620,676		$70,269,223	$38,221,801
2026	10	0.5083	$ 668,002,871	$ 339,578,787	$ 6,680,028.71	$3,395,788	$333,498,075	$333,498,075	$169,533,510	$ 134,736,843	$134,736,843	$68,493,379	$ 58,800,367	$58,800,367	$29,891,125	$ 71,053,378	$71,053,378	$36,119,934
2027	11	0.4751			$ 6,680,028.71	$3,173,634		$341,942,830	$162,454,575		$138,225,158	$65,669,777		$60,219,634	$28,609,914		$72,761,090	$34,568,270
2028	12	0.4440			$ 6,680,028.71	$2,966,013		$350,387,585	$155,576,278		$141,713,473	$62,922,477		$61,638,901	$27,368,409		$74,468,801	$33,065,038
2029	13	0.4150			$ 6,680,028.71	$2,771,974		$358,832,340	$148,902,664		$145,201,787	$60,253,580		$63,058,168	$26,166,898		$76,176,513	$31,610,545
2030	14	0.3878			$ 6,680,028.71	$2,590,630		$367,277,095	$142,436,390		$148,690,102	$57,664,585		$64,477,435	$25,005,461		$77,884,224	$30,204,845
2031	15	0.3624			$ 6,680,028.71	$2,421,150		$375,721,850	$136,178,889		$152,178,417	$55,156,461		$65,896,702	$23,883,997		$79,591,936	$28,847,780
2032	16	0.3387			$ 6,680,028.71	$2,262,757		$384,166,605	$130,130,520		$155,666,731	$52,729,708		$67,315,968	$22,802,247		$81,299,648	$27,539,003
2033	17	0.3166			$ 6,680,028.71	$2,114,726		$392,611,360	$124,290,702		$159,155,046	$50,384,412		$68,735,235	$21,759,815		$83,007,359	$26,278,004
2034	18	0.2959			$ 6,680,028.71	$1,976,379		$401,056,115	$118,658,033		$162,643,361	$48,120,302		$70,154,502	$20,756,186		$84,715,071	$25,064,133
2035	19	0.2765			$ 6,680,028.71	$1,847,084		$409,500,870	$113,230,403		$166,131,676	$45,936,793		$71,573,769	$19,790,744		$86,422,782	$23,896,620
2036	20	0.2584			$ 6,680,028.71	$1,726,246	$417,945,625	$417,945,625	$108,005,092	$ 169,619,990	$169,619,990	$43,833,029	$ 72,993,036	$72,993,036	$18,862,788	$ 88,130,494	$88,130,494	$22,774,594
2037	21	0.2415			$ 6,680,028.71	$1,613,314		$426,390,379	$102,978,857		$173,108,305	$41,807,921		$74,412,303	$17,971,545		$89,838,206	$21,697,102
2038	22	0.2257			$ 6,680,028.71	$1,507,770		$434,835,134	$98,148,015		$176,596,620	$39,860,182		$75,831,570	$17,116,184		$91,545,917	$20,663,119
2039	23	0.2109			$ 6,680,028.71	$1,409,131		$443,279,889	$93,508,511		$180,084,934	$37,988,356		$77,250,837	$16,295,823		$93,253,629	$19,671,562
2040	24	0.1971			$ 6,680,028.71	$1,316,945		$451,724,644	$89,055,987		$183,573,249	$36,190,846		$78,670,104	$15,509,545		$94,961,340	$18,721,307
2041	25	0.1842			$ 6,680,028.71	$1,230,790		$460,169,399	$84,785,833		$187,061,564	$34,465,939		$80,089,371	$14,756,401		$96,669,052	$17,811,193
2042	26	0.1722			$ 6,680,028.71	$1,150,271		$468,614,154	$80,693,245		$190,549,879	$32,811,830		$81,508,638	$14,035,420		$98,376,764	$16,940,035
2043	27	0.1609			$ 6,680,028.71	$1,075,019		$477,058,909	$76,773,265		$194,038,193	$31,226,638		$82,927,905	$13,345,618		$100,084,475	$16,106,631
2044	28	0.1504			$ 6,680,028.71	$1,004,691		$485,503,664	$73,020,825		$197,526,508	$29,708,424		$84,347,172	$12,686,001		$101,792,187	$15,309,770
2045	29	0.1406			$ 6,680,028.71	$938,964		$493,948,419	$69,430,780		$201,014,823	$28,255,209		$85,766,439	$12,055,572		$103,499,898	$14,548,237
2046	30	0.1314			$ 6,680,028.71	$877,536		$502,393,174	$65,997,943		$204,503,138	$26,864,988		$87,185,706	$11,453,335		$105,207,610	$13,820,820
2047	31	0.1228			$ 6,680,028.71	$820,127		$510,837,929	$62,717,108		$207,991,452	$25,535,736		$88,604,973	$10,878,299		$106,915,322	$13,126,315
2048	32	0.1147			$ 6,680,028.71	$766,474		$519,282,684	$59,583,081		$211,479,767	$24,265,427		$90,024,240	$10,329,483		$108,623,033	$12,463,529
2049	33	0.1072			$ 6,680,028.71	$716,331		$527,727,439	$56,590,693		$214,968,082	$23,052,037		$91,443,507	$9,805,917		$110,330,745	$11,831,284
2050	34	0.1002			$ 6,680,028.71	$669,468		$536,172,194	$53,734,826		$218,456,396	$21,893,557		$92,862,773	$9,306,646		$112,038,456	$11,228,421
2051	35	0.0937			$ 6,680,028.71	$625,671		$544,616,949	$51,010,424		$221,944,711	$20,787,994		$94,282,040	$8,830,733		$113,746,168	$10,653,800
2052	36	0.0875			$ 6,680,028.71	$584,739		$553,061,704	$48,412,509		$225,433,026	$19,733,383		$95,701,307	$8,377,258		$115,453,879	$10,106,308
2053	37	0.0818			$ 6,680,028.71	$546,485		$561,506,459	$45,936,191		$228,921,341	$18,727,789		$97,120,574	$7,945,321		$117,161,591	$9,584,854
2054	38	0.0765			$ 6,680,028.71	$510,734		$569,951,214	$43,576,679		$232,409,655	$17,769,312		$98,539,841	$7,534,047		$118,869,303	$9,088,373
2055	39	0.0715			$ 6,680,028.71	$477,322		$578,395,969	$41,329,288		$235,897,970	$16,856,091		$99,959,108	$7,142,579		$120,577,014	$8,615,831
2056	40	0.0668			$ 6,680,028.71	$446,095		$586,840,723	$39,189,447		$239,386,285	$15,986,307		$101,378,375	$6,770,087		$122,284,726	$8,166,221
2057	41	0.0624			$ 6,680,028.71	$416,911		$595,285,478	$37,152,702		$242,874,599	$15,158,185		$102,797,642	$6,415,762		$123,992,437	$7,738,563
				$339,578,787		**$45,088,165**			**$2,806,681,117**			**$1,138,966,160**			**$490,273,310**			**$591,957,262**

Discounted Costs and Benefits

Maintenance		1%	COSTS				BENEFITS											
Option 7		7%	Construction		Maintenance		Travel Time			VOC and CO2			External Environmental			Crashes		
Year (from 1 July of)	Year	Discount factor	Money of the Day	Present Value	Annual Costs (Money of the Day)	Annual Costs (Present Value)	Annual Benefits (Money of the Day)	Interpolated Annual Benefits (Money of the Day)	Annual Benefits (Present Value)	Annual Benefits (Money of the Day)		Annual Benefits (Present Value)	Annual Benefits (Money of the Day)		Annual Benefits (Present Value)	Annual Benefits (Money of the Day)	Interpolated Annual Benefits (Money of the Day)	Annual Benefits (Present Value)
2016	0	1			$ -	$0	$ 301,239,029	$ 301,239,029	$301,239,029	$ 122,500,557	$ 122,500,557	$122,500,557	$ 53,206,608	$ 53,206,608	$53,206,608	$ 64,575,254	$64,575,254	$64,575,254
2017	1	0.9346			$ -	$0		$303,408,842	$283,559,665		$123,503,750	$115,424,065		$53,615,458	$50,107,904		$65,041,786	$60,786,716
2018	2	0.8734			$ -	$0		$305,578,655	$266,904,232		$124,506,943	$108,749,186		$54,024,307	$47,186,922		$65,508,317	$57,217,501
2019	3	0.8163			$ -	$0		$307,748,468	$251,214,421		$125,510,136	$102,453,658		$54,433,156	$44,433,670		$65,974,848	$53,855,128
2020	4	0.7629			$ -	$0		$309,918,281	$236,435,172		$126,513,329	$96,516,413		$54,842,005	$41,838,703		$66,441,379	$50,687,810
2021	5	0.7130			$ -	$0		$312,088,093	$222,514,497		$127,516,522	$90,917,518		$55,250,855	$39,393,096		$66,907,910	$47,704,415
2022	6	0.6663			$ -	$0		$314,257,906	$209,403,312		$128,519,715	$85,638,113		$55,659,704	$37,088,411		$67,374,441	$44,894,435
2023	7	0.6227			$ -	$0		$316,427,719	$197,055,280		$129,522,908	$80,660,358		$56,068,553	$34,916,677		$67,840,972	$42,247,948
2024	8	0.5820			$ -	$0		$318,597,532	$185,426,664		$130,526,102	$75,967,379		$56,477,403	$32,870,362		$68,307,503	$39,755,589
2025	9	0.5439			$ -	$0		$320,767,345	$174,476,182		$131,529,295	$71,543,221		$56,886,252	$30,942,352		$68,774,035	$37,408,518
2026	10	0.5083	$ 749,678,482	$ 381,098,526	$ 7,496,784.82	$3,810,985	$322,937,158	$322,937,158	$164,164,876	$ 132,532,488	$132,532,488	$67,372,796	$ 57,295,101	$57,295,101	$29,125,924	$ 69,240,566	$69,240,566	$35,198,393
2027	11	0.4751			$ 7,496,784.82	$3,561,668		$325,807,328	$154,788,714		$133,709,095	$63,524,228		$57,800,122	$27,460,422		$69,830,199	$33,175,825
2028	12	0.4440			$ 7,496,784.82	$3,328,662		$328,677,497	$145,936,740		$134,885,702	$59,890,865		$58,305,143	$25,888,181		$70,419,833	$31,267,248
2029	13	0.4150			$ 7,496,784.82	$3,110,899		$331,547,667	$137,580,495		$136,062,309	$56,461,021		$58,810,164	$24,404,127		$71,009,467	$29,466,404
2030	14	0.3878			$ 7,496,784.82	$2,907,382		$334,417,837	$129,693,003		$137,238,916	$53,223,618		$59,315,185	$23,003,451		$71,599,101	$27,767,366
2031	15	0.3624			$ 7,496,784.82	$2,717,180		$337,288,007	$122,248,696		$138,415,523	$50,168,155		$59,820,206	$21,681,596		$72,188,734	$26,164,519
2032	16	0.3387			$ 7,496,784.82	$2,539,420		$340,158,177	$115,223,343		$139,592,130	$47,284,684		$60,325,227	$20,434,242		$72,778,368	$24,652,551
2033	17	0.3166			$ 7,496,784.82	$2,373,290		$343,028,346	$108,593,990		$140,768,738	$44,563,777		$60,830,248	$19,257,299		$73,368,002	$23,226,430
2034	18	0.2959			$ 7,496,784.82	$2,218,028		$345,898,516	$102,338,890		$141,945,345	$41,996,506		$61,335,269	$18,146,893		$73,957,636	$21,881,396
2035	19	0.2765			$ 7,496,784.82	$2,072,923		$348,768,686	$96,437,448		$143,121,952	$39,574,412		$61,840,290	$17,099,356		$74,547,269	$20,612,941
2036	20	0.2584			$ 7,496,784.82	$1,937,312	$351,638,856	$351,638,856	$90,870,162	$ 144,298,559	$144,298,559	$37,289,490	$ 62,345,311	$62,345,311	$16,111,213	$ 75,136,903	$75,136,903	$19,416,804
2037	21	0.2415			$ 7,496,784.82	$1,810,572		$354,509,026	$85,618,569		$145,475,166	$35,134,156		$62,850,332	$15,179,178		$75,726,537	$18,288,950
2038	22	0.2257			$ 7,496,784.82	$1,692,123		$357,379,195	$80,665,189		$146,651,773	$33,101,236		$63,355,353	$14,300,137		$76,316,171	$17,225,564
2039	23	0.2109			$ 7,496,784.82	$1,581,423		$360,249,365	$75,993,481		$147,828,380	$31,183,936		$63,860,374	$13,471,147		$76,905,804	$16,223,040
2040	24	0.1971			$ 7,496,784.82	$1,477,966		$363,119,535	$71,587,789		$149,004,988	$29,375,830		$64,365,395	$12,689,420		$77,495,438	$15,277,964
2041	25	0.1842			$ 7,496,784.82	$1,381,276		$365,989,705	$67,433,302		$150,181,595	$27,670,835		$64,870,416	$11,952,321		$78,085,072	$14,387,110
2042	26	0.1722			$ 7,496,784.82	$1,290,913		$368,859,875	$63,516,008		$151,358,202	$26,063,200		$65,375,438	$11,257,356		$78,674,706	$13,547,430
2043	27	0.1609			$ 7,496,784.82	$1,206,460		$371,730,044	$59,822,653		$152,534,809	$24,547,483		$65,880,459	$10,602,166		$79,264,339	$12,756,039
2044	28	0.1504			$ 7,496,784.82	$1,127,533		$374,600,214	$56,340,701		$153,711,416	$23,118,537		$66,385,480	$9,984,523		$79,853,973	$12,010,214
2045	29	0.1406			$ 7,496,784.82	$1,053,769		$377,470,384	$53,058,300		$154,888,023	$21,771,497		$66,890,501	$9,402,317		$80,443,607	$11,307,380
2046	30	0.1314			$ 7,496,784.82	$984,831		$380,340,554	$49,964,242		$156,064,630	$20,501,761		$67,395,522	$8,853,555		$81,033,241	$10,645,103
2047	31	0.1228			$ 7,496,784.82	$920,403		$383,210,724	$47,047,933		$157,241,237	$19,304,979		$67,900,543	$8,336,354		$81,622,874	$10,021,086
2048	32	0.1147			$ 7,496,784.82	$860,190		$386,080,894	$44,299,357		$158,417,845	$18,177,042		$68,405,564	$7,848,932		$82,212,508	$9,433,156
2049	33	0.1072			$ 7,496,784.82	$803,915		$388,951,063	$41,709,050		$159,594,452	$17,114,063		$68,910,585	$7,389,606		$82,802,142	$8,879,263
2050	34	0.1002			$ 7,496,784.82	$751,323		$391,821,233	$39,268,067		$160,771,059	$16,112,370		$69,415,606	$6,956,787		$83,391,776	$8,357,469
2051	35	0.0937			$ 7,496,784.82	$702,171		$394,691,403	$36,967,957		$161,947,666	$15,168,494		$69,920,627	$6,548,971		$83,981,409	$7,865,946
2052	36	0.0875			$ 7,496,784.82	$656,234		$397,561,573	$34,800,734		$163,124,273	$14,279,158		$70,425,648	$6,164,741		$84,571,043	$7,402,965
2053	37	0.0818			$ 7,496,784.82	$613,303		$400,431,743	$32,758,856		$164,300,880	$13,441,264		$70,930,669	$5,802,756		$85,160,677	$6,966,896
2054	38	0.0765			$ 7,496,784.82	$573,181		$403,301,912	$30,835,197		$165,477,487	$12,651,889		$71,435,690	$5,461,748		$85,750,310	$6,556,199
2055	39	0.0715			$ 7,496,784.82	$535,683		$406,172,082	$29,023,029		$166,654,094	$11,908,270		$71,940,711	$5,140,524		$86,339,944	$6,169,421
2056	40	0.0668			$ 7,496,784.82	$500,638		$409,042,252	$27,315,997		$167,830,702	$11,207,798		$72,445,732	$4,837,954		$86,929,578	$5,805,190
2057	41	0.0624			$ 7,496,784.82	$467,886		$411,912,422	$25,708,101		$169,007,309	$10,548,012		$72,950,753	$4,552,971		$87,519,212	$5,462,211
				$381,098,526		**$50,601,020**			**$2,368,586,769**			**$971,975,552**			**$419,955,242**			**$506,151,072**

E Summary BCR and Sensitivity Analysis

Summary of Costs and Benefits

Economics Evaluator	Matt Gatenby
Economics Reviewer	Chris Morahan

Discount Rate 7%

Scenario	Description	Present Value Costs			Present Value Benefits					BCR	NPV	FYRR	IRR	NPVI
		Capital Cost	Maintenance	TOTAL COST	Travel Time	Vehicle Operating Costs	Crashes	Environmental	TOTAL BENEFITS					
Base Case	Do Minimum	-	-	-	-	-	-	-	-	-	-	-	-	-
Option 2	Base Case + East West ("EW") Link	$ 238,433,049	$ 31,658,363	$ 270,091,412	$ 967,826,491	$ 944,883,729	$ 380,003,749	$ 295,153,912	$ 2,587,867,880	9.6	$ 2,317,776,468	135%		862%
Option 3	Base Case + North South ("NS") Link	$ 101,145,738	$ 13,429,801	$ 114,575,540	$ 1,104,136,824	$ 1,059,679,103	$ 440,819,240	$ 331,061,837	$ 2,935,697,004	25.6	$ 2,821,121,465	301%		2462%
Option 4	Base Case + Lady Nelson Drive ("LND") airport link	$ 77,043,421	$ 10,229,575	$ 87,272,997	$ 1,005,295,546	$ 993,196,008	$ 429,159,295	$ 327,371,164	$ 2,755,022,013	31.6	$ 2,667,749,016	389%		3057%
Option 5	Base Case + EW + LND	$ 315,476,472	$ 41,887,938	$ 357,364,409	$ 1,319,861,467	$ 1,083,907,942	$ 461,811,419	$ 361,210,163	$ 3,196,790,892	8.9	$ 2,839,426,483	90%		795%
Option 6	Base Case + NS + LND	$ 339,578,787	$ 45,088,165	$ 384,666,951	$ 1,161,279,557	$ 1,064,834,235	$ 434,768,797	$ 327,841,534	$ 2,988,724,122	7.8	$ 2,604,057,171	79%		677%
Option 7	Base Case + NS + EW + LND	$ 381,098,536	$ 50,601,030	$ 431,699,546	$ 1,599,373,905	$ 1,231,824,942	$ 520,574,987	$ 398,159,602	$ 3,749,933,336	8.7	$ 3,318,233,790	69%		769%

Sensitivities

Discount Rate 4%

Scenario	Description	Present Value Costs			Present Value Benefits					BCR	NPV	FYRR
		Capital Cost	Maintenance	TOTAL COST	Travel Time	Vehicle Operating Costs	Crashes	Environmental	TOTAL BENEFITS			
Base Case	Do Minimum	-	-	-	-	-	-	-	-	-	-	-
Option 2	Base Case + East West ("EW") Link	$ 316,862,494	$ 56,983,647	$ 373,846,140	$ 1,768,431,206	$ 1,733,703,420	$ 701,113,459	$ 530,095,092	$ 4,733,343,177	12.7	$ 4,359,497,037	130%
Option 3	Base Case + North South ("NS") Link	$ 134,416,311	$ 24,173,046	$ 158,589,357	$ 2,085,921,185	$ 1,974,392,273	$ 836,018,686	$ 613,371,275	$ 5,489,703,419	34.6	$ 5,331,114,063	289%
Option 4	Base Case + Lady Nelson Drive ("LND") airport link	$ 102,385,853	$ 18,412,780	$ 120,798,633	$ 1,732,647,982	$ 1,797,080,833	$ 769,044,997	$ 585,112,485	$ 4,873,886,297	40.3	$ 4,753,087,665	325%
Option 5	Base Case + EW + LND	$ 419,348,347	$ 75,396,436	$ 494,644,773	$ 2,521,497,585	$ 1,908,040,548	$ 850,806,060	$ 668,125,366	$ 5,948,469,559	12.0	$ 5,453,824,786	87%
Option 6	Base Case + NS + LND	$ 451,278,805	$ 81,156,692	$ 532,435,497	$ 2,101,675,477	$ 1,917,806,992	$ 794,368,618	$ 591,241,311	$ 5,415,092,397	10.2	$ 4,882,656,900	76%
Option 7	Base Case + NS + EW + LND	$ 506,455,930	$ 91,079,587	$ 597,535,508	$ 3,017,466,396	$ 2,291,147,663	$ 964,336,205	$ 738,678,479	$ 7,011,628,742	11.7	$ 6,414,093,234	66%

Discount Rate 10%

Scenario	Description	Present Value Costs			Present Value Benefits					BCR	NPV	FYRR
		Capital Cost	Maintenance	TOTAL COST	Travel Time	Vehicle Operating Costs	Crashes	Environmental	TOTAL BENEFITS			
Base Case	Do Minimum	-	-	-	-	-	-	-	-	-	-	-
Option 2	Base Case + East West ("EW") Link	$ 180,832,871	$ 18,751,656	$ 199,584,527	$ 565,988,610	$ 550,590,287	$ 231,245,501	$ 175,145,387	$ 1,522,969,786	7.6	$ 1,323,385,259	129%
Option 3	Base Case + North South ("NS") Link	$ 76,711,154	$ 7,954,644	$ 84,665,798	$ 626,858,602	$ 609,203,499	$ 254,888,345	$ 191,279,244	$ 1,682,229,690	19.9	$ 1,597,563,892	309%
Option 4	Base Case + Lady Nelson Drive ("LND") airport link	$ 58,431,427	$ 6,059,109	$ 64,490,536	$ 619,367,121	$ 585,701,468	$ 255,139,259	$ 195,046,708	$ 1,655,254,552	25.7	$ 1,590,764,016	347%
Option 5	Base Case + EW + LND	$ 239,264,298	$ 24,810,765	$ 264,075,063	$ 763,373,868	$ 599,437,578	$ 268,147,898	$ 209,001,957	$ 1,839,961,301	7.0	$ 1,575,886,238	93%
Option 6	Base Case + NS + LND	$ 257,544,024	$ 26,706,300	$ 284,250,325	$ 684,694,424	$ 624,889,071	$ 257,022,363	$ 193,870,470	$ 1,760,476,228	6.2	$ 1,476,225,903	81%
Option 7	Base Case + NS + EW + LND	$ 289,033,508	$ 29,971,636	$ 319,005,144	$ 909,138,255	$ 709,267,017	$ 300,817,485	$ 229,773,285	$ 2,148,996,042	6.7	$ 1,829,990,898	70%

Construction Cost +25%

Scenario	Description	Present Value Costs			Present Value Benefits					BCR	NPV	FYRR
		Capital Cost	Maintenance	TOTAL COST	Travel Time	Vehicle Operating Costs	Crashes	Environmental	TOTAL BENEFITS			
Base Case	Do Minimum	-	-	-	-	-	-	-	-	-	-	-
Option 2	Base Case + East West ("EW") Link	$ 298,041,311	$ 39,572,954	$ 337,614,265	$ 967,826,491	$ 944,883,729	$ 380,003,749	$ 295,153,912	$ 2,587,867,880	7.7	$ 2,250,253,616	100%
Option 3	Base Case + North South ("NS") Link	$ 126,432,173	$ 16,787,252	$ 143,219,424	$ 1,104,136,824	$ 1,059,679,103	$ 440,819,240	$ 331,061,837	$ 2,935,697,004	20.5	$ 2,792,477,580	241%
Option 4	Base Case + Lady Nelson Drive ("LND") airport link	$ 96,304,279	$ 12,786,968	$ 109,091,247	$ 1,005,295,546	$ 993,196,008	$ 429,159,295	$ 327,371,164	$ 2,755,022,013	25.3	$ 2,645,930,767	271%
Option 5	Base Case + EW + LND	$ 394,345,590	$ 52,359,922	$ 446,705,512	$ 1,319,861,467	$ 1,083,907,942	$ 461,811,419	$ 361,210,163	$ 3,196,790,892	7.2	$ 2,750,085,380	72%
Option 6	Base Case + NS + LND	$ 424,473,484	$ 56,360,206	$ 480,833,689	$ 1,161,279,557	$ 1,064,834,235	$ 434,768,797	$ 327,841,534	$ 2,988,724,122	6.2	$ 2,507,890,433	63%
Option 7	Base Case + NS + EW + LND	$ 476,373,157	$ 63,251,275	$ 539,624,432	$ 1,599,373,905	$ 1,231,824,942	$ 520,574,987	$ 398,159,602	$ 3,749,933,336	6.9	$ 3,210,308,904	55%

Construction Cost +50%

Scenario	Description	Present Value Costs			Present Value Benefits					BCR	NPV	FYRR
		Capital Cost	Maintenance	TOTAL COST	Travel Time	Vehicle Operating Costs	Crashes	Environmental	TOTAL BENEFITS			
Base Case	Do Minimum	-	-	-	-	-	-	-	-	-	-	-
Option 2	Base Case + East West ("EW") Link	$ 357,649,573	$ 47,487,545	$ 405,137,118	$ 967,826,491	$ 944,883,729	$ 380,003,749	$ 295,153,912	$ 2,587,867,880	6.4	$ 2,182,730,763	83%
Option 3	Base Case + North South ("NS") Link	$ 151,718,607	$ 20,144,702	$ 171,863,309	$ 1,104,136,824	$ 1,059,679,103	$ 440,819,240	$ 331,061,837	$ 2,935,697,004	17.1	$ 2,763,833,695	201%
Option 4	Base Case + Lady Nelson Drive ("LND") airport link	$ 115,565,134	$ 15,344,362	$ 130,909,496	$ 1,005,295,546	$ 993,196,008	$ 429,159,295	$ 327,371,164	$ 2,755,022,013	21.0	$ 2,624,112,517	226%
Option 5	Base Case + EW + LND	$ 473,214,707	$ 62,831,906	$ 536,046,614	$ 1,319,861,467	$ 1,083,907,942	$ 461,811,419	$ 361,210,163	$ 3,196,790,892	6.0	$ 2,660,744,278	60%
Option 6	Base Case + NS + LND	$ 509,368,180	$ 67,632,247	$ 577,000,427	$ 1,161,279,557	$ 1,064,834,235	$ 434,768,797	$ 327,841,534	$ 2,988,724,122	5.2	$ 2,411,723,695	53%
Option 7	Base Case + NS + EW + LND	$ 571,647,788	$ 75,901,530	$ 647,549,318	$ 1,599,373,905	$ 1,231,824,942	$ 520,574,987	$ 398,159,602	$ 3,749,933,336	5.8	$ 3,102,384,017	46%

Travel Times -25%

Scenario	Description	Present Value Costs			Present Value Benefits					BCR	NPV	FYRR
		Capital Cost	Maintenance	TOTAL COST	Travel Time	Vehicle Operating Costs	Crashes	Environmental	TOTAL BENEFITS			
Base Case	Do Minimum	-	-	-	-	-	-	-	-	-	-	-
Option 2	Base Case + East West ("EW") Link	$ 238,433,049	$ 31,658,363	$ 270,091,412	$ 725,869,868	$ 944,883,729	$ 380,003,749	$ 295,153,912	$ 2,355,911,258	8.7	$ 2,085,819,846	135%
Option 3	Base Case + North South ("NS") Link	$ 101,145,738	$ 13,429,801	$ 114,575,540	$ 828,102,618	$ 1,059,679,103	$ 440,819,240	$ 331,061,837	$ 2,659,662,798	23.2	$ 2,545,087,259	301%
Option 4	Base Case + Lady Nelson Drive ("LND") airport link	$ 77,043,421	$ 10,229,575	$ 87,272,997	$ 753,971,660	$ 993,196,008	$ 429,159,295	$ 327,371,164	$ 2,503,698,127	28.7	$ 2,416,425,129	389%
Option 5	Base Case + EW + LND	$ 315,476,472	$ 41,887,938	$ 357,364,409	$ 1,004,896,100	$ 1,083,907,942	$ 461,811,419	$ 361,210,163	$ 2,861,825,525	8.0	$ 2,504,461,116	90%
Option 6	Base Case + NS + LND	$ 339,578,787	$ 45,088,165	$ 384,666,951	$ 870,959,668	$ 1,064,834,235	$ 434,768,797	$ 327,841,534	$ 2,698,404,233	7.0	$ 2,313,737,282	79%
Option 7	Base Case + NS + EW + LND	$ 381,098,536	$ 50,601,030	$ 431,699,546	$ 1,199,530,428	$ 1,231,824,942	$ 520,574,987	$ 398,159,602	$ 3,350,089,860	7.8	$ 2,918,390,314	69%

Travel Times +25%

Scenario	Description	Present Value Costs			Present Value Benefits					BCR	NPV	FYRR
		Capital Cost	Maintenance	TOTAL COST	Travel Time	Vehicle Operating Costs	Crashes	Environmental	TOTAL BENEFITS			
Base Case	Do Minimum	-	-	-	-	-	-	-	-	-	-	-
Option 2	Base Case + East West ("EW") Link	$ 238,433,049	$ 31,658,363	$ 270,091,412	$ 1,209,783,114	$ 944,883,729	$ 380,003,749	$ 295,153,912	$ 2,829,824,503	10.5	$ 2,559,733,091	135%
Option 3	Base Case + North South ("NS") Link	$ 101,145,738	$ 13,429,801	$ 114,575,540	$ 1,380,171,030	$ 1,059,679,103	$ 440,819,240	$ 331,061,837	$ 3,211,731,210	28.0	$ 3,097,155,671	301%
Option 4	Base Case + Lady Nelson Drive ("LND") airport link	$ 77,043,421	$ 10,229,575	$ 87,272,997	$ 1,256,619,433	$ 993,196,008	$ 429,159,295	$ 327,371,164	$ 3,006,345,900	34.4	$ 2,919,072,903	389%
Option 5	Base Case + EW + LND	$ 315,476,472	$ 41,887,938	$ 357,364,409	$ 1,674,826,834	$ 1,083,907,942	$ 461,811,419	$ 361,210,163	$ 3,531,756,259	9.9	$ 3,174,391,850	90%
Option 6	Base Case + NS + LND	$ 339,578,787	$ 45,088,165	$ 384,666,951	$ 1,451,599,446	$ 1,064,834,235	$ 434,768,797	$ 327,841,534	$ 3,279,044,011	8.5	$ 2,894,377,060	79%
Option 7	Base Case + NS + EW + LND	$ 381,098,536	$ 50,601,030	$ 431,699,546	$ 1,999,217,381	$ 1,231,824,942	$ 520,574,987	$ 398,159,602	$ 4,149,776,812	9.6	$ 3,718,077,266	69%

All Benefits -25%

Scenario	Description	Present Value Costs			Present Value Benefits					BCR	NPV	FYRR
		Capital Cost	Maintenance	TOTAL COST	Travel Time	Vehicle Operating Costs	Crashes	Environmental	TOTAL BENEFITS			
Base Case	Do Minimum	-	-	-	-	-	-	-	-	-	-	-
Option 2	Base Case + East West ("EW") Link	$ 238,433,049	$ 31,658,363	$ 270,091,412	$ 725,869,868	$ 708,662,797	$ 285,502,811	$ 221,365,434	$ 1,940,400,910	7.2	$ 1,670,309,498	135%
Option 3	Base Case + North South ("NS") Link	$ 101,145,738	$ 13,429,801	$ 114,575,540	$ 828,102,618	$ 794,759,327	$ 330,614,430	$ 248,296,378	$ 2,201,772,753	19.2	$ 2,087,197,214	301%
Option 4	Base Case + Lady Nelson Drive ("LND") airport link	$ 77,043,421	$ 10,229,575	$ 87,272,997	$ 753,971,660	$ 744,897,006	$ 321,869,471	$ 245,528,373	$ 2,066,266,510	23.7	$ 1,978,993,513	389%
Option 5	Base Case + EW + LND	$ 315,476,472	$ 41,887,938	$ 357,364,409	$ 1,004,896,100	$ 775,430,882	$ 346,358,565	$ 270,907,623	$ 2,397,593,169	6.7	$ 2,040,228,760	90%
Option 6	Base Case + NS + LND	$ 339,578,787	$ 45,088,165	$ 384,666,951	$ 870,959,668	$ 798,625,676	$ 326,076,598	$ 245,881,151	$ 2,241,543,092	5.8	$ 1,856,876,140	79%
Option 7	Base Case + NS + EW + LND	$ 381,098,536	$ 50,601,030	$ 431,699,546	$ 1,199,530,428	$ 923,868,682	$ 390,431,240	$ 298,619,702	$ 2,812,450,002	6.5	$ 2,380,750,456	69%

All Benefits +25%

Scenario	Description	Present Value Costs			Present Value Benefits					BCR	NPV	FYRR
		Capital Cost	Maintenance	TOTAL COST	Travel Time	Vehicle Operating Costs	Crashes	Environmental	TOTAL BENEFITS			
Base Case	Do Minimum	-	-	-	-	-	-	-	-	-	-	-
Option 2	Base Case + East West ("EW") Link	$ 238,433,049	$ 31,658,363	$ 270,091,412	$ 1,209,783,114	$ 1,181,104,661	$ 487,504,686	$ 368,942,390	$ 3,247,334,850	12.0	$ 2,977,243,439	135%
Option 3	Base Case + North South ("NS") Link	$ 101,145,738	$ 13,429,801	$ 114,575,540	$ 1,380,171,030	$ 1,324,598,879	$ 551,024,051	$ 413,827,296	$ 3,669,621,255	32.0	$ 3,555,045,716	301%
Option 4	Base Case + Lady Nelson Drive ("LND") airport link	$ 77,043,421	$ 10,229,575	$ 87,272,997	$ 1,256,619,433	$ 1,241,495,010	$ 536,449,119	$ 409,213,955	$ 3,443,777,517	39.5	$ 3,356,504,519	389%
Option 5	Base Case + EW + LND	$ 315,476,472	$ 41,887,938	$ 357,364,409	$ 1,674,826,834	$ 1,292,384,803	$ 577,264,274	$ 451,512,704	$ 3,995,988,615	11.2	$ 3,638,624,206	90%
Option 6	Base Case + NS + LND	$ 339,578,787	$ 45,088,165	$ 384,666,951	$ 1,451,599,446	$ 1,331,042,793	$ 543,460,996	$ 409,801,918	$ 3,735,905,153	9.7	$ 3,351,238,201	79%
Option 7	Base Case + NS + EW + LND	$ 381,098,536	$ 50,601,030	$ 431,699,546	$ 1,999,217,381	$ 1,539,781,053	$ 650,718,733	$ 497,699,503	$ 4,687,416,670	10.9	$ 4,255,717,124	69%

80% benefits after 2036

Scenario	Description	Present Value Costs			Present Value Benefits					BCR	NPV	FYRR
		Capital Cost	Maintenance	TOTAL COST	Travel Time	Vehicle Operating Costs	Crashes	Environmental	TOTAL BENEFITS			
Base Case	Do Minimum	-	-	-	-	-	-	-	-	-	-	-
Option 2	Base Case + East West ("EW") Link	$ 238,433,049	$ 31,658,363	$ 270,091,412	$ 962,871,305	$ 938,695,092	$ 380,168,347	$ 295,373,410	$ 2,587,108,053	9.6	$ 2,317,016,641	135%
Option 3	Base Case + North South ("NS") Link	$ 101,145,738	$ 13,429,801	$ 114,575,540	$ 1,085,634,786	$ 1,047,093,834	$ 436,581,963	$ 327,780,227	$ 2,897,090,810	25.3	$ 2,782,515,271	301%
Option 4	Base Case + Lady Nelson Drive ("LND") airport link	$ 77,043,421	$ 10,229,575	$ 87,272,997	$ 1,021,608,298	$ 991,435,990	$ 429,803,045	$ 328,148,824	$ 2,770,990,156	31.8	$ 2,683,717,159	389%
Option 5	Base Case + EW + LND	$ 315,476,472	$ 41,887,938	$ 357,364,409	$ 1,319,240,660	$ 1,025,071,770	$ 458,137,071	$ 357,836,828	$ 3,160,286,329	8.8	$ 2,802,921,920	90%
Option 6	Base Case + NS + LND	$ 339,578,787	$ 45,088,165	$ 384,666,951	$ 1,159,134,240	$ 1,060,861,923	$ 434,430,000	$ 327,627,241	$ 2,982,053,404	7.8	$ 2,597,386,453	79%
Option 7	Base Case + NS + EW + LND	$ 381,098,536	$ 50,601,030	$ 431,699,546	$ 1,573,333,797	$ 1,217,943,673	$ 515,443,683	$ 394,026,503	$ 3,700,747,657	8.6	$ 3,269,048,111	69%

Expansion factors x 0.9

Scenario	Description	Present Value Costs			Present Value Benefits					BCR	NPV	FYRR
		Capital Cost	Maintenance	TOTAL COST	Travel Time	Vehicle Operating Costs	Crashes	Environmental	TOTAL BENEFITS			
Base Case	Do Minimum	-	-	-	-	-	-	-	-	-	-	-
Option 2	Base Case + East West ("EW") Link	$ 238,433,049	$ 31,658,363	$ 270,091,412	$ 871,043,842	$ 850,395,356	$ 351,003,374	$ 265,638,521	$ 2,338,081,093	8.7	$ 2,067,989,680	118%
Option 3	Base Case + North South ("NS") Link	$ 101,145,738	$ 13,429,801	$ 114,575,540	$ 993,723,141	$ 953,711,193	$ 396,737,316	$ 297,955,653	$ 2,642,127,304	23.1	$ 2,527,551,764	271%
Option 4	Base Case + Lady Nelson Drive ("LND") airport link	$ 77,043,421	$ 10,229,575	$ 87,272,997	$ 904,765,991	$ 893,876,407	$ 386,243,366	$ 294,634,048	$ 2,479,519,812	28.4	$ 2,392,246,815	305%
Option 5	Base Case + EW + LND	$ 315,476,472	$ 41,887,938	$ 357,364,409	$ 1,205,875,320	$ 930,517,058	$ 415,630,277	$ 325,089,147	$ 2,877,111,803	8.1	$ 2,519,747,394	81%
Option 6	Base Case + NS + LND	$ 339,578,787	$ 45,088,165	$ 384,666,951	$ 1,045,151,601	$ 958,350,811	$ 391,291,917	$ 295,057,381	$ 2,689,851,710	7.0	$ 2,305,184,759	71%
Option 7	Base Case + NS + EW + LND	$ 381,098,536	$ 50,601,030	$ 431,699,546	$ 1,439,436,514	$ 1,108,642,358	$ 468,517,488	$ 358,343,642	$ 3,374,940,002	7.8	$ 2,943,240,457	62%

Discount Rate 7% - without externality

Scenario	Description	Present Value Costs			Present Value Benefits					BCR	NPV	FYRR
		Capital Cost	Maintenance	TOTAL COST	Travel Time	Vehicle Operating Costs	Crashes	Environmental	TOTAL BENEFITS			
Base Case	Do Minimum	-	-	-	-	-	-	-	-	-	-	-
Option 2	Base Case + East West ("EW") Link	$ 238,433,049	$ 31,658,363	$ 270,091,412	$ 967,826,491	$ 944,883,729	$ 380,003,749	-	$ 2,292,713,968	8.5	$ 2,022,622,557	118%
Option 3	Base Case + North South ("NS") Link	$ 101,145,738	$ 13,429,801	$ 114,575,540	$ 1,104,136,824	$ 1,059,679,103	$ 440,819,240	-	$ 2,604,635,167	22.7	$ 2,490,059,628	232%
Option 4	Base Case + Lady Nelson Drive ("LND") airport link	$ 77,043,421	$ 10,229,575	$ 87,272,997	$ 1,005,295,546	$ 993,196,008	$ 429,159,295	-	$ 2,427,650,849	27.8	$ 2,340,377,852	306%
Option 5	Base Case + EW + LND	$ 315,476,472	$ 41,887,938	$ 357,364,409	$ 1,319,861,467	$ 1,083,907,942	$ 461,811,419	-	$ 2,835,580,729	7.9	$ 2,478,216,319	82%
Option 6	Base Case + NS + LND	$ 339,578,787	$ 45,088,165	$ 384,666,951	$ 1,161,279,557	$ 1,064,834,235	$ 434,768,797	-	$ 2,660,882,588	6.9	$ 2,276,215,637	71%
Option 7	Base Case + NS + EW + LND	$ 381,098,536	$ 50,601,030	$ 431,699,546	$ 1,599,373,905	$ 1,231,824,942	$ 520,574,987	-	$ 3,351,773,733	7.8	$ 2,920,074,188	62%

Incremental

Scenario	Description	Present Value Costs			Present Value Benefits					BCR	NPV	FYRR	IRR	NPVI
		Capital Cost	Maintenance	TOTAL COST	Travel Time	Vehicle Operating Costs	Crashes	Environmental	TOTAL BENEFITS					
Base Case	Do Minimum	-	-	-	-	-	-	-	-	-	-	-	-	-
Option 4	Base Case + Lady Nelson Drive ("LND") airport link	$ 77,043,421	$ 10,229,575	$ 87,272,997	$ 1,005,295,546	$ 993,196,008	$ 429,159,295	$ 327,371,164	$ 2,755,022,013	31.6	$ 2,667,749,016	389%		3057%
Option 3	Base Case + North South ("NS") Link	$ 101,145,738	$ 13,429,801	$ 114,575,540	$ 1,104,136,824	$ 1,059,679,103	$ 440,819,240	$ 331,061,837	$ 2,935,697,004	25.6	$ 2,821,121,465	301%		2462%
				$ 27,302,543					$ 180,674,991	6.6	$ 153,372,449			562%
Option 2	Base Case + East West ("EW") Link	$ 238,433,049	$ 31,658,363	$ 270,091,412	$ 967,826,491	$ 944,883,729	$ 380,003,749	$ 295,153,912	$ 2,587,867,880	9.6	$ 2,317,776,468	135%		862%
				$ 155,515,872					-$ 347,829,124	-2.2	-$ 498,344,996			-317%
Option 5	Base Case + EW + LND	$ 315,476,472	$ 41,887,938	$ 357,364,409	$ 1,319,861,467	$ 1,083,907,942	$ 461,811,419	$ 361,210,163	$ 3,196,790,892	8.9	$ 2,839,426,483	90%		795%
				$ 242,788,870					$ 261,093,888	1.1	$ 18,305,018			8%
Option 6	Base Case + NS + LND	$ 339,578,787	$ 45,088,165	$ 384,666,951	$ 1,161,279,557	$ 1,064,834,235	$ 434,768,797	$ 327,841,534	$ 2,988,724,122	7.8	$ 2,604,057,171	79%		677%
				$ 27,302,542					-$ 208,066,770	-7.6	-$ 235,369,312			-862%
Option 7	Base Case + NS + EW + LND	$ 381,098,536	$ 50,601,030	$ 431,699,546	$ 1,599,373,905	$ 1,231,824,942	$ 520,574,987	$ 398,159,602	$ 3,749,933,336	8.7	$ 3,318,233,790	69%		769%
				$ 74,335,116					$ 551,142,444	7.4	$ 476,807,207			641%

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Appendix F – Safety in Design Register

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Risk Management Register - Safety in Design

Client:	Port macquarie Hastings Council
Project Name:	Outer Orbital Link
Project Number:	T-14519.00
t Recent Workshop Date:	TBA
Date:	11-December-2018
Document Revision	1.0

Risk Rating Matrix (Definitions at back)		Likelihood				
		E - Extreme	H - High	M - Moderate	L - Low	N - Negligable
Consequence	E - Extreme	E - Extreme	E - Extreme	E - Extreme	H - High	M - Moderate
	H - High	E - Extreme	H - High	H - High	M - Moderate	M - Moderate
	M - Medium	E - Extreme	H - High	M - Moderate	M - Moderate	L - Low
	L - Low	H - High	M - Moderate	M - Moderate	L - Low	L - Low
	N - Negligable	M - Moderate	M - Moderate	L - Low	L - Low	N - Negligable

Reference	Cause,Trigger or Issue	Risk, Hazard or Opportunity	Potential Consequences	Original Rating			Risk Priority	Proposed Risk Treatment	Risk Owner	Action Owner	Timing	Residual Rating			Status
				Likelihood	Consequence	Original Risk	1 (High) - 5 (Low)					Likelihood	Consequence	Residual Risk	
Non-Design Stage Specific - Consideration at All Times															
1	**Approvals**														
1.01	Insufficient design, or changes to the design	Unable to gain necessary approvals in order to proceed with construction.	Project delay	L	H	M	2	Ensure drainage and road plan requirements are understood and met. Issue design in stages to allow any non-conformances to be	PMHC	PMHC	Next design stage	L	H	M	Open
2	**Project Objectives**														
2.01	Incorrect hydraulic data used in detemination of stormwater design	Flooding or inadequate surface flow could occur in flooding areas within the project area	Disruption to commuters Runoff from project area polluting nearby water systems and community areas	N	M	L	5	Ensure hydraulic design is accurate and calibrated to current data.	PMHC	PMHC	Next design stage	N	M	L	Open
2.02	Incorrect analysis of data	Bridge is not able to meet vehicle mass, containment, and speed requirements	Disruption to community, injuries from potential sweeping	N	H	M	4	Ensure bridge requirements are understood and met. Issue design in stages to allow any non-conformances to be addressed.	PMHC	PMHC	Next design stage	N	M	L	Open
2.02	Proposed Outer Orbital alignment analysis fails to recognise negative environmental impact	Impact on environment to great to progress to next design stage.	Additional costs and time necessary to allow for further design, contract termination	L	H	M	5	Ensure team members fully comprehend the aim of the project and the desired outcomes	PMHC	PMHC	Next design stage	N	M	L	Open
2.03	Proposed Outer orbital alignment does not propose significant benefits	Benefit Cost Analysis shows little to no benefits of Outer Orbital construction	Additional costs and time necessary to allow for further design, contract termination	L	H	M	5	Ensure team members fully comprehend the aim of the project and the desired outcomes	PMHC	PMHC	Next design stage	N	M	L	Open
2.04	Project alignments do not interface with existing instructure.	Construction of interface infrastructure has not considered safe construction methodlogies.	Additional costs and time necessary to allow for further design, contract termination	L	H	M	5	Council to review and consider at all design stages. Ensure team members fully comprehend the aim of the project and the desired outcomes	PMHC	PMHC	Next design stage	N	M	L	Open
3	**Project Scope**														
3.01	Incorrect interpolation of data supplied by Council	Project Scope of Works is not met	Project delay as changes to design to meet scope/changes to options are made	N	H	M	4	Ensure Scope of Works provided is fully adhered to. Issue design in stages to allow any non-conformances to be addressed.	PMHC	PMHC	Detailed design	N	M	L	Open
4	**Project Budget**														
4.01	Under-estimation of project cost	Cost of proposed options calculated exceeds contract compensation	Project goes over budget	L	L	L	5	Ensure adequate project management and internal verification	PMHC	PMHC	Detailed design	L	L	L	Open
4.02	Under-estimation of project timeframe	Detailed design not able to be submitted on agreed issue dates	Project delay and additional costs	L	M	M	4	Ensure adequate project management and internal verification	PMHC	PMHC	Detailed design	L	L	L	Open

Port Macquarie Outer Orbital

Risk Management Register - Safety In Design

Reference	Cause,Trigger or Issue	Risk, Hazard or Opportunity	Potential Consequences	Original Rating			Risk Priority	Proposed Risk Treatment	Risk Owner	Action Owner	Timing	Residual Rating			Status
				Likelihood	Consequence	Original Risk	1 (High) - 5 (Low)					Likelihood	Consequence	Residual Risk	
5	**Cost Estimates**														
5.01	Inaccurate estimation	Construction cost estimate does not reflect actual construction cost of project	Tendering issues Unable to engage contractor financially	L	H	M	2	Ensure all aspects of design, and their quantities, are included in cost estimate. Unit rate estimations are based on recent project	PMHC	PMHC	Detailed design	L	M	M	Open
6	**Community**														
6.01	Inadequate measures to contain pollution from construction activities	Environmental or noise pollution to surroundings	Disruption to community members, possible environmental issues	L	M	M	4	Provide adequate contaminant and noise pollution containment. Adhere to working conditions set out in CEMP and tender	PMHC	PMHC	Construction	L	M	M	Open
6.02	Additional construction vehicles and workers present on site	Additional localised traffic within the community	Disruption to community, higher chance of vehicle crashes	M	N	L	5	Contractor to produce traffic management plans. Stockpile and site compund located in	PMHC	PMHC	Construction	L	N	L	Open
6.03	Inadequate public consultation on all aspects of the project	Community not satisfied with aesthetic or functional aspects of construction	Disruption to community and resistance to the project.	L	M	M	3	Ensure public consultation is conducted during various stages of the project to keep the community informed, and ensure	PMHC	PMHC	Construction/ Operation	L	L	L	Open
7	**Emergency Services**														
7.01	Road closures as a result of construction procedures	Emergency vehicles not able to pass through during construction to attend emergency situation	Fatality/ damage to infrastructure	L	E	H	2	Ensure existing structure and road remain open and in serviceable state. Contractor to provide a traffic management plan.	PMHC	PMHC	Construction	L	M	L	Open
7.02	Construcion site accessibility	Emergency vehicles not able to access site when required.	Fatality of workers or bystanders	N	E	M	3	Ensure all areas of the site are accessible for emergency service vehicles and personnel.	PMHC	PMHC	Construction	N	M	L	Open
8	**Other Stakeholders**														
8.01	Additional stakeholders are to be	N/A	N/A	N	N	N		N/A	N/A	N/A	N/A	N	N	N	N/A
9	**Geotech, Earthworks**														
9.01	Services not identified during initial investigations	Damage or contact to unidentified services as a result of excavation and construction activities	Fatality of construction workers	L	E	H	2	Carry out services investigations such as a DBYD search prior to excavation works starting.	PMHC	PMHC	Detailed design/ prior to construction	L	H	M	Open
9.02	Construction activities, lack of soil stability	Instability of excavations	Injury to workers and bystanders, Delays to the projects progress	L	M	M	5	Minor risk due to shallow excavations. Monitor soil movements, provide stepped excavations or temporary bracing where	PMHC	PMHC	Construction	L	M	M	Open
9.03	Unexpected ground conditions within the site area	Depth of foundations is inadequate for calculated design loadings in the given ground conditions	Project delay and additional costs	L	H	M	3	Ensure adequate boreholes are undertaken, and a suitably qualified geotech engineer undertakes/ checks design and is present during borehole investigation.	PMHC	PMHC	Detailed design	L	M	M	Open
10	**Property**														
10.01	Construction through areas of Port Macquarie will require a number of property acquisitions	Community not in agreement with location of new development	Conflicts with community members, vandalism, project delays while negoatiations are caried out	H	M	M	5	Council to decide on the preferred option and continue effective community consultation so any conflicts are resolved in good time	PMHC	PMHC	Detailed design/Construction	H	L	M	Open
10.02	Working in close proximity to private land	Damage to private property as a result of construction activities	Disruption to community and additional costs	L	L	L	4	Ensure works do not encroach on private land, and adequate areas for site compounds, delivery areas etc. are accounted for. Private	PMHC	PMHC	Construction	L	L	L	Open

Port Macquarie Outer Orbital

Risk Management Register - Safety In Design

Reference	Cause,Trigger or Issue	Risk, Hazard or Opportunity	Potential Consequences	Original Rating			Risk Priority	Proposed Risk Treatment	Risk Owner	Action Owner	Timing	Residual Rating			Status
				Likelihood	Consequence	Original Risk	1 (High) - 5 (Low)					Likelihood	Consequence	Residual Risk	
11	**Traffic**														
11.01	Construction to progress through Oxley Highway at site of proposed intersection	Construction to partially obstruct Oxley Highway for an extended period of time, requiring the presence of additional construction vehicles and workers travelling to and from site	Additional traffic leading to traffic delays and higher chance of vehicle crashes. Construction site on Oxley Highway to obstruct traffic causing tension with commuters	H	M	M	5	Contractor to plan construction staging effectively and ensure construction across the Oxley Highway is done efficiently, minimising time in this area	PMHC	PMHC	Construction	H	L	M	Open
11.02	Construction undertaken in proximity to airport	One of the main access roads to airport will be under construction	Traffic delays to airport, community dissatisfaction	M	M	M	3	Council to provide adequate consultation to inform community of future construction. Council to also indicate alternative routes to	PMHC	PMHC	Construction	M	L	L	Open
11.03	Construction undertaken with close proximity to utilised roads	Disruption to road traffic within the area during construction	Disruption to community, potential vehicle accidents when forced to choose alternate routes.	H	M	M	2	Utilise design and construction methodology to reduce construction timeframe. Adequately inform local community of any disruptions. Staged construction, traffic	PMHC	PMHC	Detailed Design/ Construction	M	L	L	Open
12	**Pedestrians and Cyclists**														
12.01	No detour or temporary crossing provided for pedestrians and cyclists in construction area	Pedestrian and cyclists are not provided a safe passage during construction. Existing conditions to be maintained.	Injury to pedestrians and cyclists seeking to find alternate routes	N	M	L	5	Minimal cyclists/pedestrians expected. Appropriate traffic management plans and/or detours in place.	PMHC	PMHC	Construction	N	N	N	Open
12.02	No pedestrian or cyclists paths along works of project	Pedestrian or cyclists struck by vehicle	Fatality and or injury to pedestrians or cyclists	L	H	M	3	Appropriate traffic management plans and/or detours in place.	PMHC	PMHC	Operation	L	M	M	Open
13	**Road Safety**														
13.01	Access to and from the site utilising local road	Vehicle accidents caused by inadequate traffic management of construction vehicles entering and exiting the work site	Fatality	N	H	M	4	Suitable contractors and QA procedures in place. Adequate traffic management procedures undertaken during operation of road.	PMHC	PMHC	Construction/ Operatoin	N	M	L	Open
14	**Utilities**														
14.01	Utilities not identified during initial investigations	Damage to unidentified utilities as a result of construction activities. Worker exposed to the utility.	Fatality	L	E	H	3	Carry out services investigations prior to construction works starting	PMHC	PMHC	Detailed design/ prior to construction	L	H	M	Open
14.02	Known utilities not adequately protected	Known utilities damaged as a result of construction activities. Workers exposed to utility	Fatality	N	E	M	4	Ensure any known utilities are diverted, managed, or protected.	PMHC	PMHC	Construction	N	H	M	Open
15	**Environment**														
15.01	Inadequate measures to contain pollution from construction within the site	Damage to local environment due to pollution spreading outside of the construction site into nearby water system	Environmental damage due to construction pollution within the site	M	H	H	2	Ensure an REF is provided, appropriate approvals are gathered, and containments provided during construction	PMHC	PMHC	Construction	L	H	M	Open
15.02	Construction through Lake Innes Natural Resources and SEPP 14	Options presented by WSP for the Outer orbital link are perceived to have a considerable impact on the Lake Innes Nature Resource, SEPP 14 wetlands and matters of natural environmental significance.	Project delays, unnecessary environmental damage, community dissatisfaction	H	M	H	4	Ensure option chosen reduces impact on the environment and liklihood of delays to project.	PMHC	PMHC	Detailed Design	H	L	M	Open

Port Macquarie Outer Orbital

Risk Management Register - Safety In Design

Reference	Cause,Trigger or Issue	Risk, Hazard or Opportunity	Potential Consequences	Original Rating			Risk Priority	Proposed Risk Treatment	Risk Owner	Action Owner	Timing	Residual Rating			Status
				Likelihood	Consequence	Original Risk	1 (High) - 5 (Low)					Likelihood	Consequence	Residual Risk	
16	**Heritage**														
16.01	Unexpected heritage presense within the construction site	Possible damage to heritage presence, extra care taken to avoid heritage presense during construction	Construction delay.	L	H	M	2	Undertake appropriate heritage searches and investigations	PMHC	PMHC	Detailed Design	L	L	L	Open
16.02	The Preliminary Environmental Assessment shows presence of Aboriginal cultural heritage sites in or near the CIA	Possible damage to heritage presence, extra care taken to avoid heritage presense during construction	Construction delay.	H	L	M	2	Construction team to be informed of these locations and take it into consideration whem planning the construction staging	PMHC	PMHC	Construction	M	L	L	Open
17	**WHS**														
17.01	Safe work Australia WHS regulations are not understood or adhered to	Work sites become unsafe for occupants and surrounding community	Fatality of workers or pedestrians	N	H	M	3	Ensure all workers are WHS accredited, and are aware of all site risks. Workers are to be vigilent of the local community, and the road	PMHC	All	Detailed Design/ Construction	N	M	L	Open
18	**Design of Roadworks**														
18.01	Design of road undertaken by	N/A	N/A	N	N	N	N/A	N/A	N/A	N/A	N/A	N	N	N	N/A
19	**Design of Structures**														
19.01	No significant structures involved	N/A	N/A	N	N	N	N/A	N/A	N/A	N/A	N/A	N	N	N	N/A
20	**Constructability**														
20.01	Design does not ensure maximum constructability	Failure of lifting lugs and any precast components or pipes	Fatality and injury	L	E	H	2	Review design to check adequate safety is allowed for during construction	PMHC	PMHC	Construction	N	E	M	Open
20.02	Inadequate separation of plant and pedestrians/ workers	Worker/pedestrians struck by plant	Fataility	L	H	M	2	Exclusion zones provided when plant in use. Contractor to address in SWMS.	PMHC	PMHC	Construction	N	H	M	Open
20.03	Inadequate eye protection during construction	Flying debris or dust damaging workers or pedestrians eyes.	Injury	L	M	M	4	Provide eye protection. Contractor to address this in SWMS.	PMHC	PMHC	Construction	N	M	L	Open
20.04	Undefined re-routing of vehicle, cycle and pedestrian traffic during road construction	Rise in vehicle collision incidents as drivers attempt to find alternate routes	Injury/ disruption to community	M	H	H	2	Contractor to provide traffic management plans that effectively illustrate re-routing of traffic during specific stages of construction	PMHC	PMHC	Construction	L	H	M	Open
22.18	Use of in-situ deck, kerb and barrier	Falls during deck, kerb and barrier construction	Fatality	M	H	H	3	Safe Work Method Statement (SWMS) to address this. Formwork and handrails to be	PMHC	PMHC	Construction	L	H	M	Open
20.05	Working alone, lack of training	Worker has an accident	Fatality/serious injury	M	H	H	3	Safe Work Method Statement (SWMS) to	PMHC	PMHC	Construction	L	H	M	Open
20.06	Noises due to construction procedures, loud machinery	Hearing loss due to work related noise exposure	Injury	M	M	M	3	Refer to Australian Safety Manual - Noise Procedure 3.2.19. Limit Exposure and wear	PMHC	PMHC	Construction	L	M	M	Open
20.07	Founding material varies to design material, or competent material is lower than designed level	road foundations degrades or collapses over time due to not being compadible with the founded material	Fatality/Loss of asset	M	H	H	3	Locate boreholes as close to proposed walls as possible, allow tolerance in design, conifrm batter condition on site.	PMHC	PMHC	Detailed design	L	H	M	Open
20.08	Large pre-cast panels/materials being moved around the site	Likely to cause accident due to Manoeuvrability around workers and bystanders around the site	Fatality/Injury	M	H	H	3	Minimise weight of the larger materials. Safe Work Method Statement (SWMS) to address this. Workers to follow the SWMS guidelines.	PMHC	PMHC	Construction	L	M	M	Open
20.09	Lift operations carrying objects for	Worker struck by falling object	Fatality	H	H	H	2	Safe Work Method Statement (SWMS) to	PMHC	PMHC	Construction	L	H	M	Open
20.10	Additional construction vehicles and workers due to construction	Additional localised traffic around the construction site	Disruption to community, increased risk of vehicle crash	M	N	L	4	Contractor to produce traffic management plans that will provide effective alternate	PMHC	PMHC	Construction	L	N	L	Open
20.11	Working around heavy vehicles	Worker gets hit by the vehicle	Fatality/serious injury	M	H	H	4	Safe Work Method Statement (SWMS) to	PMHC	PMHC	Construction	M	M	M	Open
21	**Urban Design**														
21.01	No urban design input	N/A	N/A	N	N	N		N/A	N/A	N/A	N/A	N	N	N	N/A
22	**Delivery method**														
22.01	Unexpected or unsafe material	Injuries or project delays	Injury, project delay	L	M	M	4	Ensure all deliveries are planned and	PMHC	PMHC	Construction	N	M	L	Open

Port Macquarie Outer Orbital

Risk Management Register - Safety In Design

Reference	Cause,Trigger or Issue	Risk, Hazard or Opportunity	Potential Consequences	Original Rating			Risk Priority	Proposed Risk Treatment	Risk Owner	Action Owner	Timing	Residual Rating			Status
				Likelihood	Consequence	Original Risk	1 (High) - 5 (Low)					Likelihood	Consequence	Residual Risk	
23	**Pre-construction**														
23.01	Clearing, grubbing for site preparation works	Trips, slips and falls by those working on the construction site	Injury	L	M	M	3	Contractor to address in SWMS	PMHC	PMHC	Construction	N	M	L	Open
23.02	Insufficient pre-planning and site management	Inadequate site area for all required compound, storage, amenities etc. areas.	Project delay	N	M	L	4	Contractor to address in Site Management Plan	PMHC	PMHC	Construction	N	M	L	Open
24	**Project Staffing**														
24.01	Underqualified staff	Underqualified staff creating a hazardous workplace for themselves and others	Fatality	N	H	M	3	Contractor to ensure suitability of staff, and manage accordingly	PMHC	PMHC	Construction	N	M	L	Open
24.02	Overworked staff	Overworked staff creating a hazardous workplace for themselves and others	Fatality	N	H	M	3	Workplace regulations to be followed throughout construction	PMHC	PMHC	Construction	N	M	L	Open
24.03	Difficult access to utilities (clean water/ electricity etc.)	No running water, access to power, amenities etc.	Project delay	N	M	L	4	Prior to start of construction, access to utilities to be organised and replenished reguarly	PMHC	PMHC	Construction	N	M	L	Open
25	**Contract Issues**														
25.01	General workplace activities	Contract disputes	Project delay, public liability	L	H	M	3	Prior to start of project, contracts to be	PMHC	All	Construction	N	H	L	Open
26	**Contractors**														
26.01	Inadequate contractor awarded tender	Project unable to be undertaken by contractor awarded tender	Project delay	N	M	L	4	Contractor is to be suitably qualified and has been assessed by PMHC.	PMHC	PMHC	Construction	N	M	L	Open
27	**Asset Maintenance**														
29.01	Working at heights during bearing inspection	Falls from height during bearing inspection	Injury	L	M	M	3	Allow for adequate access locations to the abutment and piers.	PMHC	PMHC	Maintenance	N	M	L	Open
27.01	Working adjacent to live traffic	Struck by vehicle	Fatality	L	H	M	2	No practical alternative. Inspection to be	PMHC	PMHC	Maintenance	L	M	M	Open
28	**Miscellaneous**														
28.01	Inadequate site management	General public accessing site outside of construction times	Fatality	L	H	M	2	Ensure security measures and deterents are in place to mitigate possibility of general	PMHC	PMHC	Construction	N	H	M	Open

Definitions - Risk Rating Matrix

	Likelihood	Consequence	Risk Level Action
E	Occurs often	Multiple fatality/ Major environmental damage	Amend dsign to reduce risk, or seek alternative options
H	Likely to occur	Single fataility or single/ multiple permanent disability/ Severe environmental damage	
M	Could occur, but more than likely won't	Major injury to one or more persons not causing permanent disability/ Moderate environmental damage	Check that risks cannot be reduced further by design
L	Would only occur under exceptional circumstances	Minor injury to one or more persons not causing permanent disability/ Minor environmental damage	
N	Not expected to occur	Minor injury	No action required

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PUBLIC EXHIBITION DATES

24 October to 21 November 2018

PLANNING PROPOSAL under section 3.33 of the EP& A Act

DRAFT AMENDMENT NO 45 TO PORT MACQUARIE-HASTINGS LOCAL ENVIRONMENTAL PLAN 2011

HOMEDALE ROAD, KEW

PROPOSED REZONING FOR RESIDENTIAL AND ENVIRONMENTAL PURPOSES

Ccl ref: PP2014-12.1
DP&E ref: PP_2017_PORTM_002_00
Date: 19/10/2018

PORT MACQUARIE HASTINGS COUNCIL

Planning Proposal status (for this copy)

Stage	Version Date (blank until achieved)
Reported to Council - sec 3.33	14/12/16
Referred to Dept of Planning & Environment - sec 3.34	24/2/17
Gateway Panel determination - sec 3.34 (2)	13/3/17
Revisions required: Yes. Additional site investigations - Completed	19/9/17
Consultation with State Government agencies - sec 56(2)(d)	16/10/17
Public Exhibition - sec Sch 1 cl 4	24/10/18 – 21/11/18
For Council review - sec 3.35(1)	
Adopted by Council for final submission to Dept of Planning - sec 3.36(2)	

Council reference:	PP2014-12.1 Port Macquarie-Hastings LEP 2011 (Amendment No 45)
Department of Planning & Environment reference:	PP_2017_PORTM_002_00

Council Address	Contact Officer
Port Macquarie-Hastings Council PO Box 84 PORT MACQUARIE NSW 2444	Sandra Bush Senior Strategic Land Use Planner Email: sandra.bush@pmhc.nsw.gov.au Phone: (02) 6581 8025

Approval of the Planning Proposal

1. For public exhibition

This Planning Proposal was endorsed on 19 October 2018 by Port Macquarie-Hastings Council delegate:

Signed

Name Peter Cameron

Position Group Manager Strategic Land Use Planning

2. For section 3.35 finalisation

This Planning Proposal was endorsed on ..... by Port Macquarie-Hastings Council, or the undersigned Council delegate (delete one):

Signed

Name

Position

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ATTACHMENT 2 - Gateway Determination and Extension
ATTACHMENT 3 – Draft Site Specific Development Control Plan provisions
ATTACHMENT 4 – Bushfire Hazard Assessment
ATTACHMENT 5 – Traffic and Parking Assessment
ATTACHMENT 6 - Preliminary Vegetation Assessment Report and Addendum
ATTACHMENT 7 - Acoustic Assessment
ATTACHMENT 8 - AHIMS Search Result, Bunyah Correspondence & Assessment of Heritage Sensitivity (Appleton, 2004)
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EXECUTIVE SUMMARY

This planning proposal has been prepared in accordance with section 3.33 of the *Environmental Planning and Assessment Act 1979* and the Department of Planning and Environment's *A guide to preparing planning proposals* (2016).

The planning proposal explains the intended effects of a proposed amendment to the *Port Macquarie-Hastings Local Environmental Plan 2011* (PMHLEP) to rezone rural land on the western edge of Kew for residential and environmental purposes.

The land comprises the residue of the Links Residential Estate to the east and unformed Crown road reserve on the western boundary. The subject land has an area of approximately 9.3 hectares (ha) and is currently zoned partly R1 General Residential and partly RU1 Primary Production.

Figure 1: Locality plan

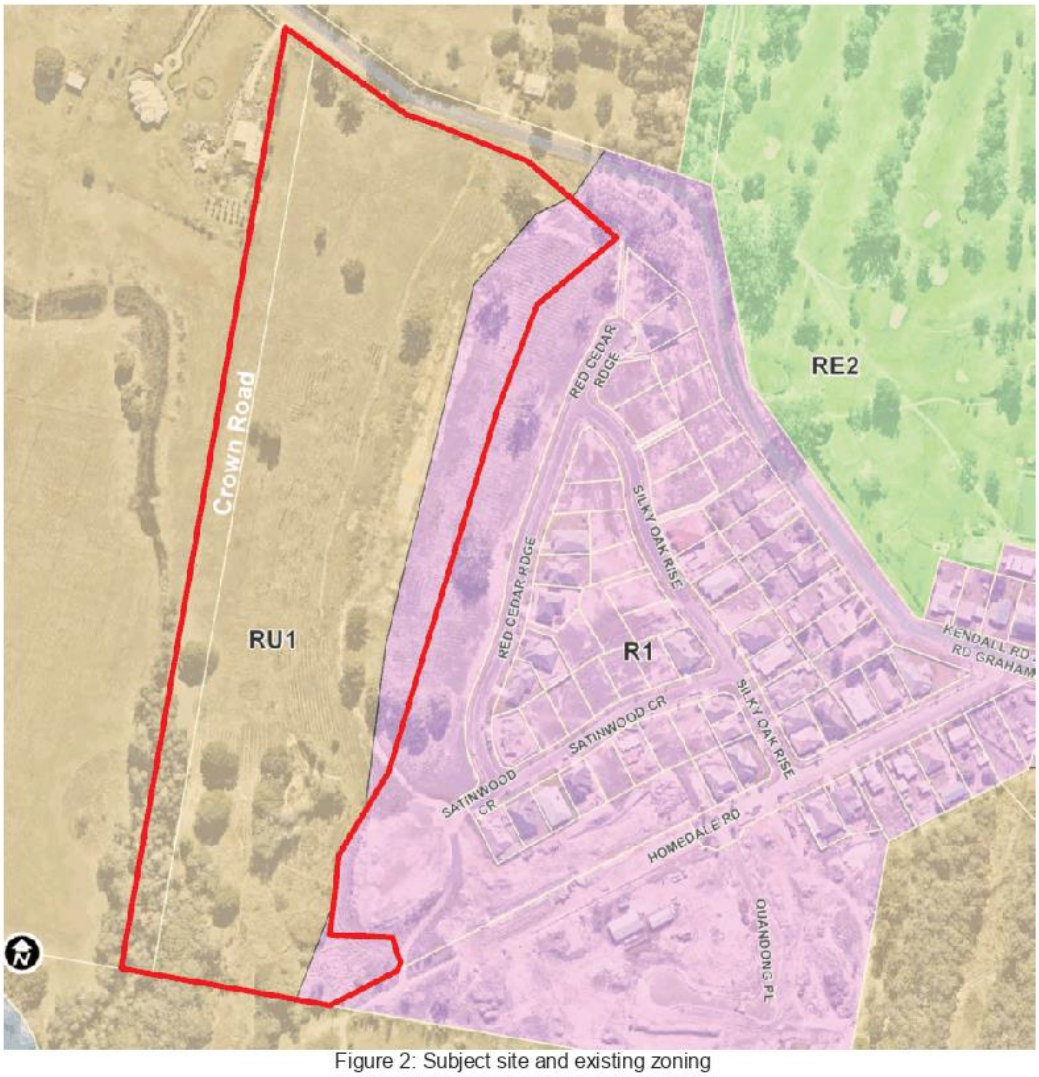


Figure 2: Subject site and existing zoning

The proposal involves an amendment to the PMHLEP to extend the R1 General Residential zone over 5.7ha of the site to enable future development for approximately 45 residential lots, including a residue that is proposed to be zoned partly E2 Environmental Conservation and partly E3 Environmental Management.

The proponent, GEM planning consultants, has submitted a subdivision concept and servicing plans (at **Attachment 1**) to demonstrate that road, sewer, water and stormwater infrastructure can be adequately provided to service future residential development.

Specialist studies in support of the proposal include ecological, agricultural, bushfire, traffic and acoustic assessments. These studies, some of which are based on an earlier concept, indicate that the proposal will have a negligible impact.

The existing rural zoned area of the site contains an Endangered Ecological Community (EEC), a small area of Regionally Significant Farmland and is partly affected by flooding. The site also adjoins a larger area of Regionally Significant Farmland to the west. These matters are key considerations of this planning proposal.

Figure 3: Native vegetation, flooding and regionally significant farmland constraints

Council resolved to prepare a draft planning proposal on 14 December 2016. The Department of Planning and Environment (DP&E) issued a Gateway Determination on 13 March 2017 to proceed with the plan preparation process, subject to conditions.

PMHC Planning Proposal - Kendall Road, Kew (PP2014-12.1)

An alteration to the Gateway Determination was issued on 8 March 2018 to extend the timeline for completion of the Planning Proposal by 12 months up until 20 December 2018. **Attachment 2** contains a copy of the Gateway Determination and subsequent alteration.

After updating the proposal to comply with the Gateway Determination, consultation occurred with State government agencies. Details of this consultation are discussed under Section D, Question 11.

This planning proposal together with related site specific development control plan provisions for future development of the land (at **Attachment 3**), are on public exhibition for community consultation from 24 October to 21 November 2018. The exhibition period will provide the landowner, surrounding owners and the community an opportunity to review and comment on the proposal before a final decision is made.

PART 1 - OBJECTIVES OR INTENDED OUTCOMES

This planning proposal aims to amend the *Port Macquarie Hastings Local Environmental Plan 2011* to rezone the rural area of the subject land to enable development for residential purposes, to conserve areas of environmental significance and to maintain a separation buffer to adjoining Regionally Significant Farmland.

PART 2 - EXPLANATION OF PROVISIONS

The planning proposal seeks to make changes to the *Port Macquarie Hastings Local Environmental Plan 2011* by:

- Amending the Land Zoning Map **from** RU1 Primary Production **to** partly R1 General Residential, partly E3 Environmental Management and partly E2 Environmental Conservation.
- Amending the Lot Size Map to permit minimum lot sizes of:
  - 450 square metres on that part of the site proposed to be zoned R1 General Residential.
  - 2 hectares for the proposed environmental residue lands.
- Amending the Height of Buildings Map to allow a maximum height of 8.5 metres for future development on that part of the site proposed to be zoned R1 General Residential.
- Amending the Floor Space Ratio Map to allow a maximum floor space ratio of 0.65:1 for future development on that part of the site proposed to be zoned R1 General Residential.

PART 3 – JUSTIFICATION

In accordance with the Department of Planning and Environment's *A guide to preparing planning proposals*, this Part provides a response to the following issues:

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

Section A - Need for the planning proposal

1. Is the planning proposal a result of any strategic study or report?

The proposal is not a result of a strategic study or report. However at the 20 August 2014 Ordinary Meeting, Council considered the site for inclusion in its Strategic Planning work program (along with other site specific proposals) and resolved to investigate the site for rezoning.

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

The area proposed for rezoning is currently zoned RU1 Primary Production with a minimum lot size of 40 hectares. For the site to be developed for residential and environmental purposes it needs to be appropriately zoned.

Section B - Relationship to strategic planning framework

3. Is the planning proposal consistent with the objectives and actions of the North Coast Regional Plan 2036?

The site is not mapped as an investigation area for urban expansion in the *North Coast Regional Plan*. Therefore the proposed variation to the growth area boundary must be considered in context of the Regional Plan 'Urban Growth Area Variation Principles'.

Table 1 provides an assessment of the proposal against the Variation Principles and demonstrates that the site has merit to be considered, even though it is outside the Regional Plan process.

Table 1 - Assessment of proposal against Urban Growth Area Variation Principles

Variation Principles	Response to Variation Principles
Policy The variation needs to be consistent with the objectives and outcomes in the *North Coast Regional Plan 2036* and any relevant Section 9.1 Directions and State Environmental Planning Policies, and should consider the intent of any applicable local growth management strategy.	The proposal is generally consistent with the objectives of the *North Coast Regional Plan 2036*, Section 9.1 Directions and State Environmental Planning Policies, as outlined further in this report. Although the site is not identified in the *Port Macquarie-Hastings Urban Growth Management Strategy 2011-2031* (UGMS) for urban expansion, the proposal is small in scale and will help to protect significant areas of vegetation in E zonings and preserve a separation buffer to adjoining Regionally Significant Farmland.
Infrastructure The variation needs to consider the use of committed and planned major transport, water and sewerage infrastructure, and have no cost to government. The variation should only be permitted if adequate and cost-effective infrastructure can be priced to match the expected population.	The expected increase in traffic movements is considered acceptable and unlikely to create any adverse impacts to the efficiency of the existing transport network. The provision of water, sewerage and utilities infrastructure to the site is technically feasible as demonstrated by the proponent's concept servicing plan. Further consideration to the implementation of a servicing plan for the site will be undertaken following rezoning. Developer contributions will be levied in accordance with existing Plans.
Environmental and farmland protection The variation should avoid areas: • of high environmental or heritage value; • mapped as important farmland, unless consistent with the interim variation criteria prior to finalising the farmland mapping review.	The proposed R1 General Residential zoning is restricted to the predominantly cleared areas of the site and significant native vegetation, including a 40m wide riparian buffer proposed to be contained in an E2 Environmental Conservation zone. Issues relating to flora and fauna are discussed in more detail under Section C, Question 7. A small area adjacent to the western site boundary contains the fringe of a larger expanse of mapped Regionally Significant Farmland to the west. The Regional Plan has identified that some pockets of mapped Regionally Significant Farmland may be suitable for uses other than farmland and sets out 'Interim Variation Criteria' that can be used to assess the suitability of the land for continued rural use. A number of these criteria overlap with the 'Urban Growth Area Variation Principles' of the Regional Plan and are addressed elsewhere in this table (i.e. land use conflict, infrastructure, environment & heritage, avoiding risk). The remaining criterion,

Variation Principles	Response to Variation Principles
	which relates to agricultural capability, is discussed under Section C, Question 9. In summary, the western boundary of the site contains the fringe (1.78ha) of a larger expanse of Regionally Significant Farmland. The proponent's Agricultural Land Use Assessment report concludes that the proposed rezoning of the mapped farmland area will have no significant impact to the agricultural production value of the region.
Land use conflict The variation must be appropriately separated from incompatible land uses, including agricultural activities, sewage treatment plants, waste facilities and productive resource lands.	The proposal is considered to represent a minor extension to the existing urban footprint of Kew village and is expected to provide housing choices consistent with existing residential development in the locality. The proposed environmental zoning of the residue lands adjacent to the western boundary will assist in maintaining an appropriate separation buffer to Regionally Significant Farmland to the west. To mitigate the potential for adverse noise impact to future residents from an adjoining bulk storage (temporary fencing) development, the proponent's Acoustic Assessment report recommends construction of a noise barrier extending from the north-western corner of the site, along the western boundary to an existing metal shed on the neighbouring property. This matter is discussed in more detail under Section C Question 8. The Acoustic Assessment also concludes that the relevant requirements with respect to road traffic noise intrusion from Kendall Road will be achieved for all dwellings by adopting standard, complying development construction techniques.
Avoiding risk The variation must avoid physically constrained land identified as: • flood prone • bushfire prone • highly erodible • having a severe slope, and • having acid sulfate soils	The western edge of the site is partly affected by the 1 in 100 year flood. Apart from a small area of Crown road reserve in the north-west and the western fringe of concept lots 124, 125, 130 and 131, all land affected by a 1 in 100 year flood is proposed to be contained within the proposed environmental zoned areas of the site. The proponent's stormwater servicing strategy (discussed under Section C Question 8) demonstrates that local overland flooding will be adequately managed at the subsequent development application stage. The proponent's Bushfire Hazard Assessment report (at **Attachment 4**) indicates that requirements for future Asset Protection Zones will be adequately provided within the site and bushfire constraints can be mitigated (refer to Ministerial Direction 4.4 at page 14 for further discussion on this topic). The proponent's Agricultural Land Use Assessment report (discussed under Section C, Q9) notes that site slope varies from 5% to 30% incline. In this regard, the concept plan shows larger lots for the steeper areas generally consistent with the *Port Macquarie-Hastings Development Control Plan 2013* (PMHDCP). Future applications to develop the steeper areas of the site will need to demonstrate compliance with the PMHDCP and include geotechnical investigations and appropriate solutions (eg retaining walls, earthworks) to manage slope limitations. There are no issues concerning acid sulfate soils (ASS) for future

Variation Principles	Response to Variation Principles
	residential development of the site and therefore no special considerations apply. Land adjacent to the south western boundary is mapped as Class 2 ASS but corresponds to low lying flood prone land and riparian buffer and therefore will be excluded from future development.
Heritage The variation must protect and manage Aboriginal and non-Aboriginal heritage.	The site does not contain any European heritage. Correspondence from the Bunyah Local Aboriginal Land Council dated 17 September 2004, suggests that a site of significant Aboriginal cultural heritage is located on the land. Following extensive investigations and consultations with Bunyah and the NSW Office of Environment and Heritage, it was concluded that no evidence exists to support the 2004 Bunyah correspondence. This issue is discussed in more detail under Section C Question 9.
Coastal area Only minor and contiguous variations to urban growth areas in the coastal area will be considered due to its environmental sensitivity and the range of land uses competing for this limited area.	The site is located west of the Pacific Highway and therefore does not fall within the mapped coastal area.

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

As noted under 'Policy' in Table 1, the site is not identified in the UGMS for urban expansion. The proposal is however, small in scale and rezoning the site will help to protect significant areas of vegetation in E zonings and preserve a separation buffer to adjoining Regionally Significant Farmland.

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

Table 2 considers the relevant SEPPs that apply to this planning proposal.

Table 2 - Assessment of the Planning Proposal against SEPPs of relevance

SEPP	Relevance	Reason for inconsistency or comment
SEPP 44 - Koala Habitat Protection	SEPP 44 encourages the conservation and management of natural vegetation areas that provide habitat for Koalas to ensure permanent free-living populations will be maintained over their present range. Councils cannot approve development in an area affected by the policy without an investigation of core Koala habitat.	**Consistent** The proponent's Koala Habitat Assessment identified two preferred Koala food tree species within the site (*Eucalyptus microcorys* and *Eucalyptus robusta*). These trees were found to comprise less than 15% of the total number of trees in the upper and lower strata of the tree component. Therefore, the assessment concluded that the site does not qualify as Potential Koala Habitat as defined by the SEPP. In addition, no scats or evidence of Koala activity were observed during field surveys completed as part of the assessment, which suggested a low probability that Koalas would

SEPP	Relevance	Reason for inconsistency or comment
		frequent the site.
SEPP 55 - Remediation of Land	SEPP 55 provides state-wide planning controls for the remediation of contaminated land. The policy states that land must not be developed if it is unsuitable for a proposed use if it is contaminated. If the land is unsuitable, remediation must take place before the land is developed.	**Consistent** The proponent has advised that a preliminary investigation of the site has been undertaken and that the land has not been used for any of the purposes referred to in Table 1 of the *Contaminated Land Guidelines*. It has also been advised that enquiries of the current landowner and a third party person familiar with the site have indicated that: - The previous and current land use has been vacant rural land, although some cattle grazing is thought to have occurred previously. - There is no cattle tick dip or former tick dip site on the site. - The site has not been used for market gardens or orchards. - There are no oil storage depots or former fuel depots associated with the past or present uses on the site. - There are no refuse or garbage land fill areas on the site. Based on the information provided, it would appear that natural soils within the site do not contain contamination.
SEPP (Infrastructure) 2007	This policy includes provisions relating to development with frontage to a classified road. The aim is to maintain the integrity of the classified road and to prevent/reduce the potential impact of traffic noise and vehicle emission on adjacent development.	**Consistent** The site has frontage to Kendall Road which is classified by the NSW Roads and Maritime Services (RMS) as a regional road under the Roads Act 1993. The proponent's concept plans indicate internal road connectivity to the adjoining Links Estate and access onto Kendall Road via the existing Homedale Road intersection. Draft site specific Development Control Plan (DCP) provisions have been prepared for public exhibition with this proposal that make provision for this road link (refer to Attachment 3). The proponent has advised that the exit onto Kendall Road in the north-western corner of the site is for emergency egress only. This area of the site is currently Crown Road. Based on the proponent's concept for residential development (of up to 45 lots), it is expected that the existing road network has sufficient capacity to accommodate the likely increase in traffic volumes. The proponent's Acoustic Assessment (discussed under Section C Question 8) indicates that traffic noise from Kendall Road

SEPP	Relevance	Reason for inconsistency or comment
		will not be an issue.
SEPP (Rural Lands) 2008	Aims to ensure the orderly and economic use of rural land, protect rural land, reduce land use conflicts and minimise land fragmentation.	**Inconsistent** The SEPP identifies eight (8) planning principles that need to be considered when assessing any proposed rezoning and/or development of rural land. Whilst the planning proposal will facilitate additional residential housing and is therefore inconsistent with the SEPP, it also reaffirms the planning principle relating to conservation by proposing an environmental zone for land in the west to help protect significant native vegetation and an existing waterway. In addition, the proposed residue environmental lands will provide a suitable separation buffer to adjoining Regionally Significant Farmland. The proposed 2ha minimum lot size requirement aims to avoid fragmentation of the buffer lands. The intent is that the buffer be retained as a consolidated area attached to a future residential lot.

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

Table 3 below considers the relevant s9.1 directions that apply to this planning proposal.

Table 3 - Assessment of the proposal against s9.1 Directions of relevance

Ministerial Direction & relevance	What a planning authority must do if this Direction applies	Reason for inconsistency or comment
1.2 Rural Zones The aim is to protect the agricultural production value of rural land.	A planning proposal must not rezone land from a rural zone to a residential zone.	**Inconsistent** The proposal is inconsistent with this Direction as it seeks to rezone land from RU1 Primary Production to R1 General Residential. This inconsistency is considered to be justifiable on the basis of the proponent's Agricultural Land Use Assessment report, which concludes that due to the size of the site and poor quality soils, it is not economically or environmentally sustainable to use the land for primary production, now or in the future. This issue is discussed in more detail under Section C Question 9. The letter accompanying the Department of Planning and Environment's Gateway Determination confirms that the planning proposal's inconsistency with this Direction is of minor significance.
1.5 Rural Lands The aim is to protect the	A planning proposal must be consistent with the Rural	**Inconsistent** Commentary regarding the consistency of the

Ministerial Direction & relevance	What a planning authority must do if this Direction applies	Reason for inconsistency or comment
agricultural production value of rural land and to facilitate the orderly and economic development of rural lands for rural and related purposes.	Planning Principles listed in SEPP (Rural Lands) 2008.	proposal in relation to SEPP (Rural Lands) 2008 is provided in Table 2 above. The letter accompanying the Department of Planning and Environment's Gateway Determination confirms that the planning proposal's inconsistency with this Direction is of minor significance.
2.1 Environmental Protection Zones The aim is to protect and conserve environmentally sensitive areas.	A planning proposal must include provisions that facilitate the protection and conservation of environmentally sensitive areas.	**Consistent** The proponent's Preliminary Vegetation Assessment Report, discussed in more detail under Section C Question 9, identified flora and fauna issues and recommendations for conservation of an Endangered Ecology Community (EEC) within the site. It is proposed to rezone the EEC in conjunction with a 40m wide riparian buffer to an adjoining watercourse to E2 Environmental Conservation.
2.3 Heritage Conservation The aim is to conserve items, areas, objects and places of environmental heritage significance and indigenous heritage significance.	A planning proposal must contain provisions that facilitate the conservation of items, places, buildings, works, Aboriginal objects, Aboriginal places, Aboriginal landscapes etc.	**Consistent** Correspondence from the Bunyah Local Aboriginal Land Council dated 17 September 2004, suggests that a site of significant Aboriginal cultural heritage is located on the land. Following extensive investigations and consultations with Bunyah and the NSW Office of Environment and Heritage, it was concluded that no evidence exists to support the 2004 Bunyah correspondence. This issue is discussed in more detail under Section C Question 9.
3.1 Residential Zones The objectives of this Direction are to facilitate housing choice, to make efficient use of infrastructure, and to minimise the impact of residential development on environment and resource lands.	A planning proposal must include provisions that encourage the provision of housing that will: • broaden the choice of building types and locations, • make efficient use of existing infrastructure and services • reduce the consumption of land for housing and associated urban development on the urban fringe, and • be of good design. A planning proposal must: • contain a requirement that residential	**Inconsistent** The proposal involves rezoning land for housing and associated urban development on the urban fringe. This inconsistency is considered to be justifiable on the basis that the site adjoins existing residential development to the east. Further, Schedule 1 of the PMHLEP 2011 permits development of a residential community of up to 66 lots/dwellings on adjoining land to the south, subject to obtaining development consent. As noted in Table 1, existing infrastructure services are available and of adequate capacity to service future residential development of the site. The letter accompanying the Department of

Ministerial Direction & relevance	What a planning authority must do if this Direction applies	Reason for inconsistency or comment
	development is not permitted until land is adequately serviced, and • not contain provision which will reduce the permissible residential density of land.	Planning and Environment's Gateway Determination confirms that the planning proposal's inconsistency with this Direction is of minor significance.
3.3 Home Occupations The objective of this Direction is to encourage the carrying out of low impact small businesses in dwelling houses.	Planning proposals must permit home occupations to be carried out in dwelling houses without the need for development consent.	**Consistent** No change is proposed to the existing provisions of PMHLEP 2011 which permit home occupations to be carried out in dwelling houses without the need for development consent.
3.4 Integrating Land Use and Transport The Direction requires consistency with State policy in terms of positioning of urban land use zones.	A planning proposal must locate zones for urban purposes and include provisions that give effect to and are consistent with the aims, objectives and principles of: • Improving Transport Choice - Guidelines for planning and development (DUAP 2001), and • The Right Place for Business and Services - Planning Policy (DUAP 2001).	**Consistent** The site adjoins the existing urban area of Kew village and is located on a designated bus route which provides satisfactory access to jobs, services and facilities in the Port Macquarie area. Council's Bike Plan (2015) includes provision for a future shared path bicycle network along Kendall Road between Kendall and Kew, linking to Lakewood and Laurieton in the east. The proponent's Traffic and Parking Assessment report (at **Attachment 5**) notes that the site is nearby (about 700m) to two exiting bus stops on Kendall Road.
4.1 Acid Sulfate Soils The Direction applies to land that has been identified as containing potential Acid Sulfate Soils (ASS)	This Direction requires that a draft LEP is consistent the ASS component of the model LEP, or such other provisions provided by the Director-General of the Department of Planning and Environment in accordance with the ASS Planning Guidelines. A relevant planning authority must not prepare a planning proposal that proposes an intensification of land uses on land identified as having a probability of containing ASS on the ASS Planning Maps unless the relevant planning authority has considered an ASS study assessing the appropriateness of the change of land use given the presence of ASS.	**Inconsistent** A small area in the southwest of the site contains Class 2 ASS and an ASS study has not been prepared. This inconsistency is considered to be of minor significance as the affected area corresponds with flood prone land and riparian buffer which is proposed to be contained in an E2 Environmental Conservation zone, which will not be disturbed as a result of future development.

Ministerial Direction & relevance	What a planning authority must do if this Direction applies	Reason for inconsistency or comment
4.3 Flood Prone Land This Direction seeks to ensure that development of flood prone land is consistent with the NSW Government's Flood Prone Land Policy.	This direction applies when a relevant planning authority prepares a planning proposal that creates, removes, or alters, a zone or a provision that affects flood prone land.	**Inconsistent** The proposal is inconsistent with this Direction because it seeks to rezone land within the flood planning area from RU1 Primary Production to R1 General Residential. This inconsistency is considered to be of minor significance as: - Only the westernmost fringe of concept lots 122 to 131 are marginally affected by the flood planning area. Adequate flood free land is available within these lots for a dwelling. - A small section of Crown road in the northwest of the site is subject to flooding but capable of being raised to the 1:100 year (including climate change) flood level. Any filling of this area is capable of being offset by excavation works to reduce the potential for adverse impact on the floodplain. - The proponent's stormwater servicing strategy (discussed under Section C Question 8) demonstrates that local overland flooding can be adequately managed at the subsequent development application stage. The letter accompanying the Department of Planning and Environment's Gateway Determination confirms that the planning proposal's inconsistency with this Direction is of minor significance.
4.4 Planning for Bushfire Protection This Direction seeks to discourage incompatible land uses in bush fire prone areas and to encourage sound management of bush fire prone areas.	The relevant planning authority must consult with the NSW Rural Fire Service and must have regard to *Planning for Bushfire Protection 2006*, provide an Asset Protection Zone (APZ) and ensure adequate access and water supply for fire fighting purposes.	**Consistent** This direction is relevant as the proposal will affect land that is identified as bushfire prone land. The direction requires that Council consult with the Commissioner of the NSW Rural Fire Service (RFS) after a Gateway Determination has been issued. The proponent's Bushfire Hazard Assessment report (refer to Attachment 4) indicates that requirements for future Asset Protection Zones can be adequately provided within the site and bushfire constraints mitigated. The RFS was consulted following issue of the Gateway Determination and advised that the proposal raises no concerns or issues in relation to bushfire.
5.1 Implementation of Regional Strategies The aim is to give legal	A planning proposal must be consistent with a Regional Strategy released by the Minister for Planning.	**Consistent** The proposal is consistent with the strategic directions of the *North Coast Regional Plan* to

Ministerial Direction & relevance	What a planning authority must do if this Direction applies	Reason for inconsistency or comment
effect to the vision, land use strategy, policies, outcomes and actins contained in regional strategies.		provide additional residential development in appropriate areas to assist with housing targets in the Port Macquarie local government area. The proposal also identifies areas of environmental significance to be zoned conservation and will assist in maintaining a buffer to adjoining Regionally Significant Farmland. An assessment of the proposal against the Urban Growth Area Variation Principles of the Regional Plan (in Table 1), indicates that the proposal has strategic merit.
6.1 Approval and Referral Requirements The objective of this Direction is to ensure that LEP provisions encourage the efficient and appropriate assessment of development.	This Direction seeks to minimise the inclusion of provisions in planning instruments that require the concurrence, consultation, or referral of development applications to a Minster or public authority.	**Consistent** None of the provisions in the proposal will create excessive concurrence, consultation or referral requirements. Further, the proposal does not identify any development as designated development.

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?

Native vegetation

A Preliminary Vegetation Assessment Report prepared on behalf of the proponent by FloraFauna Consulting (at **Attachment 6**), notes that the majority of the site is cleared with seven (7) small isolated patches of remnant vegetation remaining. No visible hollow bearing trees were recorded in any of these areas.

The largest area of remnant vegetation, connected to riparian vegetation associated with a small watercourse on the adjoining land to the west, was identified as an Endangered Ecological Community (EEC) *Swamp Oak - Mixed Eucalypt Coastal Floodplain Wetland Forest Complex*.

This EEC is located in the south west of the site and is proposed to be zoned E2 Environmental Conservation in conjunction with a 40m wide riparian buffer to an adjoining watercourse. A Vegetation Management Plan will be required prior to development.

Koala habitat

An Addendum to the proponent's Preliminary Vegetation Assessment Report (also at **Attachment 6**), indicates that the site is unlikely to support Koalas.

Two species of Koala food tree, as listed under Schedule 2 of SEPP 44, were recorded. These included a small number of trees identified as *Eucalyptus microcorys* (Tallowwood) and a single individual of *Eucalyptus robusta* (Swamp Mahogany), which collectively represented significantly

less than 15% of the total number of trees in the upper and lower strata of the tree component on the site.

The report concluded that the site is not considered to be potential Koala habitat for the purposes of SEPP 44. It was also noted that no scats or evidence of Koala activity were observed during field surveys, indicating a low likelihood that Koalas frequent the site.

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

Noise

The potential for traffic noise to adversely impact future residential development in close proximity to the Kendall Road site frontage has been assessed by EMM consultants for the proponent. The Acoustic Assessment report (at **Attachment 7**) concludes that the relevant requirements for road traffic noise intrusion from Kendall Road, will be achieved for all dwellings by adopting standard, complying development construction techniques.

The report also included an assessment of noise associated with an approved bulk storage (temporary fencing) business operating on a neighbouring rural property adjoining to the north-west. The assessment found that noise emission levels from the adjoining development are predicted to meet the most stringent intrusive noise criteria and sleep disturbance screening criteria at the nearest proposed residences with the inclusion of a noise barrier.

The barrier is assumed to be a minimum height of 1.8m, continuous and contain no gaps, and constructed from an appropriate material such as concrete or lapped and capped timber. The report recommends that consideration be given to the durability of the barrier material.

Site specific Development Control Plan provisions (see Attachment 3) have been drafted for public exhibition with this planning proposal to flag the need for construction of the noise barrier at the time of subdividing the land for residential purposes.

Stormwater Drainage

The proponent's stormwater servicing strategy indicates that all lots will be directed via piped drainage system to a 2,400sqm water quality/detention basin located adjacent to the western boundary.

The proponent has advised that the basin has been sized to accommodate the residential footprint in terms of water quality and will be designed to retain water (i.e. a dry basin) with a sand filter system. An overflow system will direct treated water into the nearby waterway via an overflow weir with a low flow pipe. A detailed stormwater drainage concept will be required at the time of lodging an application to develop the site.

9. How has the planning proposal adequately addressed any social and economic effects?

Aboriginal heritage

The proponent's search of the Aboriginal Heritage Information Management System (AHIMS) identified one Aboriginal site in proximity to the subject land. The local indigenous community had also previously identified an area of 2,000sqm in the south west of the site as having significant cultural value.

Additionally, in a Heritage Assessment report prepared by Jon Appleton consultants (October 2004) for the adjoining land to the south, this general area was identified as having cultural significance. A copy of the AHIMS search, historic Bunyah correspondence and Appleton report are at **Attachment 8**. Based on this information, the initial planning proposal recommended an E2 Environmental Conservation zone for this area of the site.

Following the issue of a Gateway Determination, Council consulted with the NSW OEH, the Bunyah Local Aboriginal Land Council (LALC) and the NSW Aboriginal Land Council in relation to the identified cultural values. As a consequence, further detailed investigations were undertaken by the proponent, including extensive consultation with Bunyah LALC from November 2017 to June 2018. The outcome of these investigations concluded that no evidence was found to confirm a site of indigenous significance on the subject land.

Acknowledging the comments provided to the proponent by the Bunyah LALC, which advised that they were unable to provide any knowledge of cultural material at the site outlined in Appleton's report, and feedback from the broader community, OEH subsequently noted that there may have been some inaccuracy regarding the original site location or registration process.

On this basis, OEH agreed to a revision to the proposed zoning for this area of the site from E2 Environmental Conservation to partly E3 Environmental Management and partly R1 General Residential (flood free north-eastern corner), with remainder of this area to retain the originally proposed E2 Environmental Conservation zone as part of a riparian buffer.

This change to the proposed Land Zone Map has been agreed to by OEH on the understanding that Bunyah LALC site officers will be present during any proposed diggings or disturbance of the originally identified archaeological site, as part of future development. A draft site specific DCP, which includes this requirement (see Attachment 3) has been prepared for public exhibition with this planning proposal.

Regionally Significant Farmland

The western boundary of the site contains the fringe of a much larger expanse of mapped Regionally Significant Farmland adjoining to the west.

An Agricultural Land Use Assessment report, prepared on behalf of the proponent by MNC Agronomy Pty Ltd (at **Attachment 9**), concluded that the proposed rezoning of the mapped farmland area, comprising a narrow band of 1.78ha, would have no significant impact on the agricultural product value of the region.

Additionally, it was concluded that because the site contains poor quality soils, including the mapped farmland area, it was neither economically nor environmentally sustainable to use the land for primary production now or in the future.

The MNC Agronomy report recommends that the 22m wide Crown road reserve on the western edge of the site be used to provide a buffer between future urban development and the adjoining Regionally Significant Farmland to the west.

Based on a more recent Land Use Conflict Risk Assessment prepared by the proponent (at **Attachment 10**), a 50m wide buffer is proposed adjacent to the western boundary, extending approximately 415m from the southern boundary.

The proposed buffer includes Crown road reserve and the majority of the Regionally Significant Farmland and also coincides with EEC, riparian buffer area, flood-affected land and proposed stormwater detention basin. With exception of the riparian buffer, an E3 Environmental Management zone is proposed for the separation buffer.

A 22m wide buffer (comprising Crown road) is proposed for the remainder of the western boundary extending to Kendall Road. The proponent's Land Use Conflict Risk Assessment notes that this area of the adjoining property is occupied by dwelling infrastructure (sheds, houses etc) and being such a small part of the adjoining farm cannot contribute significantly to any agricultural production system. As noted previously, a bulk storage (temporary fencing) business also operates from this part of the adjoining site (approved on 29/5/09 under DA No. 2009/93).

Social and economic impact

A change of zone and proposed development to permit an additional 45 lots as an extension to the adjoining Links Residential Estate is not expected to result in any detrimental social or economic impacts on the local community. It is considered that sufficient capacity exists in local social infrastructure (e.g. schools, parks and open space) and with a proposed increase in population, the local business community may potentially gain economic benefits.

Section D - State and Commonwealth interests

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

The proposed rezoning and subsequent development of up to 45 residential lots is not expected to require significant upgrades to existing public infrastructure in the locality. Reticulated water and sewer services networks currently exist and are of sufficient capacity to cater for future development of the site.

The surrounding locality is serviced by electricity and telecommunications infrastructure and is expected to be satisfactory for future residential development.

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

The following public authorities have been consulted in accordance with the requirements of the Department of Planning and Environment's Gateway Determination:

- NSW Rural Fire Service
- NSW Department of Industries - Agriculture
- NSW Office of Environment and Heritage
- NSW Roads and Maritime Services
- The Local Aboriginal Land Council
- NSW Aboriginal Land Council
- Department of Industry - Lands

In addition, Council sought comments from Essential Energy, Transgrid and Telstra regarding the capacity of electricity and telecommunications infrastructure in the locality to service the proposed future development of the site.

A summary of the written responses received and Council comment is provided below and a copy of all correspondence received is at **Attachment 11.** Key matters identified in the State responses relate to Aboriginal heritage, buffers to adjoining Regionally Significant Farmland, and traffic impact.

- **NSW Department of Primary Industries (DPI) Fisheries –** *letter dated 22 Sep 2017*

No objections were raised, however DPI Fisheries noted that Council's proposed 40m riparian buffer which is measured from the centre of the creek line, is inconsistent with their policy and guidelines that require riparian buffers to be measured from the top of bank and widths to be determined by the habitat Type and Waterway Class.

Comment:

The proposed Land Use Zone map has been adjusted to show the E2 Environmental Conservation riparian buffer commencing at the top of bank rather than the creek centreline as previously mapped. The width of the buffer complies with Council's *Port Macquarie-Hastings Development Control Plan 2013* requirements for buffers to second order streams.

- **NSW Department of Primary Industries (DPI) Water –** *letter dated 29 Sep 2017*

The DPI Water did not raise any particular concerns or issues in relation to the proposal and are supportive of Council's proposed E2 Environmental Conservation zoning for a 40m riparian

buffer. It is requested that further consultation occur regarding a Vegetation Management Plan that will be required at the later development assessment stage.

Comment:

Noted.

- **NSW Department of Primary Industries (DPI) Agriculture –** *letter dated 29 Sep 2017*

The DPI Agriculture note that the site is not strategically identified for urban housing in a Regional or Local Strategy and raise concerns that the rezoning will effectively remove Regionally Significant Farmland in perpetuity. It is noted that notwithstanding that the area of Regionally Significant Farmland on the site may be small and has flooding constraints, it is located on the fringe of a large expanse of Regionally Significant Farmland which is a highly important agricultural resource for the NSW North Coast.

The DPI Agriculture also consider that the proponent's *Land Use Conflict Risk Assessment* does not adequately mitigate potential impacts from future urban housing to the neighbouring farmland. It is recommended that where grazing is expected to be the primary adjoining land use, a nominal 50 metre minimum setback between dwellings and adjoining rural lands be provided.

The correspondence also noted that inclusion of Crown road reserve as part of the proposed separation buffer to the adjoining Regionally Significant Farmland is not considered to be appropriate and that the Department of Lands should be consulted on this matter.

Comment:

A 50m wide separation buffer from future urban housing to the neighbouring rural property is proposed where grazing could be expected to be the primary adjoining land use. A narrower 22m separation buffer adjoins dwelling infrastructure and a bulk storage (temporary fencing) business on the neighbouring property. Consultation has occurred with NSW Department of Industry Lands concerning use of the Crown road reserve, as detailed below.

- **NSW Department of Industry (DoI) Crown Lands & Water –** *letter dated 4 Oct 2017*

The DoI advised that the rezoning must not restrict the potential future use, nor burden the Crown road in any way. It is also noted that given the intended use of the Crown road as part of future development, Council should take over care and control of the affected Crown road, or else the proponent should make an application to close and purchase the Crown road. The advice also noted that any bushfire APZs are to be contained wholly within the development site and must not impact the Crown road.

Comment:

The proponent has provided documentation to confirm that an application has been made to the DoI to close and purchase the Crown road reserve, which is currently under lease by the landowner and fenced within the site boundaries. The intent is that proposed road acquisition be integrated into the site as part of the separation buffer to the adjoining rural property.

- **NSW Office of Environment and Heritage (OEH) –** *letter No. 1 dated 4 Oct 2017*

Aboriginal culture heritage was identified by OEH as a key concern, particularly the lack of detail on the values that exist for the site and the significance of the values as determined by the Aboriginal community. In their advice, OEH recommended that Council:

- Seeks clarification on how the Aboriginal cultural heritage values contained within the parcel that was nominated for protection in 2004 were determined.
- Seeks clarification on why the lesser area of 0.2ha was nominated for protection, rather than the 0.36ha area referred to in the Struggletown report, prepared by Appleton in 2004.
- Ensures that further consultation is undertaken with the Aboriginal knowledge holders, and that it is conducted in a respectful, informed and consultative manner, to determine

the cultural significance of the entire planning area, given its location in a landscape that is likely to have a high potential for further Aboriginal cultural material and usage, or is of ceremonial value.

- Ensures that a cultural survey and assessment be undertaken in line with OEH guidelines to identify the values that may be present within the planning area.
- Ensures that the future inclusion of the lot as an urban growth area and the future zoning of the site, is determined by taking into consideration the outcomes of consultation, site survey and assessment.

OEH also questioned whether the proposal meets the 'Urban Growth Area Variation Principles' of the *North Coast Regional Plan* (i.e. should avoid areas of heritage value) due to the lack of information on the Aboriginal cultural heritage values present, and lack of recent consultation with the Aboriginal knowledge holders with respect to the proposal.

Comment:

Following receipt of OEH's advice, more detailed investigations were undertaken by the proponent, including extensive consultation with the Bunyah LALC from November 2017 to June 2018. The outcome of these investigations concluded that no evidence was found to confirm a site of indigenous significance on the subject land. Further consultation occurred with OEH as discussed in Section C Question 9 and OEH's response, dated 14 August 2018, is summarised over page.

- **NSW Rural Fire Service (RFS) –** *letter dated 11 Oct 2017*

No concerns or issues were raised in relation to bushfire.

Comment:

Noted.

- **NSW Transport Roads & Maritime Services (RMS) –** *letter dated 16 Oct 2017*

As Kendall Road is a classified (State) road, the RMS suggested that the proposal include a Traffic and Parking Assessment to be prepared in accordance with the current Austroads Guide to Traffic Management Part 12, the complementary Roads and Maritime Supplement and the RTA Guide to Traffic Generating Developments. The correspondence lists the matters that should be included as a minimum.

Comment:

The proponent subsequently submitted a Traffic and Parking Assessment report (refer to Attachment 5) in accordance with RMS's requirements. The assessment report concludes that overall, the traffic impacts of the proposal are considered acceptable on the basis that:

- The traffic impacts of the development would be minimal.
- The existing intersection of Kendall Road/Homedale Road has recently been subjected to an upgrade in accordance with the requirements of Austroads.
- The intersection of Kendall Road/Homedale Road would continue to operate at levels of service to that which currently occurs and 10 years into the future.
- The design of the internal road network exceed sthe minimum requirement of Council's Engineering Specifications and is considered saisfactoy.
- It is anticipated that any future development application for the subdivision would consider the relevant requirements of Council's DCP to inform the subdivision and road network design.

The RMS will be given an opportunity to review and comment on the Traffic Impact Assessment during public exhibition of this planning proposal.

- **NSW Office of Environment and Heritage (OEH) –** *letter No. 2 dated 14 Aug 2018*

Acknowledging the comments provided to the proponent by the Bunyah LALC, the OEH noted that there may have been some inaccuracy regarding the original site location or registration process in relation to Aboriginal heritage cultural values.

On this basis OEH supported an alteration to the initially proposed E2 Environmental Conservation zone for this area of the site to partly E3 Environmental Management, where it corresponds with the 1:100 year flood and partly R1 General Residential for the north-eastern corner, where there is no flood risk. This approach is supported on the basis that Bunyah LALC site officers are *"present during any proposed diggings or disturbance of the originally identified archaeological site as part of future development to be enabled by the planning proposal*."

Comment:

A draft site specific DCP (refer to Attachment 3), which includes provision for a heritage officer to be on-site during any diggings or disturbances in the designated area, has been prepared for public exhibition with this planning proposal.

PART 4 – MAPPING

Proposed map amendments to the *PMHLEP 2011*, as outlined in Part 2 of this planning proposal, are illustrated below. The site is shown in red outline.

Current

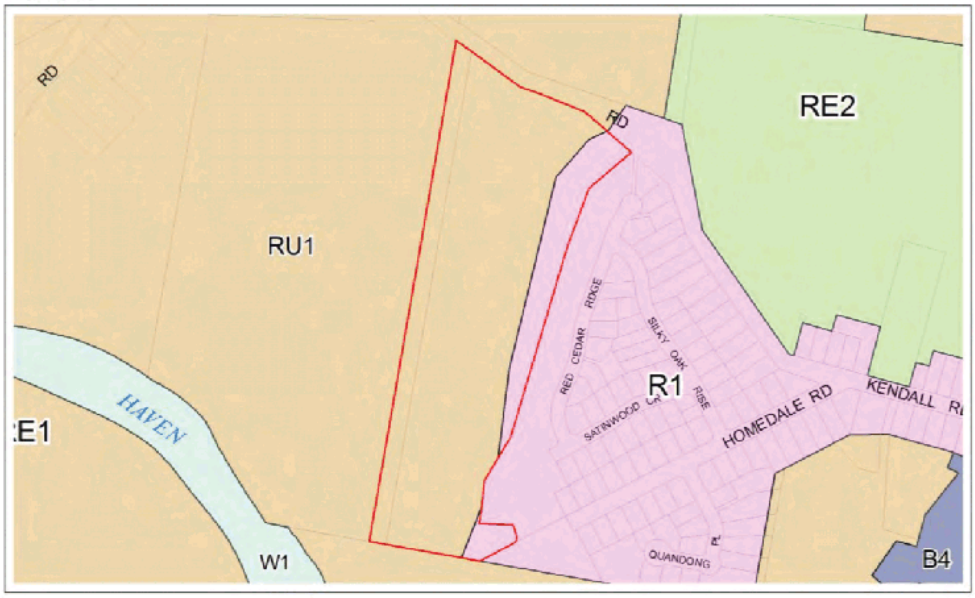


Figure 4: Existing Land Zone

Proposed

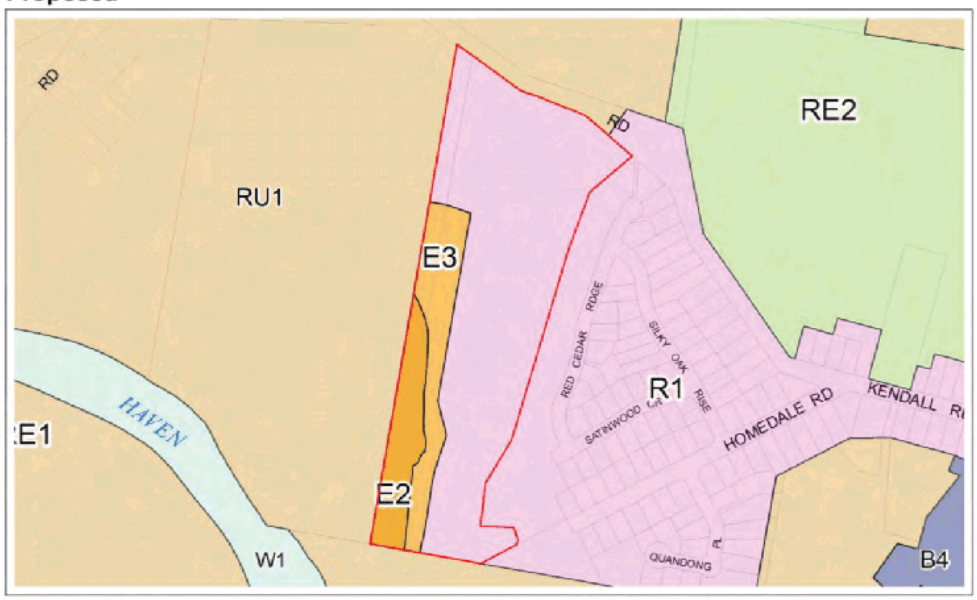


Figure 5: Proposed Land Zone

Zones (site and surrounds)

RU1 Primary Production
R1 General Residential
E3 Environmental Management
E2 Environmental Conservation
B4 Mixed Use
RE2 Private Recreation
W1 Natural Waterways

PMHC Planning Proposal - Kendall Road, Kew (PP2014-12.1)

Current

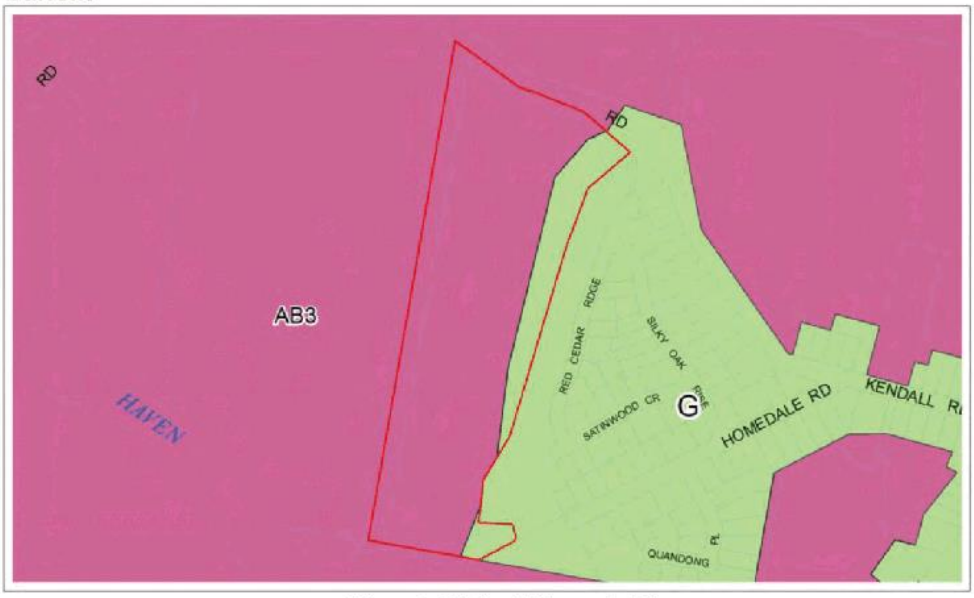


Figure 6: Existing Minimum Lot Size

Proposed

Figure 7: Proposed Minimum Lot Size

Minimum Lot Size relevant to the site

G	450sqm
AB3	40 hectares
Z1	2.0 ha

Current

Figure 8: Existing Maximum Height of Buildings

Proposed

Figure 9: Proposed Maximum Height of Buildings

Maximum Building Height relevant to the site

I	8.5m
Blank	No Maximum

Current

Figure 10: Existing Maximum Floor Space Ratio

Proposed

Figure 11: Proposed Maximum Floor Space Ratio

Maximum Floor Space Ratio relevant to the site

G	0.65:1
Blank	No Maximum

PART 5 – COMMUNITY CONSULTATION

It is proposed to undertake community consultation for 28-days, as required by the Gateway Determination, and include notification in a local newspaper and written notification to adjoining and adjacent landowners. The exhibition material will be available on Council's Have Your Say website and at the Port Macquarie, Wauchope and Laurieton Administration offices for the duration.

This section of the planning proposal will be updated following public exhibition.

PART 6 – PROJECT TIMELINE

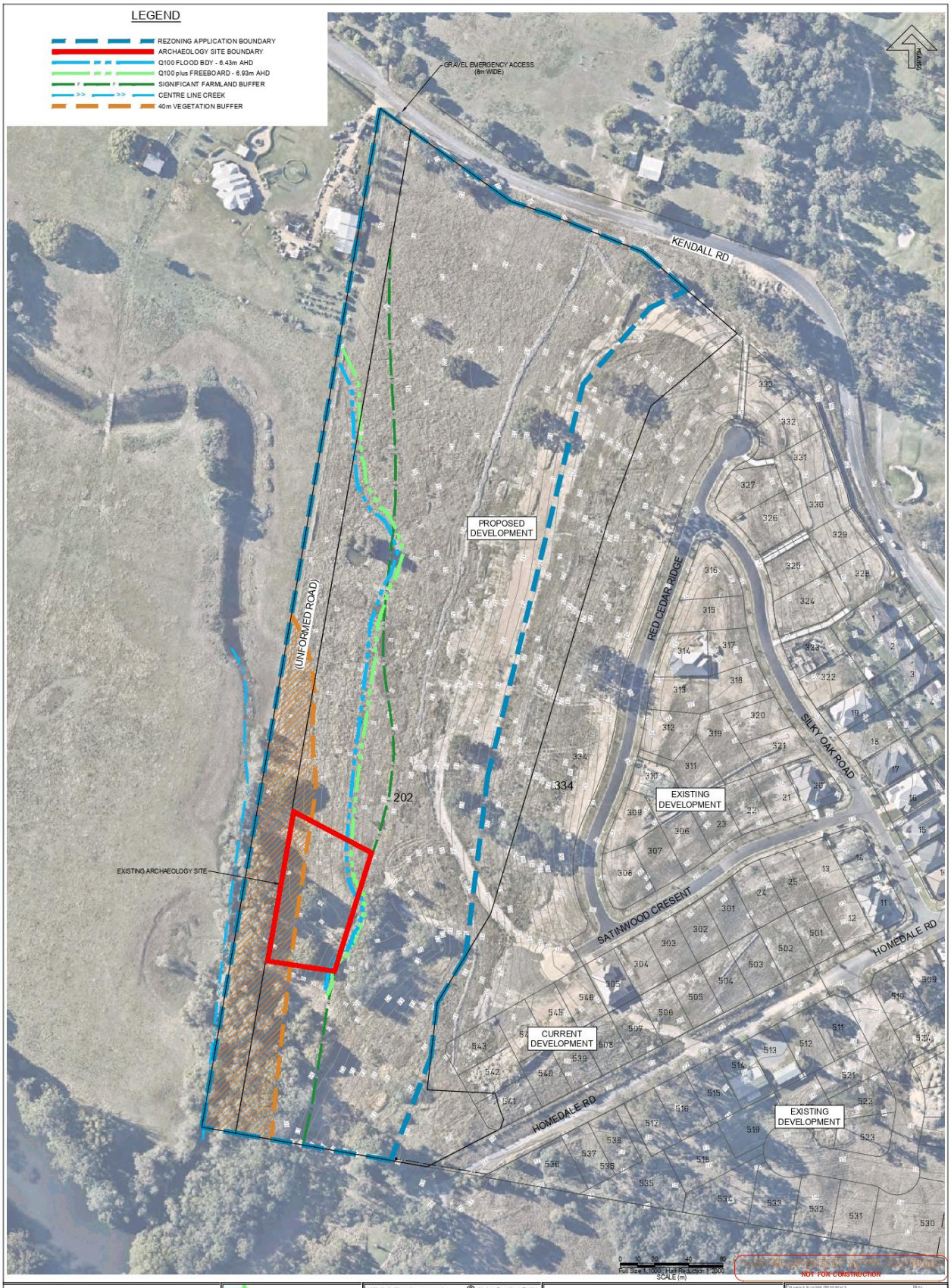
The project timeline below is based on anticipated dates and timeframes, although it is recognised there can be unexpected delays.

In accordance with the Gateway Determination, Council has delegated authority to carry out certain plan making functions. Delegation will be exercised by Council's General Manager or the Director of Strategy and Growth.

Action	Timeframe
Commencement date (date of Gateway determination)	Mar 2017
Timeframe for completion of required technical information (noise impact assessment)	June 2017
Timeframe for government agency consultation (pre exhibition as required by Gateway determination)	Sep 2017
Public exhibition period	Oct/Nov 2018
Consideration of submissions	Dec 2018
Post exhibition planning proposal consideration by Council	Feb 2019
Submission to the Department for Parliamentary Counsel Opinion	Feb 2019
Anticipated date Council will make the Plan	Mar 2019
Anticipated date Council will forward to the Dept for notification	Mar 2019

ATTACHMENT 1 - Subdivision Concept & Servicing Plans

PMHC Planning Proposal - Kendall Road, Kew (PP2014-12.1)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ARCHAEOLOGY SITE BOUNDARY
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Q100 plus FREEBOARD - 6.93m AHD
SIGNIFICANT FARMLAND BUFFER
CENTRE LINE CREEK
40m VEGETATION BUFFER
GRAVEL EMERGENCY ACCESS (8m WIDE)
KENDALL RD
PROPOSED DEVELOPMENT
(UNFORMED ROAD)
RED CEDAR RIDGE
SILKY OAK ROAD
EXISTING DEVELOPMENT
202
334
EXISTING ARCHAEOLOGY SITE
SATINWOOD CRESENT
HOMEDALE RD
CURRENT DEVELOPMENT
HOMEDALE RD
EXISTING DEVELOPMENT
NOT FOR CONSTRUCTION
SCALE (m)
HOPKINS CONSULTANTS PTY LTD
Suite 1 / 109 William Street · PO Box 1556
Port Macquarie NSW 2444 · ABN 27 055 060 878
Telephone: 02 6583 6722 · Facsimile: 02 6584 9009 Email: mail@hopcon.com.au
DEVELOPMENT · MANAGERS · SURVEYORS ENGINEERS · PLANNERS
HOMEDALE - KEW PTY LTD
THE LINKS
LOT 202 DP1133171, LOT 334 DP1204569
KENDALL RD, KEW
LOT 202 & 334 REZONING
SITE CONTEXT AND CHARACTER
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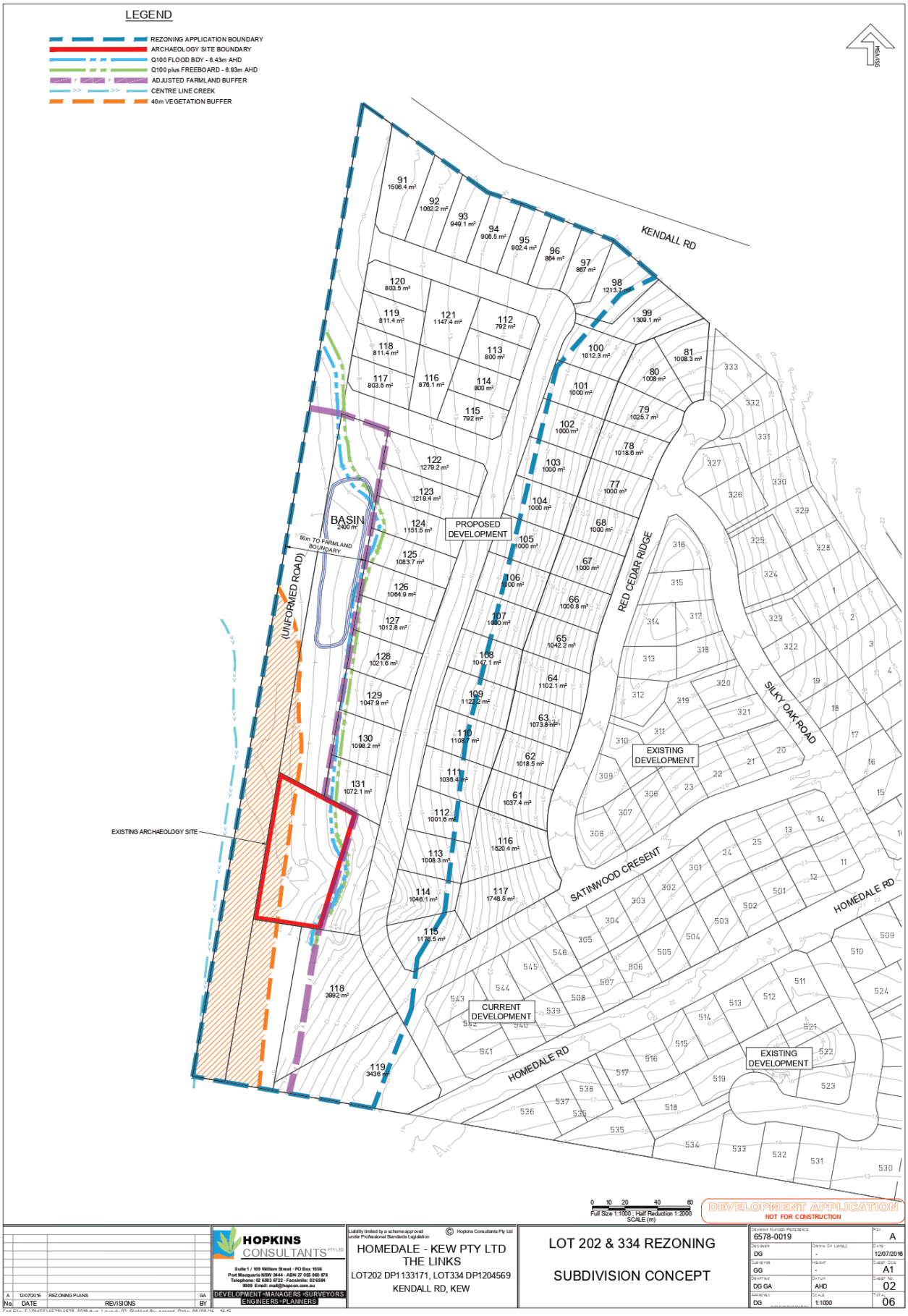
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CENTRE LINE CREEK
40m VEGETATION BUFFER
KENDALL RD
BASIN
50m TO FARMLAND BOUNDARY
(UNFORMED ROAD)
PROPOSED DEVELOPMENT
RED CEDAR RIDGE
SILKY OAK ROAD
EXISTING DEVELOPMENT
EXISTING ARCHAEOLOGY SITE
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LOT202 DP1133171, LOT334 DP1204569
KENDALL RD, KEW
LOT 202 & 334 REZONING
SUBDIVISION CONCEPT
DRAWING NUMBER/REFERENCE 6578-0019
REV. A
DESIGNER DG
DRAWN BY DG
DATE 12/07/2016
SURVEYOR GG
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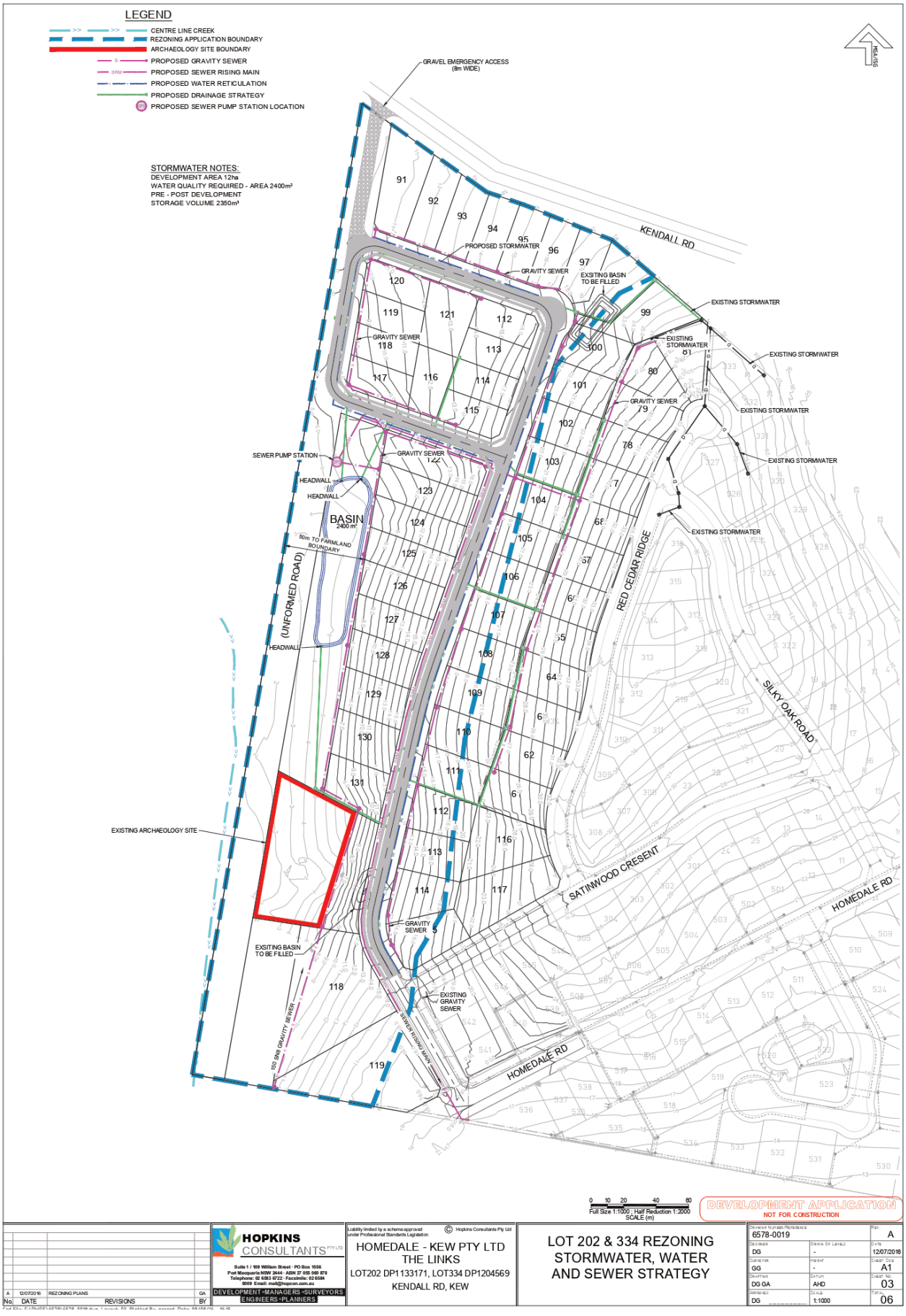
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ARCHAEOLOGY SITE BOUNDARY
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PROPOSED SEWER RISING MAIN
PROPOSED WATER RETICULATION
PROPOSED DRAINAGE STRATEGY
PROPOSED SEWER PUMP STATION LOCATION
STORMWATER NOTES:
DEVELOPMENT AREA 12ha
WATER QUALITY REQUIRED - AREA 2400m²
PRE - POST DEVELOPMENT
STORAGE VOLUME 2350m³
GRAVEL EMERGENCY ACCESS (8m WIDE)
KENDALL RD
PROPOSED STORMWATER
GRAVITY SEWER
EXSITING BASIN TO BE FILLED
EXISTING STORMWATER
SEWER PUMP STATION
HEADWALL
BASIN 2400 m²
50m TO FARMLAND BOUNDARY
(UNFORMED ROAD)
RED CEDAR RIDGE
SILKY OAK ROAD
EXISTING ARCHAEOLOGY SITE
SATINWOOD CRESENT
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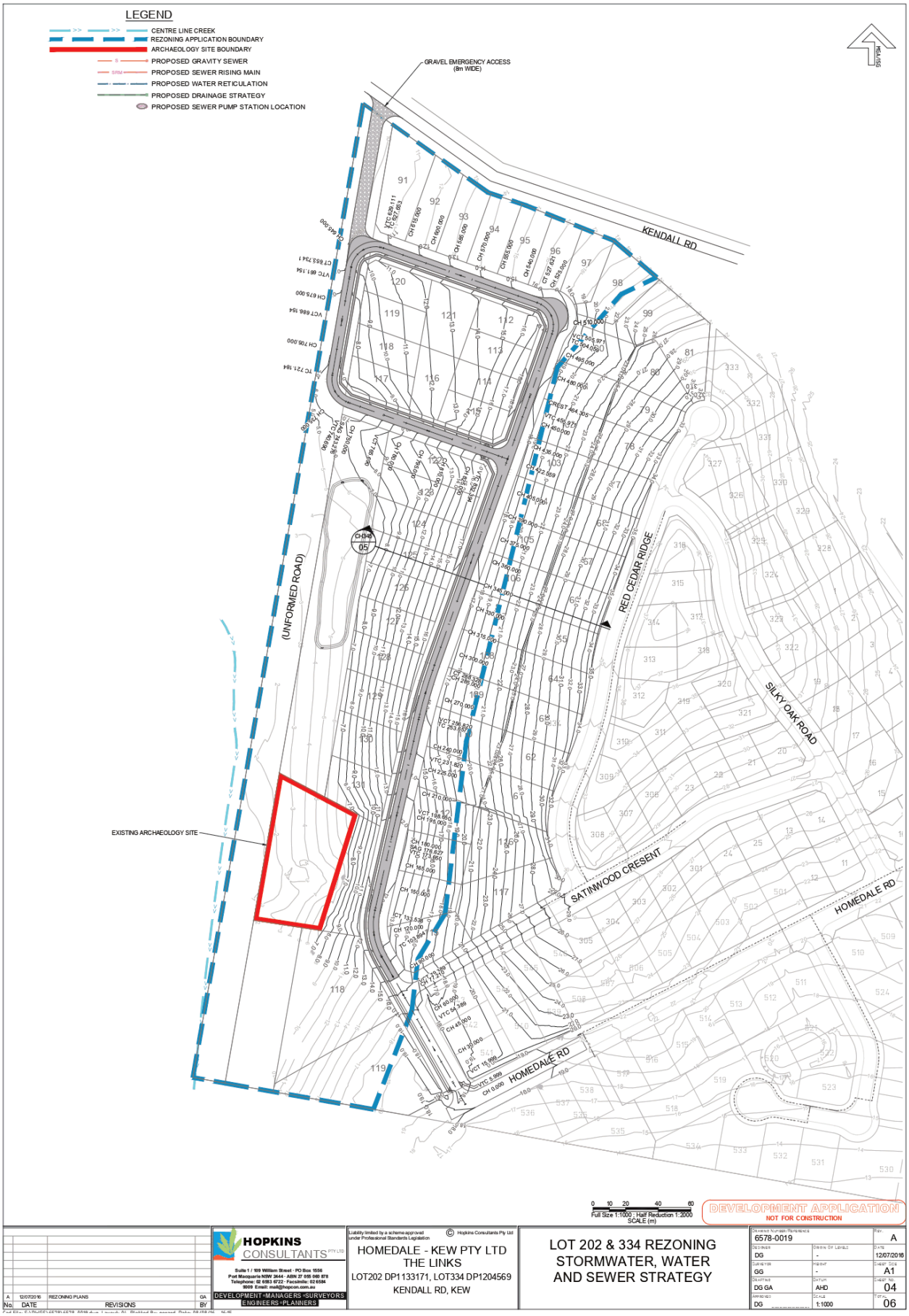
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PROPOSED WATER RETICULATION
PROPOSED DRAINAGE STRATEGY
PROPOSED SEWER PUMP STATION LOCATION
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KENDALL RD
(UNFORMED ROAD)
RED CEDAR RIDGE
SILKY OAK ROAD
SATINWOOD CRESENT
HOMEDALE RD
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SCALE (m)
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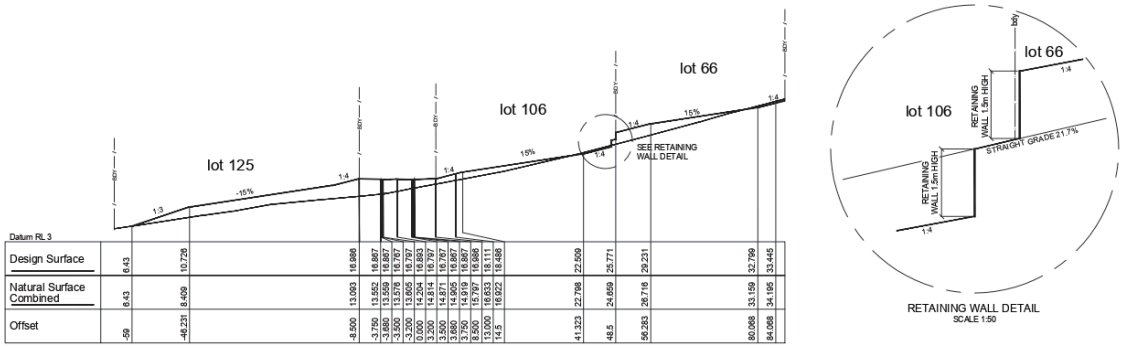

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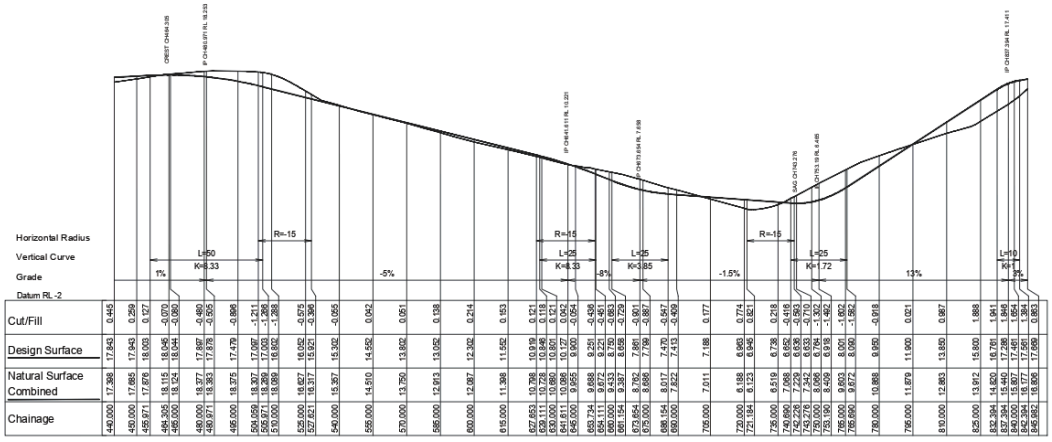

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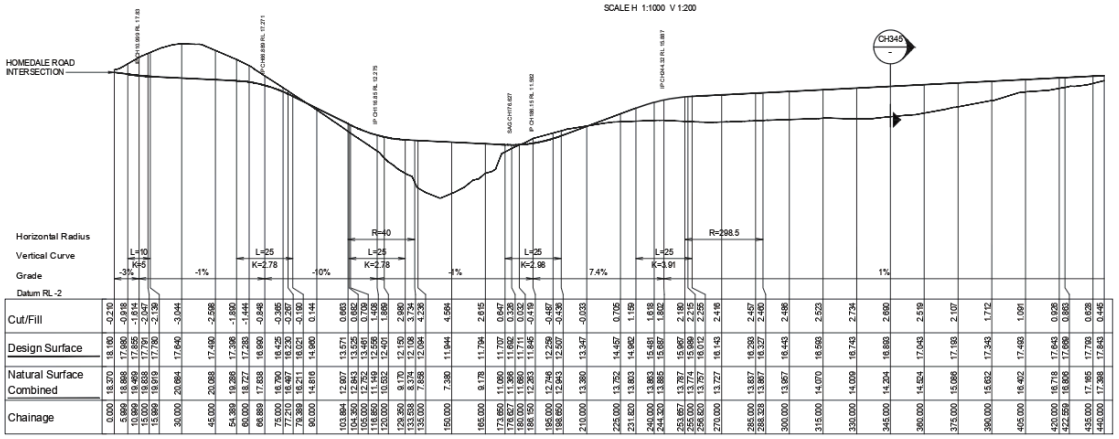

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NOT FOR CONSTRUCTION

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KENDALL RD, KEW

LOT 202 & 334 REZONING
ROAD LONGSECTION AND
CH 345.000 CROSS SECTION

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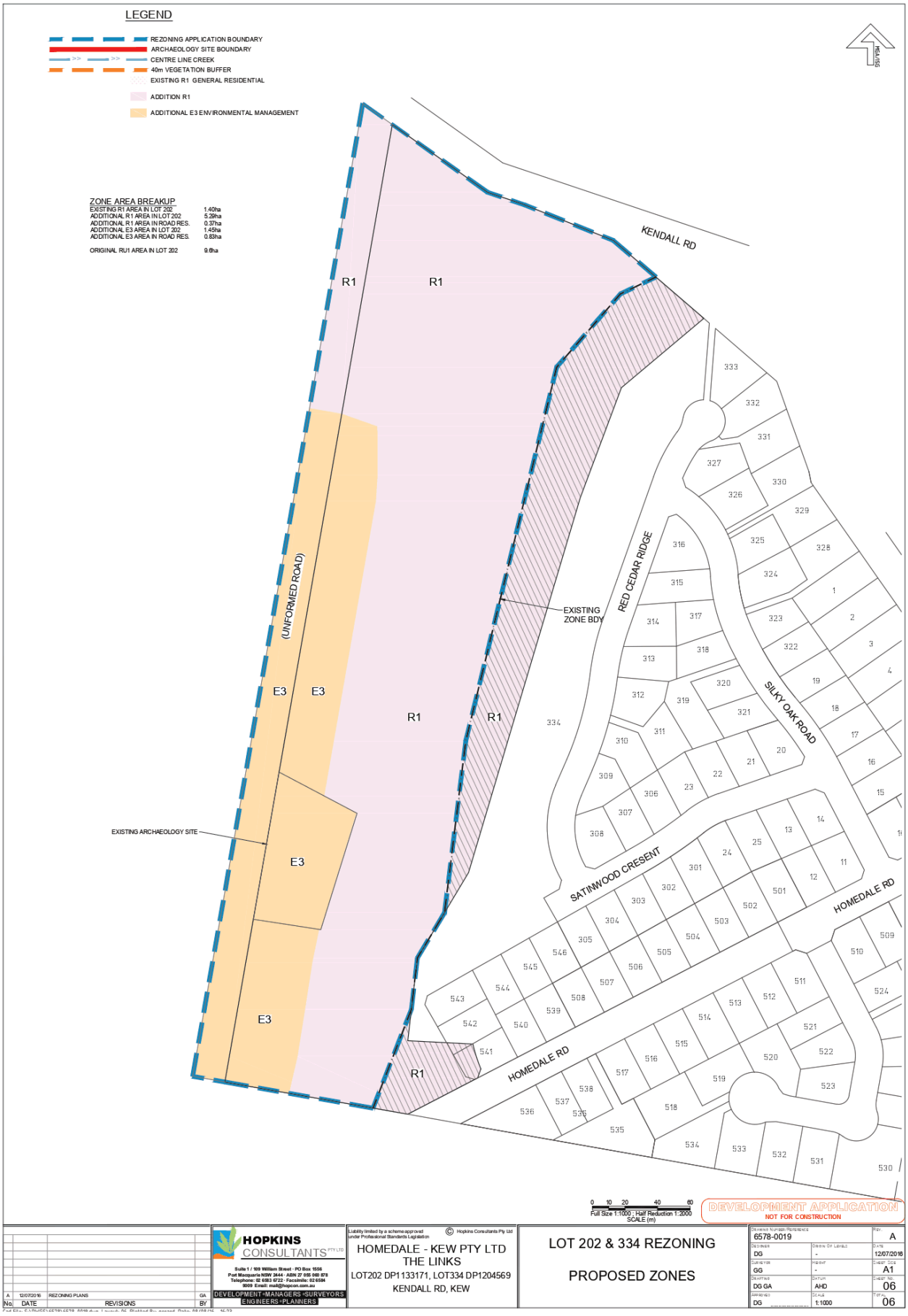
LEGEND
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ARCHAEOLOGY SITE BOUNDARY
CENTRE LINE CREEK
40m VEGETATION BUFFER
EXISTING R1 GENERAL RESIDENTIAL
ADDITION R1
ADDITIONAL E3 ENVIRONMENTAL MANAGEMENT
ZONE AREA BREAKUP
EXISTING R1 AREA IN LOT 202 1.40ha
ADDITIONAL R1 AREA IN LOT 202 5.29ha
ADDITIONAL R1 AREA IN ROAD RES. 0.37ha
ADDITIONAL E3 AREA IN LOT 202 1.45ha
ADDITIONAL E3 AREA IN ROAD RES. 0.83ha
ORIGINAL RU1 AREA IN LOT 202 9.6ha
KENDALL RD
R1
E3
(UNFORMED ROAD)
EXISTING ZONE BDY
EXISTING ARCHAEOLOGY SITE
RED CEDAR RIDGE
SILKY OAK ROAD
SATINWOOD CRESENT
HOMEDALE RD
Full Size 1:1000 ; Half Reduction 1:2000
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DEVELOPMENT APPLICATION
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No. DATE REVISIONS BY

ATTACHMENT 2 - Gateway Determination and Extension

PMHC Planning Proposal - Kendall Road, Kew (PP2014-12.1)

NSW GOVERNMENT | Planning & Environment

57488

PORT MACQUARIE HASTINGS
TRIM No CRM No
20 MAR 2017
Keyword
Activity
Subject
Folder PP2014-12-1

Our ref: PP_2017_PORTM_002_00 (17/03590)
Your ref: PP2014 – 12.1

Mr Craig Swift-McNair
General Manager
Port Macquarie-Hastings Council
PO Box 84
Port Macquarie NSW 2444

Dear Mr Swift-McNair

Planning proposal to amend Port Macquarie - Hastings Local Environmental Plan 2011

I am writing in response to your Council's letter dated 24 February 2017 requesting a Gateway determination under section 56 of the Environmental Planning and Assessment Act 1979 (the Act) in respect of the planning proposal to rezone land at Homedale Road, Kew from RU1 Primary Production to R1 General Residential, E2 Environmental Conservation and E3 Environmental Management and amend associated development standards.

As delegate of the Minister for Planning, I have now determined the planning proposal should proceed subject to the conditions in the attached Gateway determination.

I have also agreed, as delegate of the Secretary, the planning proposal's inconsistencies with S117 Directions 1.2 Rural Zones, 1.5 Rural Lands and 3.1 Residential Zones and 4.3 Flood Prone Land are of minor significance.

Council may still need to obtain the agreement of the Department's Secretary to comply with the requirements of relevant S117 Directions such as Direction 2.3 Heritage Conservation and Direction 4.4 Planning for Bushfire Protection. Council should ensure this occurs prior to the plan being made.

Plan making powers were delegated to councils by the Minister in October 2012. It is noted that Council has requested to be issued with delegation for this planning proposal. I have considered the nature of Council's planning proposal and have decided to issue an authorisation for Council to exercise delegation to make this plan.

The amending Local Environmental Plan (LEP) is to be finalised within 12 months of the week following the date of the Gateway determination. Council should aim to commence the exhibition of the planning proposal as soon as possible. Council's request to draft and finalise the LEP should be made directly to Parliamentary Counsel's Office 6 weeks prior to the projected publication date. A copy of the request should be forwarded to the Department of Planning and Environment for administrative purposes.

The State Government is committed to reducing the time taken to complete LEPs by tailoring the steps in the process to the complexity of the proposal, and by providing clear and publicly available justification for each plan at an early stage. In order to meet these commitments, the Minister may take action under section 54(2)(d) of the Act if the time frames outlined in this determination are not met.

Department of Planning and Environment
Northern Region | 49 Victoria Street Grafton 2460 | Locked Bag 9022 Grafton 2460 | planning.nsw.gov.au

Should you have any queries in regard to this matter, I have arranged for Mr Duncan Howley of the Department's regional office to assist you. Mr Howley can be contacted on (02) 6641 6531.

Yours sincerely

13 March 2017

Craig Diss
Acting Director Regions, Northern
Planning Services

Encl:
Gateway Determination
Written Authorisation to Exercise Delegation
Attachment 5 – Delegated Plan Making Reporting Template

NSW GOVERNMENT | Planning & Environment

Gateway Determination

***Planning proposal (Department Ref: PP_2017_PORTM_002_00)**: to rezone land at Homedale Road, Kew from RU1 Primary Production to R1 General Residential, E2 Environmental Conservation and E3 Environmental Management and amend associated development standards.*

I, the Acting Director Regions, Northern at the Department of Planning and Environment as delegate of the Minister for Planning, have determined under section 56(2) of the *Environmental Planning and Assessment Act 1979* (the Act) that an amendment to the Port Macqaurie - Hastings Local Environmental Plan (LEP) 2011 to rezone land at Homedale Road, Kew from RU1 Primary Production to R1 General Residential, E2 Environmental Conservation and E3 Environmental Management and amend associated development standards should proceed subject to the following conditions:

1. Prior to community consultation the following site investigations are to be undertaken and placed on public exhibition with the planning proposal:

   (a) noise assessment report addressing traffic noise from Kendall Rd and the the adjacent rural industry; and
   (b) bushfire assessment

2. Prior to community consultation the planning proposal is to be amended as follows:

   (a) to incorporate any necessary changes to the proposal arising from the additional site investigations or consultation with State agencies or organisations.

3. Consultation is required with the following public authorities prior to community consultation under section 56(2)(d) of the Act and/or to comply with the requirements of relevant S117 Directions:

   - NSW Rural Fire Service;
   - NSW Department of Industries – Agriculture;
   - NSW Office of Environment and Heritage;
   - Roads and Maritime Services;
   - NSW Aboriginal Land Council;
   - Local Aboriginal Land Council; and
   - Department of Industry - Lands.

   Each public authority is to be provided with a copy of the planning proposal and any relevant supporting material, and given at least 21 days to comment on the proposal.

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4. Community consultation is required under sections 56(2)(c) and 57 of the Act as follows:

   (a) the planning proposal must be made publicly available for a minimum of **28 days**; and
   (b) the relevant planning authority must comply with the notice requirements for public exhibition of planning proposals and the specifications for material that must be made publicly available along with planning proposals as identified in section 5.5.2 of *A Guide to Preparing LEPs (Department of Planning and Environment 2016)*.

5. A public hearing is not required to be held into the matter by any person or body under section 56(2)(e) of the Act. This does not discharge Council from any obligation it may otherwise have to conduct a public hearing (for example, in response to a submission or if reclassifying land).

6. The timeframe for completing the LEP is to be **12 months** from the week following the date of the Gateway determination.

Dated 13 day of March 2017

Craig Diss
Acting Director Regions, Northern
Planning Services
Department of Planning and Environment

Delegate of the Minister for Planning

Port Macquarie – Hastings Council PP_2017_PORTM_002_00 (17/03590)

NSW GOVERNMENT | Planning & Environment

WRITTEN AUTHORISATION TO EXERCISE DELEGATION

Port Macquarie-Hastings Council is authorised to exercise the functions of the Minister for Planning under section 59 of the *Environmental Planning and Assessment Act 1979* that are delegated to it by instrument of delegation dated 14 October 2012, in relation to the following planning proposal:

Number	Name
PP_2017_PORTM_002_00	Planning proposal to rezone land at Homedale Road, Kew from RU1 Primary Production to R1 General Residential, E2 Environmental Conservation and E3 Environmental Management and amend associated development standards

In exercising the Minister's functions under section 59, the Council must comply with the Department of Planning and Environment's "*A guide to preparing local environmental plans*" and "*A guide to preparing planning proposals*".

Dated 13 March 2017

Craig Diss
Acting Director Regions, Northern
Planning Services
Department of Planning and Environment

Delegate of the Minister for Planning

Attachment 5 – Delegated plan making reporting template

Reporting template for delegated LEP amendments

Notes:

- Planning proposal number will be provided by the Department of Planning and Environment following receipt of the planning proposal
- The Department of Planning and Environment will fill in the details of Tables 1 and 3
- RPA is to fill in details for Table 2
- If the planning proposal is exhibited more than once, the RPA should add additional rows to **Table 2** to include this information
- The RPA must notify the relevant contact officer in the regional office in writing of the dates as they occur to ensure the publicly accessible LEP Tracking System is kept up to date
- A copy of this completed report must be provided to the Department of Planning and Environment with the RPA's request to have the LEP notified

Table 1 – To be completed by Department of Planning and Environment

Stage	Date/Details
Planning Proposal Number	**PP_2017_PORTM_002_00**
Date Sent to DoP&E under s56	**24/2/17**
Date considered at LEP Review Panel (if applicable)	**N/A**
Gateway determination date	**13/3/17**

Table 2 – To be completed by the RPA

Stage	Date/Details	Notified Reg Off
Dates draft LEP exhibited		
Date of public hearing (if held)		
Date sent to PCO seeking Opinion		
Date Opinion received		
Date Council Resolved to Adopt LEP		
Date LEP made by GM (or other) under delegation		
Date sent to DoP&E requesting notification		

Table 3 – To be completed by Department of Planning and Environment

Stage	Date/Details
Notification Date and details	

Additional relevant information:

NSW GOVERNMENT | Planning & Environment

PP_2017_PORTM_002_00 (IRF18/1121)

Mr Craig Swift-McNair
General Manager
Port Macquarie-Hastings Council
PO Box 84
PORT MACQUARIE NSW 2444

Attention: Sandra Bush

Dear Mr Craig Swift-McNair

Planning proposal PP_2017_PORTM_002_00 – Alteration of Gateway determination

I refer to your letter seeking an extension of time to complete planning proposal PP_2017_PORTM_002_00 for the rezoning of land at Homedale Road, Kew.

I have determined as the delegate of the Minister, in accordance with section 3.34(7) of the *Environmental Planning and Assessment Act 1979*, to alter the Gateway determination dated 13 March 2017 for PP_2017_PORTM_002_00. The Alteration of Gateway determination is enclosed.

If you have any questions in relation to this matter, I have arranged for Mr Craig Diss, Team Leader, Northern Region to assist you. Mr Diss can be contacted on [redacted]

Yours sincerely

[redacted] 8-3-2018.

Jeremy Gray
Director Regions, Northern
Planning Services

Encl: Alteration of Gateway Determination

NSW GOVERNMENT | Planning & Environment

Alteration of Gateway Determination

Planning proposal (Department Ref: PP_2017_PORTM_002_00)

I, Director Regions, Northern, at the Department of Planning and Environment, as delegate of the Minister for Planning, have determined under section 3.34(7) of the *Environmental Planning and Assessment Act 1979* to alter the Gateway determination dated 13 March 2017 for the proposed amendment to the Port Macquarie-Hastings Local Environmental Plan 2011 as follows:

1. Delete condition 6:

   "No.6 The timeframe for completing the LEP is to be **12 months** from the week following the date of the Gateway determination."

   and replace with:

   a new condition 6:

   "No.6 The time frame for completing the LEP is by 20 December 2018."

Dated 8 day of MARCH. 2018.

[redacted]

Jeremy Gray
Director Regions, Northern
Planning Services
Department of Planning and Environment

Delegate of the Minister for Planning

PP_2017_PORTM_002_00 (IRF18/1121)

ATTACHMENT 3 – Draft Site Specific Development Control Plan provisions

PMHC Planning Proposal - Kendall Road, Kew (PP2014-12.1)

Draft Amendment to Port Macquarie-Hastings Development Control Plan 2013 (Part 5 Southern Coastal Towns area-based provisions)

Homedale Road, Kew

Land to which this section applies

This section applies to the land shown below in Figure 1.

Figure 1: Land to which this section applies

Strategic Context

The site specific rezoning was informed by a concept plan submitted by GEM Planning consultants, on behalf of the landowner, and provides development potential for approximately 45 residential lots and an environmental residue lot. The environmental residue comprises significant vegetation, area for stormwater detention and a 50m wide separation buffer to Regionally Significant Farmland on the neighbouring rural property to the west.

The concept road layout allows for internal connectivity to the Links Residential Estate to the east and a 22m separation buffer to an approved bulk storage (temporary fencing) business operating on the Kendall Road frontage of the neighbouring rural property.

Purpose

The purpose of these provisions are:

a) To minimise the potential for land use conflict as a result of adverse noise impacts.
b) To provide for internal road connectivity.
c) To ensure adequate measures to minimise the potential for adverse impacts to indigenous heritage significance.

These provisions supplement the relevant provisions in Parts 2 and 3 of the Port Macquarie Development Control Plan. Where there is inconsistency between these Area Based Provisions and the provisions in Parts 3 and 4, for the extent of the inconsistency these Area Based Provisions prevail.

The maps shown in this plan are not to scale and show indicative locations only.

Development Guide

Noise attenuation
Objective • To mitigate the potential for adverse noise impacts on residents in proximity to the neighbouring bulk storage development.
Development Provisions The first subdivision adjoining Kendall Road must provide a minimum 1.8m high acoustic fence for noise attenuation extending along the north-west boundary generally in the location shown on Figure 2. The fence is to: ○ Be constructed of concrete, lapped and capped timber, or other suitable materials. ○ Be located within, or on the boundary of private property. ○ Be constructed prior to issuing the Subdivision Certificate. The development application must demonstrate the suitability of the barrier design and material to achieve the required relevant noise criteria at the time of noise barrier installation.

Road network connectivity
Objective • To ensure an appropriate road network that links to adjoining residential areas.
Development Provisions The subdivision design is to provide a connecting road through the site that links to the adjoining residential Estate, generally in accordance with Figure 3.

Aboriginal cultural heritage
Objective • To ensure Aboriginal archaeological values are respected in the design of development and in the development process.
Development Provisions A cultural site officer from the Bunyah Local Aboriginal Land Council must be present during any proposed diggings or disturbance of the potential archaeology site identified in Figure 4. If any Aboriginal artefacts are discovered, all works are to immediately stop in the vicinity of the site, the area cordoned off and contact made with the NSW Office of Environment and Heritage so that the site can be appropriately assessed and managed.

Figure 2: Indicative location for acoustic barrier

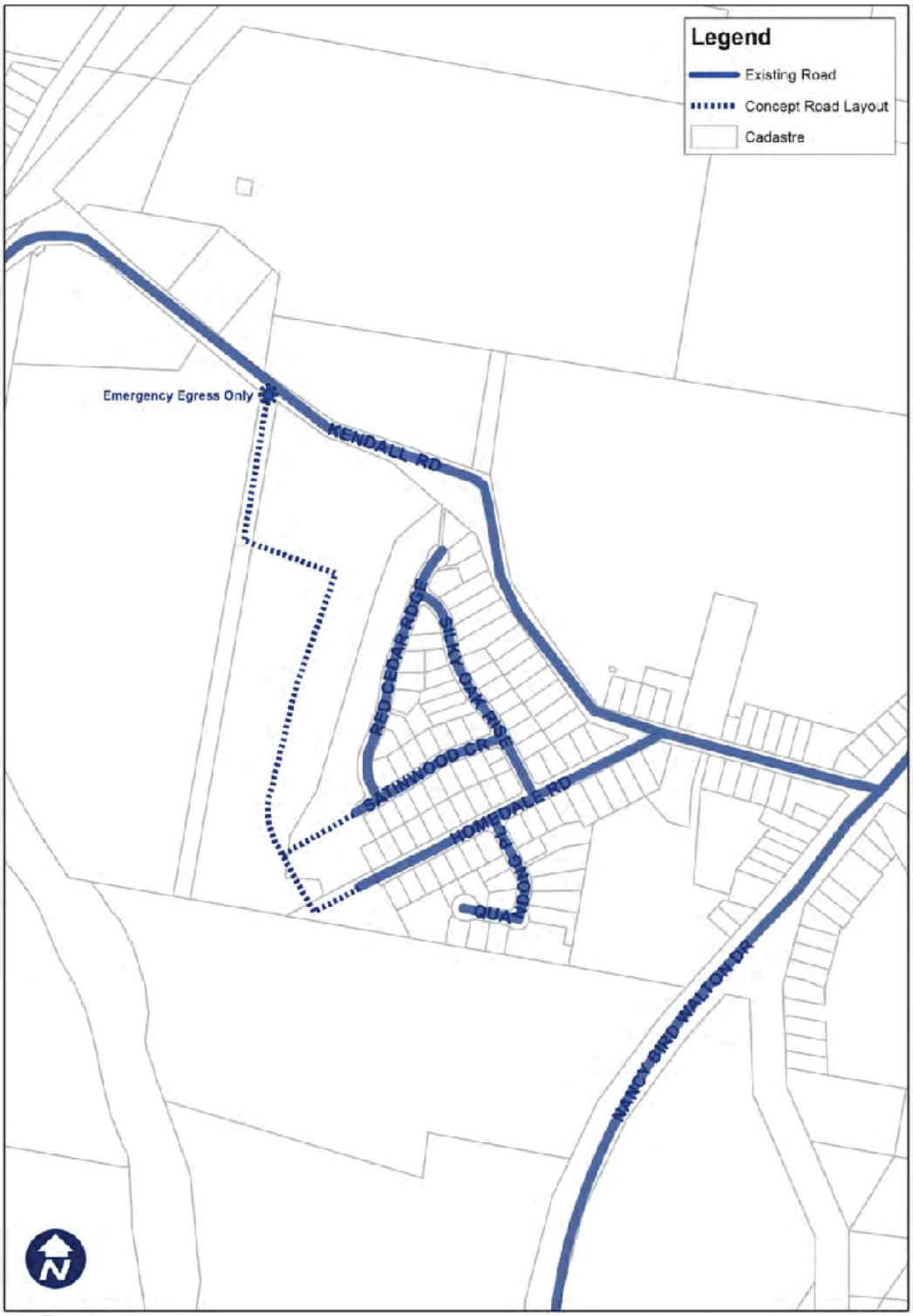

Figure 3: Concept road layout

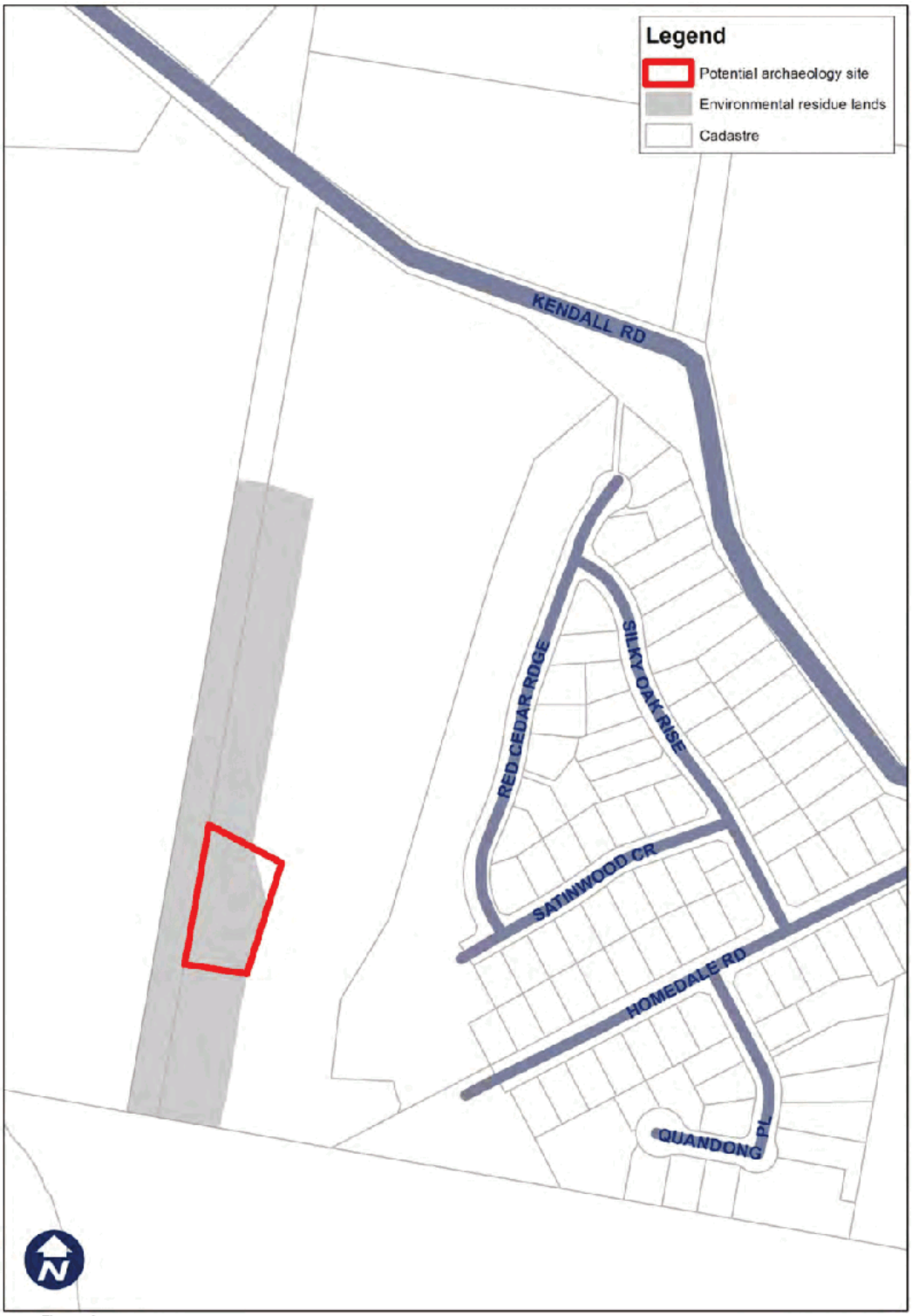

Figure 4: Potential archaeology site

ATTACHMENT 4 – Bushfire Hazard Assessment

PMHC Planning Proposal - Kendall Road, Kew (PP2014-12.1)

Midcoast
Building and
Environmental

BUSHFIRE HAZARD ASSESSMENT

Proposed Subdivision

30 x Lots

Lot 202 DP 1133171 &
Lot 334 DP 1204569
Kendall Road
Kew NSW 2439

May 2017

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

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APPENDIX 2 – Western Zone Mapping
APPENDIX 3 – BAL Contour Plan
APPENDIX 4 – Water Supply Requirements

1.0 INTRODUCTION

As requested a Bushfire Risk Assessment has been carried out for the proposed rezoning of Lots 202 DP 1133171 and Lot 334 DP 12045569 Kendall Road, Kew.

This report is based on a site assessment carried out on the 3rd May 2017.

The report is to demonstrate that bushfire risk is manageable.

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

NOTE

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

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

1. Rural Fires Act 1997.
2. Environmental Planning and Assessment Act 1979.
3. Building Code of Australia.
4. Council Local Environment Plans and Development Control Plans where applicable.
5. NSW Rural Fire Services, Planning for Bushfire Protection, 2006. (PfBP, 2006)
6. AS 3959-2009 Construction of Buildings in Bushfire Prone Areas.

The report recognizes the fact that no property and lives can be guaranteed to survive a bushfire attack. The report examines ways the risk of bushfire attack can be reduced where the subdivision site falls within the scope of the legislation.

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

1.1 Objectives

The objectives of this report are to:

- Ensure that the proposed rezoning/subdivision meets the aims and objectives of NSW Rural Fire Services, *Planning for Bushfire Protection*, 2006 and has measures sufficient to minimize the impact of bushfires; and
- Reduce the risk to property and the community from bushfire; and
- Comply where applicable with AS3959 – 2009.

1.2 Legislative Framework

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

The BCA references AS3959 – 2009 as the deemed-to-satisfy (DTS) solution for construction requirements in bushfire prone areas for NSW.

All development on bushfire prone land in NSW should comply with the requirements of Addendum Appendix 3 and other bushfire protection measures identified within PfBP, 2006.

The proposed subdivision is required to obtain a bushfire safety authority from the NSW Rural Fire Service.

1.3 Location

The site is located at Lot 202 DP 1133171 & Lot 334 DP 1204569 Kendall Road, Kew.

The site is positioned approximately 650m west of Kew CBD.

From the roundabout intersecting Ocean Drive, Nancy Bird Walton Drive and Kendall Drive head west along Kendall Drive for approximately 800m where the subject site will be on your left.

All the above mentioned roads are public sealed roads.

Locality – Kew
Local Government Area – Port Macquarie – Hastings Council
Closest Rural Fire Service – Kew
Closest Fire Control Centre – Wauchope

The site location of the proposed subdivision can be seen in **Figure 1** and **Figure 2** below:

Figure 1 – Topographic Map

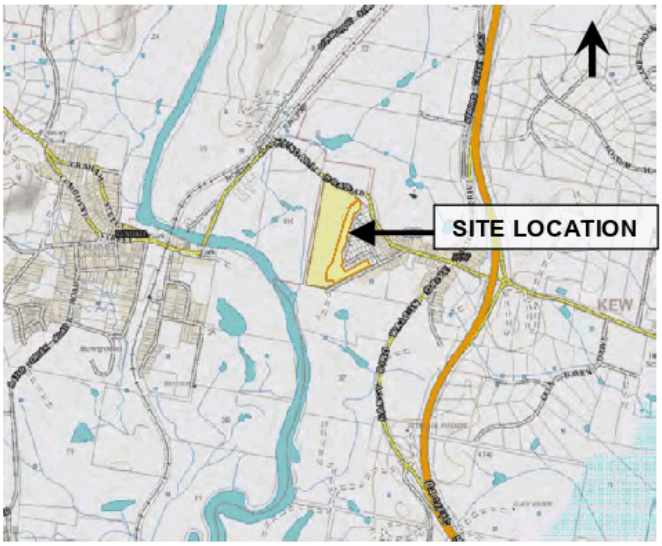


Figure 2 – Aerial View

Figure 3: Close up Aerial of Lot 202 and Lot 334

1.4 Development Proposal and History

The subject site is 10.92 ha in size.

It is proposed to subdivide the subject lots into 30 residential lots and the subdivision layout can be seen in **Appendix 1**.

2.0 BUSHFIRE HAZARD ASSESSMENT

2.1 Assessment Methodology

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

These factors are slope, vegetation type, and distance from hazard, access/egress and fire weather.

Each of these factors has been reviewed in determining the bushfire protection measures which are applicable to the subject site and proposed development.

The assessment of slope and vegetation being carried out in accordance with Appendix 2 and Appendix 3 of NSW Rural Fire Service, *Planning for Bushfire Protection*, 2006 and Section 2 of AS 3959 - 2009.

2.2 Slope Assessment

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

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

The hazard vegetation on adjacent land was identified and the slopes within the vegetation measured. The following table shows the results:

Table 1 – Hazard Vegetation Slopes

Proposed Subdivision	Hazard Aspect	Slope	Upslope/Downslope or Flat
	North	0-5°	Downslope
	West	0-5°	Downslope
	Southwest	15-20°	Downslope
	South	0°	Upslope

The different slopes to the west reflect the different vegetation classifications.

2.3 Vegetation Assessment

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

The vegetation formations were classified using the system adopted as per Keith (2004) initially for the Asset Protection Zone calculation and then converting Keith to AUSLIG using Table A3.5.1 of Appendix 3 (2010) for assessment of the Bushfire Attack Level.

2.3.1 Vegetation on and Adjoining/Adjacent to the Subject Lot

The existing vegetation on the subject lots is mostly grassland.

To the north of the existing lots is a three (3) hectare lot that is currently managed. Beyond this lot is the Golf Club.

To the west of the lots is grassland currently managed by cattle grazing, there is planned rezoning in this western area. The E3 zone is to extend along the western boundary as shown in **Appendix 2.**

The report assumes that the middle section of the subject lot including the drainage basin will be similar to a rainforest hazard. This can be seen in the hazard mapping section.

To the southwest is the existing area of riparian vegetation. This area has steep slopes down to the creek line and for the purposes of the report has been considered conservatively assessed as forest vegetation. It is not known at this stage whether the vegetation will extend beyond one (1) hectare or have a greater run than 50m and the vegetation maybe suitable for a short fire run analysis.

To the south of the existing lots is a mixture of unmanaged vegetation and grassland.

The following table details the hazards for the proposed lots:

Table 2 – Hazard Vegetation

Proposed Subdivision	Hazard Aspect	Vegetation
	North	Grassland
	West	Grassland Rainforest
	Southwest	Forest
	South	Grassland and areas of unmanaged vegetation

Photos 1 & 2 - grassland and unmanaged areas to the south

Photo 3 - riparian vegetation to the southwest

Photo 4 - to the west at approximate position of drainage basin

2.4 Hazard

The determining hazards are located to the north, west, southwest and south.

The hazard vegetation can be seen in ***Figure 4*** below:

Figure 4: Hazards

Table 3 – Summary of Hazard Characteristics

Proposed Lots	Hazard Aspect	Hazard	Slope	Upslope/Downslope or Flat
	North	Grassland	0-5°	Downslope
	West	Grassland Rainforest	0-5° 0-5°	Downslope Downslope
	Southwest	Forest	15-20°	Downslope
	South	Woodland	0°	Upslope

With respect to the hazards the following is noted:

1) The report assumes that the middle section of the western hazard including the drainage basin will be similar to a Rainforest hazard.

2) To the south west is the existing area of riparian vegetation. This area has steep slopes down to the creek line and for the purposes of the report has been considered conservatively assessed as forest vegetation. It is not known at this stage whether the vegetation will extend beyond 1 hectare or have a greater run than 50m. It should also be noted that the vegetation maybe suitable for a short fire run analysis.

3) To the south of the lot there is grassland vegetation and very small pockets of unmanaged vegetation. For the purposes of the report this vegetation has been considered as Woodland.

2.5 Fire Danger Index

The fire weather for the site is assumed on the worst-case scenario. In accordance with NSW Rural Fire Services, PfBP, 2006 and Table 2.1 of AS3959 - 2009, the fire weather for the site is based upon the 1:50 year fire weather scenario and has a Fire Danger Index (FDI) of 80.

3.0 BUSHFIRE THREAT REDUCTION MEASURES

3.1 NSW Rural Fire Services, *Planning for Bushfire Protection*, 2006

The following provisions of PfBP 2006 have been identified:

3.1.1 Defendable Space/Asset Protection Zone (APZ)

To ensure that the aims and objectives of NSW Rural Fire Services, PfBP, 2006, a defendable space between the asset and the hazard should be provided. The defendable space provides for, minimal separation for safe firefighting, reduced radiant heat, reduced influence of convection driven winds, reduced ember viability and dispersal of smoke.

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

It is recommended that the defendable space for the proposed development be based upon the minimum requirements for Asset Protection Zones as set out in NSW Rural Fire Services, *Planning for Bushfire Protection*, 2006.

Table 4 - APZ Requirements (PfBP 2006) for the Proposed Lots of the Subdivision

Hazard Aspect	Vegetation Type	Slope	IPA	OPA	Total APZ Required (IPA + OPA)
North	Grassland	0-5° Downslope	9m	_	9m
West	Grassland Rainforest	0-5° Downslope 0-5° Downslope	9m 11m	_	9m 11m
Southwest	Forest	15-20° Downslope	32m	20m	52m
South	Woodland	0° Upslope	14m	_	14m

With respect to the above table the following should be noted:

1. The riparian vegetation has been conservatively assessed as forest vegetation without completing performance reporting.

2. All slopes towards the creek have been considered as 0-5° downslope.

See **Appendix 3** for the Asset Protection lines (i.e. BAL-29 contour lines).

3.1.2 Operational Access and Egress

Access to and egress from each of the proposed lots will be via public roads to be completed as part of the subdivision.

Performance Criteria	Acceptable Solutions	Comment
The intent may be achieved where:		
• Firefighters are provided with safe all weather access to structures (thus allowing more efficient use of firefighting resources)	• Public roads are two-wheel drive, all weather roads	Can comply
• Public road widths and design that allow safe access for firefighters while residents are evacuating an area.	• Urban perimeter roads are two-way, that is, at least two traffic lane widths (carriageway 8 metres minimum kerb to kerb), allowing traffic to pass in opposite directions. Non perimeter roads comply with Table 4.1 – Road widths for Category 1 Tanker (Medium Rigid Vehicle). • The perimeter road is linked to the internal road system at an interval of no greater than 500 metres in urban areas. • Traffic management devices are constructed to facilitate access by emergency services vehicles. • Public roads have a cross fall not exceeding 3 degrees. • All roads are through roads. Dead end roads are not recommended, but if unavoidable, dead ends are not more than 200 metres in length, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end and direct traffic away from the hazard. • Curves of roads (other than perimeter roads	Can comply Will comply Can Comply Can Comply A gravel emergency access is proposed in the northern section of the lot. Council does not want a formal access onto Kendall Road. Can Comply

	are a minimum inner radius of six metres and minimal in number, to allow for rapid access and egress. • The minimum distance between inner and outer curves is six metres. • Maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient. • There is a minimum vertical clearance to a height of four metres above the road at all times.	Can Comply Can Comply Can Comply
• The capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles.	• The capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles (approximately 15 tonnes for areas with reticulated water, 28 tonnes or 9 tonnes per axle for all other areas). Bridges clearly indicate load rating.	Can comply
• Roads that are clearly signposted (with easily distinguishable names) and buildings/properties that are clearly numbered.	• Public roads greater than 6.5 metres wide to locate hydrants outside of parking reserves to ensure accessibility to reticulated water for fire suppression. • Public roads between 6.5 metres and 8 metres wide are No Parking on one side with the services (hydrants) located on this side to ensure accessibility to reticulated water for fire suppression.	Can comply
• There is clear access to reticulated water supply	• Public roads up to 6.5 metres wide provide parking within parking bays and locate services outside of the parking bays to ensure accessibility to reticulated water for fire suppression • One way only public access roads are no less than 3.5 metres wide and provide parking within parking bays and locate services outside of the parking bays to ensure accessibility to reticulated water for fire suppression.	Can comply
• Parking does not obstruct the minimum paved width	• Parking bays are a minimum of 2.6 metres wide from kerb edge to road pavement. No services or hydrants are located within the parking bays. • Public roads directly interfacing the bush fire hazard vegetation provide roll top kerbing to the hazard side of the road.	Can comply

It is considered that the relevant acceptable solutions as provided for by 4.1.3 of NSW Rural Fire Service, PfBP, 2006 are capable of being complied with and as such the intent for the provisions of services can be achieved.

3.1.3 Services - Water, Gas and Electricity

As set out in Section 4.1.3 of NSW Rural Fire Services, *Planning for Bushfire Protection*, 2006, developments in bushfire prone areas must maintain a water supply for firefighting purposes.

Electricity supply is available and will be connected to the subdivision site.

Reticulated water supply is available and connected to the site. If Council cannot guarantee a water supply then a Water Supply for Fire Fighting of 20,000 litres in accordance with Fast Fact 3/08 and Planning for Bushfire Protection, 2006 is to be provided for the development (See **Appendix 4).**

Any tanks will require the following at a minimum.

- A suitable connection for firefighting purposes is made available and located within the IPA and away from the structure. A 65mm Storz outlet with a Gate or Ball valve is provided.
- Gate or Ball valve and pipes are adequate for water flow and are metal rather than plastic.
- Underground tanks have an access hole of 200mm to allow tankers to refill direct from the tank. A hardened ground surface for truck access is supplied within 4 metres of the access hole.
- Above ground tanks are manufactured of concrete or metal and raised tanks have their stands protected. Plastic tanks are not used. Tanks on the hazard side of a building are provided with adequate shielding for the protection of fire fighters.
- All above ground water pipes external to the building are metal including and up to any taps.
- Pumps are shielded.

The use of heavy-duty hoses with wide spray nozzles is recommended with hoses able to reach all parts of any proposed new dwelling.

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

It is considered that the relevant acceptable solutions as provided for by 4.1.3 of NSW Rural Fire Services, PfBP, 2006 are capable of being complied with and as such the intent for the provision of services can be achieved.

3.1.4 Landscaping

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

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

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

Appendix 5 of NSW Rural Fire Services, *Planning for Bushfire Protection*, 2006, contains standards that are applicable to the provision and maintenance of landscaping. Any landscaping proposed to be undertaken in conjunction with the proposed development is to comply with the principles contained in Appendix 5 of NSW Rural Fire Services, PfBP, 2006.

Compliance with Appendix 5 of NSW Rural Fire Services, PfBP, 2006, will satisfy the intent of the bush fire protection measures that are applicable to the provision of landscaping.

3.2 Construction of Buildings

3.2.1 General

The deemed-to-satisfy provisions for construction requirements are detailed in AS 3953-2009. The relevant Bushfire Attack Level and Construction Requirements have been determined in accordance with Appendix 3 (2010) of PfBP, 2006 and Section 2 of AS 3959-2009. The additional construction requirements with respect to A3.7 of Appendix 3 (2010) of PfBP (2006) are required to be added to the standards for each Bushfire Attack Level.

3.2.2 Vegetation

To complete the assessment under AS 3959-2009 the vegetation, as originally assessed in accordance with Keith, has to be converted to AUSLIG.

The following table shows the conversion:

Table 5 – Summary of Vegetation Characteristics

Vegetation Classification – (Keith, 2004)	Vegetation Classification – (AUSLIG 1990)
Forest	Forest

3.2.3 AS3959 – 2009 Construction of Buildings in Bushfire Prone Areas

The following construction requirements in accordance with AS 3959 – 2009 Construction of Buildings in Bushfire Prone Areas is required for the bushfire attack categories.

Bushfire Attack Level (BAL)
BAL - LOW No construction requirements under AS 3959-2009
BAL - 12.5
BAL - 19
BAL - 29
BAL - 40
BAL - FZ

Appendix 3 that shows the BAL-29 contour lines.

Compliance with these requirements will ensure that any proposed new dwelling complies with the requirements of AS3959-2009 Construction of Buildings in Bushfire Prone Areas, for the siting, design and construction.

4.0 REQUIREMENTS

The following requirements are considered to be integral to this bushfire risk assessment:

1. An Asset Protection Zones as detailed in Section 3.1.1 of this report are to be provided.
2. The proposed subdivision is to comply with the relevant performance criteria/acceptable solutions as provided for by Section 4.1.3 of NSW Rural Fire Services, PfBP, 2006.
3. Adopt landscaping principals in accordance with Section 3.1.4 of the NSW Rural Fire Services, PfBP, 2006.

5.0 CLAUSE 44 CONSIDERATIONS

Table 6

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

6.0 CONCLUSION

It is suggested that with the implementation of this report, and its recommendations, that the bushfire risk is manageable and will be consistent with the acceptable bushfire protection measure solutions, provided for in Section 4.3.5 of NSW Rural Fire Services, PfBP, 2006.

The report provides that the required APZ's can be achieved and that any proposed new dwelling can be constructed so as to comply with the requirements of AS 3959-2009 and Appendix 3 of PfBP, 2006, Construction of Buildings in Bushfire Prone Areas.

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

Assumptions

1. For a satisfactory level of bushfire safety to be achieved, regular inspection and testing of proposed measures, building elements and methods of construction, specifically nominated in this report, is essential and is assumed in the conclusion of this assessment.

2. There are no re-vegetation plans in respect to hazard vegetation and therefore the assumed fuel loading will not alter.

3. It is assumed that the building works will comply with the DTS provisions of the BCA including the relevant requirements of Australian Standard 3959 – 2009.

4. The proposed development is constructed and maintained in accordance with the risk reduction strategy in this report.

5. The vegetation characteristics of the subject site and surrounding land remains unchanged from that observed at the time of inspection.

Limitations

1. The data, methodologies, calculations and conclusions documented within this report specifically relate to the proposed subdivision and must not be used for any other purpose.

2. A reassessment will be required to verify consistency with this assessment if there is any alterations and/or additions, or changes to the risk reduction strategy contained in this report.

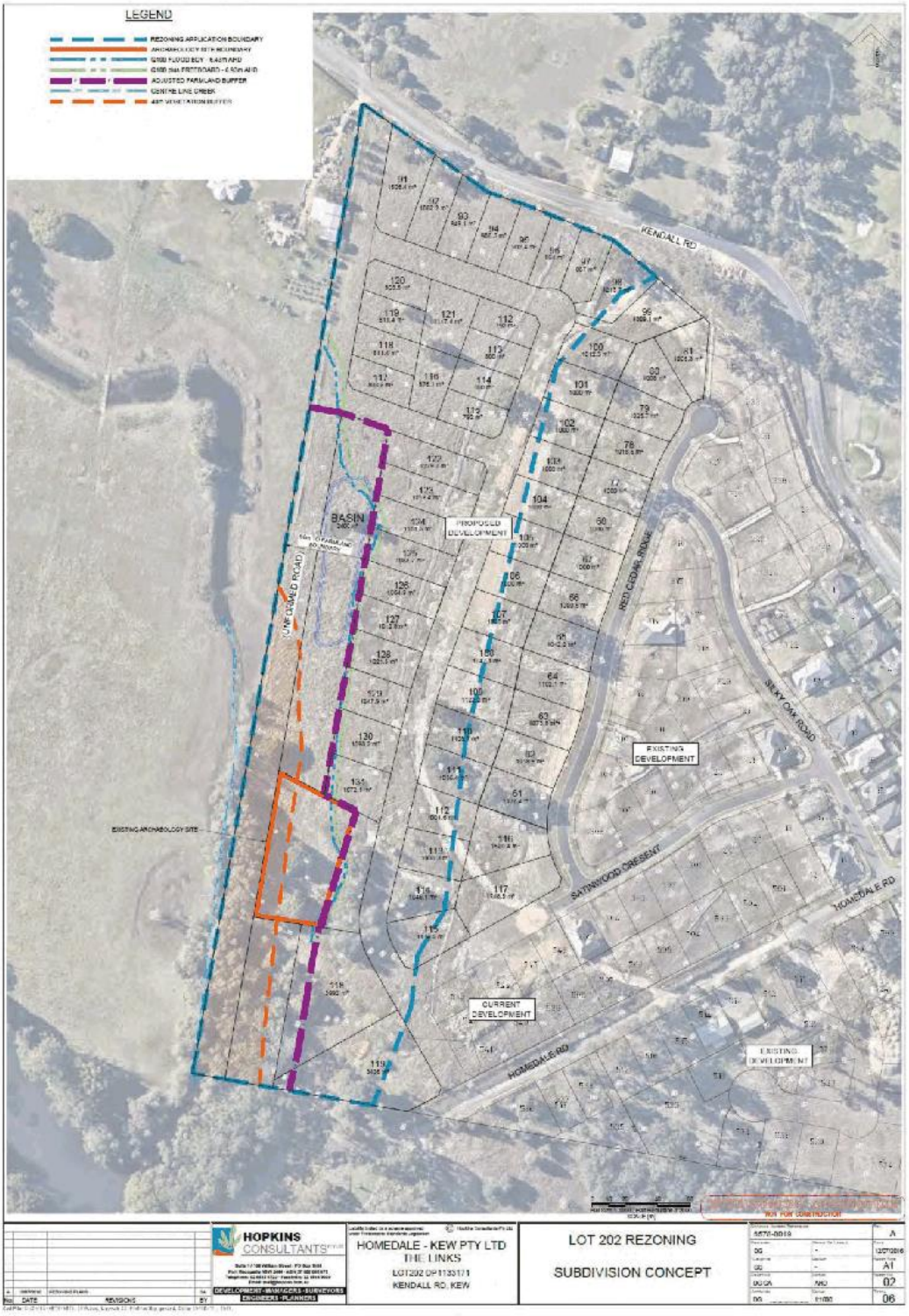
Regards

Tim Mecham
Midcoast Building and Environmental

7.0 REFERENCES

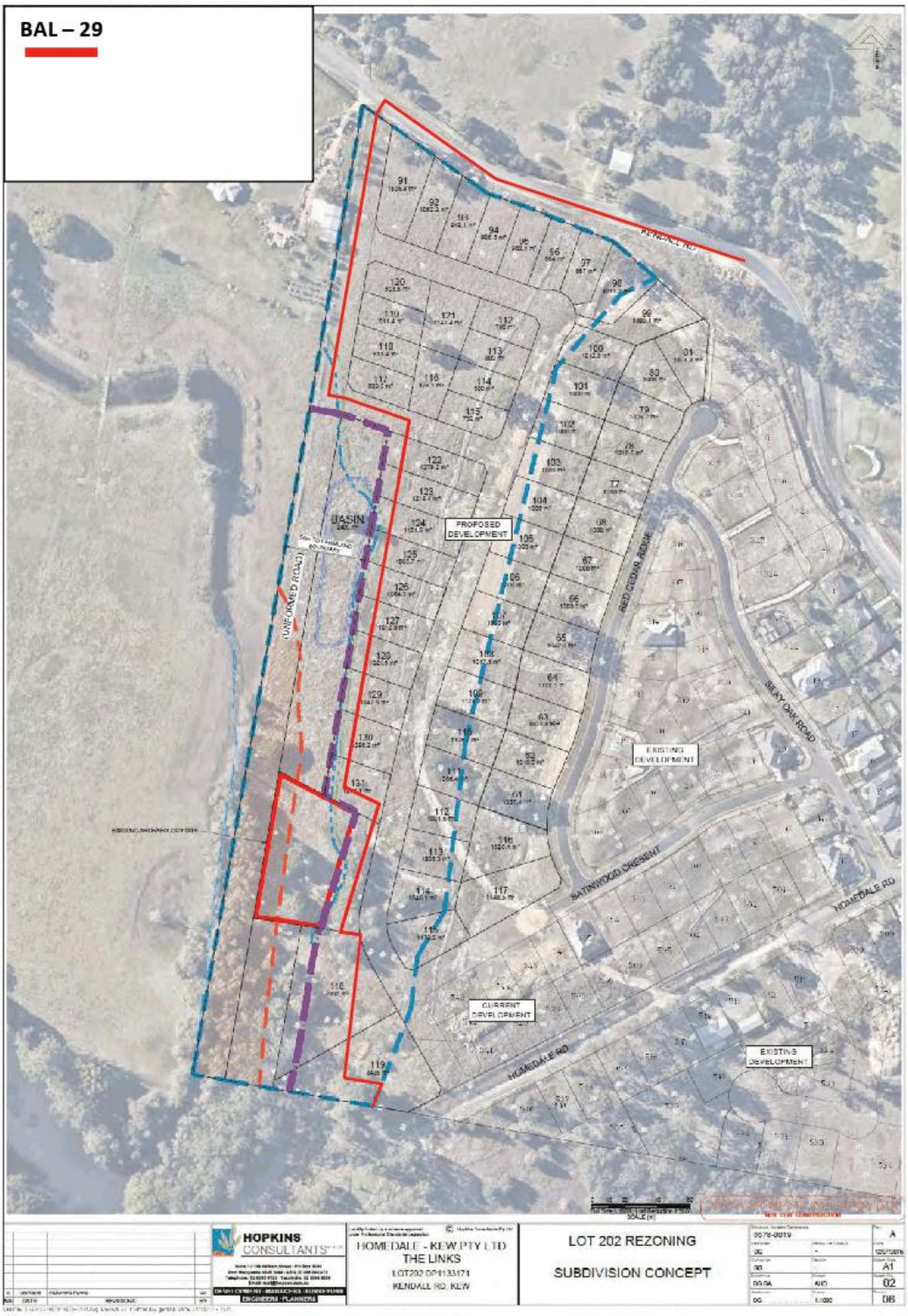
NSW Rural Fire Services, ***Planning for Bushfire Protection***, 2001
NSW Rural Fire Services, ***Planning for Bushfire Protection***, 2006
AS 3959-2009 ***Construction of Buildings in Bushfire Prone Areas***
Keith David 2004, Ocean ***Shores to Desert Dunes, The Native Vegetation of New South Wales and the ACT***, Department of Environment and Conservation
NSW State Government (1997) Rural Fires Act 1997
NSW Rural Fire Service – ***Guideline for Bushfire Prone Land Mapping 2002***

APPENDIX 1: Subdivision Layout



APPENDIX 2 – Zone E3 to the West

APPENDIX 3 – BAL Contour Lines



Note: BAL Contour Lines are indicative only

APPENDIX 4 – Water Supply Requirements

NSW RURAL FIRE SERVICE

COMMUNITY RESILIENCE FAST FACTS

3/08

Water Supply for Fire Fighting Purposes

This Fast Fact clarifies the NSW Rural Fire Service (RFS) position on the requirement for water supplies for development in bush fire prone areas.

Adequate water supply is critical for effective fire fighting. Where a non reticulated water supply is provided or the reticulated water supply is deemed inadequate, an additional onsite stored supply of water for fire fighting will be required. Non reticulated water is a supply that is not piped by council or a water authority and includes rainwater, ground water or surface water.

In the past, additional water sources could take the form of a static water supply (SWS) or a dedicated water supply. The RFS has traditionally required that an alternate supply of water be 'dedicated' for fire fighting purposes in line with the provisions of *Planning for Bush Fire Protection* 2006 (PBP). Dedicated water implies that the supply shall be in the form of a tank of water and has traditionally not included swimming pools or dams. The term also implies that the supply must be isolated from other domestic water supplies and used solely for fire fighting purposes.

From a practical fire fighting point of view, any source of available water will be utilised during a bush fire event and dedicated tanks are not always the most practical option.

In light of the above and the increasing demand for sustainable and efficient use of our water resources, the RFS will no longer require water to be solely 'dedicated' for fire fighting purposes and will allow more flexibility in satisfying the water requirements of PBP. As such, water holding structures such as tanks, swimming pools and dams can be considered.

Therefore, the RFS conditions addressing water supply will no longer refer to a 'dedicated' water supply and will simply state that a supply of water shall be provided for 'fire fighting purposes'. This position will also apply to previously issued conditions referring to dedicated supplies. As such, the water source can be used for other purposes and allow for the circulation of fresh water. The onus will be on the property owner to provide suitable water supply arrangements for fire fighting that meet the RFS requirements and ensure that any water sources are maintained at the appropriate capacity (see Table 4. of PBP).

Water capacities, access (tanker or pedestrian) for fire fighters and the provision of appropriate connections should also be considered when determining if a proposed water source is suitable. Furthermore, the property owner is encouraged to place a 'SWS' sign in a visible location on the street front.

Disclaimer: Any representation, statement opinion, or advice expressed or implied in this publication is made in good faith on the basis that the State of New South Wales, the NSW Rural Fire Service, its agents and employees are not liable (whether by reason of negligence, lack of care or otherwise) to any person for any damage or loss whatsoever which has occurred or may occur in relation to that person taking or not taking (as the case may be) action in respect of any representation, statement or advice referred to above

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1 of 1

Version 3 – February 2012

ATTACHMENT 5 – Traffic and Parking Assessment

PMHC Planning Proposal - Kendall Road, Kew (PP2014-12.1)

Proposed Residential Development
Lot 202 Homedale Road, Kew

Traffic and Parking Assessment Report

Prepared for: Yevrah Super Pty Ltd

September 2018

Report No: PT18015_Final_V2

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1. Introduction

This report has been prepared on behalf of Yevrah Super Pty Ltd to present findings of a traffic and parking assessment of the proposed residential sub division of the site known as Lot 202 Homedale Road, Kew.

The study has assessed existing traffic conditions, parking demands, access arrangements, future traffic conditions, service vehicle provision and design compliance.

The remainder of the report is set out as follows:

- Section 2 describes the existing traffic and parking conditions;
- Section 3 summarises the background of the development site;
- Section 4 summarises the proposed development;
- Section 5 reviews the potential traffic impacts of the proposal;
- Section 6 provides a road design compliance assessment; and
- Section 7 presents the conclusions

2. Existing Development / Conditions

The following presents a summary of existing site and traffic conditions.

2.1 Site Location

The site is located to the west of Homedale Road in Kew and forms part of the Homedale Road Sub Division proposal. At the time of preparing this report a number of dwellings within the lands between this development site and Homedale Road had been constructed and were occupied. The location of the development site is shown in **Figure 1**.

Figure 1 - Site Location

Source: Google maps

The existing site is a greenfield site with no dwellings. The site includes a frontage to Kendall Road in the north.

2.2 Classification Criteria

It is usual to classify roads according to a road hierarchy in order to determine their functional role within the road network. Changes to traffic flows on the roads can then be assessed within the context of the road hierarchy. Roads are classified according to the role they fulfil and the volume of traffic they should appropriately carry. The RTA has set down the following guidelines for the functional classification of roads.

- Arterial Road – typically a main road carrying over 15,000 vehicles per day and fulfilling a role as a major inter-regional link (over 1,500 vehicles per hour)
- Sub-arterial Road – defined as secondary inter-regional links, typically carrying volumes between 5,000 and 20,000 vehicles per day (500 to 2,000 vehicles per hour)

- Collector Road – provides a link between local roads and regional roads, typically carrying between 2,000 and 10,000 vehicles per day (250 to 1,000 vehicles per hour). At volumes greater than 5,000 vehicles per day, residential amenity begins to decline noticeably.
- Local Road – provides access to individual allotments, carrying low volumes, typically less than 2,000 vehicles per day (250 vehicles per hour).

2.3 Existing Road Network

Kendall Road – forms part of the regional road network in the area providing a crossing over the Camden Haven River in the west and a direct link to the Pacific Highway in the east. In the vicinity of Homedale Road, the road includes a single travel lane in each direction and parallel parking lanes on both sides of the street. The intersection of Kendall Road / Homedale Road is a priority-controlled intersection. The street includes a posted speed limit of 50km/hr.

Homedale Road – is a north-south Collector Road linking Kendall Road in the north with adjacent residential properties. The street includes a carriageway width of approximately 9.0m with a single travel lane in each direction and unrestricted parallel parking available on either side of the street. It is noted that Homedale Road has been recently constructed to a 'Collector Road status' in terms of width of the street as required by previous development applications for adjacent residential sub divisions. The street includes a posted speed limit of 50km/hr.

Nancy Bird Walton Drive – runs north-south and parallel to the Pacific Highway. This road provides the northbound on and off ramp access to Kendall from the Pacific Highway. The intersection of Nancy Bird Walton Drive / Kendall Road is a traffic signal-controlled intersection with pedestrian phasing across Kendall Road. That is, the signals provide an existing safe pedestrian crossing facility some 230m east of the Kendall Road / Homedale Road intersection linking the north and southern sides of Kendall Road for pedestrians.

2.4 Existing Intersection Arrangements

As stated above, the intersection of Kendall Road / Homedale Road is a priority-controlled intersection. This intersection was subject to a recent upgrade as part of the approval for the adjacent sub division to this development to provide an intersection which complies with Austroads in terms of layout and safety. Condition 17(3) of the approval stated the following:

> 3. The intersection of Kendall Road & Homedale Road is to be upgraded requiring:
>
> a. 'No Stopping' restrictions on Northern side of this intersection.

b. Channelised intersection with right turn shelters to comply with AUSTROADS PT.5 – Intersection at Grade (refer Fig 4.5.12 – RTA, Road Design Guide).

c. Standard 'No Stopping' restrictions' to address sight lines at intersection.

d. Appropriate intersection Design plans showing a detailed intersection layout are to be submitted to Council for approval, prior to issuing of a Construction Certificate.

e. Intersection lighting to the requirements of AS 1158

As confirmed in the aerial photograph below, all works as per the condition of consent at the intersection have been undertaken.

Figure 2 – Existing Intersection Arrangements at Kendall Road / Homedale Road

The intersection includes a protected right turn bay for eastbound traffic in Kendall Road.

2.5 Existing Traffic Flows

To gauge existing traffic flows on the surrounding road network, an intersection count at Kendall Road / Homedale Road was undertaken during the morning and afternoon peak periods on a weekday. Copies of the intersection count can be found in **Appendix A** of this report.

The peak flows by direction in each street at each intersection are summarised below.

Table 1 – Existing Weekday Peak Period Volumes in vicinity of site (veh/hr)

		AM		PM	
Road	Location	NB/EB	SB/WB	NB/EB	SB/WB
Kendall Rd	West of Homedale Rd	250	142	162	181
Kendall Rd	East of Homedale Rd	269	157	176	196
Homedale Rd	South of Kendall Rd	24	20	26	26

From **Table 1** it can be seen that existing flows on surrounding roads are in generally in line with their classification. Of further note the existing traffic flows in Homedale Road are significantly lower than that which would be expected for a Collector Road. Thus, there is significant spare mid-block capacity in this street to accommodate future development.

2.6 Existing Intersection Operating Conditions

All intersections surveyed have been analysed using the Sidra Intersection analysis program. Sidra Intersection determines the average delay that vehicles encounter, the degree of saturation of the intersection, and the level of service. The degree of saturation is the ratio of the arrival rate of vehicles to the capacity of the approach. Sidra Intersection provides analysis of the operating conditions which can be compared to the performance criteria set out in **Table 2.**

Table 2 – Level of Service Criteria

Level of Service	Average Delay per Vehicle (secs/veh)	Signals & Roundabouts	Give Way & Stop Signs
A	less than 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
F	> 70	Extra capacity required	Extreme delay, traffic signals or other major treatment required

Adapted from RTA Guide to Traffic Generating Developments, 2002.

For roundabouts and priority intersections, the reported average delay is for the individual movement with the highest average delay per vehicle. At signalised intersections, the reported average delay is over all movements.

The existing weekday intersection operating conditions are presented in **Table 3.** Average delay is expressed in seconds per vehicle.

Table 3 – Existing Weekday AM / PM Intersection Operating Conditions

		Morning Peak		Evening Peak	
Intersection	Control	Av Delay	LOS	Av Delay	LOS
Kendall Rd / Homedale Rd	Priority	8.2	A	7.7	A

Avg Delay (sec/veh) is over all movements at signals, and for worst movement at priority and roundabouts

From **Table 3** it is noted that the intersection of Kendall Road / Homedale Road currently operates at a satisfactory level of service during both the AM and PM peak periods on a weekday with spare capacity. Copies of the SIDRA outputs are provided in **Appendix B** of this report.

2.7 Public Transport - Buses

The centre of the development site is located some 700m from two (2) existing bus stops in Kendall Road. The walking distance to each bus stop is shown below.

Figure 3 – Development Site Proximity to Existing Bus Stops

The bus stops provide access to the following bus services and centres served by these bus routes is provided below:

Table 4 - Bus Routes Operating Past Development Site

Route No.	Operator	Description
334K	Busways	Port Macquarie to Kendall / Laurieton

From **Table 4** it can be seen that the site is located within a reasonable walking distance to bus services which provide direct access to the major employment / retail centre of the area namely Port Macquarie City Centre.

3. Background Report Review

As stated above, the proposed development is located within an area previously subject to reporting for its release to provide a residential sub division. The following presents a summary of those investigations.

3.1 Planning Proposal Report – Port Macquarie / Hastings Council February 2017

This report prepared by Port Macquarie / Hastings Council was in support of a proposed amendment to the Port Macquarie-Hastings Local Environmental Plan 2011 (PMHLEP) to rezone rural land on the western edge of Kew for residential and environmental purposes. The report specifically investigated the rezoning of Lot 202 Homedale Road to change from an existing zoning of RU1 to R1 to permit a sub division for housing.

The report analysed the potential impacts having regard to the Mid North Coast Regional Strategy (MNCRS) 2006 criteria for assessing new land sub division proposals.

On traffic and access matters the report noted the following as shown in **Table 5**:

Table 5 - Port Macquarie / Hastings Council MNCRS Criteria Assessment of Proposal

MNCRS Sustainability Criteria Response to Sustainability Criteria	MNCRS Sustainability Criteria Response to Sustainability Criteria
2. Access Accessible transport options for efficient and sustainable travel between homes, jobs, services and recreation to be existing or provided.	Due to its size and inland location, Kew village is largely car dependant. An existing bus route provides access to Laurieton and Port Macquarie; however, this service is infrequent. In regional areas services are often underutilised and difficult to maintain on a cost basis. The planning proposal would provide an opportunity for increased population and therefore patronage to help support public transport services in the area. The Pacific Highway is approximately 1 km to the east of the site and the Kendall Railway Station is approximately 2 km to the west. Rail services are available between Sydney and Brisbane on a daily basis with passenger stops at Kendall. Air transport services are available via Port Macquarie to Sydney, Brisbane and Melbourne. The expected increase in traffic movements is considered acceptable and unlikely to create any adverse impacts to the efficiency of the existing transport network.

From the analysis of Council above in **Table 5** it is noted that the proposal would assist in the viability of existing bus services and that the proposal would not create *any adverse impacts of the efficiency of the existing transport network.*

3.2 Kendall Road Traffic Surveys – February 2016

To provide an indication of historical traffic flows in the vicinity of the development site for comparison with current traffic conditions, tube count data was provided by Port Macquarie / Hastings Council. A copy of this tube count data is provided in **Appendix C** of this report.

The count data did not provide volumes by direction in Kendall Road but combined two-way volumes. A summary of the counts is provided below.

Site MR533 Kendall Road

Direction Combined

Back to Site Summary Page

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	7 days		Weekday		Weekend	
Date	15/02/2016	16/02/2016	17/02/2016	11/02/2016	12/02/2016	13/02/2016	14/02/2016	Total	Average	Total	Average	Total	Average
AM Peak	09:00	10:00	10:00	06:00	07:00	09:00	11:00	N/A	09:00	N/A	06:00	N/A	09:00
PM Peak	15:00	16:00	12:00	16:00	16:00	19:00	17:00	N/A	16:00	N/A	12:00	N/A	16:00
00:00	8	8	4	5	3	15	8	49	7	26	5	23	12
01:00	2	5	4	3	2	7	4	27	4	16	3	11	6
02:00	1	0	3	4	2	4	4	18	3	10	2	8	4
03:00	5	0	1	4	10	6	7	39	6	26	5	13	7
04:00	20	18	27	28	25	8	6	132	19	118	24	14	7
05:00	82	64	69	63	71	21	11	381	52	320	68	32	16
06:00	175	147	171	183	159	62	35	932	133	835	167	97	49
07:00	209	252	231	202	215	131	74	1314	188	1109	222	205	103
08:00	353	379	360	376	380	200	191	2239	320	1848	370	391	196
09:00	298	343	243	274	299	254	245	1954	279	1455	291	499	250
10:00	240	300	220	283	258	266	285	1862	266	1311	262	551	276
11:00	249	242	278	273	301	334	263	1941	277	1344	269	597	299
12:00	249	230	240	270	265	209	271	1620	260	1260	252	560	280
13:00	251	250	250	252	238	240	225	1715	245	1241	248	474	237
14:00	305	280	290	269	280	210	239	1891	270	1433	287	458	229
15:00	387	359	373	379	389	195	222	2304	329	1887	377	417	209
16:00	305	290	317	330	305	219	227	1993	285	1547	309	446	223
17:00	288	289	317	298	292	172	186	1842	263	1484	297	358	179
18:00	197	204	213	221	196	137	137	1305	186	1031	206	274	137
19:00	135	96	85	137	104	87	119	763	109	557	111	206	103
20:00	80	63	95	80	100	84	74	556	79	398	80	158	79
21:00	36	73	52	50	73	45	27	356	51	284	57	72	36
22:00	13	23	26	24	44	30	17	185	26	130	26	55	28
23:00	7	13	13	11	25	22	7	98	14	69	14	29	15
Total	3853	3941	3889	4029	4036	3064	2884	25696	3671	19748	3950	5948	2980
% Heavy	10.33%	10.18%	9.98%	8.79%	8.52%	6.49%	5.89%	8.77%		9.66%		6.20%	

The counts confirmed the AM and PM peak hours to be 8:00am to 9:00am and 3:00pm to 4:00pm which mirrors the peak hours noted in the 2018 counts.

A comparison of the two way flows west of Homedale Road recorded in 2018 with the flows above is provided below.

Table 6 – 2016 vs 2018 Kendall Road Two Way Peak Hour Flows Comparison

Time Period	Location	2016 Two-Way Flow*	2018 Two-Way Flow	% Difference
8:00am – 9:00am	Kendall Rd West of Homedale Rd	370	392	+6%
3:00pm – 4:00pm	Kendall Rd West of Homedale Rd	377	343	-7%

*Weekday avg.

From **Table 6** it can be seen that AM peak hour flows have increased by some 6%. However, PM peak hour flows have decreased by 7%.

3.3 Kendall to Laurieton Regional Bike Path

As advised by Hastings Council, Council has identified in its future planning a shared pedestrian / cycle pathway which links Kendall in the west with Laurieton in the east.

At the time of preparing this report, an existing shared pathway was available along the northern side of Kendall Road between Homedale Road and Nancy Bird Walton Drive. In the future the pathway is proposed to extend to the west to the town of Kendall linking to an existing shared pedestrian / cycle path in this centre.

The existing / proposed pathways of the Kendall to Laurieton Regional Bike Path is shown below:

Figure 4 – Existing Proposed Shared Pedestrian / Cycling Path Kendall to Laurieton

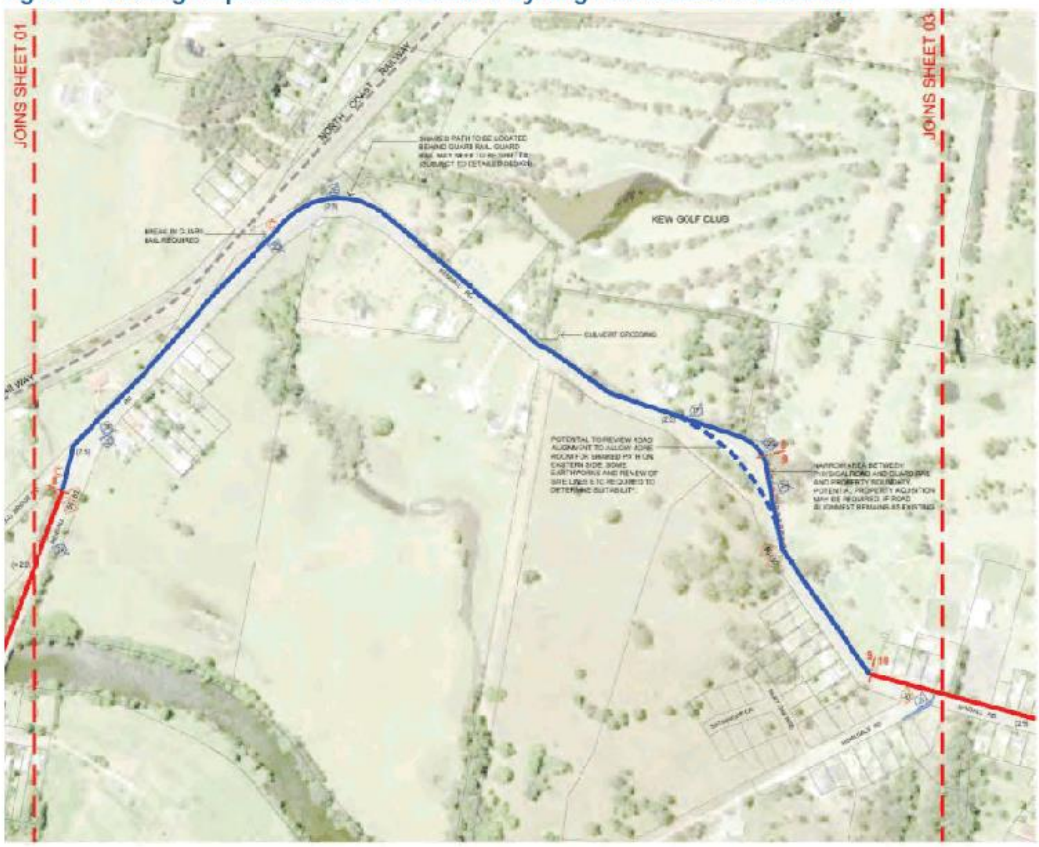
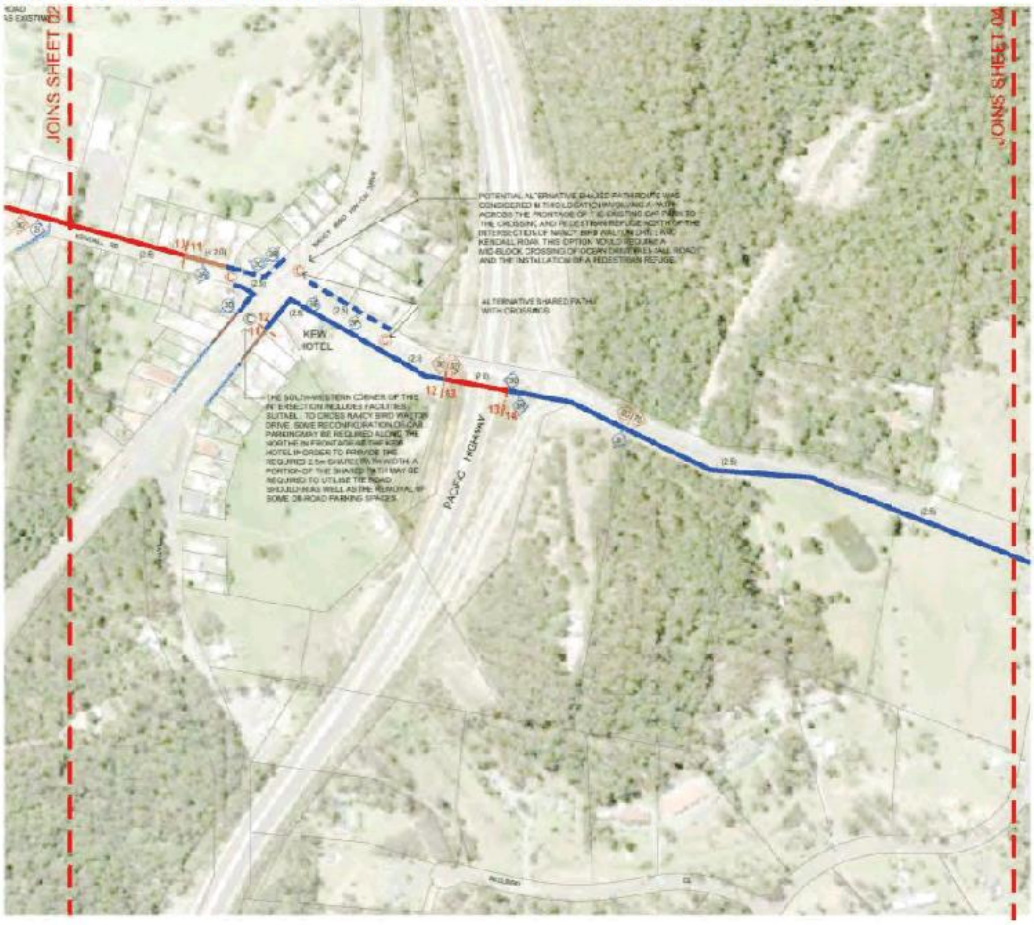


Figure 5 – Existing Proposed Shared Pedestrian / Cycling Path Kendall to Laurieton



4. The Proposed Development

The key components of the proposed development and associated public works are described below.

- Construction of 47 residential lots
- A revised arrangement of pre-approved Lots 81 to 117 (approved in Red Cedar Ridge DA)
- Internal road network to service residential lots and road connection to Homedale Road

Plans of the proposed development can be found in **Appendix D** of this report.

5. Potential Traffic Impacts

5.1 Introduction

The following presents an assessment of the potential traffic impacts of the proposal using the Roads and Traffic Authority Guide to Traffic Generating Developments standard approach.

5.2 Development Traffic Generation

The RMS Technical Direction TDT-2013/04a provides an update to the RTA Guide to Traffic Generating Developments for peak hour traffic generation rates for low density housing. These are as follows (max rate for regional areas):

- 0.90 trips per dwelling in the AM peak
- 0.85 trips per dwelling in the PM peak

Therefore, the proposed development has the potential to generate 43 and 40 peak hour trips and the AM and PM peak hours respectively two-way. 80% of the generated trips would be outbound in the AM peak with 20% inbound. The reverse would occur in the PM peak.

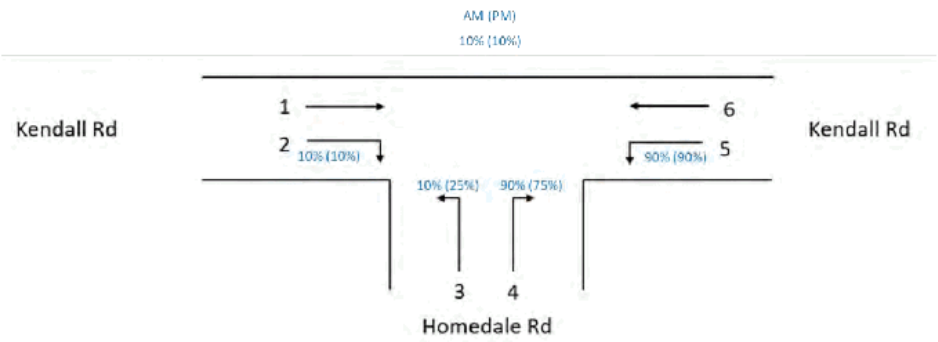
5.3 Trip Distribution / Future Traffic Flows

The traffic generated by the proposal has been added to the surrounding road network.

Whilst traffic volumes in Kendall Road were generally 50/50 between eastbound and westbound movements, the adopted trip distribution into / out of Kendall Road has mirrored existing distribution of trips into and out of the side street.

The adopted distribution of newly generated trips of the proposal into and out of Homedale Road is shown below:

Figure 6 – Adopted AM / PM Existing Proposed Shared Pedestrian / Cycling Path Kendall to Laurieton



Applying the above distribution, the future peak flows by direction in each street at each intersection are summarised below in **Table 7**.

Table 7 – Future Weekday Peak Period Volumes in vicinity of site (veh/hr)

		AM		PM	
Road	Location	NB/EB	SB/WB	NB/EB	SB/WB
Kendall Rd	West of Homedale Rd	251	145	165	183
Kendall Rd	East of Homedale Rd	290	165	182	225
Homedale Rd	South of Kendall Rd	58	29	34	58

From **Table 7** it can be seen that future traffic flows remain within their current expected maximum for each classification of surrounding streets. Further, traffic flows in Homedale Road would continue to be markedly lower than that which would be expected for a Collector Road.

5.4 Future Intersection Operation

The future traffic flows on the surrounding road network have been assessed in SIDRA. The resulting future intersection operation is presented below. As a sensitivity test a 3% growth rate has been applied to all future traffic flows on all legs of the intersection of Kendall Road / Homedale Road to take into account potential background growth in traffic till 2028.

Table 8 – Future Weekday AM / PM Intersection Operating Conditions

		Morning Peak		Evening Peak	
Intersection	Control	Av Delay	LOS	Av Delay	LOS
Existing + Development					
Kendall Rd / Homedale Rd	Priority	8.4	A	7.9	A
10yr Future year (+3% per annum)					
Kendall Rd / Homedale Rd	Priority	10.0	A	9.1	A

Avg Delay (sec/veh) is over all movements at signals, and for worst movement at priority and roundabouts

From **Table 8** it is noted that the intersection of Kendall Road / Homedale Road would continue to operate at a satisfactory level of service during both the AM and PM peak periods. This includes in the scenario of a 10yr future condition assessment assuming 3% growth per annum of all future traffic movements at the intersection. Further, the intersection would function with significant spare capacity in both scenarios.

Therefore, the potential traffic impacts of the proposal are considered satisfactory.

6. Access and Design Compliance Assessment

6.1 Road Network

The Port Macquarie / Hastings Development Design Specification – Geometric Road Design provides recommended road / footpath widths for different road types. In the case of the proposed development, all streets proposed are 'local' streets. The specification requires the following:

- 7.0m wide carriageway
- 4.0m wide verges
- Road reservation width of 15.0 to 16.0m

As all streets proposed as part of the sub division include a 17.0m wide road reservation, the proposed design exceeds the minimum requirements of the engineering specification and is considered satisfactory.

6.2 Pedestrians / Cyclists

The frontage of this development with Homedale Road is minimal. It is noted that a footpath along the western side of Homedale Road has been constructed as part of the adjacent sub division. It is understood that this pathway would be extended south in the future upon completion of the sub division.

As per the Hastings Council sub division standards, it is expected a condition of consent for a footpath on one side of all streets within the sub division would be imposed on any future development applications. This in turn would provide an all-weather path from the sub division to the existing pathway in Homedale Road to Kendall Road.

Overall, upon completion of both sub divisions, residents of this development would be provided with a connected all weather path system to / from Kendall Road.

No on-road or off-road facilities are proposed within Homedale Road as part of Hastings Council 2014 Bike Plan. The proposal would not preclude any new cycle facilities in Homedale Road to link with the existing / future Kendall to Laurieton shared pedestrian / cycle path.

6.3 Public Transport

As stated above, the centroid of this sub division proposal would be approximately 700m walking distance to existing eastbound / westbound bus stops in Kendall Road. The relocation of bus stops or services closer to this proposed sub division is beyond the scope of this report and is a matter for Transport for NSW / bus operators to consider during the course of occupation of this sub division.

Overall, the placement and / or relocation of bus stops in Kendall Road needs to consider existing users and available crossing facilities (such as the traffic signals at Kendall Road / Nancy Bird Walton Drive intersection).

Of note, at all times bus operators are seeking new opportunities for increased patronage of which this sub division would provide.

However, it should be noted that the existing Homedale Road construction to Collector Road standard and the proposed 17m wide local road reserves internal to the site, supported by looped road pattern would enable bus services internal to the site should they be warranted in the future. There is capacity within the road reserves and road network to accommodate bus movements and install bus stops as necessary

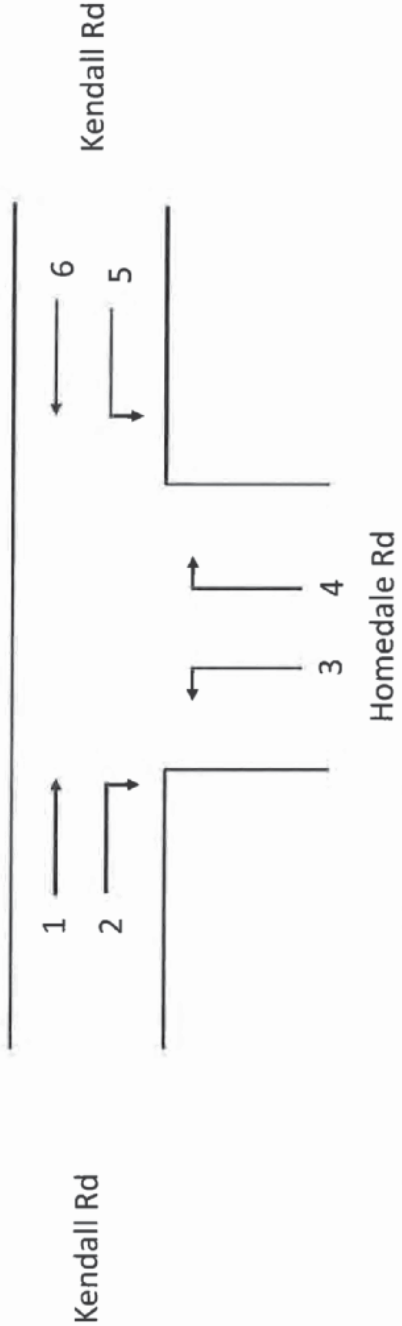
7. Conclusions

This report has reviewed the potential traffic impacts of the proposed 47 lot residential sub division at the site known as Lot 202 Homedale Road, Kew. The findings of this review are presented below:

1. The traffic impacts of the development would be minimal.
2. The existing intersection of Kendall Road / Homedale Road has recently been subjected to an upgrade in accordance with the requirements of Austroads.
3. The intersection of Kendall Road / Homedale Road would continue to operate at levels of service to that which currently occurs and 10 years into the future.
4. The design of the internal road network exceeds the minimum requirements of Council's Engineering Specifications and is considered satisfactory.
5. It is anticipated that any future development application for the sub division would consider the requirements of Section 3.6 of Council's DCP to inform the sub division and road network design.

Overall the traffic impacts of the proposal are considered acceptable.

8. Appendix A – 2018 Intersection Count



	Movement 1	Movement 2	Movement 3	Movement 4	Movement 5	Movement 6
7:00am – 7:15am	𝍸 𝍸			𝍸	𝍸	𝍸 𝍸 𝍸
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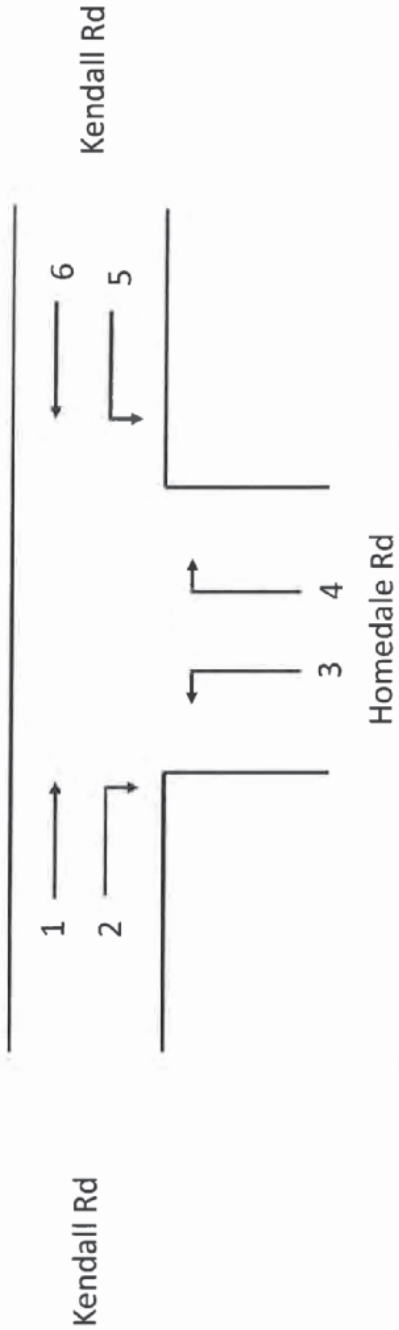

	Movement 1	Movement 2	Movement 3	Movement 4	Movement 5	Movement 6
7:15am – 7:30am	𝍸 𝍸			𝍸		𝍸 𝍸
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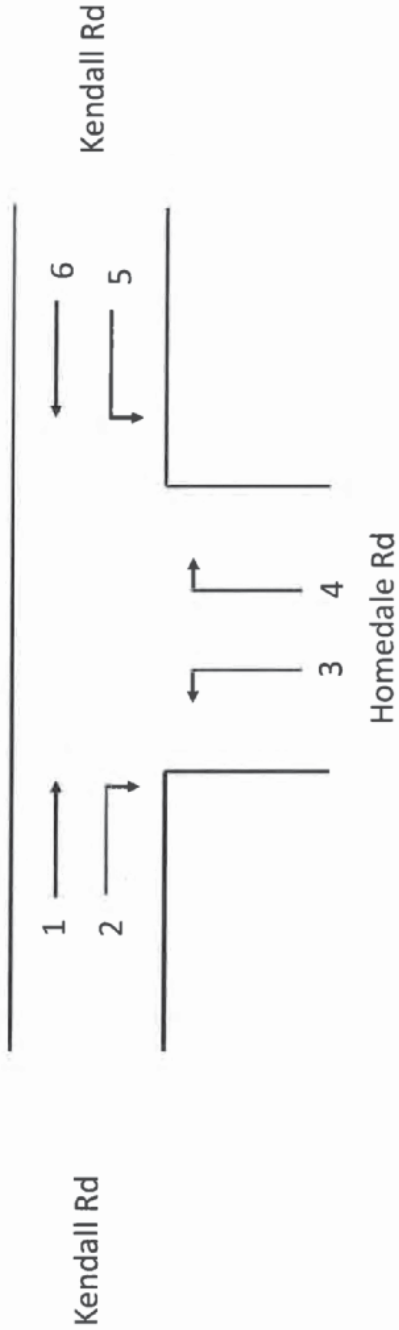

	Movement 1	Movement 2	Movement 3	Movement 4	Movement 5	Movement 6
7:30am – 7:45am	𝍸 𝍸	𝍸		𝍸	𝍸	𝍸 𝍸 𝍸 𝍸
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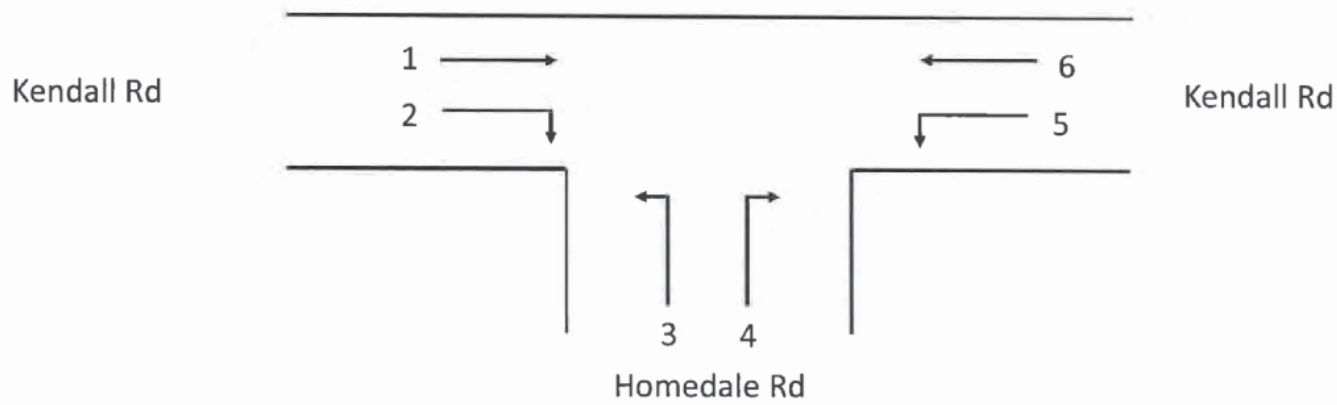
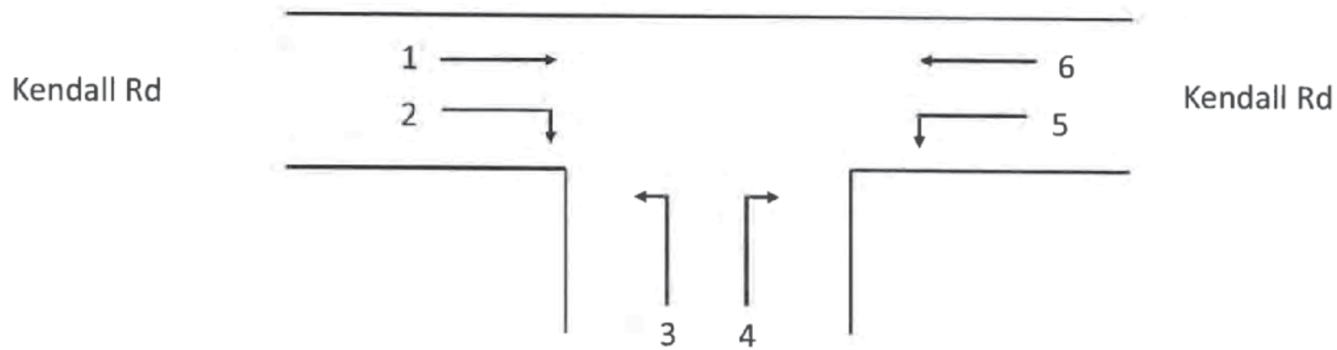


	Movement 1	Movement 2	Movement 3	Movement 4	Movement 5	Movement 6
7:45am – 8:00am	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 |||			𝍸 |||		𝍸 𝍸 𝍸 𝍸 𝍸 ||||



	Movement 1	Movement 2	Movement 3	Movement 4	Movement 5	Movement 6
8:00am – 8:15am	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸			𝍸 |	||||	𝍸 𝍸 𝍸 𝍸 |||

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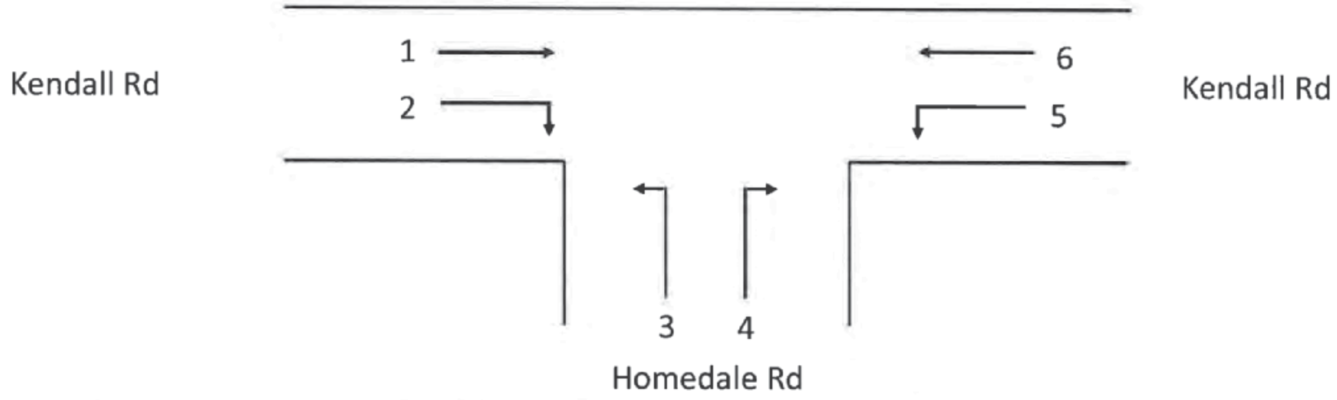

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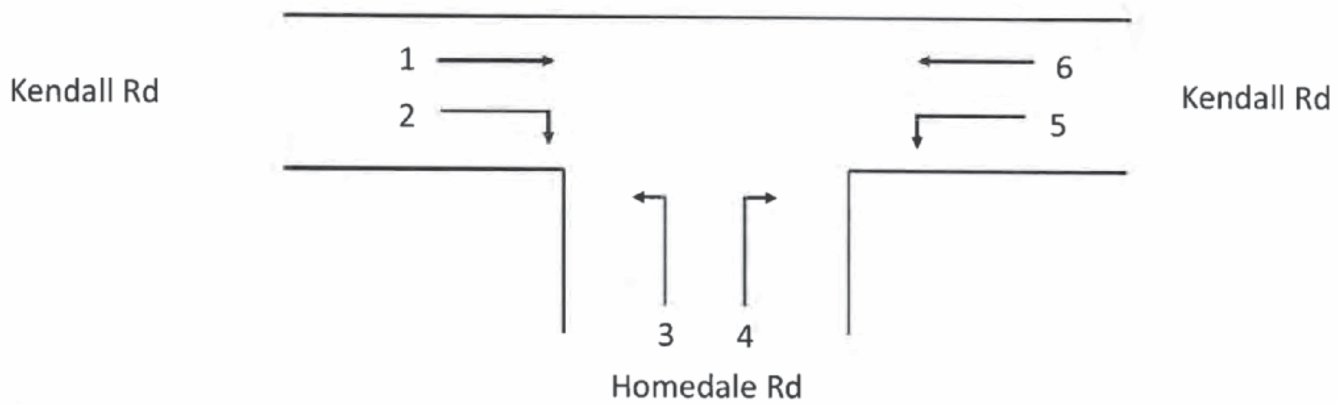

	Movement 1	Movement 2	Movement 3	Movement 4	Movement 5	Movement 6
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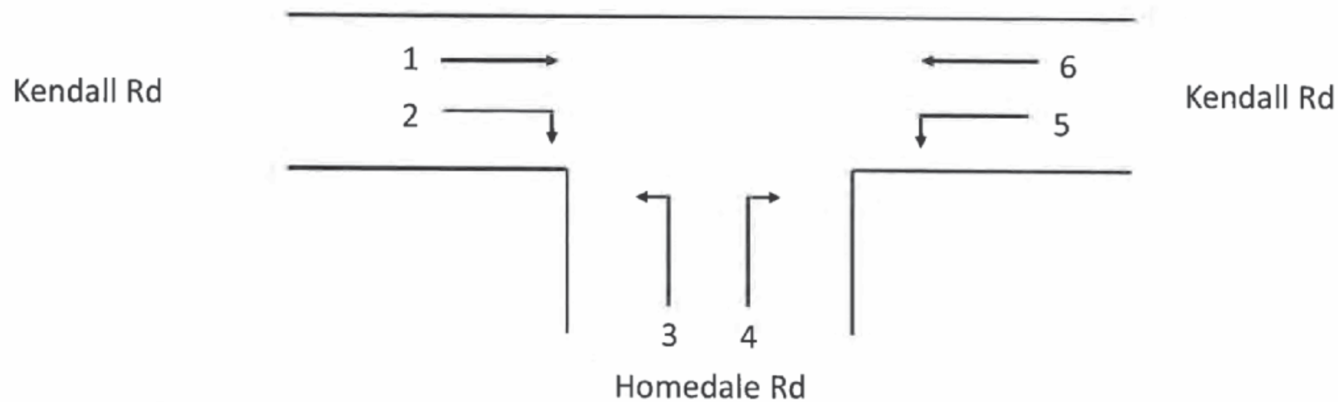
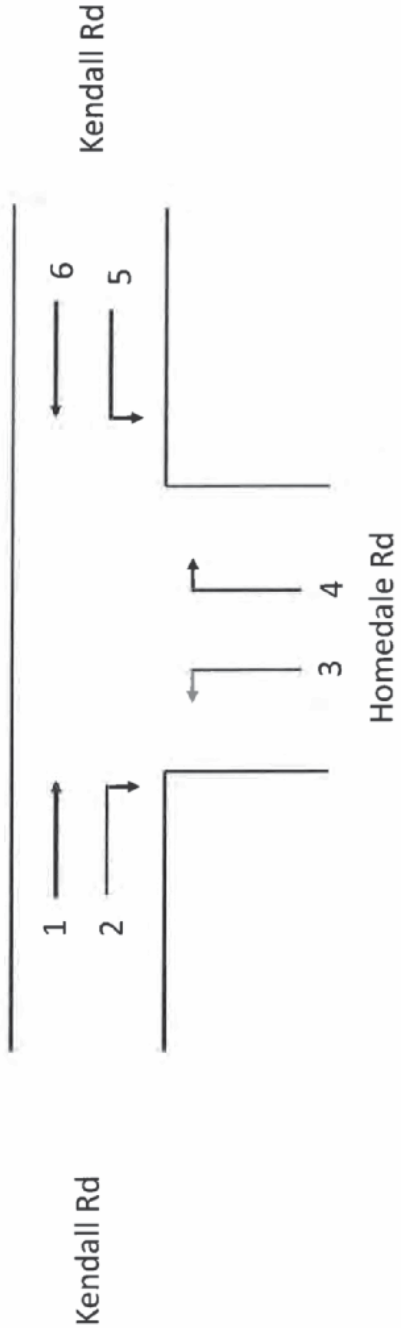
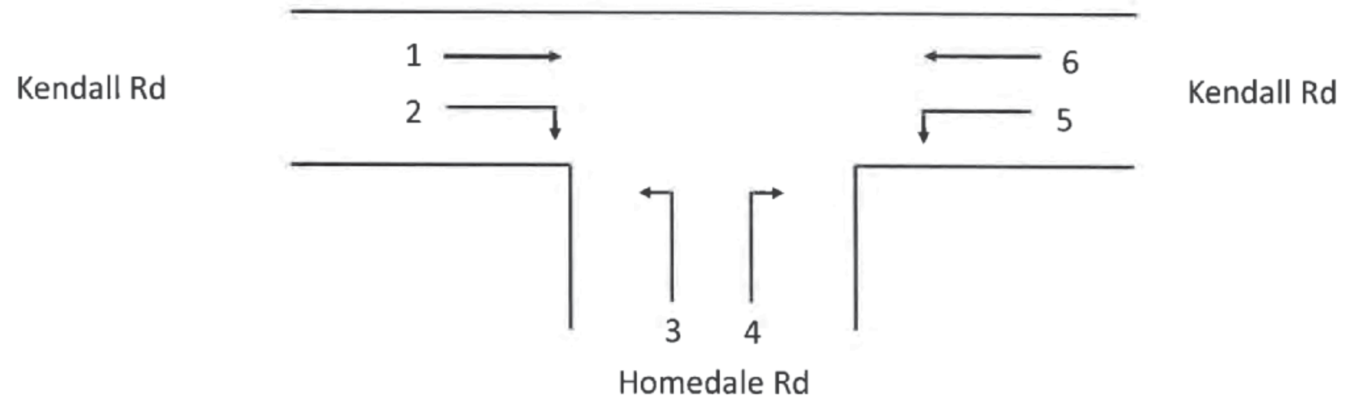


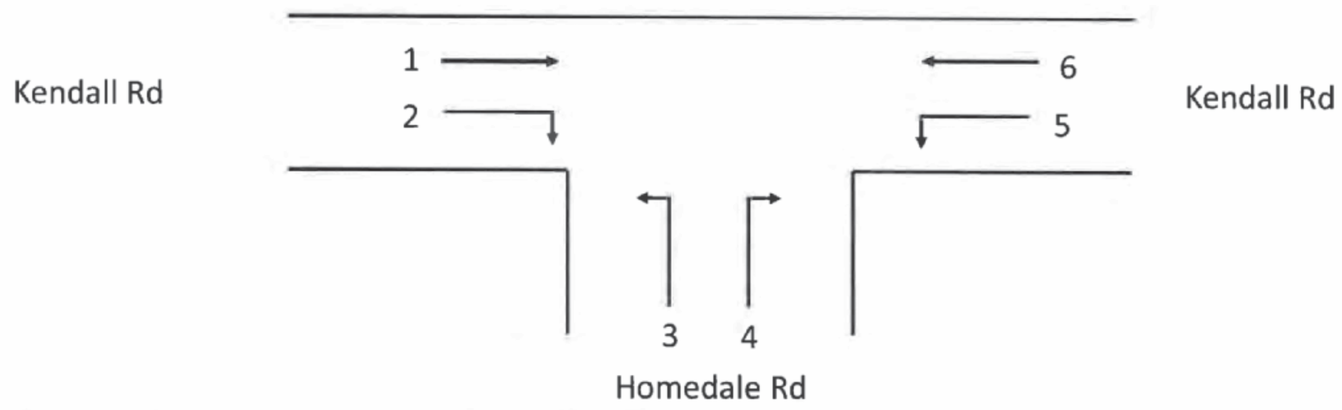
	Movement 1	Movement 2	Movement 3	Movement 4	Movement 5	Movement 6
8:45am – 9:00am	卌 卌 卌 卌 卌 卌 卌 卌 卌 卌 卌 卌 卌 卌			卌	||||	卌 卌 卌 卌 卌 卌 卌 卌 |||



	Movement 1	Movement 2	Movement 3	Movement 4	Movement 5	Movement 6
3:00pm – 3:15pm	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸	𝍸	𝍸	𝍸	𝍸	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸



	Movement 1	Movement 2	Movement 3	Movement 4	Movement 5	Movement 6
3:15pm – 3:30pm	41	1		4	7	37



	Movement 1	Movement 2	Movement 3	Movement 4	Movement 5	Movement 6
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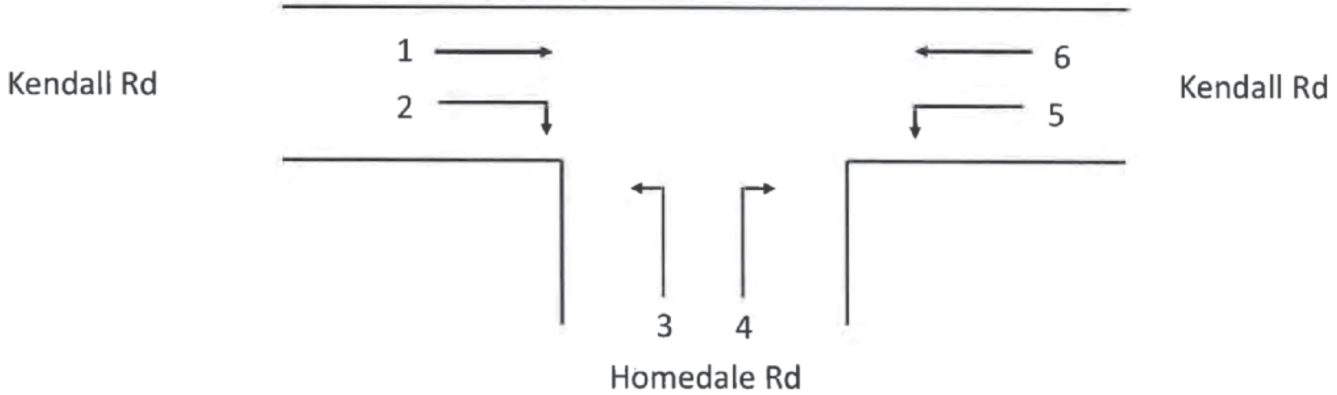
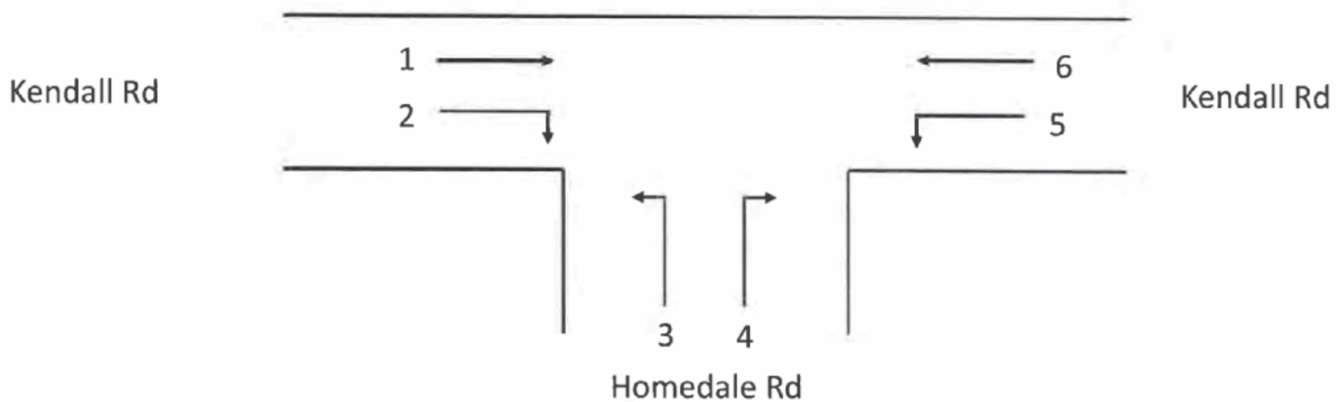
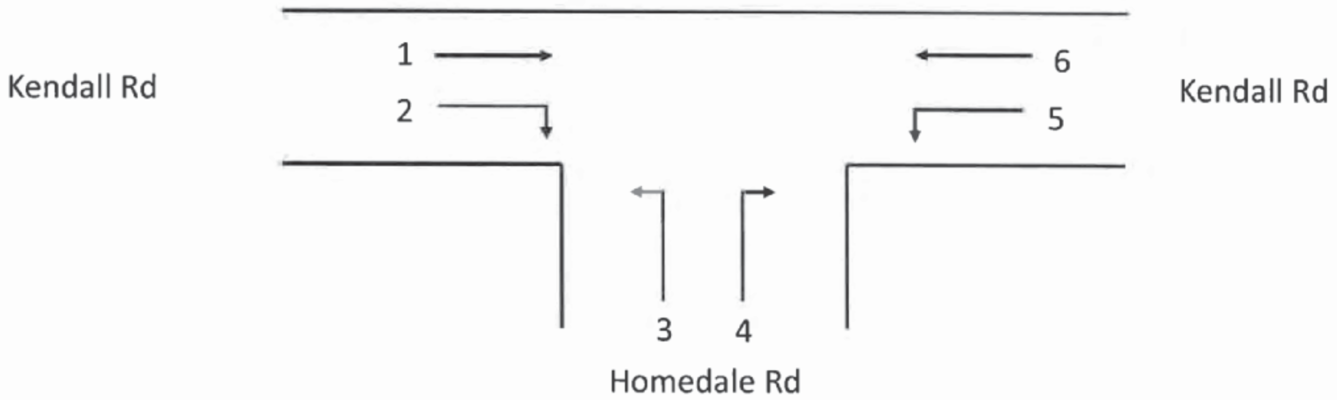


	Movement 1	Movement 2	Movement 3	Movement 4	Movement 5	Movement 6
3:45pm – 4:00pm	卌 卌 卌 卌 卌		||	卌	卌 ||	卌 卌 卌 卌 卌 卌 卌 卌 卌 ||||



	Movement 1	Movement 2	Movement 3	Movement 4	Movement 5	Movement 6
4:00pm – 4:15pm	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 |||	|	|	𝍸 ||	𝍸	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 ||



	Movement 1	Movement 2	Movement 3	Movement 4	Movement 5	Movement 6
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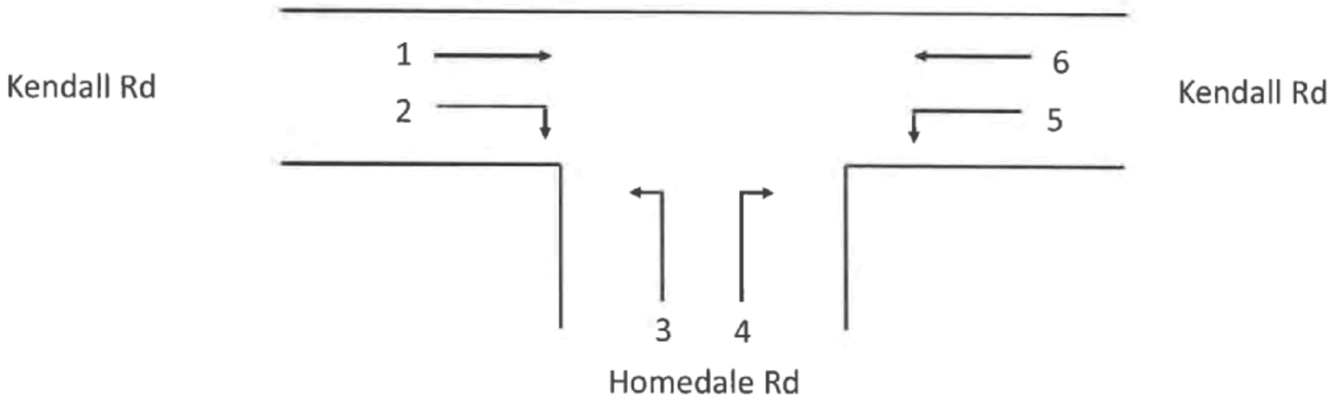
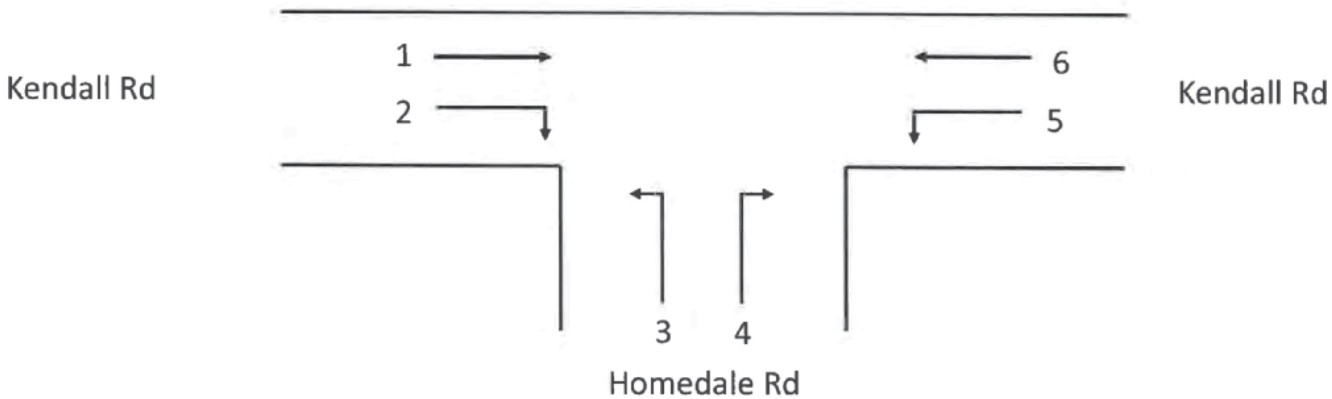
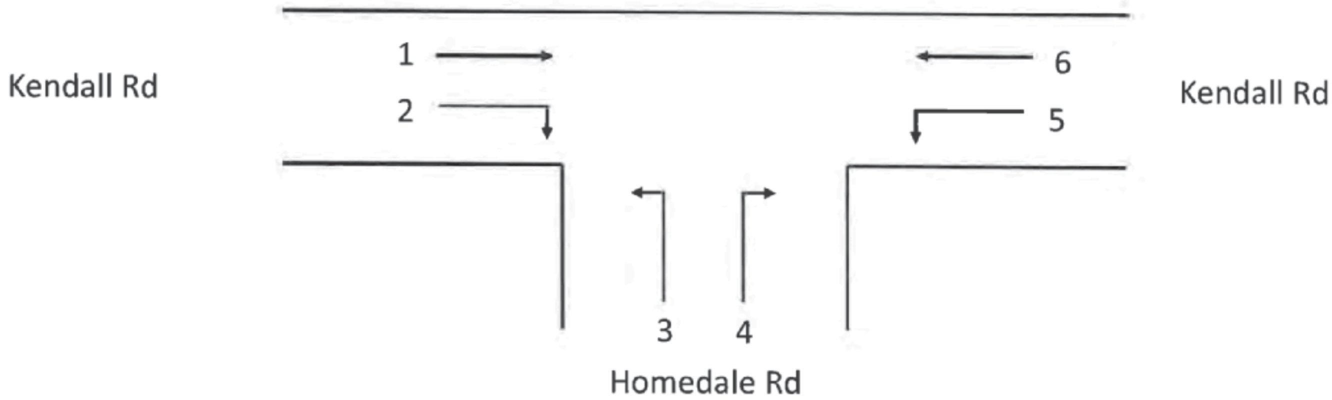


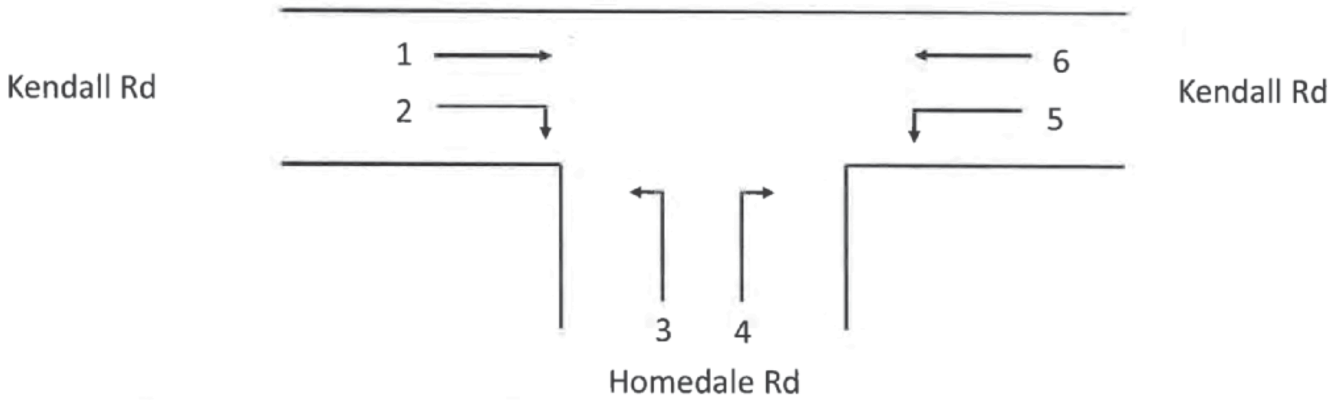
	Movement 1	Movement 2	Movement 3	Movement 4	Movement 5	Movement 6
4:30pm – 4:45pm	𝍸 𝍸 𝍸 𝍸 𝍸 |	|	|	|	|	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 |



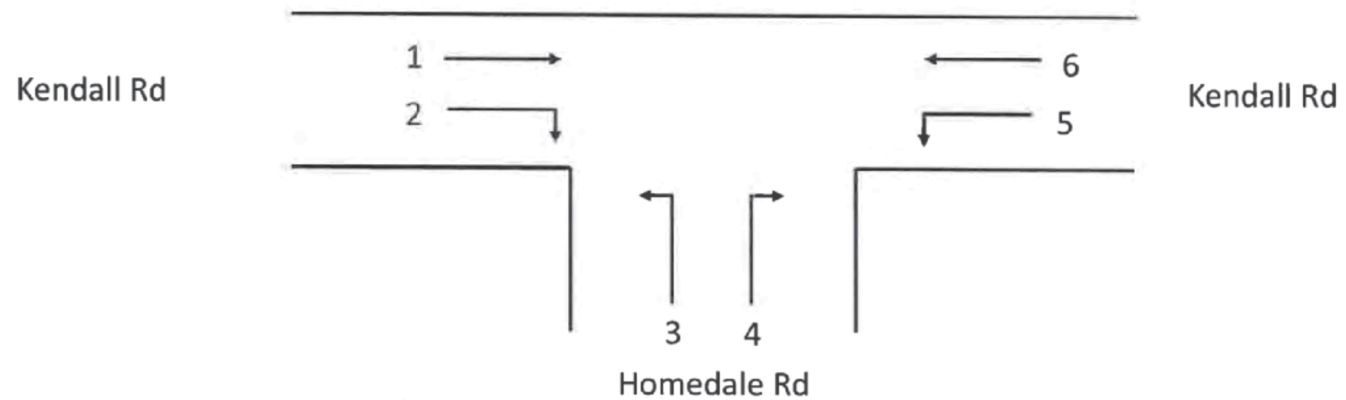
	Movement 1	Movement 2	Movement 3	Movement 4	Movement 5	Movement 6
4:45pm – 5:00pm	𝍸 𝍸 𝍸 𝍸 ||			|	||||	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 |||



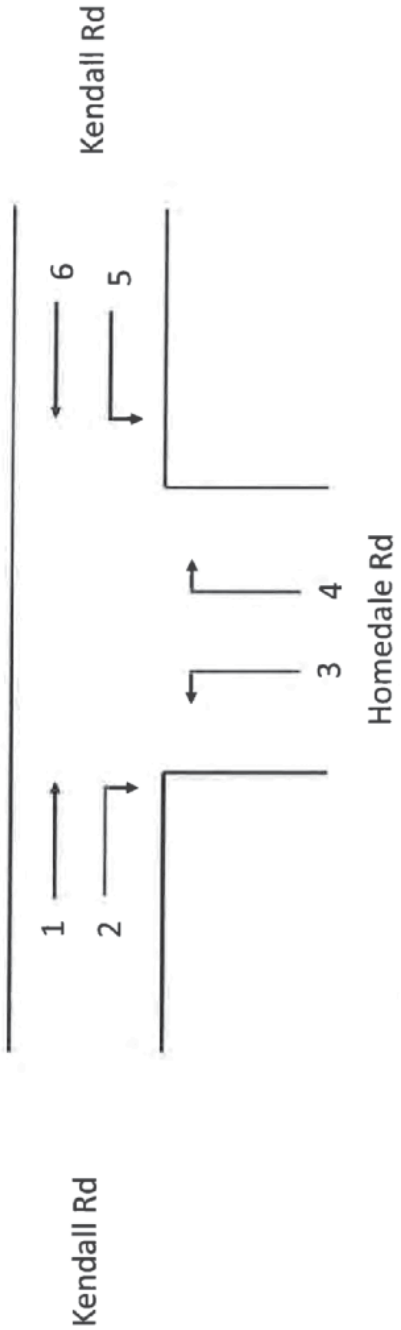
	Movement 1	Movement 2	Movement 3	Movement 4	Movement 5	Movement 6
5:00pm – 5:15pm	𝍸 𝍸 𝍸 𝍸 𝍸 𝍷		𝍷	𝍷𝍷𝍷𝍷	𝍷𝍷𝍷	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍷𝍷



	Movement 1	**Movement 2**	**Movement 3**	**Movement 4**	**Movement 5**	**Movement 6**
5:15pm – 5:30pm	卌 卌 卌 ||		|	|	|||	卌 卌 卌 卌 卌 卌 卌 卌 卌 卌 |



	Movement 1	Movement 2	Movement 3	Movement 4	Movement 5	Movement 6
5:30pm – 5:45pm	𝍸 𝍸 𝍸 ||||	||		||	𝍸 ||	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 |||



	Movement 1	Movement 2	Movement 3	Movement 4	Movement 5	Movement 6
5:45pm – 6:00pm	𝍸 𝍸 𝍸

9. Appendix B – SIDRA Outputs

LANE LEVEL OF SERVICE

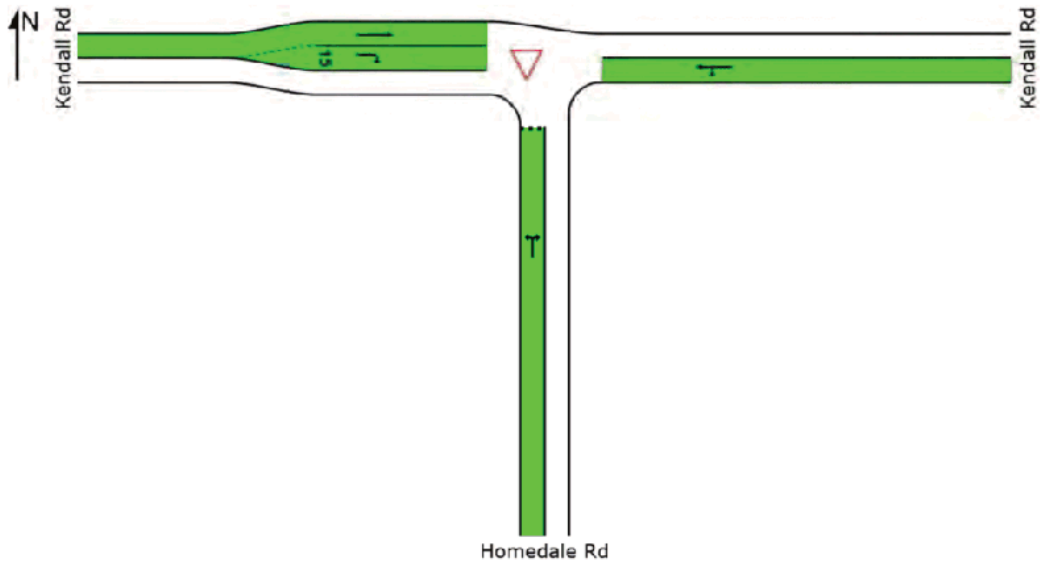
Lane Level of Service

Site: 101 [Kendall_Homedale_PM_Fut + 10yrs]

New Site
Giveway / Yield (Two-Way)
Design Life Analysis (Practical Capacity): Results for 10 years

All Movement Classes

	South	East	West	Intersection
LOS	A	NA	NA	NA



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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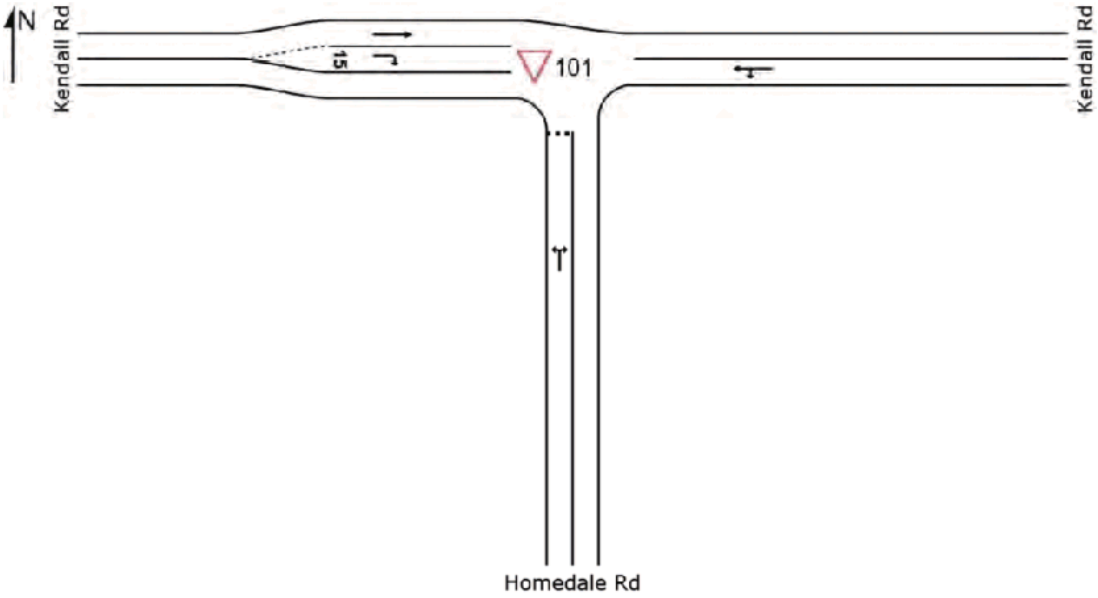
SITE LAYOUT

Site: 101 [Kendall_Homedale_PM_Fut + 10yrs]

New Site
Giveway / Yield (Two-Way)



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INTERSECTION SUMMARY

Site: 101 [Kendall_Homedale_PM_Fut + 10yrs]

New Site
Giveway / Yield (Two-Way)
Design Life Analysis (Practical Capacity): Results for 10 years

Intersection Performance - Hourly Values				
Performance Measure	Vehicles		Persons	
Travel Speed (Average)	58.2	km/h	58.2	km/h
Travel Distance (Total)	604.9	veh-km/h	725.9	pers-km/h
Travel Time (Total)	10.4	veh-h/h	12.5	pers-h/h
Demand Flows (Total)	598	veh/h	718	pers/h
Percent Heavy Vehicles (Demand)	2.0	%		
Degree of Saturation	0.167			
Practical Spare Capacity	485.7	%		
Effective Intersection Capacity	3577	veh/h		
Control Delay (Total)	0.24	veh-h/h	0.29	pers-h/h
Control Delay (Average)	1.5	sec	1.5	sec
Control Delay (Worst Lane)	8.3	sec		
Control Delay (Worst Movement)	9.1	sec	9.1	sec
Geometric Delay (Average)	1.2	sec		
Stop-Line Delay (Average)	0.3	sec		
Idling Time (Average)	0.1	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.2	veh		
95% Back of Queue - Distance (Worst Lane)	1.7	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	81	veh/h	98	pers/h
Effective Stop Rate	0.14	per veh	0.14	per pers
Proportion Queued	0.04		0.04	
Performance Index	11.2		11.2	
Cost (Total)	233.13	$/h	233.13	$/h
Fuel Consumption (Total)	40.7	L/h		
Carbon Dioxide (Total)	96.2	kg/h		
Hydrocarbons (Total)	0.007	kg/h		
Carbon Monoxide (Total)	0.118	kg/h		
NOx (Total)	0.089	kg/h		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection 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.

Intersection Performance - Annual Values				
Performance Measure	Vehicles		Persons	
Demand Flows (Total)	287,230	veh/y	344,676	pers/y
Delay	116	veh-h/y	140	pers-h/y
Effective Stops	39,031	veh/y	46,838	pers/y
Travel Distance	290,350	veh-km/y	348,420	pers-km/y
Travel Time	4,992	veh-h/y	5,990	pers-h/y
Cost	111,903	$/y	111,903	$/y
Fuel Consumption	19,522	L/y		
Carbon Dioxide	46,171	kg/y		
Hydrocarbons	3	kg/y		
Carbon Monoxide	56	kg/y		
NOx	43	kg/y		

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MOVEMENT SUMMARY

Site: 101 [Kendall_Homedale_PM_Fut + 10yrs]

New Site
Giveway / Yield (Two-Way)
Design Life Analysis (Practical Capacity): Results for 10 years

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Homedale Rd											
1	L2	14	2.0	0.065	6.4	LOS A	0.2	1.7	0.46	0.68	51.4
3	R2	34	2.0	0.065	9.1	LOS A	0.2	1.7	0.46	0.68	50.9
Approach		48	2.0	0.065	8.3	LOS A	0.2	1.7	0.46	0.68	51.1
East: Kendall Rd											
4	L2	74	2.0	0.167	5.6	LOS A	0.0	0.0	0.00	0.14	57.1
5	T1	245	2.0	0.167	0.0	LOS A	0.0	0.0	0.00	0.14	58.7
Approach		318	2.0	0.167	1.3	NA	0.0	0.0	0.00	0.14	58.3
West: Kendall Rd											
11	T1	224	2.0	0.116	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
12	R2	8	2.0	0.006	6.5	LOS A	0.0	0.2	0.39	0.57	52.0
Approach		232	2.0	0.116	0.2	NA	0.0	0.2	0.01	0.02	59.6
All Vehicles		598	2.0	0.167	1.5	NA	0.2	1.7	0.04	0.14	58.2

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.

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LANE LEVEL OF SERVICE

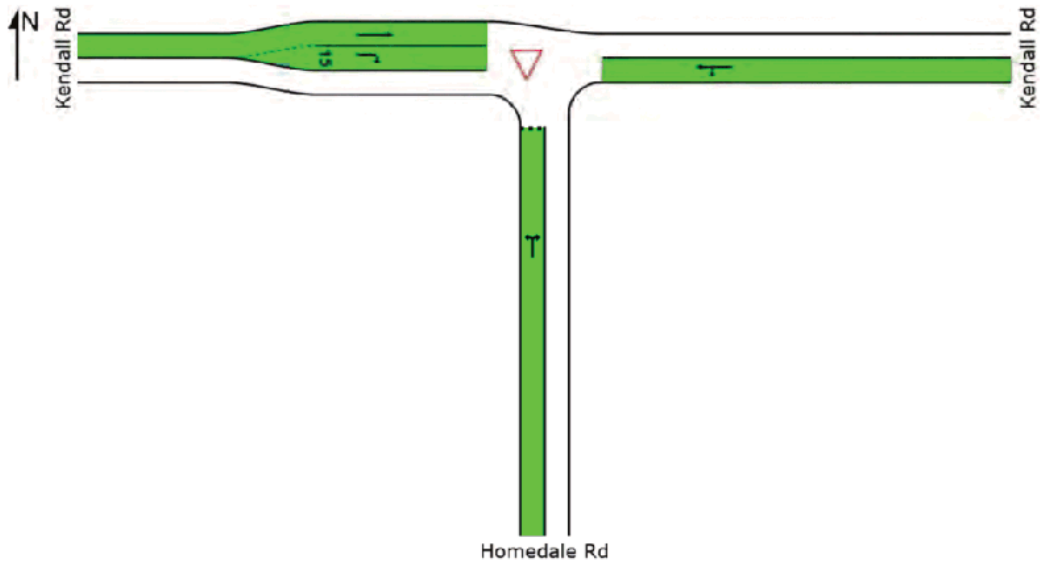
Lane Level of Service

Site: 101 [Kendall_Homedale_PM_Fut]

New Site
Giveway / Yield (Two-Way)
Design Life Analysis (Practical Capacity): Results for 10 years

All Movement Classes

	South	East	West	Intersection
LOS	A	NA	NA	NA



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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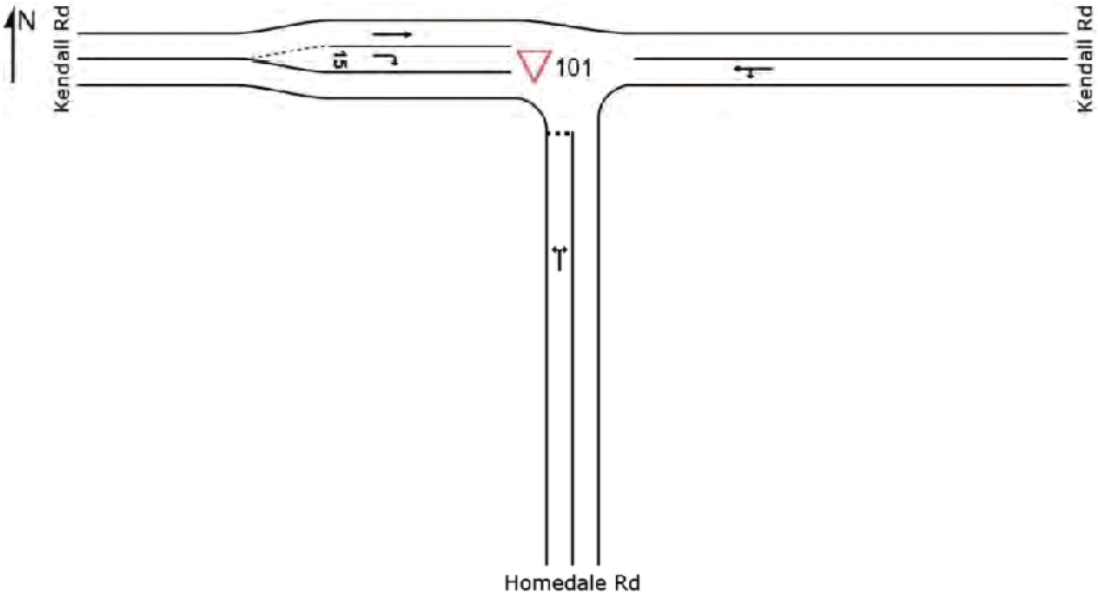
SITE LAYOUT

Site: 101 [Kendall_Homedale_PM_Fut]

New Site
Giveway / Yield (Two-Way)



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MOVEMENT SUMMARY

Site: 101 [Kendall_Homedale_PM_Fut]

New Site
Giveway / Yield (Two-Way)
Design Life Analysis (Practical Capacity): Results for 10 years

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Homedale Rd											
1	L2	13	2.0	0.055	6.3	LOS A	0.2	1.5	0.44	0.66	51.7
3	R2	31	2.0	0.055	8.6	LOS A	0.2	1.5	0.44	0.66	51.2
Approach		44	2.0	0.055	7.9	LOS A	0.2	1.5	0.44	0.66	51.4
East: Kendall Rd											
4	L2	67	2.0	0.152	5.6	LOS A	0.0	0.0	0.00	0.14	57.1
5	T1	222	2.0	0.152	0.0	LOS A	0.0	0.0	0.00	0.14	58.7
Approach		289	2.0	0.152	1.3	NA	0.0	0.0	0.00	0.14	58.3
West: Kendall Rd											
11	T1	203	2.0	0.105	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
12	R2	8	2.0	0.006	6.4	LOS A	0.0	0.2	0.37	0.56	52.0
Approach		210	2.0	0.105	0.2	NA	0.0	0.2	0.01	0.02	59.6
All Vehicles		543	2.0	0.152	1.4	NA	0.2	1.5	0.04	0.13	58.2

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.

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INTERSECTION SUMMARY

Site: 101 [Kendall_Homedale_PM_Fut]

New Site
Giveway / Yield (Two-Way)
Design Life Analysis (Practical Capacity): Results for 10 years

Intersection Performance - Hourly Values				
Performance Measure	Vehicles		Persons	
Travel Speed (Average)	58.2	km/h	58.2	km/h
Travel Distance (Total)	548.7	veh-km/h	658.4	pers-km/h
Travel Time (Total)	9.4	veh-h/h	11.3	pers-h/h
Demand Flows (Total)	543	veh/h	651	pers/h
Percent Heavy Vehicles (Demand)	2.0	%		
Degree of Saturation	0.152			
Practical Spare Capacity	545.8	%		
Effective Intersection Capacity	3577	veh/h		
Control Delay (Total)	0.21	veh-h/h	0.26	pers-h/h
Control Delay (Average)	1.4	sec	1.4	sec
Control Delay (Worst Lane)	7.9	sec		
Control Delay (Worst Movement)	8.6	sec	8.6	sec
Geometric Delay (Average)	1.2	sec		
Stop-Line Delay (Average)	0.2	sec		
Idling Time (Average)	0.1	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.2	veh		
95% Back of Queue - Distance (Worst Lane)	1.5	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	73	veh/h	87	pers/h
Effective Stop Rate	0.13	per veh	0.13	per pers
Proportion Queued	0.04		0.04	
Performance Index	10.1		10.1	
Cost (Total)	211.28	$/h	211.28	$/h
Fuel Consumption (Total)	36.9	L/h		
Carbon Dioxide (Total)	87.2	kg/h		
Hydrocarbons (Total)	0.007	kg/h		
Carbon Monoxide (Total)	0.107	kg/h		
NOx (Total)	0.081	kg/h		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection 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.

Intersection Performance - Annual Values				
Performance Measure	Vehicles		Persons	
Demand Flows (Total)	260,531	veh/y	312,637	pers/y
Delay	103	veh-h/y	124	pers-h/y
Effective Stops	34,909	veh/y	41,891	pers/y
Travel Distance	263,361	veh-km/y	316,033	pers-km/y
Travel Time	4,525	veh-h/y	5,430	pers-h/y
Cost	101,416	$/y	101,416	$/y
Fuel Consumption	17,703	L/y		
Carbon Dioxide	41,869	kg/y		
Hydrocarbons	3	kg/y		
Carbon Monoxide	51	kg/y		
NOx	39	kg/y		

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LANE LEVEL OF SERVICE

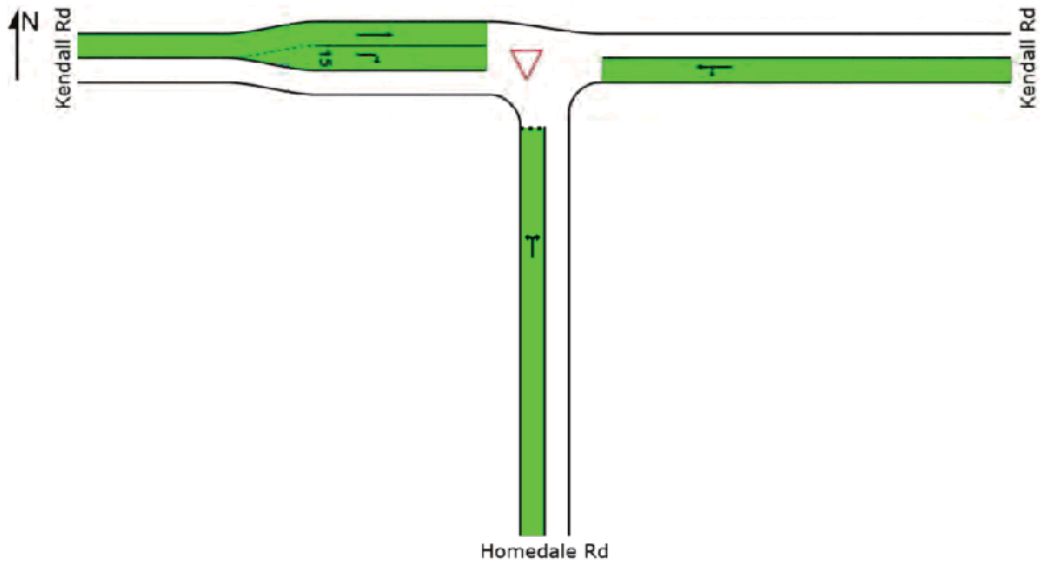
Lane Level of Service

Site: 101 [Kendall_Homedale_PM_Ex]

New Site
Giveway / Yield (Two-Way)
Design Life Analysis (Practical Capacity): Results for 10 years

All Movement Classes

	South	East	West	Intersection
LOS	A	NA	NA	NA



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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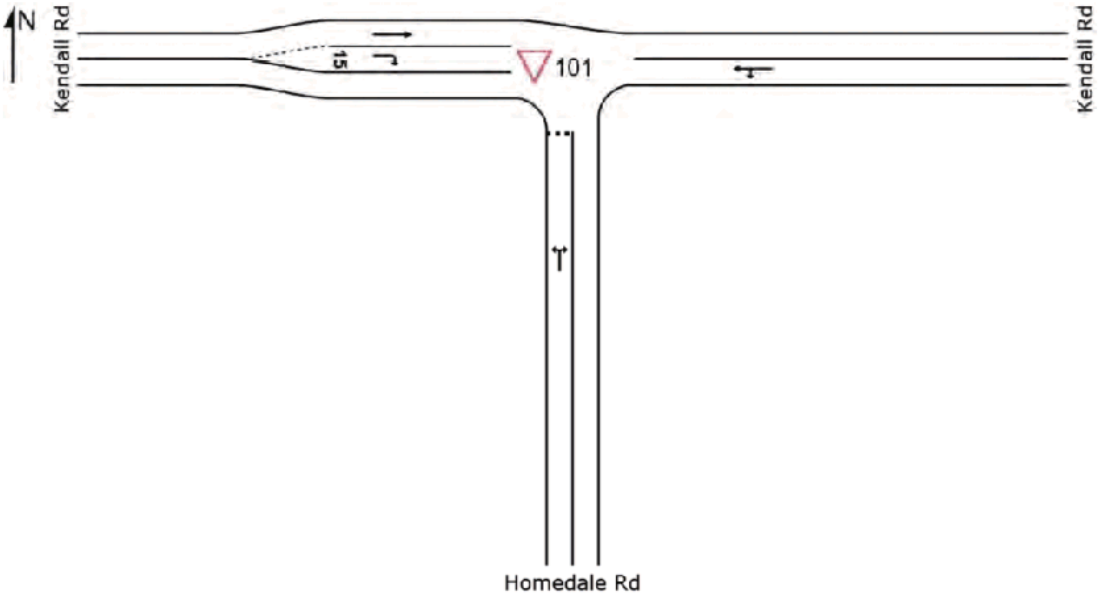
SITE LAYOUT

Site: 101 [Kendall_Homedale_PM_Ex]

New Site
Giveway / Yield (Two-Way)



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MOVEMENT SUMMARY

Site: 101 [Kendall_Homedale_PM_Ex]

New Site
Giveway / Yield (Two-Way)
Design Life Analysis (Practical Capacity): Results for 10 years

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Homedale Rd											
1	L2	10	2.0	0.041	6.3	LOS A	0.2	1.1	0.42	0.64	51.9
3	R2	23	2.0	0.041	8.4	LOS A	0.2	1.1	0.42	0.64	51.4
Approach		33	2.0	0.041	7.7	LOS A	0.2	1.1	0.42	0.64	51.5
East: Kendall Rd											
4	L2	30	2.0	0.131	5.6	LOS A	0.0	0.0	0.00	0.07	57.6
5	T1	222	2.0	0.131	0.0	LOS A	0.0	0.0	0.00	0.07	59.3
Approach		251	2.0	0.131	0.7	NA	0.0	0.0	0.00	0.07	59.1
West: Kendall Rd											
11	T1	203	2.0	0.105	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
12	R2	4	2.0	0.003	6.2	LOS A	0.0	0.1	0.34	0.54	52.1
Approach		207	2.0	0.105	0.1	NA	0.0	0.1	0.01	0.01	59.8
All Vehicles		491	2.0	0.131	0.9	NA	0.2	1.1	0.03	0.08	58.8

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.

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INTERSECTION SUMMARY

Site: 101 [Kendall_Homedale_PM_Ex]

New Site
Giveway / Yield (Two-Way)
Design Life Analysis (Practical Capacity): Results for 10 years

Intersection Performance - Hourly Values				
Performance Measure	Vehicles		Persons	
Travel Speed (Average)	58.8	km/h	58.8	km/h
Travel Distance (Total)	496.6	veh-km/h	595.9	pers-km/h
Travel Time (Total)	8.4	veh-h/h	10.1	pers-h/h
Demand Flows (Total)	491	veh/h	590	pers/h
Percent Heavy Vehicles (Demand)	2.0	%		
Degree of Saturation	0.131			
Practical Spare Capacity	645.6	%		
Effective Intersection Capacity	3739	veh/h		
Control Delay (Total)	0.13	veh-h/h	0.15	pers-h/h
Control Delay (Average)	0.9	sec	0.9	sec
Control Delay (Worst Lane)	7.7	sec		
Control Delay (Worst Movement)	8.4	sec	8.4	sec
Geometric Delay (Average)	0.8	sec		
Stop-Line Delay (Average)	0.2	sec		
Idling Time (Average)	0.0	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.2	veh		
95% Back of Queue - Distance (Worst Lane)	1.1	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	41	veh/h	49	pers/h
Effective Stop Rate	0.08	per veh	0.08	per pers
Proportion Queued	0.03		0.03	
Performance Index	8.9		8.9	
Cost (Total)	184.06	$/h	184.06	$/h
Fuel Consumption (Total)	32.3	L/h		
Carbon Dioxide (Total)	76.3	kg/h		
Hydrocarbons (Total)	0.006	kg/h		
Carbon Monoxide (Total)	0.094	kg/h		
NOx (Total)	0.068	kg/h		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection 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.

Intersection Performance - Annual Values				
Performance Measure	Vehicles		Persons	
Demand Flows (Total)	235,895	veh/y	283,074	pers/y
Delay	60	veh-h/y	72	pers-h/y
Effective Stops	19,723	veh/y	23,668	pers/y
Travel Distance	238,367	veh-km/y	286,041	pers-km/y
Travel Time	4,052	veh-h/y	4,863	pers-h/y
Cost	88,348	$/y	88,348	$/y
Fuel Consumption	15,489	L/y		
Carbon Dioxide	36,638	kg/y		
Hydrocarbons	3	kg/y		
Carbon Monoxide	45	kg/y		
NOx	33	kg/y		

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MOVEMENT SUMMARY

Site: 101 [Kendall_Homedale_AM_Fut]

New Site
Giveway / Yield (Two-Way)
Design Life Analysis (Practical Capacity): Results for 10 years

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Homedale Rd											
1	L2	8	2.0	0.112	6.1	LOS A	0.4	3.0	0.50	0.74	50.9
3	R2	67	2.0	0.112	9.4	LOS A	0.4	3.0	0.50	0.74	50.4
Approach		74	2.0	0.112	9.0	LOS A	0.4	3.0	0.50	0.74	50.5
East: Kendall Rd											
4	L2	33	2.0	0.111	5.6	LOS A	0.0	0.0	0.00	0.09	57.4
5	T1	178	2.0	0.111	0.0	LOS A	0.0	0.0	0.00	0.09	59.1
Approach		212	2.0	0.111	0.9	NA	0.0	0.0	0.00	0.09	58.9
West: Kendall Rd											
11	T1	318	2.0	0.165	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
12	R2	4	2.0	0.003	6.1	LOS A	0.0	0.1	0.31	0.54	52.2
Approach		322	2.0	0.165	0.1	NA	0.0	0.1	0.00	0.01	59.9
All Vehicles		608	2.0	0.165	1.5	NA	0.4	3.0	0.06	0.13	58.2

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.

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MOVEMENT SUMMARY

Site: 101 [Kendall_Homedale_AM_Ex]

New Site
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Homedale Rd											
1	L2	3	2.0	0.033	6.0	LOS A	0.1	0.9	0.42	0.65	51.7
3	R2	22	2.0	0.033	8.2	LOS A	0.1	0.9	0.42	0.65	51.2
Approach		25	2.0	0.033	7.9	LOS A	0.1	0.9	0.42	0.65	51.3
East: Kendall Rd											
4	L2	19	2.0	0.086	5.6	LOS A	0.0	0.0	0.00	0.07	57.7
5	T1	146	2.0	0.086	0.0	LOS A	0.0	0.0	0.00	0.07	59.4
Approach		165	2.0	0.086	0.6	NA	0.0	0.0	0.00	0.07	59.2
West: Kendall Rd											
11	T1	261	2.0	0.136	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
12	R2	2	2.0	0.001	5.9	LOS A	0.0	0.0	0.27	0.53	52.3
Approach		263	2.0	0.136	0.1	NA	0.0	0.0	0.00	0.00	59.9
All Vehicles		454	2.0	0.136	0.7	NA	0.1	0.9	0.02	0.06	59.1

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.

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LANE LEVEL OF SERVICE

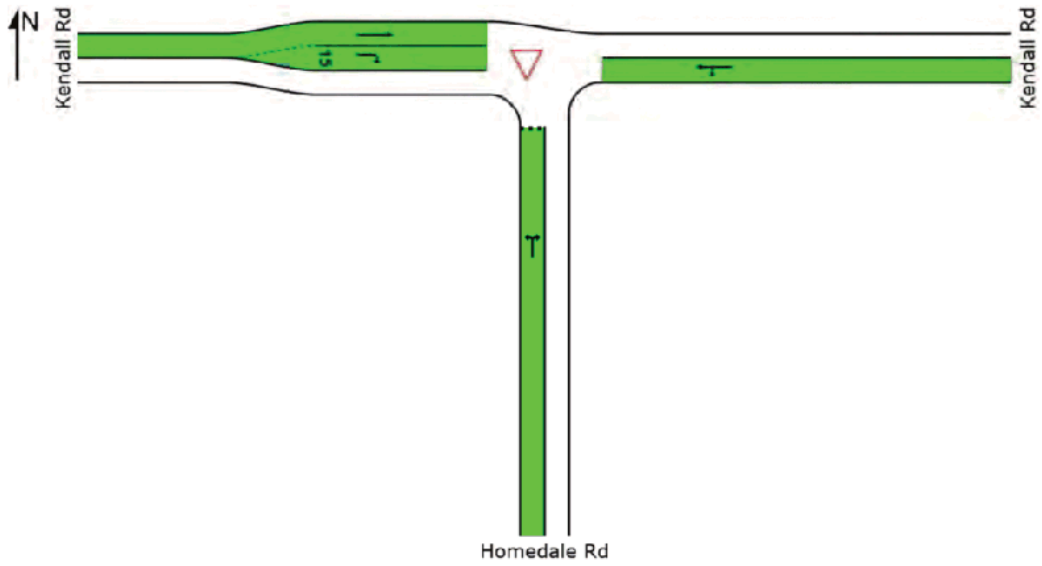
Lane Level of Service

Site: 101 [Kendall_Homedale_AM_Fut + 10yrs]

New Site
Giveway / Yield (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

All Movement Classes

	South	East	West	Intersection
LOS	A	NA	NA	NA



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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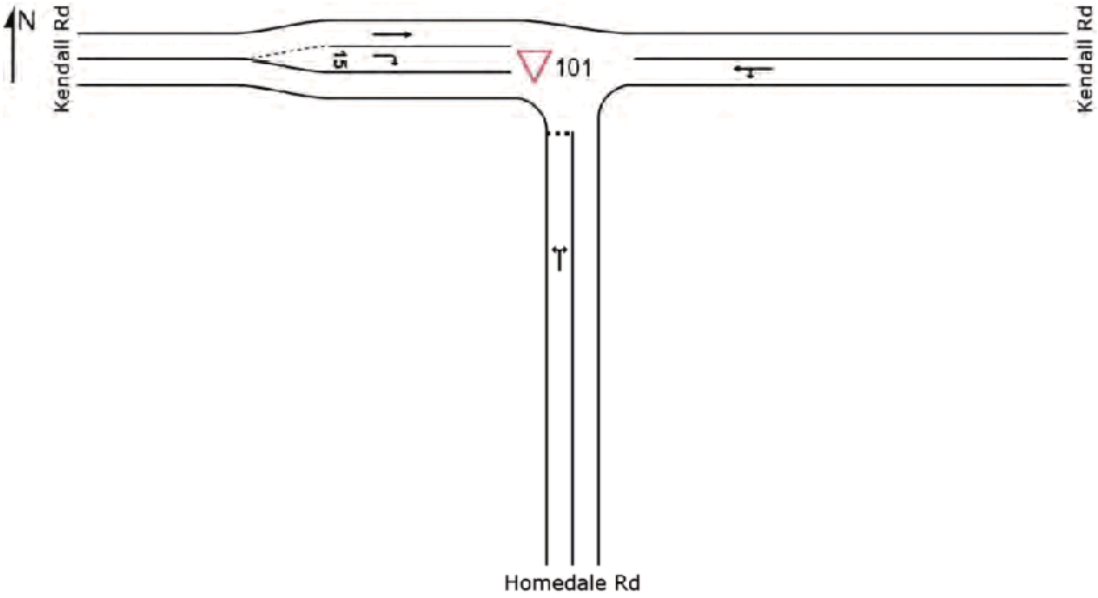
SITE LAYOUT

Site: 101 [Kendall_Homedale_AM_Fut + 10yrs]

New Site
Giveway / Yield (Two-Way)



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MOVEMENT SUMMARY

Site: 101 [Kendall_Homedale_AM_Fut + 10yrs]

New Site
Giveway / Yield (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Homedale Rd											
1	L2	8	2.0	0.133	6.2	LOS A	0.5	3.6	0.53	0.77	50.5
3	R2	74	2.0	0.133	10.0	LOS A	0.5	3.6	0.53	0.77	50.0
Approach		82	2.0	0.133	9.6	LOS A	0.5	3.6	0.53	0.77	50.1
East: Kendall Rd											
4	L2	37	2.0	0.122	5.6	LOS A	0.0	0.0	0.00	0.09	57.4
5	T1	197	2.0	0.122	0.0	LOS A	0.0	0.0	0.00	0.09	59.1
Approach		233	2.0	0.122	0.9	NA	0.0	0.0	0.00	0.09	58.9
West: Kendall Rd											
11	T1	351	2.0	0.182	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
12	R2	4	2.0	0.003	6.2	LOS A	0.0	0.1	0.33	0.54	52.2
Approach		355	2.0	0.182	0.1	NA	0.0	0.1	0.00	0.01	59.9
All Vehicles		671	2.0	0.182	1.5	NA	0.5	3.6	0.07	0.13	58.1

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.

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INTERSECTION SUMMARY

Site: 101 [Kendall_Homedale_AM_Fut + 10yrs]

New Site
Giveway / Yield (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Intersection Performance - Hourly Values				
Performance Measure	Vehicles		Persons	
Travel Speed (Average)	58.1	km/h	58.1	km/h
Travel Distance (Total)	677.5	veh-km/h	813.0	pers-km/h
Travel Time (Total)	11.7	veh-h/h	14.0	pers-h/h
Demand Flows (Total)	671	veh/h	805	pers/h
Percent Heavy Vehicles (Demand)	2.0	%		
Degree of Saturation	0.182			
Practical Spare Capacity	437.7	%		
Effective Intersection Capacity	3679	veh/h		
Control Delay (Total)	0.29	veh-h/h	0.34	pers-h/h
Control Delay (Average)	1.5	sec	1.5	sec
Control Delay (Worst Lane)	9.6	sec		
Control Delay (Worst Movement)	10.0	sec	10.0	sec
Geometric Delay (Average)	1.0	sec		
Stop-Line Delay (Average)	0.5	sec		
Idling Time (Average)	0.3	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.5	veh		
95% Back of Queue - Distance (Worst Lane)	3.6	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	88	veh/h	105	pers/h
Effective Stop Rate	0.13	per veh	0.13	per pers
Proportion Queued	0.07		0.07	
Performance Index	12.9		12.9	
Cost (Total)	259.13	$/h	259.13	$/h
Fuel Consumption (Total)	45.1	L/h		
Carbon Dioxide (Total)	106.6	kg/h		
Hydrocarbons (Total)	0.008	kg/h		
Carbon Monoxide (Total)	0.131	kg/h		
NOx (Total)	0.097	kg/h		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection 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.

Intersection Performance - Annual Values				
Performance Measure	Vehicles		Persons	
Demand Flows (Total)	321,861	veh/y	386,233	pers/y
Delay	137	veh-h/y	165	pers-h/y
Effective Stops	42,027	veh/y	50,432	pers/y
Travel Distance	325,217	veh-km/y	390,261	pers-km/y
Travel Time	5,596	veh-h/y	6,715	pers-h/y
Cost	124,385	$/y	124,385	$/y
Fuel Consumption	21,628	L/y		
Carbon Dioxide	51,155	kg/y		
Hydrocarbons	4	kg/y		
Carbon Monoxide	63	kg/y		
NOx	47	kg/y		

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LANE LEVEL OF SERVICE

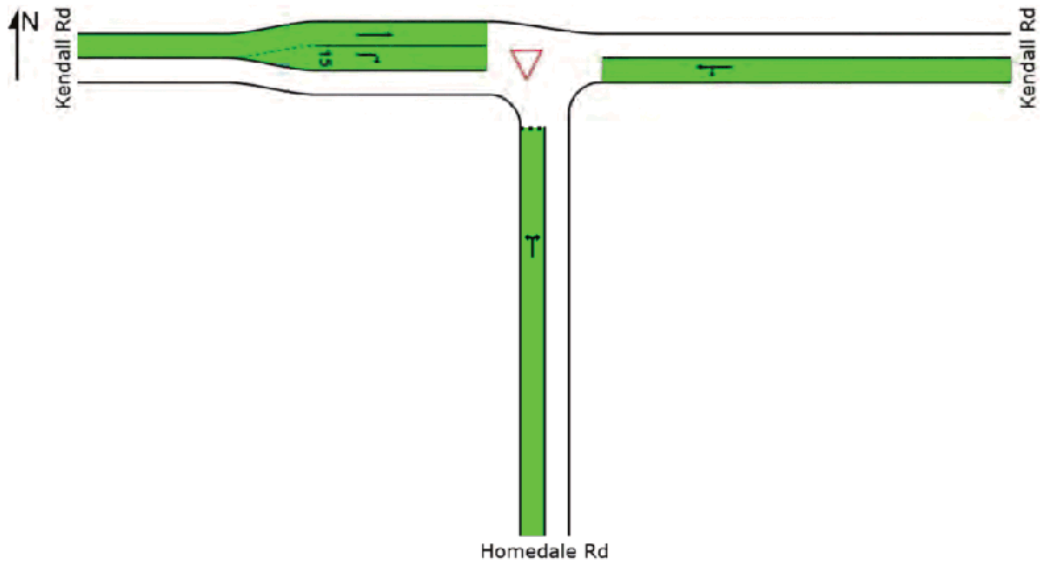
Lane Level of Service

Site: 101 [Kendall_Homedale_AM_Fut]

New Site
Giveway / Yield (Two-Way)
Design Life Analysis (Practical Capacity): Results for 10 years

All Movement Classes

	South	East	West	Intersection
LOS	A	NA	NA	NA



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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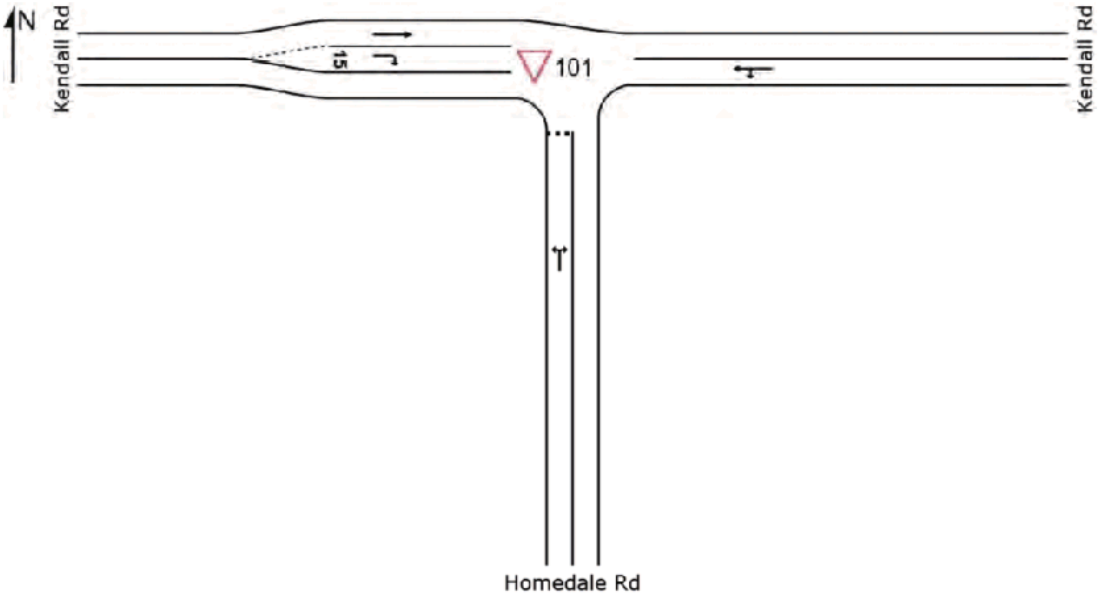
SITE LAYOUT

Site: 101 [Kendall_Homedale_AM_Fut]

New Site
Giveway / Yield (Two-Way)



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INTERSECTION SUMMARY

Site: 101 [Kendall_Homedale_AM_Fut]

New Site
Giveway / Yield (Two-Way)
Design Life Analysis (Practical Capacity): Results for 10 years

Intersection Performance - Hourly Values				
Performance Measure	Vehicles		Persons	
Travel Speed (Average)	58.2	km/h	58.2	km/h
Travel Distance (Total)	614.6	veh-km/h	737.5	pers-km/h
Travel Time (Total)	10.6	veh-h/h	12.7	pers-h/h
Demand Flows (Total)	608	veh/h	730	pers/h
Percent Heavy Vehicles (Demand)	2.0	%		
Degree of Saturation	0.165			
Practical Spare Capacity	492.8	%		
Effective Intersection Capacity	3679	veh/h		
Control Delay (Total)	0.25	veh-h/h	0.30	pers-h/h
Control Delay (Average)	1.5	sec	1.5	sec
Control Delay (Worst Lane)	9.0	sec		
Control Delay (Worst Movement)	9.4	sec	9.4	sec
Geometric Delay (Average)	1.0	sec		
Stop-Line Delay (Average)	0.5	sec		
Idling Time (Average)	0.2	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.4	veh		
95% Back of Queue - Distance (Worst Lane)	3.0	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	77	veh/h	92	pers/h
Effective Stop Rate	0.13	per veh	0.13	per pers
Proportion Queued	0.06		0.06	
Performance Index	11.6		11.6	
Cost (Total)	234.61	$/h	234.61	$/h
Fuel Consumption (Total)	40.9	L/h		
Carbon Dioxide (Total)	96.6	kg/h		
Hydrocarbons (Total)	0.007	kg/h		
Carbon Monoxide (Total)	0.118	kg/h		
NOx (Total)	0.088	kg/h		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection 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.

Intersection Performance - Annual Values				
Performance Measure	Vehicles		Persons	
Demand Flows (Total)	291,943	veh/y	350,331	pers/y
Delay	119	veh-h/y	142	pers-h/y
Effective Stops	36,923	veh/y	44,308	pers/y
Travel Distance	294,987	veh-km/y	353,984	pers-km/y
Travel Time	5,069	veh-h/y	6,083	pers-h/y
Cost	112,612	$/y	112,612	$/y
Fuel Consumption	19,608	L/y		
Carbon Dioxide	46,378	kg/y		
Hydrocarbons	3	kg/y		
Carbon Monoxide	57	kg/y		
NOx	42	kg/y		

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LANE LEVEL OF SERVICE

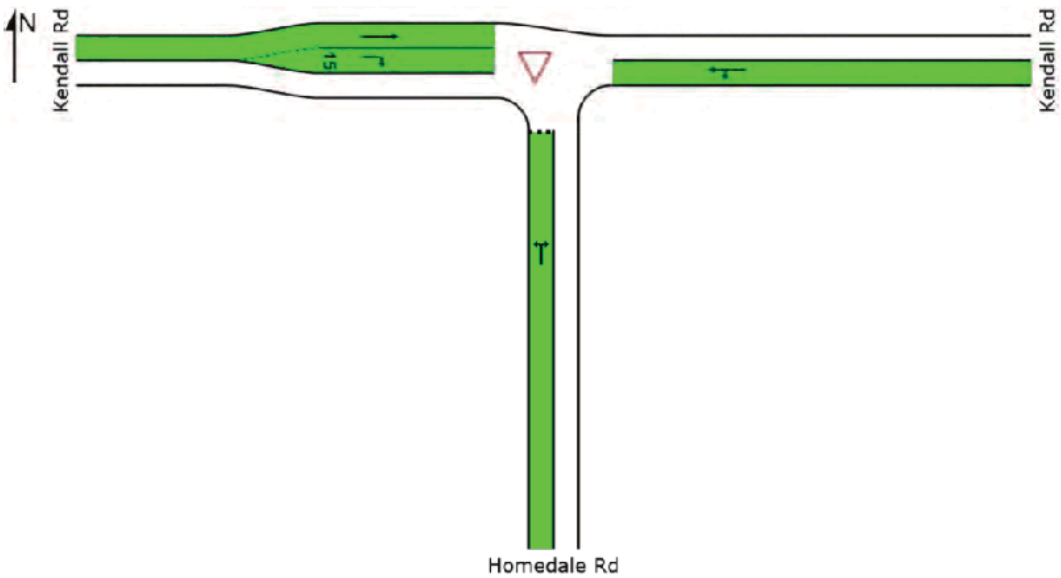
Lane Level of Service

Site: 101 [Kendall_Homedale_AM_Ex]

New Site
Giveway / Yield (Two-Way)

All Movement Classes

	South	East	West	Intersection
LOS	A	NA	NA	NA



Colour code based on Level of Service

LOS A | LOS B | LOS C | LOS D | LOS E | LOS F

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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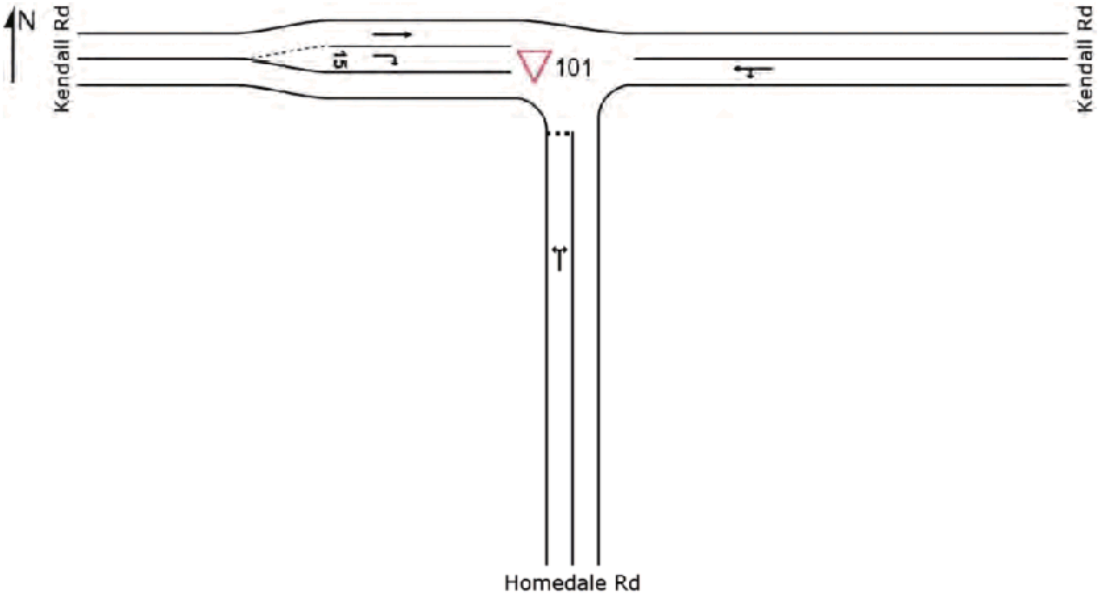
SITE LAYOUT

Site: 101 [Kendall_Homedale_AM_Ex]

New Site
Giveway / Yield (Two-Way)



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INTERSECTION SUMMARY

Site: 101 [Kendall_Homedale_AM_Ex]

New Site
Giveway / Yield (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	Vehicles		Persons	
Travel Speed (Average)	59.1	km/h	59.1	km/h
Travel Distance (Total)	458.4	veh-km/h	550.0	pers-km/h
Travel Time (Total)	7.8	veh-h/h	9.3	pers-h/h
Demand Flows (Total)	454	veh/h	544	pers/h
Percent Heavy Vehicles (Demand)	2.0	%		
Degree of Saturation	0.136			
Practical Spare Capacity	622.6	%		
Effective Intersection Capacity	3345	veh/h		
Control Delay (Total)	0.09	veh-h/h	0.11	pers-h/h
Control Delay (Average)	0.7	sec	0.7	sec
Control Delay (Worst Lane)	7.9	sec		
Control Delay (Worst Movement)	8.2	sec	8.2	sec
Geometric Delay (Average)	0.6	sec		
Stop-Line Delay (Average)	0.1	sec		
Idling Time (Average)	0.0	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.1	veh		
95% Back of Queue - Distance (Worst Lane)	0.9	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	29	veh/h	35	pers/h
Effective Stop Rate	0.06	per veh	0.06	per pers
Proportion Queued	0.02		0.02	
Performance Index	8.1		8.1	
Cost (Total)	167.13	$/h	167.13	$/h
Fuel Consumption (Total)	29.4	L/h		
Carbon Dioxide (Total)	69.4	kg/h		
Hydrocarbons (Total)	0.005	kg/h		
Carbon Monoxide (Total)	0.086	kg/h		
NOx (Total)	0.061	kg/h		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection 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.

Intersection Performance - Annual Values				
Performance Measure	Vehicles		Persons	
Demand Flows (Total)	217,768	veh/y	261,322	pers/y
Delay	43	veh-h/y	52	pers-h/y
Effective Stops	13,804	veh/y	16,565	pers/y
Travel Distance	220,011	veh-km/y	264,013	pers-km/y
Travel Time	3,724	veh-h/y	4,469	pers-h/y
Cost	80,222	$/y	80,222	$/y
Fuel Consumption	14,091	L/y		
Carbon Dioxide	33,334	kg/y		
Hydrocarbons	2	kg/y		
Carbon Monoxide	41	kg/y		
NOx	29	kg/y		

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10. Appendix C - 2016 Tube Counts

AUTOMATIC COUNTER SUMMARY AND DATA SHEET

TRANS TRAFFIC SURVEY

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AUTOMATIC COUNT SUMMARY

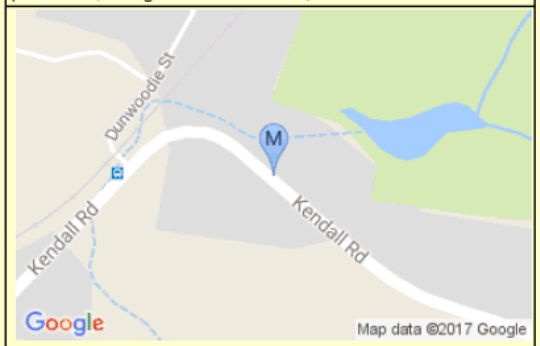
Street Name :	MR538 Kendall Road	**Location :**	East of Dunwoodie St (No 105)
Suburb :	Kew	**Start Date :**	00:00 Thu 11/February/2016
Metrocount ID	DV62T6S7	**Finish Date :**	00:00 Thu 18/February/2016
Site ID Number :	192	**Speed Zone :**	60 km/h
Prepared By :	Vo Son Binh	**Email:**	binh@trafficsurvey.com.au

			Direction of Travel		
GPS information	Lat	31° 37' 41.48 North			
	Long	152° 42' 54.34 East	**Combined**	**Westbound**	**Eastbound**
Traffic Volume :		Weekdays Average	3,951	1,973	1,978
(Vehicles/Day)		7 Day Average	3,668	1,835	1,833
Weekday	**AM**	06:00	370	138	232
Peak hour start	**PM**	12:00	377	202	176
Speeds :		85th Percentile	59.9	59.5	60.3
(Km/Hr)		Average	47.3	47.4	47.2
Classification % :		Light Vehicles up to 5.5m	91.2%	91.4%	91.1%

Location

GPS Information Load Google Map (internet require

(Latitude, Longitude) -31.628188,+ 152.715095



Speed Data | Speed Graph | Speed Bin
Volume Data | Volume Graph | Classification

QUALITY ASSURED COMPANY BY AS/NZS ISO 9001:2008
OH&S SYSTEM CERTIFIED TO AS/NZS ISO 4801:2001
ENVIRONMENT MANAGEMENT SYSTEM CERTIFIED TO AS/NZS ISO14001:2004

AUTOMATIC COUNTER SUMMARY AND DATA SHEET

TRANS TRAFFIC SURVEY
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Site MR538 Kendall Road

Direction Combined

Back to Site Summary Page

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	7 days		Weekday		Weekend	
Date	15/02/2016	16/02/2016	17/02/2016	11/02/2016	12/02/2016	13/02/2016	14/02/2016	Total	Average	Total	Average	Total	Average
AM Peak	09:00	10:00	10:00	06:00	07:00	09:00	11:00	N/A	09:00	N/A	06:00	N/A	09:00
PM Peak	15:00	16:00	12:00	16:00	16:00	19:00	17:00	N/A	16:00	N/A	12:00	N/A	16:00
00:00	8	6	4	5	3	15	8	49	7	26	5	23	12
01:00	2	5	4	3	2	7	4	27	4	16	3	11	6
02:00	1	0	3	4	2	4	4	18	3	10	2	8	4
03:00	5	6	1	4	10	6	7	39	6	26	5	13	7
04:00	20	18	27	28	25	8	6	132	19	118	24	14	7
05:00	62	64	69	63	71	21	11	361	52	329	66	32	16
06:00	175	147	171	183	159	62	35	932	133	835	167	97	49
07:00	209	252	231	202	215	131	74	1314	188	1109	222	205	103
08:00	353	379	360	376	380	200	191	2239	320	1848	370	391	196
09:00	296	343	243	274	299	254	245	1954	279	1455	291	499	250
10:00	240	300	220	293	258	266	285	1862	266	1311	262	551	276
11:00	249	242	279	273	301	334	263	1941	277	1344	269	597	299
12:00	249	230	246	270	265	289	271	1820	260	1260	252	560	280
13:00	251	250	250	252	238	249	225	1715	245	1241	248	474	237
14:00	305	289	290	269	280	219	239	1891	270	1433	287	458	229
15:00	387	359	373	379	389	195	222	2304	329	1887	377	417	209
16:00	305	290	317	330	305	219	227	1993	285	1547	309	446	223
17:00	288	289	317	298	292	172	186	1842	263	1484	297	358	179
18:00	197	204	213	221	196	137	137	1305	186	1031	206	274	137
19:00	135	96	85	137	104	87	119	763	109	557	111	206	103
20:00	60	63	95	80	100	84	74	556	79	398	80	158	79
21:00	36	73	52	50	73	45	27	356	51	284	57	72	36
22:00	13	23	26	24	44	38	17	185	26	130	26	55	28
23:00	7	13	13	11	25	22	7	98	14	69	14	29	15
Total	3853	3941	3889	4029	4036	3064	2884	25696	3671	19748	3950	5948	2980
% Heavy	10.33%	10.18%	9.98%	8.79%	8.52%	6.49%	5.89%	8.77%		9.55%		6.20%	

AUTOMATIC COUNTER SUMMARY AND DATA SHEET

TRANS TRAFFIC SURVEY

Site MR538 Kendall Road

Direction Combined

Day 7 Days

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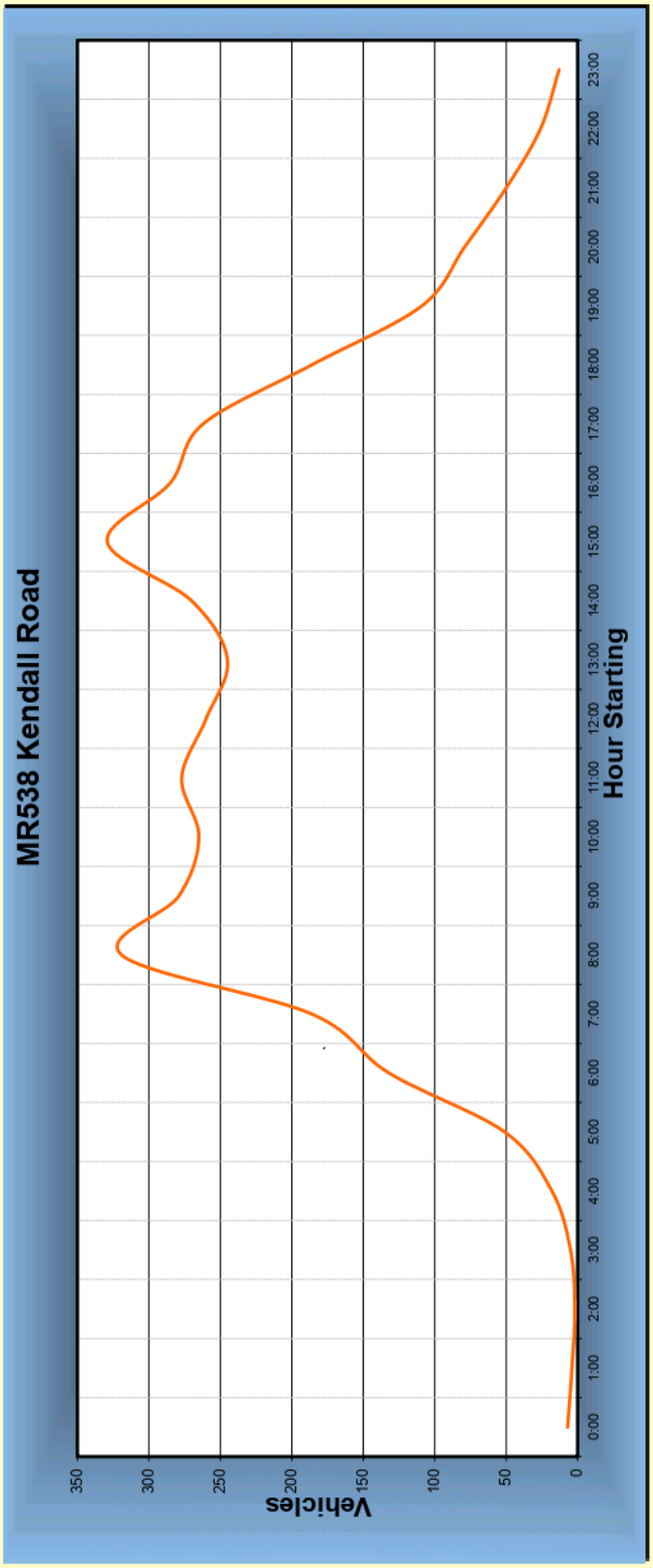

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AUTOMATIC COUNTER SUMMARY AND DATA SHEET

TRANS TRAFFIC SURVEY
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Site MR538 Kendall Road

Direction Combined

Day 7 Days

Back to Site Summary Page

Hour Start	Vehicles Classifications												
	SV	SVT	TB2	TB3	T4	ART3	ART4	ART5	ART6	BD	DRT	TRT	UC
	1	2	3	4	5	6	7	8	9	10	11	12	13
12:00 AM	7	0	0	0	0	0	0	0	0	0	0	0	0
01:00 AM	4	0	0	0	0	0	0	0	0	0	0	0	0
02:00 AM	2	0	0	0	0	0	0	0	0	0	0	0	0
03:00 AM	4	0	0	1	0	0	0	0	0	0	0	0	0
04:00 AM	16	0	1	1	0	0	0	0	0	0	0	0	0
05:00 AM	43	1	5	0	0	1	0	0	1	0	0	0	0
06:00 AM	111	3	15	2	0	0	0	0	1	0	0	0	0
07:00 AM	158	4	22	1	0	1	0	0	0	0	0	0	0
08:00 AM	286	7	21	2	0	1	1	0	1	0	0	0	0
09:00 AM	244	7	21	3	1	1	1	0	1	0	0	0	0
10:00 AM	237	6	16	3	0	1	0	0	2	0	0	0	0
11:00 AM	245	9	18	3	0	1	1	0	0	0	0	0	0
12:00 PM	232	5	16	3	0	2	1	0	1	0	0	0	0
01:00 PM	215	7	16	2	0	1	1	1	1	1	0	0	0
02:00 PM	237	7	20	3	0	1	1	0	1	0	0	0	0
03:00 PM	293	7	24	3	0	1	1	0	0	0	0	0	0
04:00 PM	254	6	20	2	0	1	1	0	1	0	0	0	0
05:00 PM	243	4	14	1	0	0	0	0	0	0	0	0	0
06:00 PM	172	2	12	0	0	0	0	0	0	0	0	0	0
07:00 PM	103	2	4	0	0	0	0	0	0	0	0	0	0
08:00 PM	76	1	2	0	0	0	0	0	0	0	0	0	0
09:00 PM	49	0	1	0	0	0	0	0	0	0	0	0	0
10:00 PM	25	0	1	0	0	0	0	0	0	0	0	0	0
11:00 PM	13	0	0	0	0	0	0	0	0	0	0	0	0
Summary	**3269**	**78**	**249**	**30**	**1**	**12**	**8**	**1**	**10**	**1**	**0**	**0**	**0**

AUTOMATIC COUNTER SUMMARY AND DATA SHEET

TRANS TRAFFIC SURVEY
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Site MR538 Kendall Road

Direction Combined

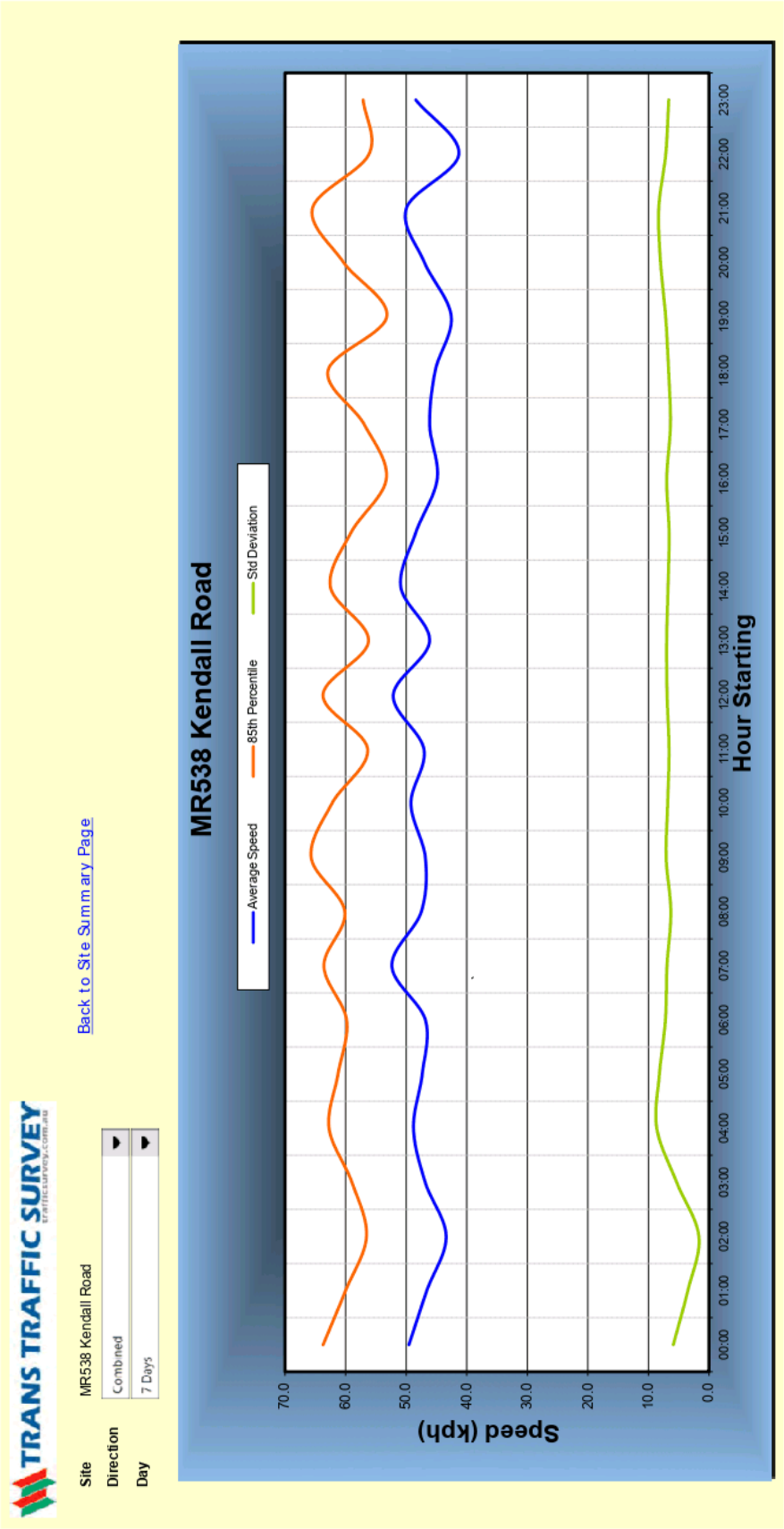
Day 7 Days

Back to Site Summary Page

AM Peak 8:00 AM
PM Peak 3:00 PM

Hour Start	Vehicle Classification Summary					
	Light Vehicles (1-2)	Small Trucks (3)	Medium Trucks (4-5)	Large Trucks (6-12)	Unclassified (13)	Hour Total
0:00	7	0	0	0	0	7
1:00	4	0	0	0	0	4
2:00	2	0	0	0	0	2
3:00	4	0	1	0	0	5
4:00	16	1	1	0	0	18
5:00	44	5	0	2	0	51
6:00	114	15	2	1	0	132
7:00	162	22	1	1	0	186
8:00	293	21	2	3	0	319
9:00	251	21	4	3	0	279
10:00	243	16	3	3	0	265
11:00	254	18	3	2	0	277
12:00	237	16	3	4	0	260
13:00	222	16	2	5	0	245
14:00	244	20	3	3	0	270
15:00	300	24	3	2	0	329
16:00	260	20	2	3	0	285
17:00	247	14	1	0	0	262
18:00	174	12	0	0	0	186
19:00	105	4	0	0	0	109
20:00	77	2	0	0	0	79
21:00	49	1	0	0	0	50
22:00	25	1	0	0	0	26
23:00	13	0	0	0	0	13
Summary	**3347**	**249**	**31**	**32**	**0**	**3659**

AUTOMATIC COUNTER SUMMARY AND DATA SHEET



Page 6 of 7

AUTOMATIC COUNTER SUMMARY AND DATA SHEET

TRANS TRAFFIC SURVEY

Site: MR538 Kendall Road

Back to Site Summary Page

Direction: Combined

Day: 7 Days

10km/h Speed Bin	
> 40 km/hr	99.67%
> 50km/hr	98.47%
> 60 km/hr	73.57%
> 70 km/hr	0.00%
> 80 km/hr	0.00%
> 90 km/hr	0.00%
> 100 km/hr	0.00%
> 110 km/hr	0.00%

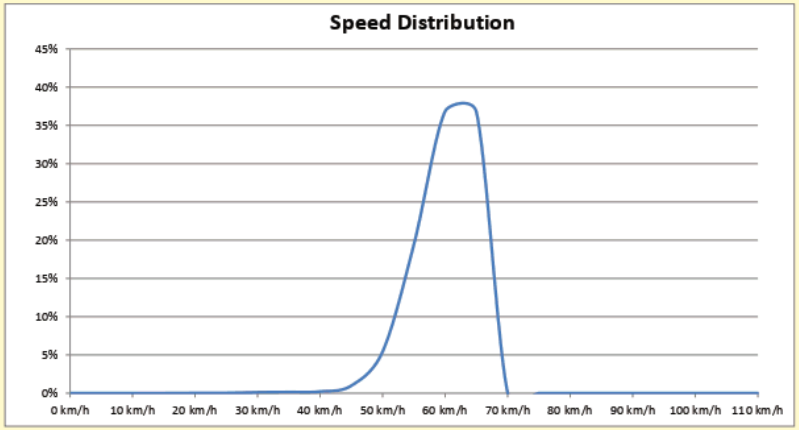
Ave Traffic Composition	
Cars	91.47%
Trucks	7.65%
Heavy Trucks	0.87%

Ave Speed Data	
85% P'tile	59.9 km/h
Mean Speed	60.2 km/h
Min. Speed	33.3 km/h
Max. Speed	63.5 km/h
Deviation	6.6 km/h

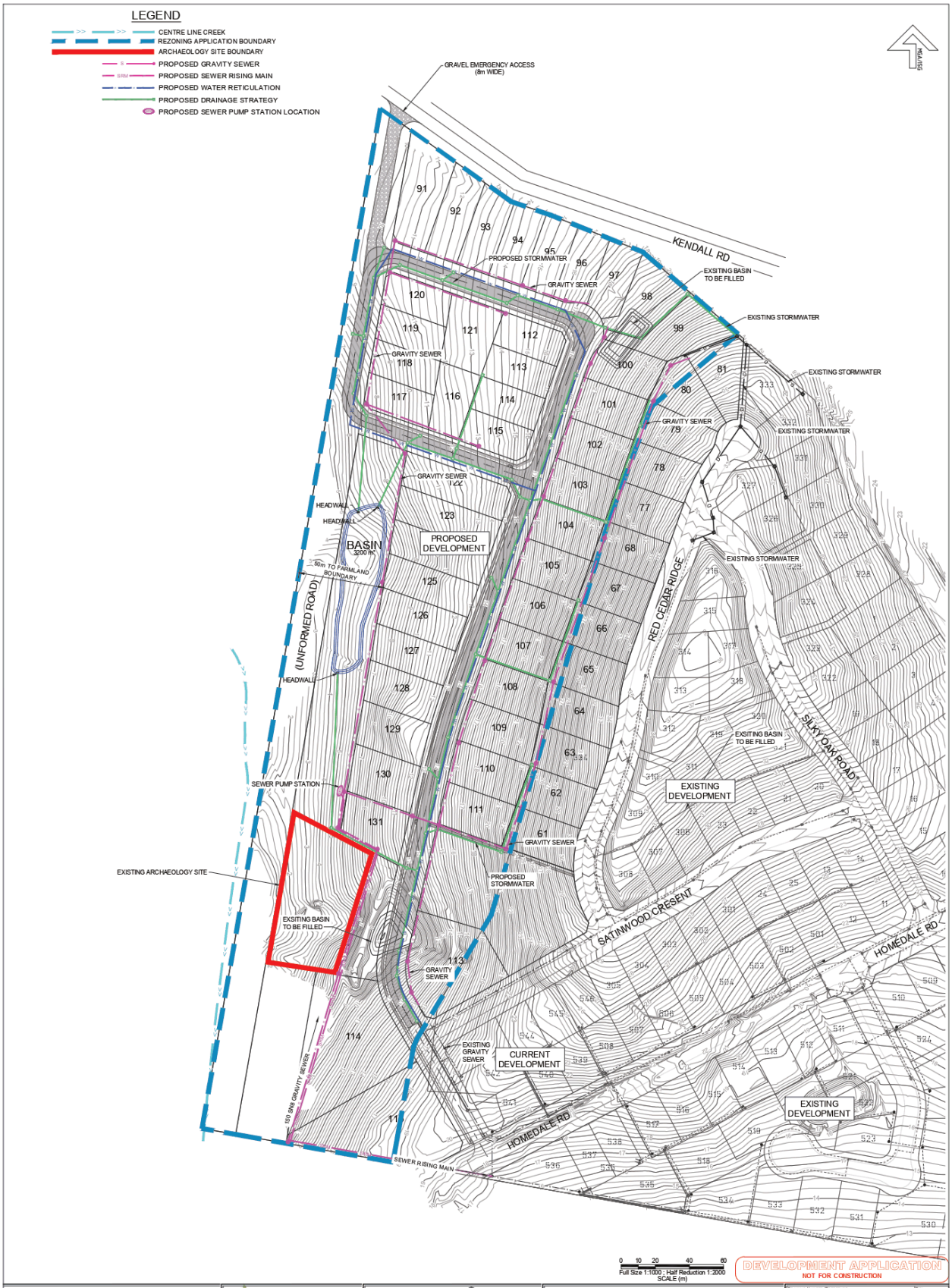
Recommended Speed Zone
60 km/h

5km/h Speed Bin	
> 0 km/h	100.00%
> 5 km/h	100.00%
> 10 km/h	100.00%
> 15 km/h	100.00%
> 20 km/h	99.99%
> 25 km/h	99.97%
> 30 km/h	99.94%
> 35 km/h	99.82%
> 40 km/h	99.67%
> 45 km/h	99.46%
> 50 km/h	98.47%
> 55 km/h	93.02%
> 60 km/h	73.57%
> 65 km/h	36.70%
> 70 km/h	0.00%
> 75 km/h	0.00%
> 80 km/h	0.00%
> 85 km/h	0.00%
> 90 km/h	0.00%
> 95 km/h	0.00%
> 100 km/h	0.00%
> 105 km/h	0.00%
> 110 km/h	0.00%

Speed Range Distribution (5km/h bin)	
> 0 km/h & ≤ 5 km/h	0.00%
> 5 km/h & ≤ 10 km/h	0.00%
> 10 km/h & ≤ 15 km/h	0.00%
> 15 km/h & ≤ 20 km/h	0.01%
> 20 km/h & ≤ 25 km/h	0.02%
> 25 km/h & ≤ 30 km/h	0.03%
> 30 km/h & ≤ 35 km/h	0.12%
> 35 km/h & ≤ 40 km/h	0.15%
> 40 km/h & ≤ 45 km/h	0.21%
> 45 km/h & ≤ 50 km/h	0.99%
> 50 km/h & ≤ 55 km/h	5.45%
> 55 km/h & ≤ 60 km/h	19.45%
> 60 km/h & ≤ 65 km/h	36.86%
> 65 km/h & ≤ 70 km/h	36.70%
> 70 km/h & ≤ 75 km/h	0.00%
> 75 km/h & ≤ 80 km/h	0.00%
> 80 km/h & ≤ 85 km/h	0.00%
> 85 km/h & ≤ 90 km/h	0.00%
> 90 km/h & ≤ 95 km/h	0.00%
> 95 km/h & ≤ 100 km/h	0.00%
> 100 km/h & ≤ 105 km/h	0.00%
> 105 km/h & ≤ 110 km/h	0.00%
> 110 km/h	0.00%



11. Appendix D – Plans of Proposed Development


LEGEND
CENTRE LINE CREEK
REZONING APPLICATION BOUNDARY
ARCHAEOLOGY SITE BOUNDARY
PROPOSED GRAVITY SEWER
PROPOSED SEWER RISING MAIN
PROPOSED WATER RETICULATION
PROPOSED DRAINAGE STRATEGY
PROPOSED SEWER PUMP STATION LOCATION
GRAVEL EMERGENCY ACCESS (8m WIDE)
KENDALL RD
PROPOSED STORMWATER
GRAVITY SEWER
EXISTING BASIN TO BE FILLED
EXISTING STORMWATER
HEADWALL
BASIN
PROPOSED DEVELOPMENT
50m TO FARMLAND BOUNDARY
(UNFORMED ROAD)
RED CEDAR RIDGE
SILKY OAK ROAD
EXISTING DEVELOPMENT
SEWER PUMP STATION
EXISTING ARCHAEOLOGY SITE
SATINWOOD CRESENT
HOMEDALE RD
EXISTING GRAVITY SEWER
CURRENT DEVELOPMENT
150 SNB GRAVITY SEWER
SEWER RISING MAIN
Full Size 1:1000 ; Half Reduction 1:2000
SCALE (m)
DEVELOPMENT APPLICATION
NOT FOR CONSTRUCTION
HOPKINS CONSULTANTS PTY LTD
Suite 1 / 109 William Street · PO Box 1556
Port Macquarie NSW 2444 · ABN 27 055 060 878
Telephone: 02 6583 6722 · Facsimile: 02 6584 9009 Email: mail@hopcon.com.au
DEVELOPMENT • MANAGERS • SURVEYORS ENGINEERS • PLANNERS
Liability limited by a scheme approved under Professional Standards Legislation
© Hopkins Consultants Pty Ltd
HOMEDALE - KEW PTY LTD
THE LINKS
LOT 202 ON DP1133171
KENDALL RD, KEW
LOT 202 REZONING
STORMWATER, WATER
AND SEWER STRATEGY
6578-0019
A
DG
12/07/2016
GG
A1
DG GA
AHD
03
DG
1:1000
05
A 12/07/2016 REZONING PLANS GA
No. DATE REVISIONS BY

ATTACHMENT 6 - Preliminary Vegetation Assessment Report and Addendum

PMHC Planning Proposal - Kendall Road, Kew (PP2014-12.1)

FloraFauna Consulting

Preliminary Vegetation Assessment Report

Project Number: EA-2015-2303

Proposed Rezoning

Lot 202 DP 1133171
Homedale Road Kew

October 2015

Prepared for:

Homedale – Kew Pty Ltd

PO Box 3212 West Kempsey NSW 2440
Phone: (02) 6566 0975 Mobile: 0429 727 010
mail@florafauna.com.au www.florafauna.com.au
ABN: 22 167 601 074

Title	Preliminary Vegetation Assessment Report
Project	Lot 202 DP 1133171 Homedale Road Kew
Client	Homedale – Kew Pty Ltd
Report No.	EA-2015-2303
Draft/Final	Draft – 29 October 2015 (Revision A)

The preparation of this addendum to the ecological report has been undertaken in accordance with the project brief provided by the client and has relied upon the information, data and results provided or collected from the sources and under the conditions outlined in the report.

All information contained within this addendum are prepared for the exclusive use of the client and with respect to the land described herein and are not to be used for any other purpose or by any other person or entity. No reliance should be placed on the information contained in this report for any purposes other than those stated herein.

Prepared By: **Steve Britt**
BSc. (Botany)
Grad. Dip. Design for Bushfire Prone Areas
Master of Wildlife Mgt. (Habitat)

Signed:

Date: 29 October 2015

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1. Glossary of Terms and Acronyms

AABR: Australian Association of Bush Regenerators

Abundance: Means a quantification of the population of the species or community

Affected species: Means subject species likely to be affected by the proposal

AHD: Australian height datum

APZ: Asset protection zone (for bushfire protection purposes)

Assessment guidelines: Means assessment guidelines issued and in force under Section 94A of the *Threatened Species Conservation Act 1995* or, subject to Section 5C of the *Fisheries Management Act 1994*

CAVS: Census of Australian Vertebrates

Conservation status: Is regarded as the degree of representation of a species or community in formal conservation reserves

Critical habitat: The area declared to be critical habitat under Part 3 of the *Threatened Species Conservation Act 1995*

DBH: Diameter at breast height being the measurement of the tree trunk at 1.3 m above ground level

DCP: Port Macquarie-Hastings Development Control Plan 2013

DECC: Department of Environment, Conservation and Climate Change

Development: The erection of a building on that land, the carrying out of work in, on, over or under that land, the use of that land or of a building or work on that land, and the subdivision of that land

EEC: Endangered Ecological Community

Endangered ecological community: An ecological community specified in Part 1 of Schedule 1 of the *Threatened Species Conservation Act 1995*

Endangered population: A population specified under Part 1 of Schedule 1 of the *Threatened Species Conservation Act 1995*

Endangered species: a species listed under Schedule 1 of the *Threatened Species Conservation Act 1995*

EP&A Act: *Environmental Planning and Assessment Act, 1979*

EPBC Act: *Environment Protection and Biodiversity Conservation Act 1999*

Field survey: Means on the ground flora and fauna assessment

Habitat: An area or areas occupied, or periodically or occasionally occupied by a species, population or ecological community and includes any abiotic component

Key Threatening Process: Is a threatening process listed under the *Threatened Species Conservation Act 1995*

LEP: Port Macquarie-Hastings Local Environmental Plan 2011

Locality: the area within a 5 km radius of the study area

NPW Act: *National Parks and Wildlife Act 1974*

OEH: NSW Office of Environment and Heritage

PBP: *Planning for Bushfire Protection 2006*

PCT: NSW Plant Community Type classification

PMHC: Port Macquarie-Hastings Council

PMST: Protected matters search tool

Recovery and threat abatement plan: A plan to promote the recovery of threatened species, population or an ecological community with the aim of returning the species, population, or ecological community to a position of viability in nature

ROTAP: Rare or threatened Australian plant

SEPP: State Environmental and Planning Policy

Subject Site: The identified land (Lot(s) and DP(s)

Study area: The geographic extent of the ecological assessment (may be the subject site or a portion of it)

Threatened species: A species specified in Part 1 or 4 of Schedule 1 or in Schedule 2 of the *Threatened Species Conservation Act 1995*

Threatening process: Means a threatening process that threatens, or could potentially threaten, the survival or evolutionary development of a species, population or ecological community

TSC Act: *Threatened Species Conservation Act 1995*

UIA: Urban Investigation Area

VIS: NSW Vegetation Information System (classification database)

VMP: Vegetation Management Plan

Vulnerable species: A species listed under Schedule 2 of the *Threatened Species Conservation Act 1995* or when a fish, listed under the *Fisheries Management Act 1994*.

2. Introduction

2.1 Background

It is proposed to rezone land identified as Lot 202 DP 1133171, Homedale Road Kew. At a pre-lodgement meeting held on 8 January 2015, Port Macquarie Hastings Council provided the following advice in relation to vegetation within the site:

"Council's records indicate that the site contains an EEC in the south-western corner comprising Swamp Oak - mixed Eucalypt coastal floodplain wetland forest. If the majority of the vegetation in this area of the site is Camphor, Council may concede to relaxing the EEC buffer requirements. Photographic evidence will be required to confirm this is the case."

Subsequent discussions between Council and GEM Planning Projects identified the need for an ecological assessment to determine the extent of weed invasion within the small remnant of vegetation around the farm dam located in the southern part of the site and the remnant vegetation in the south-western corner that is connected to the riparian vegetation associated with the small creek located adjacent to the western boundary. Based on the findings of the ecological assessment a decision would then be made regarding the ecological value of the vegetation and whether it could be removed without significant impact on biodiversity. The provision of an appropriate offset was also identified with the lower banks adjacent to the creek (i.e. within 40 metres of the creek) being maintained and improved by weeding and if necessary enhanced with plantings to establish the creek buffer and to improve the habitat values of the land in the south-western corner of the site. Suitable plantings would also be undertaken in the drainage reserve of the future subdivision.

FloraFauna Consulting has been engaged by Homedale – Kew Pty Ltd to prepare a report in relation to the assessment of the two areas of remnant vegetation.

2.2 Subject Site

The subject site is identified as Lot 202 in DP 1133171, Homedale Road Kew and comprises land of approximately 8.14 hectares located more or less at the margin of the village. Outside of the residential areas of Kew there are large expanses of rural zoned land in which agricultural and forestry activities are carried out. The site adjoins Kendall Road to the north and a recently developed subdivision known as The Links to the east. The southern and western boundaries adjoin rural land that is generally managed for agricultural purposes. There is a second order stream that flows past the site adjacent to the boundary in the south-western corner, which continues southward for approximately 100 metres before joining the Camden Haven River. An image of the subject site and surrounding landscape is provided at Figure 2.1.

Figure 2.1: Aerial image of the subject site and surrounding landscape

2.3 Study Area

The study area comprised the seven (7) patches of remnant vegetation in the southern part of the site including the immediate surrounds of a small farm dam, an area of land

containing remnant vegetation in the south-western corner of the site and five (5) other smaller patches of remnant vegetation as indicated in Figure 2.2.

Figure 2.2: Study area

3. Methodology

3.1 Nomenclature

The names of plants used in this document follow the *Flora of New South Wales* (Harden, 2000) with updates from the PlantNet website (Royal Botanic Gardens Sydney, 2012).

The description of plant communities used in this document follow the Port Macquarie-Hastings Council (PMHC) vegetation community mapping. For clarity a description based on observations recorded during the field survey has also been provided.

Unless otherwise stated, tree growth stage descriptions used in this document are adapted from Jacobs, M.R. (1955) *Growth Habits of the Eucalypts*, Woodgate et al, 1994, *A Study of Old-growth Forests of East Gippsland*, and the Joint Old Growth Forest Project (JOGFP), 1996 as is currently utilised by the NSW Environmental Protection Agency (EPA) for the purposes of old growth forest field verification. Table 3.1 sets out the growth stages adopted for this document:

Jacobs (1955) Growth Stages	Woodgate et al (1994) Growth Stages	Amalgamated Major Growth Stages
Juvenile		
Sapling	Sapling	Regrowth
Pole	Pole	
Mature	Early-mature	Mature
	Mature	
	Late-mature	Senescing
Overmature	Overmature	

Table 3.1: Relationship between growth stage classifications used in this document

The names of vertebrate animals used in this document follow the Census of Australian Vertebrates (CAVS) database maintained by the Department of the Environment and Heritage (2004).

3.2 Licencing

All work in relation to this fauna survey was undertaken with appropriate licences and authorisations including:

- A Scientific Licence for the purpose of ecological survey and consulting issued subject to the provisions of Section 132C of the NPW Act and regulations; and
- An Animal Research Authority issued by the Department of Industries and Investment (formerly the Department of Primary Industries) Director-General's Animal Care and Ethics Committee for the purpose of biodiversity survey and habitat assessment.

3.3 Survey Timing and Weather Conditions

The survey was conducted on Monday, 18 May 2015. Weather conditions at the time were relatively mild with light rain falling during the morning then clearing later.

3.4 Desktop Assessment

The desktop assessment involved database searches as summarised in Table 3.1 were undertaken on 17 May 2015.

Database	Source
Atlas of NSW Wildlife (10 km x 10 km search area)	NSW Government Office of Environment and Heritage
PlantNet: ROTAP/Threatened Species Spatial Search (10 km radius)	Sydney Royal Botanic Gardens
EPBC Act Protected Matters Search Tool (10 km buffer)	Department of Sustainability, Environment, Water, Population and Communities

Table 4.1: Database Searches

3.4.1 Atlas of NSW Wildlife

The Atlas of NSW wildlife database was searched to inform of threatened species records within a 10 x 10 km (default) search area around the study area. This information was used to determine:

- The threatened species recorded; and
- The proximity of any threatened species records to the study area.

3.4.2 EPBC Act Protected Matters Search Tool

The Protected Matters Search Tool (PMST) was utilised to generate a report that provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act around the study area employing a 10 km buffer.

3.5 Field Survey

An investigation of the study area was undertaken Monday, 18 May 2015 for the purpose of conducting an assessment of the flora and habitat as detailed below.

3.5.1 Flora Assessment

Because of the relatively small size of the study area and disturbed condition of the habitat therein, the assessment of the flora was conducted using the random meander method after Cropper (1993). The following tasks were undertaken:

- Identification of the plant communities;
- Assessment of the species assemblage to assist with identification of the plant communities;
- Identification of principal species;

- Spatial distribution of the vegetation in the survey area;
- Assessment of the vegetation's condition; and
- Determination of the vegetation's conservation significance.

For the purposes of this ecological assessment a tree is defined as a perennial plant having a trunk diameter at breast height (DBH) of not less than 100 mm where DBH is the measurement of the trunk at 1.3 metres above ground level.

3.5.2 Habitat Assessment

The habitat within the survey area was assessed to identify any significant habitat features such as hollow-bearing trees and other factors such as habitat connectivity and conservation significance.

3.6 Survey Limitations

Ecological surveys are limited in their capacity to document all of the species of flora and fauna likely or actually occurring at a given site. There are numerous factors that will influence whether a species is detected or not, including climatic and seasonal conditions, the issue of migratory species movements, availability of shelter and food resources, and how readily a species is observed or otherwise recorded given the cryptic nature of some species making them difficult to detect. The absence of a species from survey results does not necessarily indicate that the species is not present. Similarly, there are limitations applicable to the interpretation of records held in databases for the presence or absence of a species at a site. For instance, the Atlas of NSW Wildlife is a database of limited available information and it should not be assumed that the absence of records indicates that a species is not present. Therefore, in order to offset these limitations the habitat components of the study area have been assessed to help predict those species likely to occur within the study area based on habitat preferences.

4. Results

4.1 Flora Survey

4.1.1 Plant Communities

The remnant vegetation located in the south-western corner of the site is mapped under the PMHC vegetation mapping as PMVC 71 Swamp Oak – Mixed Eucalypt Coastal Floodplain Wetland Forest Complex. For the purposes of the PMHC vegetation mapping the other remnant patches that formed the study area have not been assigned to a plant community. The PMHC vegetation community description and field observations for the mapped plant community is provided below.

i. PMHC Vegetation Community Description

Vegetation Formation: Wet Sclerophyll Forests

Sub-formation: Shrubby

Class: North Coast Wet Sclerophyll Forests

Floristic Type: *Eucalyptus pilularis*

Structure: *Eucalyptus pilularis - Glochidion ferdinandi - Imperata cylindrica*

Community Description:

Canopy

Callistemon salignus (Willow Bottlebrush), *Corymbia intermedia* (Pink Bloodwood), *Eucalyptus grandis* (Flooded Gum), *Eucalyptus tereticornis* (Forest Red Gum), *Eucalyptus robusta* (Swamp Mahogany), *Eucalyptus microcorys* (Tallowwood), *Melaleuca linariifolia* (Flax-leaved Paperbark) and *Melaleuca styphelioides* (Prickly Paperbark). In the long-term absence of fire *Ficus obliqua* (Small-leaved Fig) and *Ficus macrophylla* (Moreton Bay Fig).

Understorey

Alphitonia excelsa (Red Ash), *Casuarina glauca* (Swamp Oak), *Callistemon salignus* (Willow Bottlebrush), *Cordyline stricta* (Slender Palm Lily), *Elaeocarpus obovatus* (Hard Quandong), *Glochidion ferdinandi* (Cheese Tree), *Guioa semiglauca* (Guioa), *Hibiscus heterophyllus* (Native Rosella), *Melaleuca linariifolia* (Flax-leaf Paperbark), *Melaleuca quinquenervia* (Broad-leaved Paperbark), *Melaleuca styphelioides* (Prickly Paperbark). In the decadal absence of fire, rainforest succession progressively allows the following species in a semi or continuous closed canopy beneath emergent layer: *Cryptocarya microneura* (Murrogun), *Cupaniopsis anacardioides* (Tuckeroo), *Cupaniopsis parvifolia* (Small-leaved Tuckeroo), *Cyclophyllum longipetalum* (Coprosma-leaved Coffee), *Jagera pseudorhus* (Foam Bark Tree), *Maclura cochinchinensis* (Cockspur Thorn), *Melicope micrococca* (Hairy-leaved Doughwood),

Myrsine spp., *Pittosporum undulatum* (Sweet Pittosporum), *Ripogonum album* (White Supplejack) and *Smilax australis* (Lawyer Vine).

Groundcover

Doodia aspera (Prickly Rasp Fern), *Gahnia clarkei* (Tall Saw-sedge), *Gahnia melanocarpa* (Black-fruit Saw-sedge), *Carex longebrachiata* (Bergalia Tussock), *Commelina cyanea* (Native Wandering Jew), *Imperata cylindrica* (Blady Grass) and *Oplismenus* spp.

ii. Field Observations

Remnant 1:

Remnant 1, as indicated in Figure 2.2 comprised three (3) isolated 'paddock' trees, which are part of a small group of trees that extend onto 'The Links' subdivision land adjoining the site to the east. These three trees were identified as *Eucalyptus microcorys* (Tallowwood) that were in the mature growth stage. No visible hollows were recorded in any of these trees. As Tallowwood is a Koala food tree species the bases of all of these trees were checked for scats. No scats or other evidence of recent Koala activity was observed.

Remnant 2:

Remnant 2, as indicated in Figure 2.2 comprised regrowth vegetation associated with a small farm dam. Generally the vegetation was confined to the dam wall and water's edge where access to slashing machinery would be difficult thus allowing the regrowth to establish. The canopy was largely composed of *Cinnamomum camphora* (Camphora Laurel) and *Casuarina glauca* (Swamp Oak). The parts of the remnant in which the canopy was dominated by Swamp Oak was generally adjacent to the water's edge and tended to be relatively narrow. The understorey was dominated by juvenile canopy species, particularly Swamp Oak as well as several environmental weeds, including *Lantana camara* (Lantana) *Ligustrum lucidum* (Broad-leaved Privet), *Ligustrum sinense* (Small-leaved Privet) and *Ochna serrulata* (Mickey Mouse Plant). Less abundant native species recorded in the understorey included *Acacia implexa* (Hickory Wattle), *Pittosporum undulatum* (Sweet Pittosporum), *Gahnia clarkei* (Tall Saw-sedge), *Callitris macleayana* (Stringybark Pine), and *Maclura cochinchinensis* (Cockspur Thorn). Beneath the Camphor Laurel the groundcover was relatively sparse with the more common species being *Lomandra longifolia* (Spiny-headed Mat-rush), *Imperata cylindrica* (Blady Grass), *Calochlaena dubia* (Rainbow Fern), *Oplismenus aemulus* (Basket Grass) and *Pratia purpurascens* (Whiteroot). The margins were dominated by species associated with the adjacent derived grassland community including *Setaria sphacelata* (South African Pigeon Grass), *Andropogon virginicus* (Whisky Grass), *Paspalum urvillei* (Vasey Grass), *Sporobolus africanus* (Parramatta Grass) and *Senecio madagascariensis* (Fireweed). Other common species recorded at the margins included *Leptospermum polygalifolium* subsp. *cismontanum* (Tantoon) and *Melaleuca thymifolia* (Thyme Honey-myrtle) which were also widespread across the derived grassland community.

The following images show the typical assemblage of species associated with the dam remnant/regrowth vegetation.

Figure 4.1: View of the dam regrowth vegetation (Remnant 2) from the eastern boundary of the site

Figure 4.2: View of vegetation on the western wall of the dam dominated by Camphor Laurel

Figure 4.3: View of the Swamp Oak regrowth along the southern edge of the dam

Figure 4.4: View looking along the western edge of the dam wall

Figure 4.5: Understorey and groundcover beneath Camphor Laurel on the western wall of the dam

Figure 4.6: View of juvenile Swamp Oak along the dam water's edge

Remnant 3 and Remnant 4:

Remnants 3 and 4 as indicated in Figure 2.2 were both more or less composed entirely of exotic/weed species. The canopy was entirely comprised of *Cinnamomum camphora* (Camphor Laurel) and the understorey consisted of *Ligustrum sinense* (Small-leaved Privet) and *Lantana camara* (Lantana). The following images show the size and species composition of these small remnants.

Figure 4.7: View of Remnant 4

Figure 4.8: View of the understorey in Remnant 4

Figure 4.9: Remnant 3 (right) and Remnant 4 (left) with riparian vegetation on the adjacent land in the background

Remnant 5:

Remnant 5 as indicated in Figure 2.2 was the most significant patch of vegetation within the site. It was part of a more extensive patch of remnant riparian vegetation associated with a second order stream that flows past the site adjacent to the boundary in the south-western corner, which continues southward for approximately 100 metres before joining the Camden Haven River. The canopy was dominated by *Cinnamomum camphora* (Camphora Laurel) with *Casuarina glauca* (Swamp Oak) being the main associate. There was also a small number of individuals of *Melaleuca quinquenervia* (Broad-leaved Paperbark) and single mature individuals of *Corymbia intermedia* (Pink Bloodwood) and *Eucalyptus robusta* (Swamp Mahogany) situated near the margin adjacent to the southern boundary. Outside the western boundary of the site on the lower slopes of the creek bank *Casuarina glauca* (Swamp Oak) became dominant in the canopy and *Cinnamomum camphora* (Camphora Laurel) was less common. No visible hollows were observed in any trees within this remnant vegetation.

Within the site, the understorey of this remnant was dominated by exotic/weed species including *Ligustrum lucidum* (Broad-leaved Privet), *Ligustrum sinense* (Small-leaved Privet), *Lantana camara* (Lantana), and *Senna pendula* var. *glabrata* (Easter Cassia). The most abundant native species was *Acacia implexa* (Hickory Wattle). Other less common species recorded in the understory included *Acacia elongata* (Swamp Wattle), *Ochna serrulata* (Mickey Mouse Plant), *Melaleuca styphelioides* (Prickly-leaved Tea Tree), *Jagera pseudorhus* (Foam Bark Tree), *Maclura cochinchinensis* (Cockspur Thorn), *Pittosporum undulatum* (Sweet Pittosporum), *Alectryon subcinereus* (Wild Quince) and *Cryptocarya microneura* (Murrogun). There was also an exotic species recorded in the understorey from the Fabaceae and in the absence of flowers or fruit was tentatively identified as *Leucaena leucocephala* (Lead Tree).

The groundcover was relatively sparse, most likely as a result of the closed nature of the understorey. The more common groundcover species included *Doodia aspera* (Prickly Rasp Fern), *Lomandra longifolia* (Spiny-headed Mat-rush) and occasionally *Leucopogon juniperinus* (Prickly Beard-heath). Seedlings of the understorey species and in particular the two Privet species were common and widespread in the groundcover. The margins were dominated by species associated with the adjacent derived grassland community including *Imperata cylindrica* (Blady Grass), *Setaria sphacelata* (South African Pigeon Grass), *Andropogon virginicus* (Whisky Grass), *Paspalum urvillei* (Vasey Grass) and *Sporobolus africanus* (Parramatta Grass). The following images show the nature of the remnant and typical assemblage of species.

Figure 4.10: View of the northern end of Remnant 5

Figure 4.11: View of the southern end of Remnant 5

Figure 4.12: View looking along the margin of Remnant 5

Figure 4.13: View of the typical understorey vegetation in Remnant 5

Remnant 6:

Remnant 6 as indicated in Figure 2.2 was also more or less entirely composed of exotic/weed species and is essentially a clump of *Erythrina* x *sykesii* (Coral Tree) with *Solanum mauritianum* (Wild Tobacco Bush) and *Ligustrum sinense* (Small-leaved Privet). An image of this patch of vegetation is provided in Figure 4.9.

Figure 4.14: View of Remnant 6

Remnant 7:

Remnant 7 as indicated in Figure 2.2 was a small remnant comprising a disjunct group of trees, most of which were located on the adjacent land to the south. Part of the remnant including a large mature individual of *Eucalyptus microcorys* (Tallowwood) together with a smaller individual of *Cinnamomum camphora* (Camphor Laurel) and associated understorey dominated by exotic/weed species were located within the site. No visible hollows were recorded in these trees. As Tallowwood is a Koala food tree species the bases of the trees were checked for scats. No scats or other evidence of recent Koala activity was observed. An image of the large Tallowwood within the study area (Remnant 7) is provided at Figure 4.10.

Figure 4.15: View of the large Tallowwood in Remnant 7

The floristic composition of the remnants that formed the study area is summarised in Figure 4.16.

Figure 4.16: Summary of the floristic composition of the remnants (study area)

4.2 Habitat Assessment

The habitat within the study area was assessed during the field survey. Remnant 1 contained three (3) Tallowwood trees in the mature growth stage and Remnant 7 contained one large mature Tallowwood tree. All of these trees and associated trees were checked for signs of Koala activity. No evidence of Koala activity was detected.

All trees within the canopy of the search area were assessed for visible hollows however, none were observed. During the field survey a Common Brushtail Possum (*Trichosurus vulpecula*) was detected in Remnant 5. This individual was found sheltering in dense vegetation of the understorey and climbed a nearby tree when it was inadvertently disturbed. There were no other significant habitat features recorded.

5. Conclusion

This report has been prepared to assess the vegetation in relation to a proposed rezoning of land identified as Lot 202 in DP 1133171, Homedale Road Kew. The study area comprised seven (7) patches of remnant vegetation in the southern part of the site including the immediate surrounds of a small farm dam, an area of land containing remnant vegetation in the south-western corner of the site and five (5) other smaller patches.

Almost all of the remnant patches of vegetation forming the study area were either significantly disturbed or comprised an assemblage of exotic species. Two of the species recorded during the survey including *Lantana camara* (Lantana) and *Senecio madagascariensis* (Fireweed) are listed as weeds of national significance. Other highly invasive weeds recorded during the survey included *Cinnamomum camphora* (Camphor Laurel), *Ligustrum lucidum* (Broad-leaved Privet), *Ligustrum sinense* (Small-leaved Privet), *Senna pendula* var. *glabrata* (Easter Cassia) and *Solanum mauritianum* (Wild Tobacco Bush). Camphor Laurel and the two species of Privet in particular are serious environmental weeds that are often associated with invasion of rainforest and riparian vegetation across the NSW north coast region.

Remnant 1 contained three (3) Tallowwood trees, which are part of a small group of trees that extend onto 'The Links' subdivision land adjoining the site to the east. These trees are preferred Koala food tree species, however their isolated position reduces the likelihood of the trees being browsed by Koalas. Remnants 3, 4 and 6 were primarily composed of exotic/weed species and have little ecological value and in fact the removal of these patches would be beneficial. Remnant 7 contained a single large mature Tallowwood tree that was associated with a small patch of vegetation with an understorey that comprised mostly exotic species. Despite the presence of undesirable species in the understorey, the large Tallowwood retains ecological value both in terms of being a preferred Koala food tree and providing resources for other species generally as well as being a recruitment tree.

Remnant 2 appears to be regrowth associated with a small dam surrounded by a derived grassland community. The 'regrowth' vegetation is confined to the dam wall or water's edge and it is likely that restricted access for slashing machinery has allowed this regeneration to occur. The remnant has a number of species in common with the Swamp Oak mixed eucalypt coastal floodplain wetland forest complex community that is associated with the second order stream on the adjacent land to the west due its proximity. It is noted that the PMHC vegetation mapping indicates that the Swamp Oak mixed eucalypt coastal floodplain wetland forest complex community is mapped as an endangered ecological community (EEC). The colonisation of the dam surrounds may have been facilitated initially by the moist conditions created by the dam that allowed wind dispersed species such as *Casuarina glauca*, which are adapted for such moist conditions to establish. Species such as *Cinnamomum camphora*, which are dispersed by other vectors such as birds may have followed once vegetation was sufficiently established to allow birds to access the area. Although the remnant has some species in common with the nearby EEC it can be argued that the remnant is itself not part of that EEC as the conditions in which it is growing are artificial

and a significant proportion of the species assemblage in all strata are in fact exotic/weed species. During the field survey it was noted that the dam was inhabited by a population of *Gambusia holbrooki* (Plague Minnow), which would reduce its ecological value in terms of frog habitat.

Remnant 5 is an extension of the mapped Swamp Oak mixed eucalypt coastal floodplain wetland forest complex and shares a number of species with that plant community. As detailed in Section 4, this remnant is highly disturbed and contains several of the more serious invasive weeds including *Cinnamomum camphora* (Camphor Laurel) in the canopy and *Ligustrum lucidum* (Broad-leaved Privet), *Ligustrum sinense* (Small-leaved Privet), *Lantana camara* (Lantana), and *Senna pendula* var. *glabrata* (Easter Cassia) in the understorey. Together these weeds comprise the larger proportion of plants within each strata. However, disturbance does not preclude a plant community from being classified as an EEC. As such Remnant 5 is considered to be part of the Swamp Oak mixed eucalypt coastal floodplain wetland forest complex EEC. On this basis Council's advice that the vegetation within 40 metres of the creek should be protected and excluded from the development footprint is supported. It is noted however that the extent of the weed invasion throughout the Swamp Oak mixed eucalypt coastal floodplain wetland forest complex community beyond the site boundaries would make it difficult to undertake any practical ecological improvement particularly as the vegetation overlaps different land tenures.

6. References

Beyer, B. L., Goldingay, R. L., 2006, The value of nest boxes in the research and Management of Australian hollow-using arboreal marsupials, *Wildlife Research*, 33, pp. 161-174

Boland, D. J., Brooker, M. I. H., Chippendale, G. M., Hall, N., Hyland, B. P. M., Johnston, R. D., Kleinig, D. A., Turner, J. D., 1992, *Forest Trees of Australia*, CSIRO Publishing, Collingwood, Victoria, Australia

Churchill, S., 2008, *Australian Bats*, Allen and Unwin, Crows Nest, NSW, Australia

Cogger, H. G., 1986, *Reptiles and Amphibians of Australia*, Reed Books Pty Ltd, Sydney, Australia

Department of Environment and Climate Change, 2008, *Recovery Plan for the Koala (Phascolarctos cinereus*)

Department of Environment, 2014, Census of Australian Vertebrates, from; www.environment.gov.au/biodiversity/abrs/onlineresources/fauna/afd/home

Department of Environment, 2014, EPBC Act Protected Matters report, retrieved 13.10.2014, from; http://www.environment.gov.au/epbc/pmst/index.html

Department of Environment, 2013, *Draft EPBC Act referral guidelines for the vulnerable koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)*

Gleeson, J., and Gleeson, D., 2012, *Reducing the Impacts of Development on Wildlife*, CSIRO Publishing, Collingwood Victoria, Australia

Goldingay, R. L. and Sharpe, D. J., 2004, How effective is spotlighting for detecting the Squirrel Glider, *Wildlife Research 31(4)*, pp. 443-449

Harden, G. J., McDonald, W. J. F., Williams, J. B., 2007, *Rainforest Climbing Plants: A Field Guide to Their Identification*, Gwen Harden Publishing, Nambucca Heads, Australia

Harden, G. J., Ed, 2000 (revised), *Flora of New South Wales*, University Press, Sydney, Australia

Keith, D., 2004, *Ocean Shores to Desert Dunes: The Native Vegetation of New South Wales and the ACT*, Department of Environment and Conservation, Hurstville, NSW Australia

Lunney, D., Matthews, A., Moon, C., Ferrier, S., 2000, Incorporating habitat mapping into practical koala conservation on private land, *Conservation Biology* 14(3), pp. 669-680

McConville, A., Law, B., Penman, T., Mahony, M., 2014, Contrasting habitat use of morphologically similar bat species with differing conservation status in south-eastern Australia, *Austral Ecology 39*, pp. 83-94

Menkhorst, P., Knight, F., 2004, *A Field Guide to the Mammals of Australia*, Oxford University Press, Melbourne, Australia

NSW Office of the Environment and Heritage, 2014, Atlas of NSW Wildlife, retrieved 13.10.2014 from; http://www.bionet.nsw.gov.au

Office of Environment and Heritage, 2014, Threatened Species Search Site, retrieved 13.10.2014, from; www. environment.nsw.gov.au/threatened species/

Phillips, S., and Callaghan, J., 2011, The Spot Assessment Technique: a tool for determining localised levels of habitat use by koalas *(Phascolarctos cinereus)*, *Australian Zoologist 35*, pp. 774–780.

Royal Botanic Gardens, 2014, PlantNet – FloraOnline Spatial Search, retrieved 13.10.2014, from; plantnet.rbgsyd.nsw.gov.au/search/spatial.htm, Sydney, NSW, Australia

Scott, D., 2003, *Key Habitats and Corridors for Forest Fauna; A landscape Framework for conservation in north-east New South Wales, Occasional Paper No. 32*, NSW National Parks and Wildlife Service, Hurstville

Smith, A. P., Andrews, S., 1997, *Koala Habitat, Abundance and Distribution in the Pine Creek Study Area, A report to State Forests NSW*, Austeco, *Environmental* Consultants, Armidale

Smith, G. C., Agnew, G., 2002, The value of 'bat boxes' for attracting hollow dependent fauna to farm forestry plantation in Southeast Queensland, *Ecological Management and Restoration*, 3, pp. 37-47

Strahan, R., Ed, 1998, *The Mammals of Australia*, New Holland Publishers, Sydney, Australia

Triggs, B., 1996, *Tracks, Scats and Other Signs- A Field Guide to Australian Mammals*, Oxford University Press, Melbourne, Australia

White, N. A., 1999, Ecology of the koala (*Phascolarctos cinereus*) in rural south-east Queensland, Australia, *Wildlife Research* 26, pp. 731-744

Woodgate, P. W., Ritman, K., Coram, J., Brady, A., Rule, A., Banks, J., 1994, A Study of Old-growth Forests of East Gippsland, Conservation and Natural Resources Department, Melbourne

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Ref: EA-2015-2303

John Harvey
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C/-GEM Planning Projects
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Dear Mr Harvey,

Addendum to Vegetation Assessment Report EA-2015-2303
Lot 202 DP 1133171 Homedale Road Kew

Port Macquarie-Hastings Council has advised that a Koala habitat assessment is required in relation to the proposed rezoning of land identified as Lot 202 DP 1133171, Homedale Road Kew. The site comprises land of approximately 8.14 hectares that adjoins Kendall Road to the north and a recently developed subdivision known as The Links to the east. The southern and western boundaries adjoin rural land that is generally managed for agricultural purposes. There is a small watercourse that flows past the site adjacent to the boundary that joins the Camden Haven River to the southwest of the site.

FloraFauna Consulting previously conducted a vegetation assessment to determine the condition and composition of the remnant vegetation located within the site. The findings of the vegetation assessment indicated that the vast majority of the site had been cleared of native vegetation to form a derived grassland and that seven, mostly small, isolated patches of remnant vegetation remained. The largest area of remnant vegetation was located in the south-western corner of the site. This vegetation is connected to riparian vegetation associated with the small watercourse on the adjacent land to the west of the site and is mapped under the Port Macquarie-Hastings Council (PMHC) vegetation community mapping as Swamp Oak – Mixed Eucalypt Coastal Floodplain Wetland Forest Complex. The other remnant patches of vegetation that formed the study area for the vegetation assessment were not assigned to a plant community under the PMHC vegetation community mapping. The locations of the remnant vegetation within the site is indicated in Figure 1 below.

ECA ECOLOGICAL CONSULTANTS ASSOCIATION of NSW Inc
2016 MEMBER

Figure 1: Remnant vegetation located within the site

The findings of the vegetation assessment are summarised below.

Remnant 1 comprised three (3) isolated 'paddock' trees, which are part of a small group of trees that extend onto 'The Links' subdivision land adjoining the site to the east. These three trees were identified as *Eucalyptus microcorys* (Tallowwood) that were in the mature growth stage. No visible hollows were recorded in any of these

trees. As Tallowwood is a Koala food tree species the bases of all of these trees were checked for scats. No scats or other evidence of recent Koala activity was observed.

Remnant 2 comprised regrowth vegetation associated with a small farm dam. Generally, the vegetation was confined to the dam wall and water's edge where access to slashing machinery would be difficult thus allowing the regrowth to establish. The canopy was largely composed of *Cinnamomum camphora* (Camphora Laurel) and *Casuarina glauca* (Swamp Oak). The parts of the remnant in which the canopy was dominated by Swamp Oak was generally adjacent to the water's edge and tended to be relatively narrow. The understorey was dominated by juvenile canopy species, particularly Swamp Oak as well as several environmental weeds, including *Lantana camara* (Lantana) *Ligustrum lucidum* (Broad-leaved Privet), *Ligustrum sinense* (Small-leaved Privet) and *Ochna serrulata* (Mickey Mouse Plant). Less abundant native species recorded in the understorey included *Acacia implexa* (Hickory Wattle), *Pittosporum undulatum* (Sweet Pittosporum), *Gahnia clarkei* (Tall Saw-sedge), *Callitris macleayana* (Stringybark Pine), and *Maclura cochinchinensis* (Cockspur Thorn). Beneath the Camphor Laurel the groundcover was relatively sparse with the more common species being *Lomandra longifolia* (Spiny-headed Mat-rush), *Imperata cylindrica* (Blady Grass), *Calochlaena dubia* (Rainbow Fern), *Oplismenus aemulus* (Basket Grass) and *Pratia purpurascens* (Whiteroot). The margins were dominated by species associated with the adjacent derived grassland community including *Setaria sphacelata* (South African Pigeon Grass), *Andropogon virginicus* (Whisky Grass), *Paspalum urvillei* (Vasey Grass), *Sporobolus africanus* (Parramatta Grass) and *Senecio madagascariensis* (Fireweed). Other common species recorded at the margins included *Leptospermum polygalifolium* subsp. *cismontanum* (Tantoon) and *Melaleuca thymifolia* (Thyme Honey-myrtle) which were also widespread across the derived grassland community as juvenile plants and resprouts.

Remnants 3 and 4 were both largely composed of exotic/weed species. The canopy was entirely comprised of *Cinnamomum camphora* (Camphor Laurel) and the understorey consisted of *Ligustrum sinense* (Small-leaved Privet) and *Lantana camara* (Lantana). The margins were dominated by species associated with the adjacent derived grassland community including *Imperata cylindrica* (Blady Grass), *Setaria sphacelata* (South African Pigeon Grass), *Andropogon virginicus* (Whisky Grass), *Paspalum urvillei* (Vasey Grass) and *Sporobolus africanus* (Parramatta Grass).

Remnant 5 was the most significant patch of vegetation within the site. It was part of a more extensive patch of remnant riparian vegetation associated with the small watercourse adjacent to the boundary in the south-western corner, which joins the Camden Haven River. The canopy was dominated by *Cinnamomum camphora* (Camphora Laurel) with *Casuarina glauca* (Swamp Oak) being the main associate. There was also a small number of individuals of *Melaleuca quinquenervia* (Broad-leaved Paperbark) and single mature individuals of *Corymbia intermedia* (Pink Bloodwood) and *Eucalyptus robusta* (Swamp Mahogany) situated near the margin adjacent to the southern boundary. Outside the western boundary of the site on the lower slopes of the creek bank *Casuarina glauca* (Swamp Oak) became dominant in the canopy and *Cinnamomum camphora* (Camphora Laurel) was less common. No visible hollows were observed in any trees within this remnant vegetation.

Within the site, the understorey of this remnant was dominated by exotic/weed species including *Ligustrum lucidum* (Broad-leaved Privet), *Ligustrum sinense* (Small-leaved Privet), *Lantana camara* (Lantana), and *Senna pendula* var. *glabrata* (Easter Cassia). The most abundant native species was *Acacia implexa* (Hickory Wattle). Other less common species recorded in the understory included *Acacia elongata* (Swamp Wattle), *Ochna serrulata* (Mickey Mouse Plant), *Melaleuca styphelioides* (Prickly-leaved Tea Tree), *Jagera pseudorhus* (Foam Bark Tree), *Maclura cochinchinensis*

(Cockspur Thorn), *Pittosporum undulatum* (Sweet Pittosporum), *Alectryon subcinereus* (Wild Quince) and *Cryptocarya microneura* (Murrogun). There was also an exotic species recorded in the understorey from the Fabaceae and in the absence of flowers or fruit was tentatively identified as *Leucaena leucocephala* (Lead Tree).

The groundcover was relatively sparse, most likely as a result of the closed nature of the understorey. The more common groundcover species included *Doodia aspera* (Prickly Rasp Fern), *Lomandra longifolia* (Spiny-headed Mat-rush) and occasionally *Leucopogon juniperinus* (Prickly Beard-heath). Seedlings of the understorey species and in particular the two Privet species were common and widespread in the groundcover. The margins were dominated by species associated with the adjacent derived grassland community including *Imperata cylindrica* (Blady Grass), *Setaria sphacelata* (South African Pigeon Grass), *Andropogon virginicus* (Whisky Grass), *Paspalum urvillei* (Vasey Grass) and *Sporobolus africanus* (Parramatta Grass).

Remnant 6 was also more or less entirely composed of exotic/weed species and is essentially a clump of *Erythrina* x *sykesii* (Coral Tree) with *Solanum mauritianum* (Wild Tobacco Bush) and *Ligustrum sinense* (Small-leaved Privet). The margins were dominated by species associated with the adjacent derived grassland community including *Imperata cylindrica* (Blady Grass), *Setaria sphacelata* (South African Pigeon Grass), *Andropogon virginicus* (Whisky Grass), *Paspalum urvillei* (Vasey Grass) and *Sporobolus africanus* (Parramatta Grass).

Remnant 7 was a small remnant comprising a disjunct group of trees, most of which were located on the adjacent land to the south. Part of the remnant including a large mature individual of *Eucalyptus microcorys* (Tallowwood) together with a smaller individual of *Cinnamomum camphora* (Camphor Laurel) and associated understorey dominated by exotic/weed species were located within the site. No visible hollows were recorded in these trees. As Tallowwood is a Koala food tree species the bases of the trees were checked for scats. No scats or other evidence of recent Koala activity was observed.

The site also contains a handful of isolated 'paddock' trees, which were not individually surveyed for the purposes of the vegetation assessment. Some of these trees were identified as *Eucalyptus microcorys* (Tallowwood). However, together these trees represent a small fraction of the remnant vegetation within the study area, which is generally dominated by the native species; *Casuarina glauca* (Swamp Oak) and the exotic species; *Cinnamomum camphora* (Camphora Laurel).

4.6.1 SEPP 44 Considerations

State Environmental Planning Policy No. 44 – Koala Habitat Protection (SEPP 44) defines Potential Koala Habitat as:

"*Areas of native vegetation where the trees of the types listed in Schedule 2 constitute at least 15 % of the total number of trees in the upper or lower strata of the tree component.*"

The tree species listed under Schedule 2 of SEPP 44 are provided in the Table below.

SEPP 44 Schedule 2 Koala feed tree species

Scientific Name	Common Name
Eucalyptus tereticornis	Forest Red Gum
Eucalyptus microcorys	Tallowwood
Eucalyptus punctata	Grey Gum
Eucalyptus viminalis	Ribbon or Manna Gum
Eucalyptus camaldulensis	River Red Gum
Eucalyptus haemastoma	Broad-leaved scribbly gum
Eucalyptus signata	Scribbly Gum
Eucalyptus albens	White Box
Eucalyptus populnea	Bimble Box or Poplar Box
Eucalyptus robusta	Swamp Mahogany

Two (2) species of Koala food tree as listed under Schedule 2 of SEPP 44 were recorded within the site. These included a small number of trees identified as *Eucalyptus microcorys* (Tallowwood) and a single individual of *Eucalyptus robusta* (Swamp Mahogany). Collectively, these trees represent significantly less than 15 % of the total number of trees in the upper or lower strata of the tree component. Therefore, the site is not considered to be potential Koala habitat for the purposes of SEPP 44.

EPBC Act Koala Habitat Assessment

The Koala habitat assessment tool was applied to assess the habitat within the site for the purposes of the EPBC Act as per the *EPBC Act referral guidelines for the vulnerable Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)* (the Guidelines). The assessment is detailed in the following table.

Koala habitat assessment (coastal criteria)

Attribute	Coastal Criteria	Score
Koala occurrence	Atlas of NSW Wildlife Koala records within 5 km	1
Vegetation composition	Does not contain forest or woodland with 2 or more species of known Koala food tree present in the canopy.	0
Habitat connectivity	Study area is not part of a contiguous landscape	0
Key existing threats	Little or no evidence of Koala mortality from vehicle strike or dog attack at present in areas that score 1 or 2 for Koala occurrence.	2
Recovery value	Habitat is unlikely to be important for achieving the interim recovery objectives for the relevant context	0
	Total	**3**

The Koala habitat assessment tool score of three (3) indicates that the habitat within the study area is unlikely to contain habitat critical to the species survival for the purposes of the EPBC Act.

Please do not hesitate to contact me if you require any further information.

Yours faithfully,

Steve Britt

Bachelor of Science (Botany)
Master of Wildlife Management (Habitat)
Graduate Diploma in Design for Bushfire Prone Area

ATTACHMENT 7 - Acoustic Assessment

PMHC Planning Proposal - Kendall Road, Kew (PP2014-12.1)

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29 June 2017

Geraldine Haigh
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Port Macquarie NSW 2444

Re: Noise impact assessment: Homedale Road Planning Proposal

Dear Geraldine,

1 Introduction

EMM Consulting Pty Limited (EMM) has been engaged by GEM Planning Projects to conduct a noise impact assessment relevant to the proposed residential subdivision located at Kendall Road, Kew to satisfy a request by Port Macquarie Hastings Council for an assessment of industrial and road traffic noise.

The acoustic assessment has been guided by the following relevant guidelines, policies, and standards:

- Australian Standard AS 1055-1997 *Acoustics – Description and measurement of environmental noise*;
- Australian Standard AS/NZS 2107-2000 *Acoustics – Recommended design sound levels and reverberation times for building interiors*;
- National Construction Code (NCC) / Building Code of Australia (BCA) (Part F5);
- NSW Department of Planning 2007 *State Environmental Planning Policy (SEPP) (Infrastructure)*;
- NSW Department of Planning 2008 *Development Near Rail Corridors and Busy Roads - Interim Guidelines*; and
- NSW Environmental Protection Authority (EPA) 2000, *Industrial Noise Policy* (INP).

2 Project description

The proposed residential subdivision is located in the mid-north coast region of NSW in Kew, approximately 1 km to the west of the Pacific Highway on Kendall Road. Port Macquarie is located approximately 28 km north east of the proposed site.

The site is bounded by Kendall Road to the north, existing residential to the east, an approved bulk storage development for temporary fencing to the west and the Camden Haven River to the south. The subdivision will be exposed to road traffic noise from Kendall Road, located approximately 15 m to the north of the site. The proposed lot layout has been provided and is shown in Figure 1.

3 Existing environment

3.1 Unattended noise monitoring

EMM completed 14 days of unattended noise monitoring to establish existing road traffic noise levels on Kendall Road. The loggers were placed adjacent to Kendall Road, approximately 600m west of the intersection of Homedale Road and Kendall Road. The logger microphones were positioned approximately 15m and 100m from Kendall Road, respectively. The road traffic noise monitoring locations are indicated on Figure 1. The monitoring locations were chosen after inspection of the site and giving due consideration to other noise sources which may influence the ambient noise environment and the safety of the logging devices.

The unattended noise monitoring was carried out using Rion NL-42EX noise loggers (S/N 00-221-356 and 00-521-657). The noise loggers were in place from 16 to 30 March 2017 and were programmed to record statistical noise level indices continuously in 15 minute intervals. Calibration of each noise logger was checked prior to and following unattended noise monitoring. Drift in calibration did not exceed ±0.5 dB. The equipment carried appropriate and current NATA calibration certificates.

Weather data for the unattended noise monitoring period was obtained from Bureau of Meteorology's (BoM) Port Macquarie Airport Automatic Weather Station (AWS ID 060139). The wind speed and the rainfall data was used to exclude noise data during periods of any rainfall and/or wind speed in excess of 5 m/s (approximately 9 knots) in accordance with methodology provided in the Industrial Noise Policy (INP) (EPA, 2000).

A summary of the unattended noise monitoring results is provided in Table 1. Detailed noise monitoring results are provided in Appendix A.

Table 1 Unattended road traffic noise monitoring results

Location	Road section	Logging period	Assessment period[1]	Measured RBL, dB	Measured noise level, dB
L1 – Kendall Road (15 m from road)	Between Homedale Road and Dunwoodie Street	16/3/17 to 30/3/17	Day	40 $L_{Aeq(period)}$	60 $L_{Aeq(15\text{-}hr)}$
			Night	40 $L_{Aeq(period)}$	54 $L_{Aeq(9\text{-}hr)}$
L2 – Kendall Road (100 m from road)	Between Homedale Road and Dunwoodie Street	16/3/17 to 30/3/17	Day	37 $L_{Aeq(period)}$	48 $L_{Aeq(15\text{-}hr)}$
			Night	40 $L_{Aeq(period)}$	46 $L_{Aeq(9\text{-}hr)}$

Notes: 1. As per the RNP the day period is from 7 am to 10 pm and the night period is from 10 pm to 7 am.

3.2 Attended noise monitoring

Operator-attended noise monitoring was conducted during deployment of the loggers on 16 March 2017. The attended noise measurements were conducted using a Brüel and Kjær Type 2250 one-third octave hand-held analyser (serial number 2759405). Field calibration of the instrument was completed using a Brüel and Kjær type 4230 calibrator. Attended measurements were undertaken in accordance with AS 1055-1997 *Description and Measurement of Environmental Noise, Parts 1, 2 and 3*. Meteorological conditions throughout the survey period were calm and clear with no winds above 5 m/s or rain.

The results from the attended noise measurement are summarised in Table 2.

Table 2 Summary of 15-minute attended noise measurement

Location	Coordinates, MGA 56H	Start time	Measured noise level dB			Comments
			L_{Aeq}	L_{A90}	L_{Amax}	
L1 – Kendall Road (15 m from road)	473145 E, 6500571 S	11:45	58	42	70	Distant road traffic noise from Pacific Highway consistent. Frequent local traffic on Kendall Road. Insects consistent. Frequent bird noise. Occasional noise from wind in grass/trees and nearby animals.
L2 – Kendall Road (100 m from road)	473129 E, 6500483 S	12:00	46	40	63	Distant road traffic noise from Pacific Highway consistent. Frequent local traffic on Kendall Road. Frequent bird noise. Occasional noise from wind in grass/trees and nearby animals. Plane audible for approximately 4 minutes.

KEY

- Unattended noise monitoring location
- Site boundary

Road traffic noise monitoring locations

Homedale Road Planning Proposal
Road traffic noise assessment
Figure 1

EMM

4 Assessment criteria

4.1 Road traffic noise

4.1.1 SEPP (Infrastructure) 2007

The SEPP (Infrastructure) 2007 relates to roads having an annual average daily traffic volume of 40,000 vehicles, although it can also be applied to roads with 20,000 to 40,000 vehicles daily. Clause 102 of the SEPP (Infrastructure) 2007 addresses the impact of road noise or vibration on non-road development and states:

> **Sub-clause 3:** "If the development is for the purposes of a building for residential use, the consent authority must not grant consent to the development unless it is satisfied that appropriate measures will be taken to ensure that the following LAeq levels are not exceeded:
>
> (a) in any bedroom in the building-35 dB(A) at any time between 10 pm and 7 am,
>
> (b) anywhere else in the building (other than a garage, kitchen, bathroom or hallway)-40 dB(A) at any time."

4.1.2 Development near Rail Corridors and Busy Roads – Interim Guideline

NSW Government Department of Planning *Development near Rail Corridors and Busy Roads – Interim Guideline* (2008) (the Guideline) adopts the same internal noise target prescribed by the SEPP (Infrastructure) 2007 and provides additional guidance on things like ventilation requirements. Section 3.6 of the Guideline states that:

> If internal noise levels with windows or doors open exceed the criteria by more than 10 dB(A), the design of the ventilation for these rooms should be such that occupants can leave windows closed, if they so desire, and also to meet the ventilation requirements of the Building Code of Australia.

4.2 Industrial noise

Potential noise impacts from the neighbouring bulk-storage development have been assessed with reference to the NSW INP (EPA 200). Noise criteria appropriate for assessing intrusive noise from industrial activity at residential properties is determined relative to existing background noise. The intrusiveness criterion essentially means that the equivalent continuous noise level (L_{Aeq}) of the source should not be more than 5 dB above the measured Rating Background Level (RBL) over any 15 minute period.

Noise criteria for each of the INP defined day, evening and night periods have been derived from noise levels measured during the ambient noise surveys and processed in accordance with the INP.

The lowest measured RBL for the monitoring period was 37 dB at L2 during the daytime period. This means that the most stringent criteria that would apply to noise emissions from the bulk storage development is $L_{Aeq,15\ minute}$ 42 dB.

4.3 Sleep disturbance criteria

Potential sleep disturbance impacts from activities such as loading a truck has also been assessed with reference to the NSW INP (EPA, 2000) and the associated Application Notes.

The INP application notes (last updated June 2013) recognise that the current sleep disturbance criteria is not ideal. The assessment of potential sleep disturbance is complex and poorly understood and the EPA believes that there is insufficient information to determine a suitable alternative criteria.

In the interim, the INP guideline suggests that the $L_{A1,1min}$ (or L_{Amax}) level of 15 dB above the measured night-time RBL is a suitable screening criteria for sleep disturbance for the night-time period.

If noise levels over the screening criteria were identified, then additional analysis would consider factors such as:

- how often the events would occur;
- the time the events would occur (between 10.00 pm and 7.00 am); and
- whether there are times of day when there is a clear change in the noise environment (such as during early morning shoulder periods).

Table 3 provides the sleep disturbance screening criteria for the residential assessment locations potentially impacted by the project.

Table 3 Sleep disturbance screening criteria

Assessment location	Adopted RBL, dB	Sleep disturbance screening criteria dB, L_{Amax} Night-time period (10 pm to 7 am)
Closest facade to noise source	37	52

Notes: 1. Sleep disturbance criteria apply during the night assessment period only.
2. Criteria are assessable at the façade of the most affected sleeping area.

Guidance regarding potential for sleep disturbance is also provided in the RNP. The RNP acknowledges that, at the current level of understanding, it is not possible to establish absolute noise level criteria that would correlate to an acceptable level of sleep disturbance. However, the RNP provides the following conclusions from the research on sleep disturbance:

- maximum internal noise levels below 50 to 55 dBA are unlikely to awaken people from sleep; and
- one or two noise events per night, with maximum internal noise levels of 65 to 70 dBA, are not likely to affect health and wellbeing significantly.

It is commonly accepted by acoustic practitioners and regulatory bodies that a facade including a partially open window will reduce external noise levels by 10 dB. Therefore, with reference to the RNP, external noise levels in the order of 60–65 dB calculated at the facade of a residence are unlikely to awaken people.

5 Assessment of noise levels

5.1 Road traffic noise assessment

To assess the building fabric and to calculate indoor noise levels from adopted external noise levels, an initial screening test is undertaken by assuming a standard, complying development building construction. The predicted internal noise levels are then derived from applying a correction to external noise levels based on published literature. Table 3 provides a summary of the typical performance of buildings with respect to noise reduction.

Table 4 Indicative building noise reduction (adapted from FHWA 1995)

Building type	Windows	Internal noise reduction
All	Open	10 dB
Light frame	Single glazed (closed)	20 dB
Masonry	Single glazed (closed)	25 dB
	Double glazed(closed)	35 dB

Notes: FHWA is the US Federal Highway traffic noise publication.

The results of the initial screening test are summarised in Table 4. The noise levels provided represent those likely to be experienced at the most exposed façade (immediately facing Kendall Road) of the proposed development.

Table 5 Initial screening test

Location	Period	External L_{Aeq}, dB	Internal L_{Aeq}, dB		Relevant L_{Aeq} Criteria, dB
			Windows Open (-10dB)	Windows closed (-20dB)[1]	
Closest facade to Kendall Road	Day	60	50	40	40 (living areas)
	Night	54	44	34	35 (bedrooms)

Notes: 1. Assuming standard, light-frame construction for proposed dwellings. Although, it is noted, the majority of dwellings are likely to be masonry construction (consistent with adjoining residential development) and therefore likely to provide additional acoustic performance to that assumed here.

The results for windows closed demonstrate that internal criteria for living and bedrooms immediately facing Kendall Road are predicted to satisfy criteria assuming standard, complying development construction. Results with windows open demonstrate that road traffic noise levels are predicted to be within 10 dB of the criteria and therefore an alternate means of ventilation is not required for any areas to satisfy the interim guideline (DP&I 2008).

5.2 Industrial noise assessment

Typical activity associated with the bulk storage development is expected to consist of a delivery truck being loaded (or unloaded) with temporary fencing product. A truck entering/exiting the site and loading activity of a truck (e.g. a forklift) was modelled at the approved locations as per DA 2009/93. Noise emissions were assessed at the nearest proposed residential lots; approximately 40 m from the bulk storage development.

Results of preliminary noise modelling indicated an exceedance of the relevant noise criteria at the nearest proposed residence and therefore a noise barrier along the western boundary of the site was considered in order to minimise noise emissions received at the proposed residences. The barrier is recommended to extend from the north western corner of the site, along the western boundary to the existing metal shed on the neighbouring property to the west (refer Figure 2). It is noted that the acoustic performance of the barrier would be same if the barrier was located on the eastern side of the road reserve; the exact location of this barrier would be determined during the Development Application for the site. The barrier is assumed to be continuous and contain no gaps, constructed from an appropriate material, such as concrete or lapped and capped timber, and be a minimum height of 1.8 m. Consideration should also be given to the durability of the barrier material.

With the recommended barrier, it is predicted that noise emission levels from the bulk storage development will be $L_{Aeq,15\ minute}$ 41 dB and L_{Amax} 49 dB at the nearest proposed residences. These predicted levels are below the most stringent intrusive noise criteria and sleep disturbance screening criteria.

KEY

- Unattended noise monitoring location
- Indicative location of the proposed barrier
- Site boundary

Noise barrier - indicative location

Homedale Road Planning Proposal
Road traffic noise assessment
Figure 2

EMM

6 Conclusion

EMM has completed a noise impact assessment for the proposed residential subdivision at Kendall Road, Kew. Long-term attended noise monitoring was completed to establish existing ambient noise levels and road traffic noise exposure.

It was found that the relevant requirements regarding road traffic noise intrusion will be achieved for all dwellings by adopting standard, complying development construction techniques.

$L_{Aeq,15\ minute}$ and L_{Amax} noise emission levels from the neighbouring bulk storage development are predicted to meet the most stringent intrusive noise criteria and sleep disturbance screening criteria at the nearest proposed residences with the inclusion of a 1.8m high boundary fence.

We trust the preceding meets your current requirements. If you have any questions or need any further information please contact our office.

Yours sincerely,

Lucas Adamson
Acoustic Consultant
ladamson@emmconsulting.com.au
Review: KT 2/6/2017

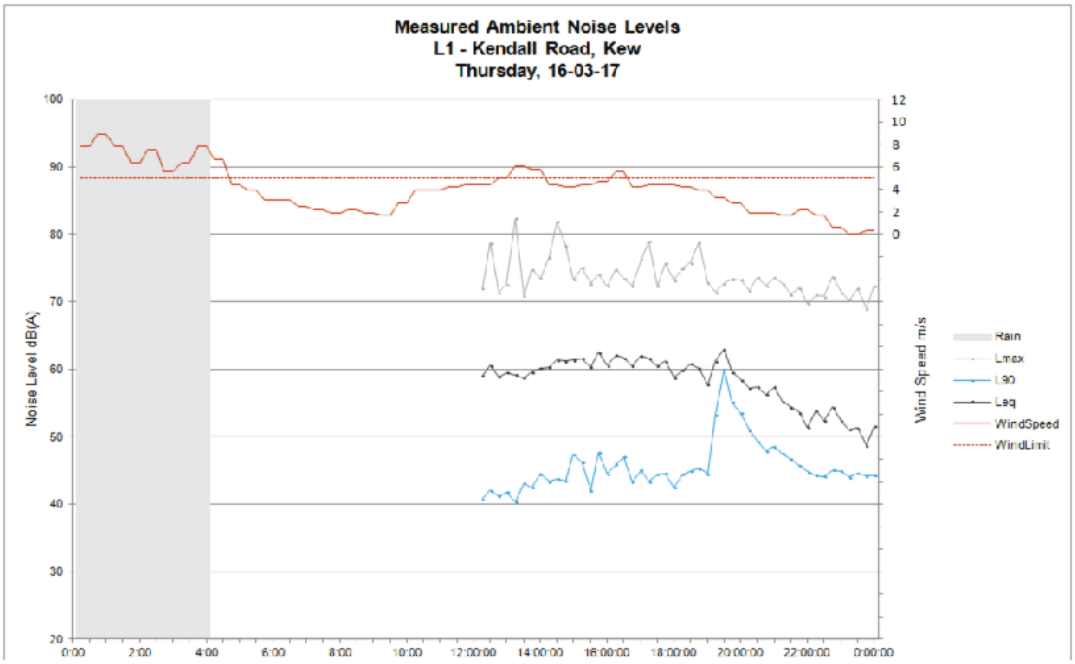
Appendix A

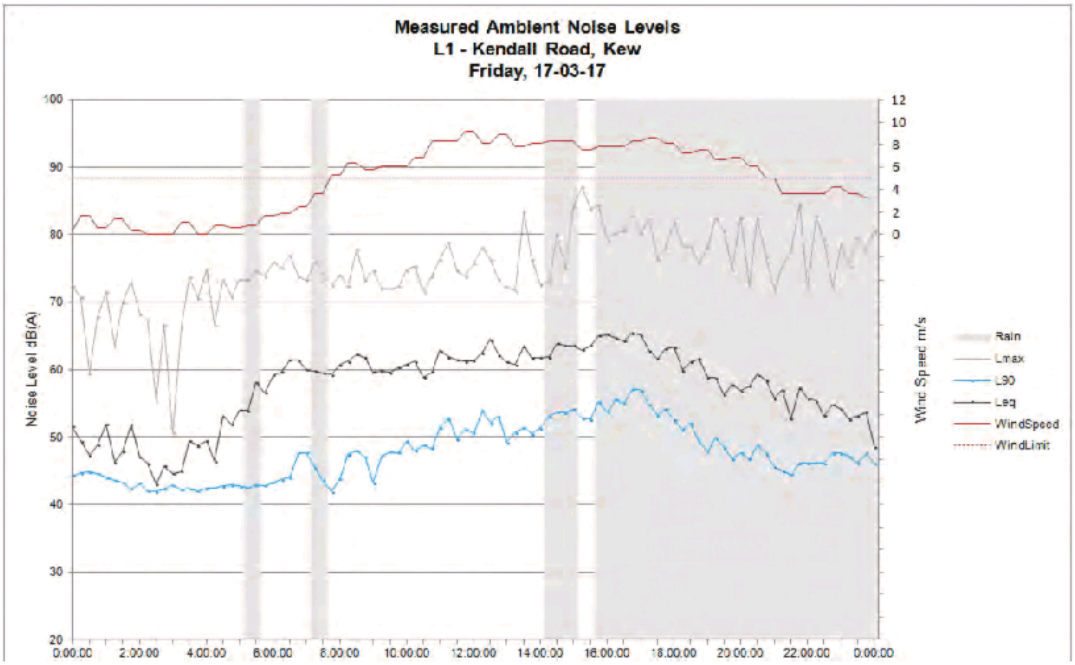
Unattended noise monitoring results and charts

Table A1 Summary of daily noise logging results – L1

Date	RBL (Day)	RBL (Evening)	RBL (Night)	$L_{Aeq,(15\text{-}hr)}$, dB (Day)	$L_{Aeq,(9\text{-}hr)}$, dB (Night)
Thursday, 16-03-17	0	45	42	0	54
Friday, 17-03-17	0	0	0	0	0
Saturday, 18-03-17	0	0	0	0	0
Sunday, 19-03-17	0	42	0	0	0
Monday, 20-03-17	0	42	0	0	0
Tuesday, 21-03-17	0	42	0	0	0
Wednesday, 22-03-17	0	38	40	0	55
Thursday, 23-03-17	0	38	38	0	54
Friday, 24-03-17	0	0	38	0	52
Saturday, 25-03-17	39	40	0	60	0
Sunday, 26-03-17	0	42	40	0	54
Monday, 27-03-17	0	43	40	0	54
Tuesday, 28-03-17	40	40	40	60	55
Wednesday, 29-03-17	0	41	0	0	0
Thursday, 30-03-17	0	0	0	0	0
Overall	40	42	40	60	54

Notes: "0" indicates periods with too few valid samples due to weather or logger operation


Measured Ambient Noise Levels
L1 - Kendall Road, Kew
Thursday, 16-03-17
Noise Level dB(A)
Wind Speed m/s
Rain
Lmax
L90
Leq
WindSpeed
WindLimit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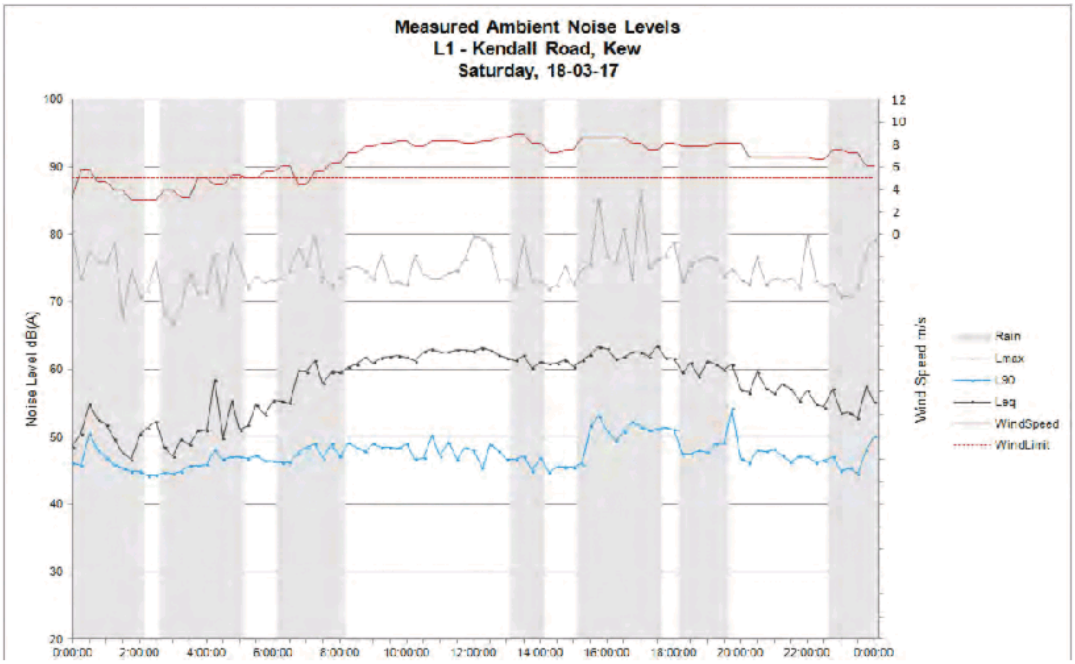
Friday, 17-03-17
Noise Level dB(A)
Wind Speed m/s
Rain
Lmax
L90
Leq
WindSpeed
WindLimit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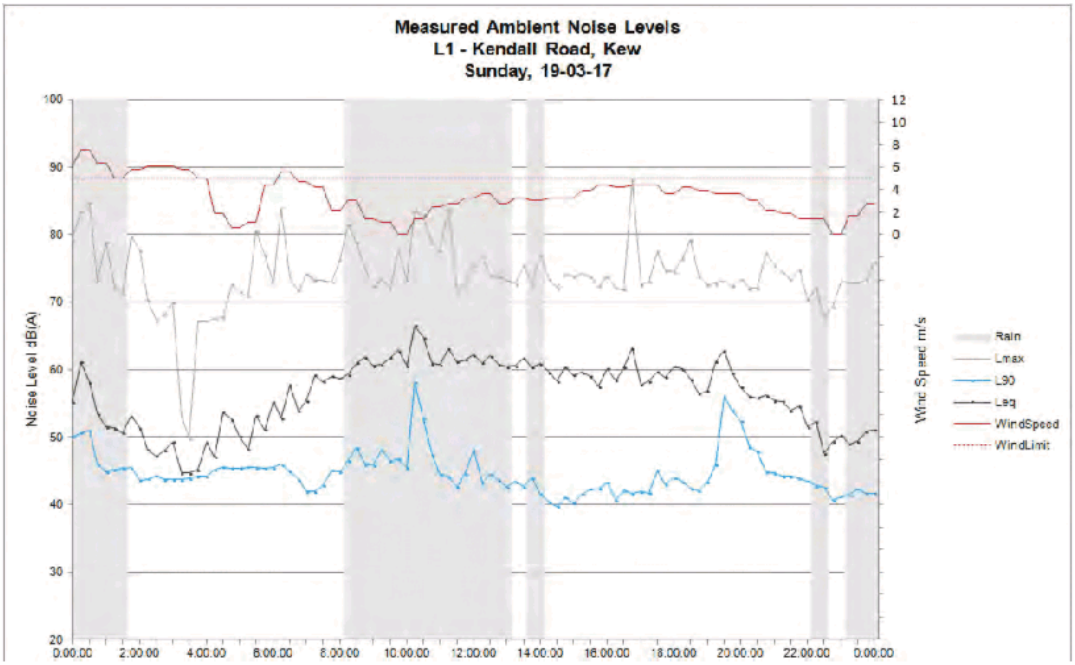
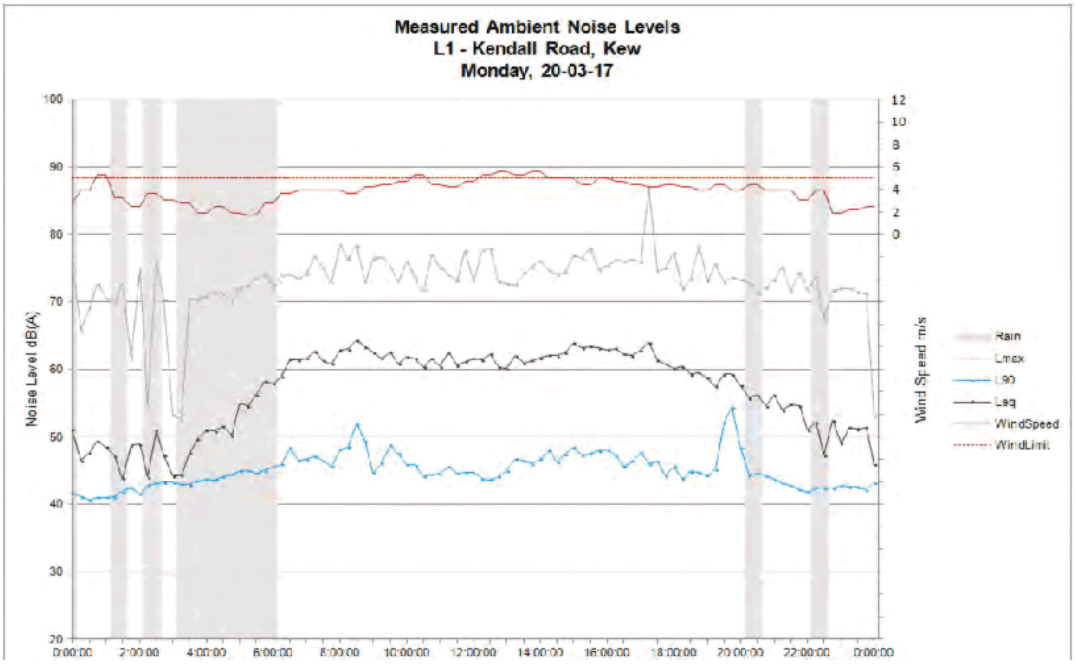
Saturday, 18-03-17
Noise Level dB(A)
Wind Speed m/s
Rain
Lmax
L90
Leq
WindSpeed
WindLimit


Measured Ambient Noise Levels
L1 - Kendall Road, Kew
Sunday, 19-03-17
Noise Level dB(A)
Wind Speed m/s
Rain
Lmax
L90
Leq
WindSpeed
WindLimit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Noise Level dB(A)
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Rain
Lmax
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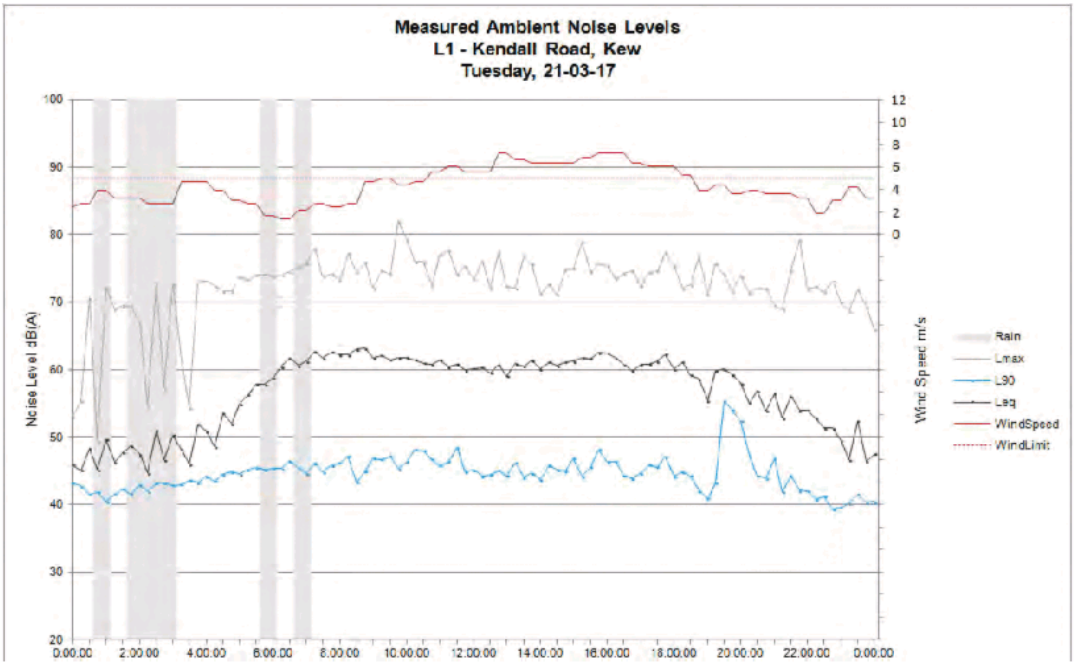
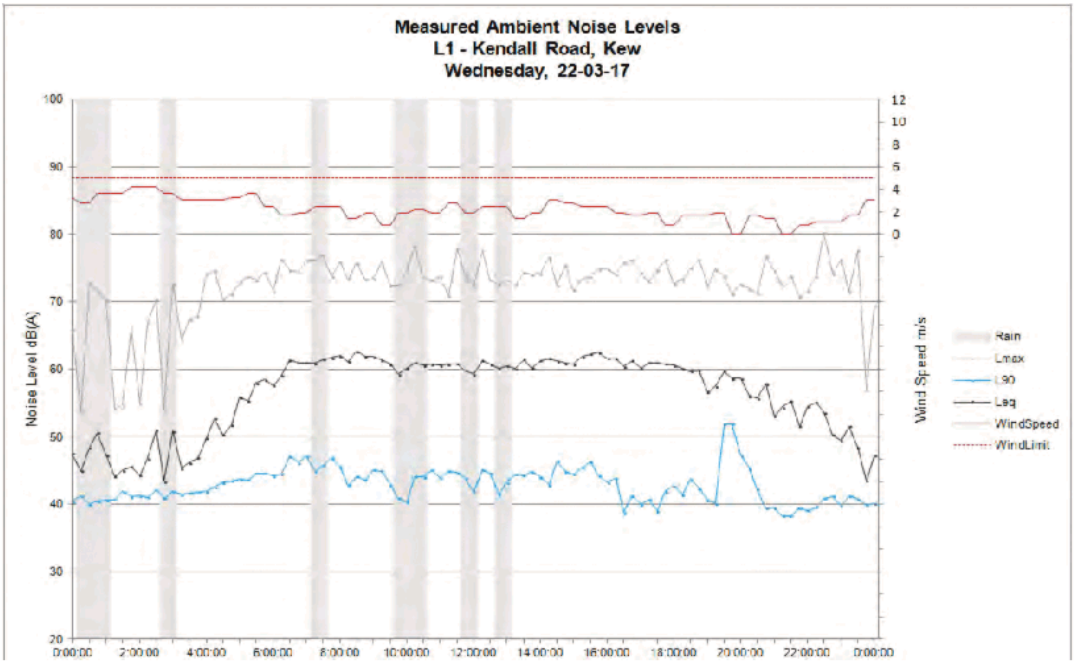
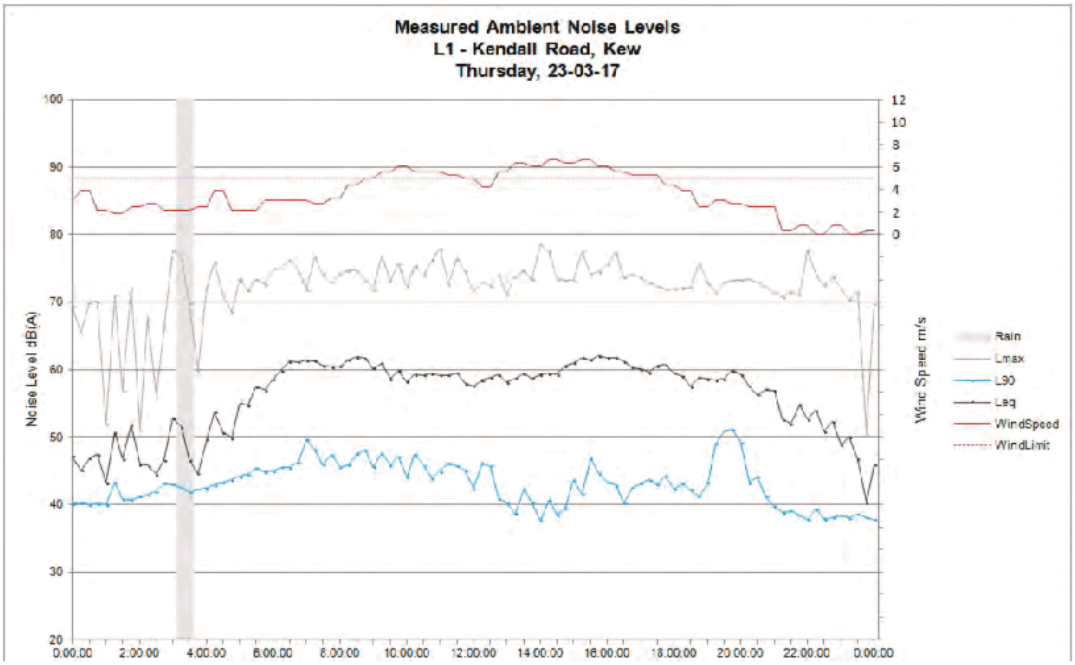
Leq
WindSpeed
WindLimit


Measured Ambient Noise Levels
L1 - Kendall Road, Kew
Tuesday, 21-03-17
Noise Level dB(A)
Wind Speed m/s
Rain
Lmax
L90
Leq
WindSpeed
WindLimit


Measured Ambient Noise Levels
L1 - Kendall Road, Kew
Wednesday, 22-03-17
Noise Level dB(A)
Wind Speed m/s
Rain
Lmax
L90
Leq
WindSpeed
WindLimit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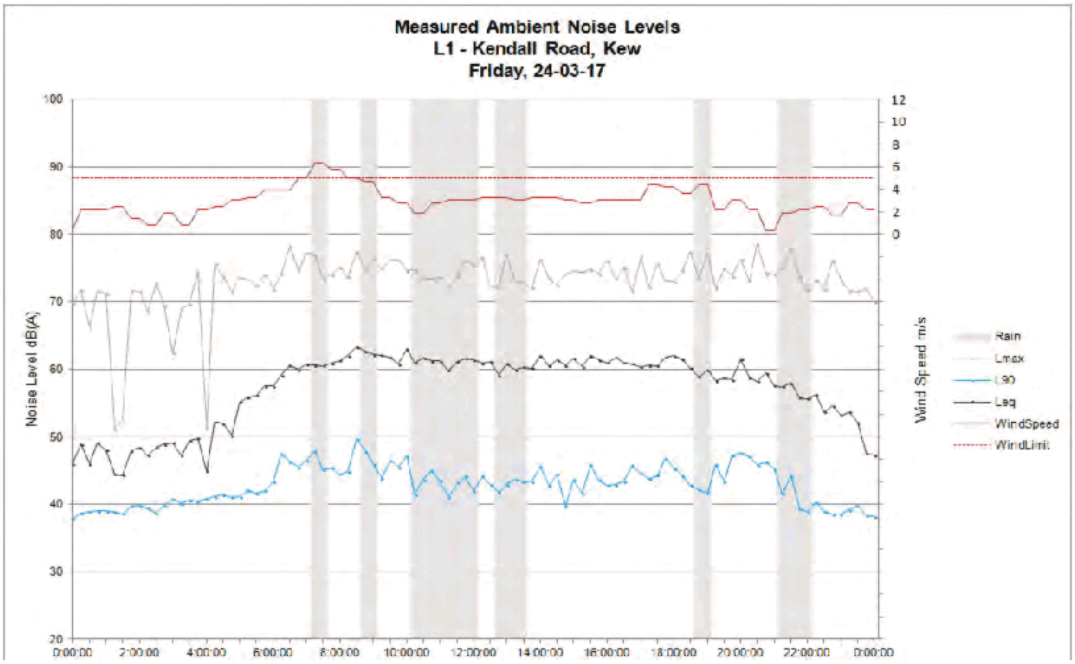
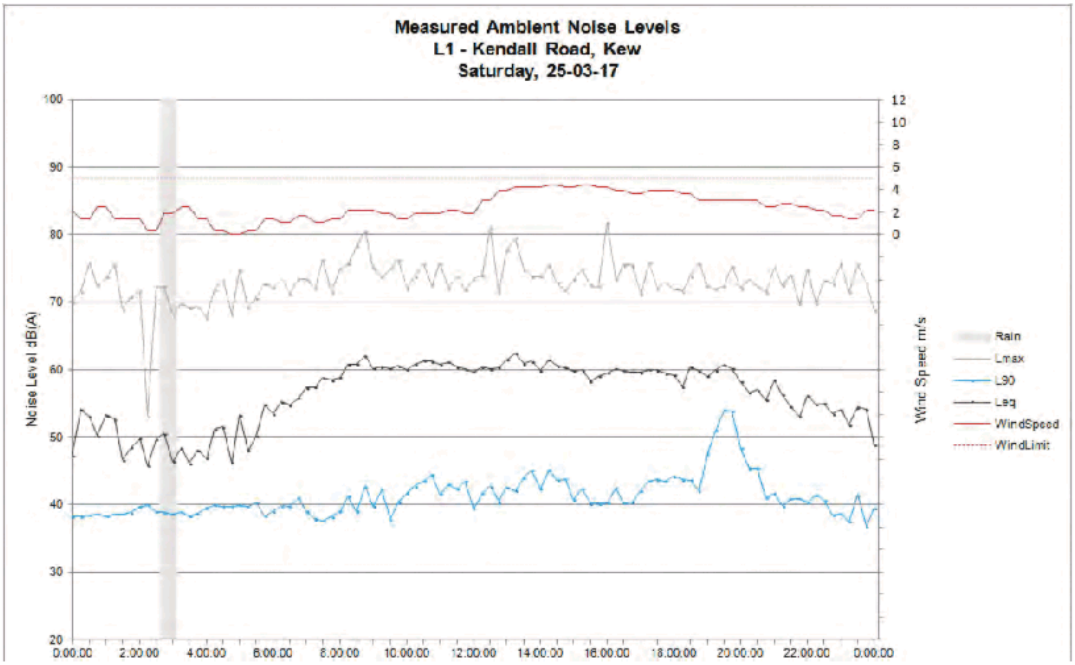
L1 - Kendall Road, Kew
Thursday, 23-03-17
Noise Level dB(A)
Wind Speed m/s
Rain
Lmax
L90
Leq
WindSpeed
WindLimit


Measured Ambient Noise Levels
L1 - Kendall Road, Kew
Friday, 24-03-17
Noise Level dB(A)
Wind Speed m/s
Rain
Lmax
L90
Leq
WindSpeed
WindLimit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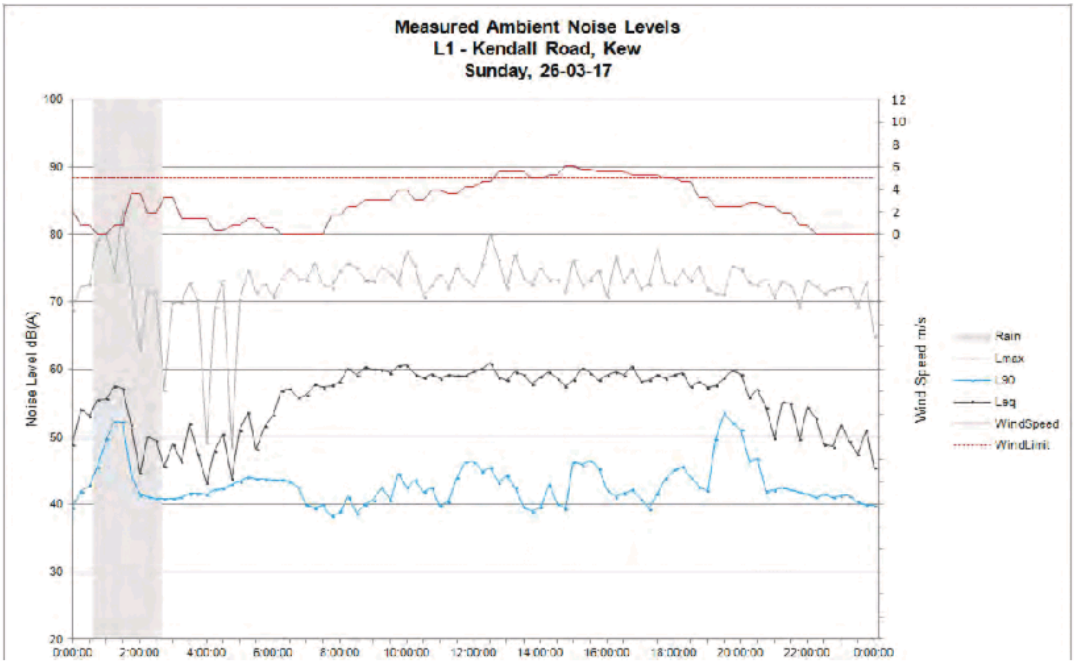
Noise Level dB(A)
Wind Speed m/s
Rain
Lmax
L90
Leq
WindSpeed
WindLimit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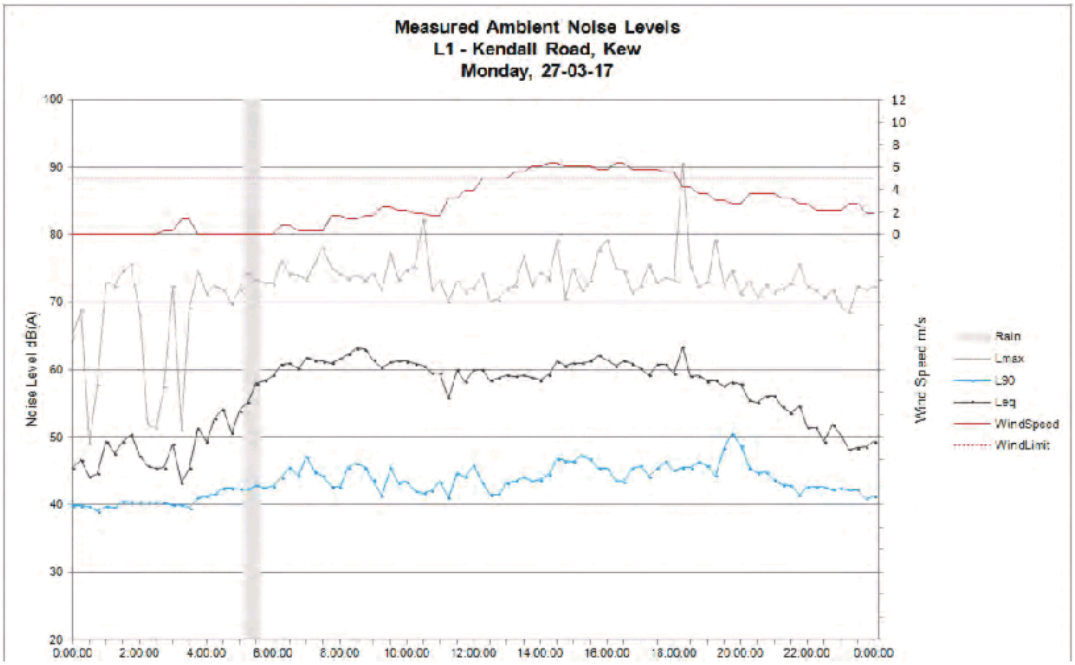
Noise Level dB(A)
Wind Speed m/s
Rain
Lmax
L90
Leq
WindSpeed
WindLimit


Measured Ambient Noise Levels
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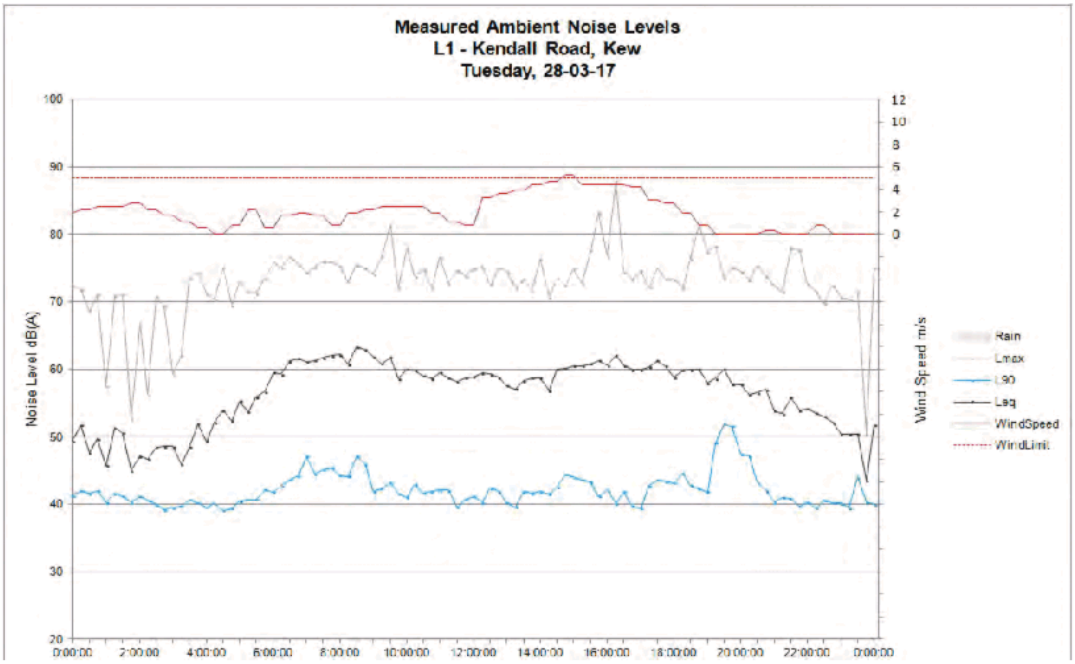
Monday, 27-03-17
Noise Level dB(A)
Wind Speed m/s
Rain
Lmax
L90
Leq
WindSpeed
WindLimit


Measured Ambient Noise Levels
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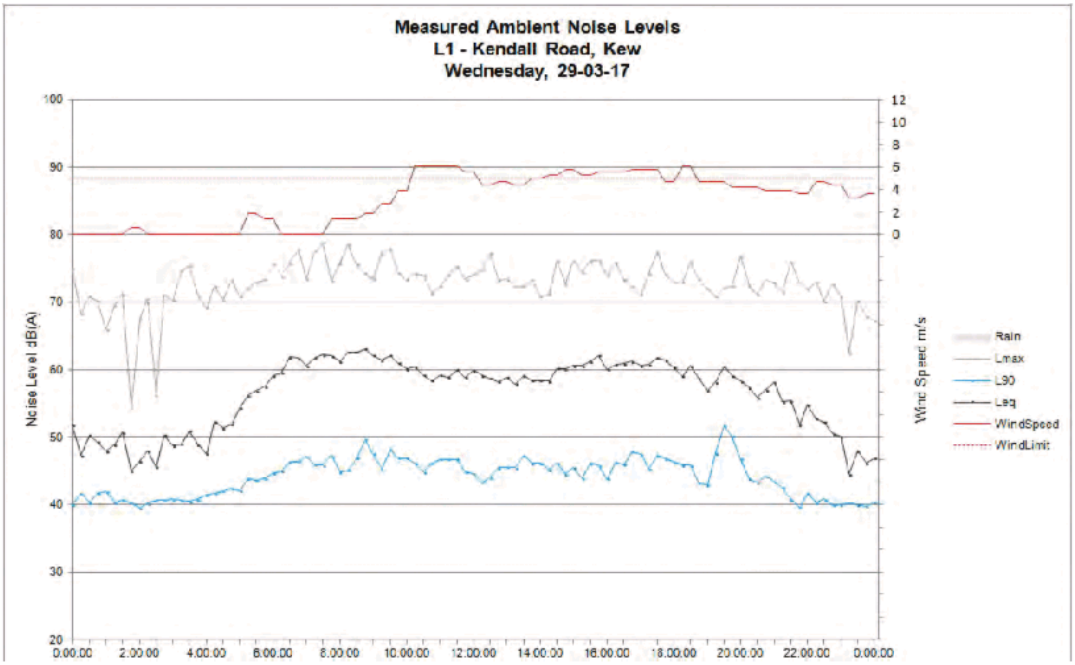
Tuesday, 28-03-17
Noise Level dB(A)
Wind Speed m/s
Rain
Lmax
L90
Leq
WindSpeed
WindLimit


Measured Ambient Noise Levels
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Wednesday, 29-03-17
Noise Level dB(A)
Wind Speed m/s
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

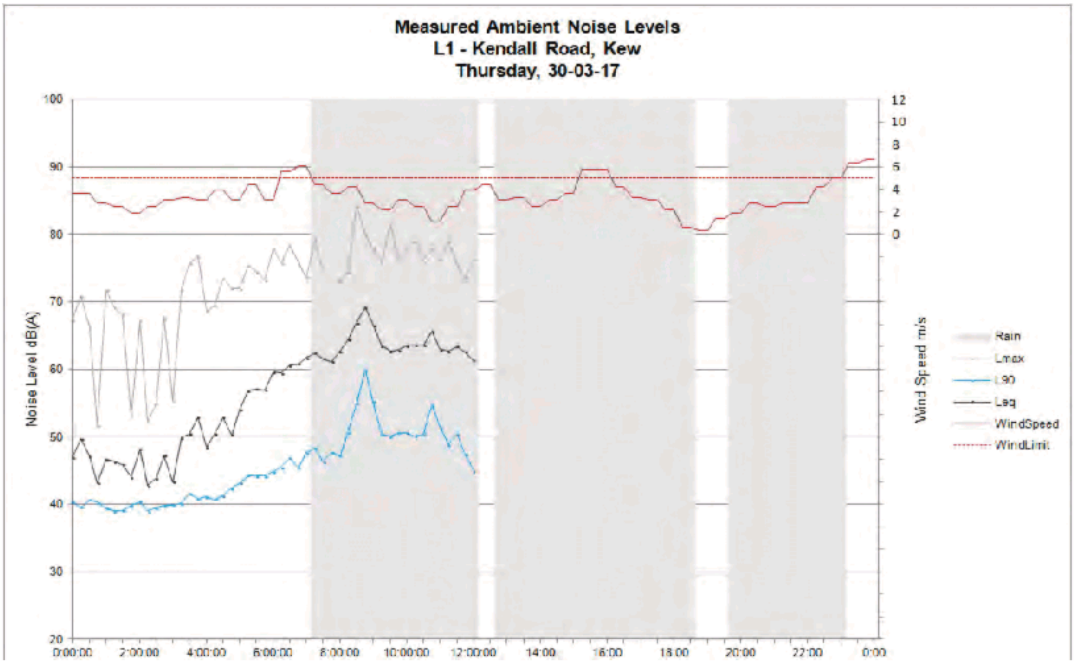
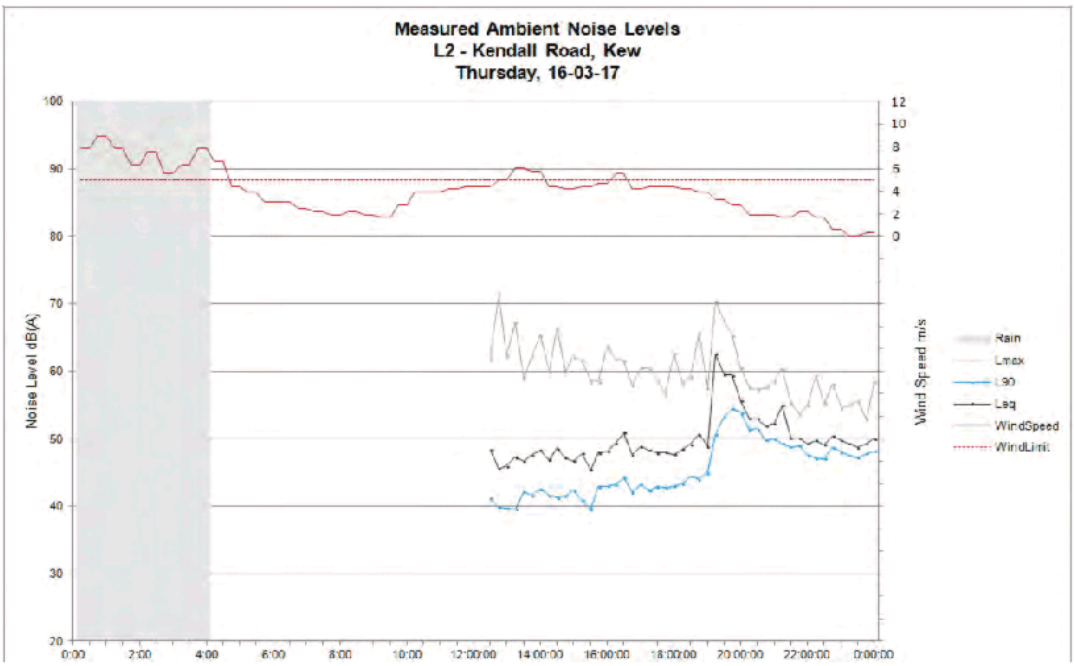

Measured Ambient Noise Levels
L1 - Kendall Road, Kew
Thursday, 30-03-17
Noise Level dB(A)
Wind Speed m/s
100
90
80
70
60
50
40
30
20
12
10
8
6
4
2
0
0:00:00
2:00:00
4:00:00
6:00:00
8:00:00
10:00:00
12:00:00
14:00
16:00
18:00
20:00
22:00
0:00
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

Table A1 Summary of daily noise logging results – L2

Date	RBL (Day)	RBL (Evening)	RBL (Night)	$L_{Aeq,(15\text{-}hr)}$, dB (Day)	$L_{Aeq,(9\text{-}hr)}$, dB (Night)
Thursday, 16-03-17	0	44	41	0	47
Friday, 17-03-17	0	0	0	0	0
Saturday, 18-03-17	0	0	0	0	0
Sunday, 19-03-17	0	42	0	0	0
Monday, 20-03-17	0	41	0	0	0
Tuesday, 21-03-17	0	43	0	0	0
Wednesday, 22-03-17	0	40	39	0	47
Thursday, 23-03-17	0	42	40	0	45
Friday, 24-03-17	0	0	38	0	42
Saturday, 25-03-17	37	43	0	49	0
Sunday, 26-03-17	0	43	43	0	46
Monday, 27-03-17	0	45	41	0	47
Tuesday, 28-03-17	37	43	40	47	46
Wednesday, 29-03-17	0	43	0	0	0
Thursday, 30-03-17	0	0	0	0	0
Overall	37	43	40	48	46

Notes: "0" indicates periods with too few valid samples due to weather or logger operation


Measured Ambient Noise Levels
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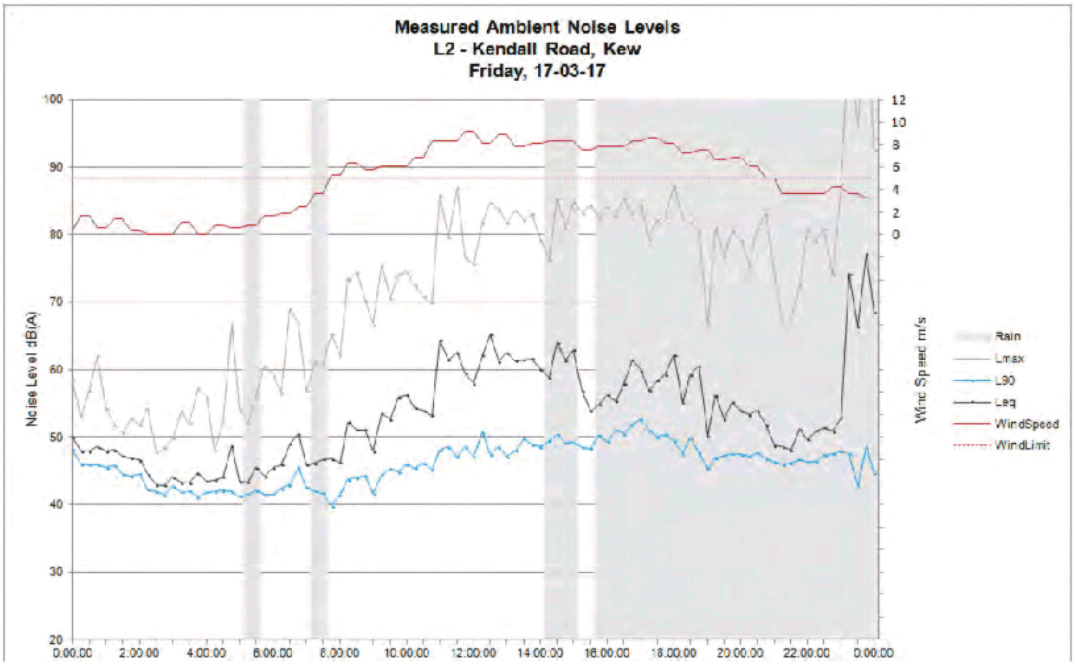
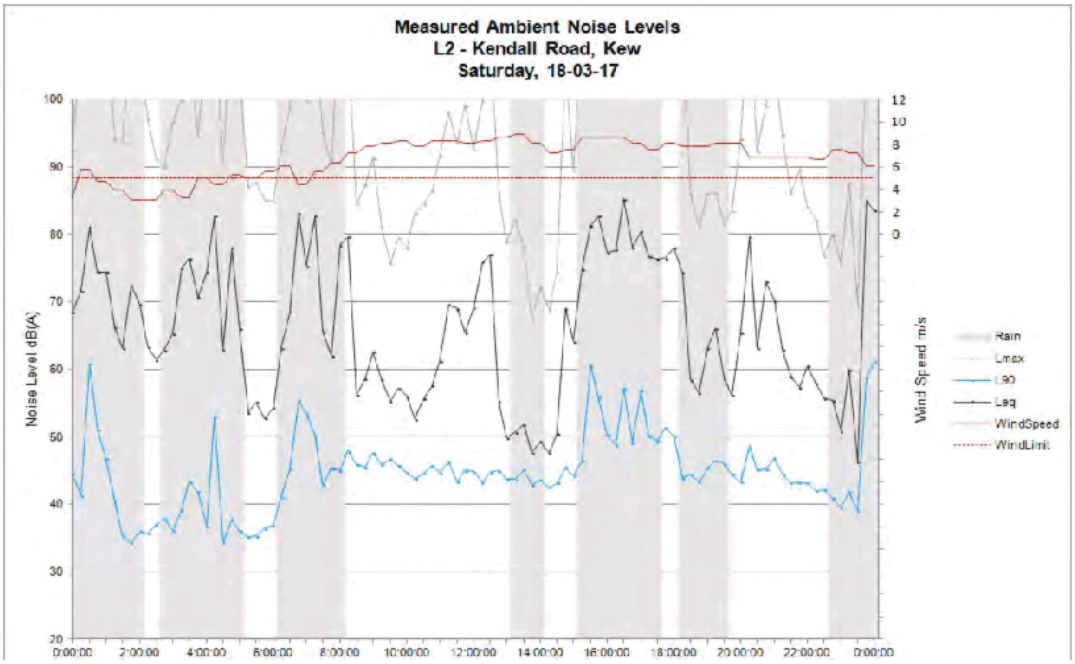
Thursday, 16-03-17
Noise Level dB(A)
Wind Speed m/s
Rain
Lmax
L90
Leq
WindSpeed
WindLimit


Measured Ambient Noise Levels
L2 - Kendall Road, Kew
Friday, 17-03-17
Noise Level dB(A)
Wind Speed m/s
Rain
Lmax
L90
Leq
WindSpeed
WindLimit


Measured Ambient Noise Levels
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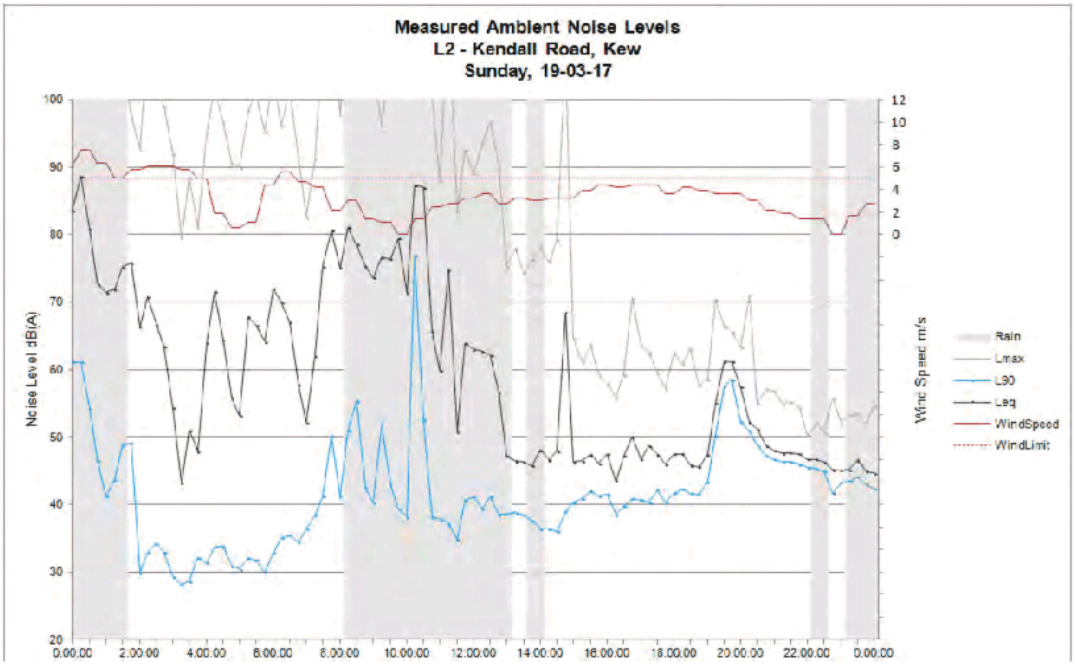
Saturday, 18-03-17
Noise Level dB(A)
Wind Speed m/s
Rain
Lmax
L90
Leq
WindSpeed
WindLimit


Measured Ambient Noise Levels
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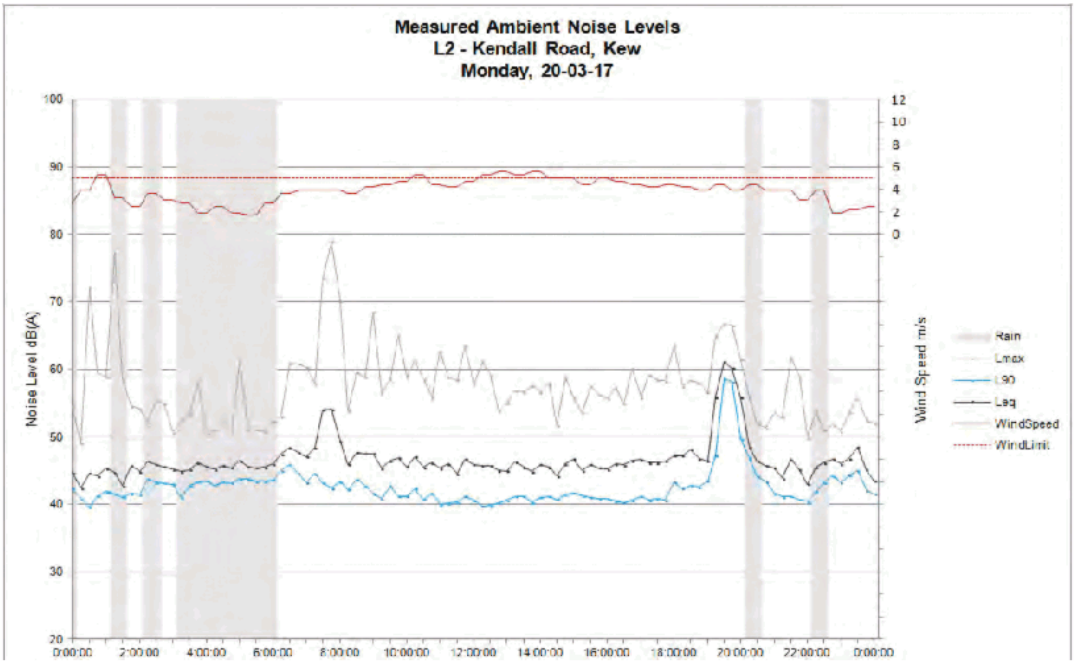
Sunday, 19-03-17
Noise Level dB(A)
Wind Speed m/s
Rain
Lmax
L90
Leq
WindSpeed
WindLimit


Measured Ambient Noise Levels
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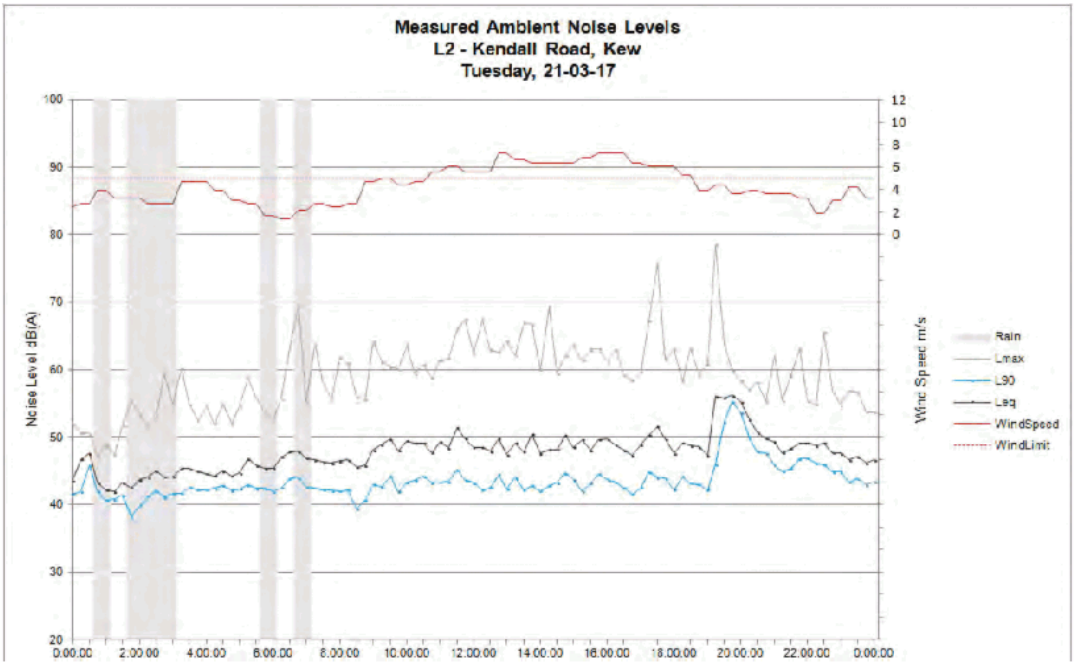
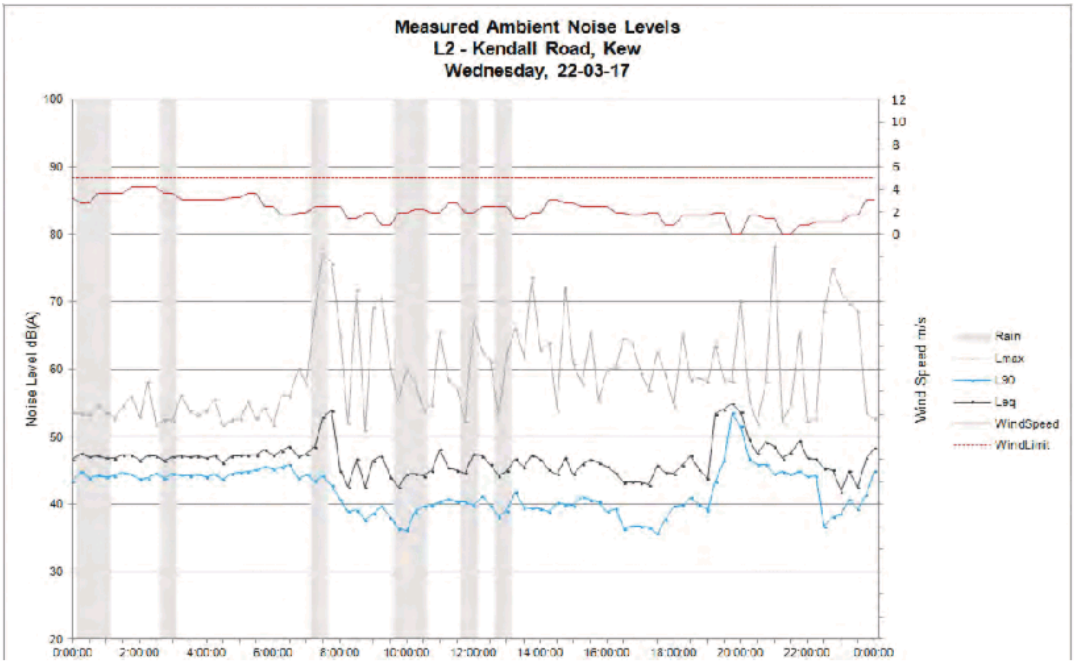
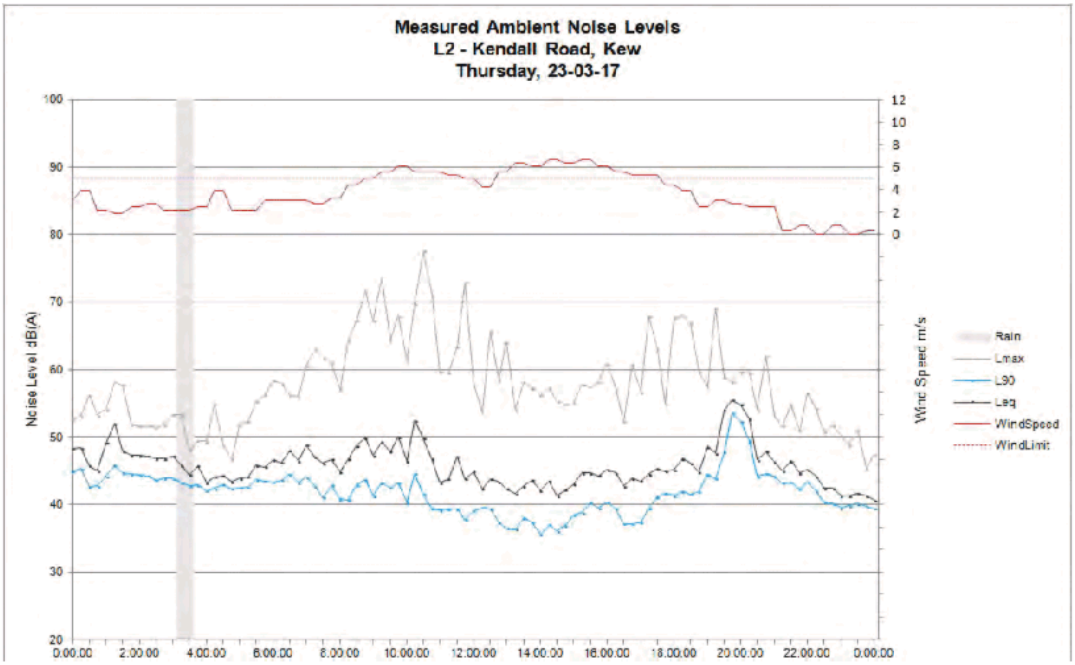
Monday, 20-03-17
Noise Level dB(A)
Wind Speed m/s
Rain
Lmax
L90
Leq
WindSpeed
WindLimit


Measured Ambient Noise Levels
L2 - Kendall Road, Kew
Tuesday, 21-03-17
Noise Level dB(A)
Wind Speed m/s
Rain
Lmax
L90
Leq
WindSpeed
WindLimit


Measured Ambient Noise Levels
L2 - Kendall Road, Kew
Wednesday, 22-03-17
Noise Level dB(A)
Wind Speed m/s
Rain
Lmax
L90
Leq
WindSpeed
WindLimit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Thursday, 23-03-17
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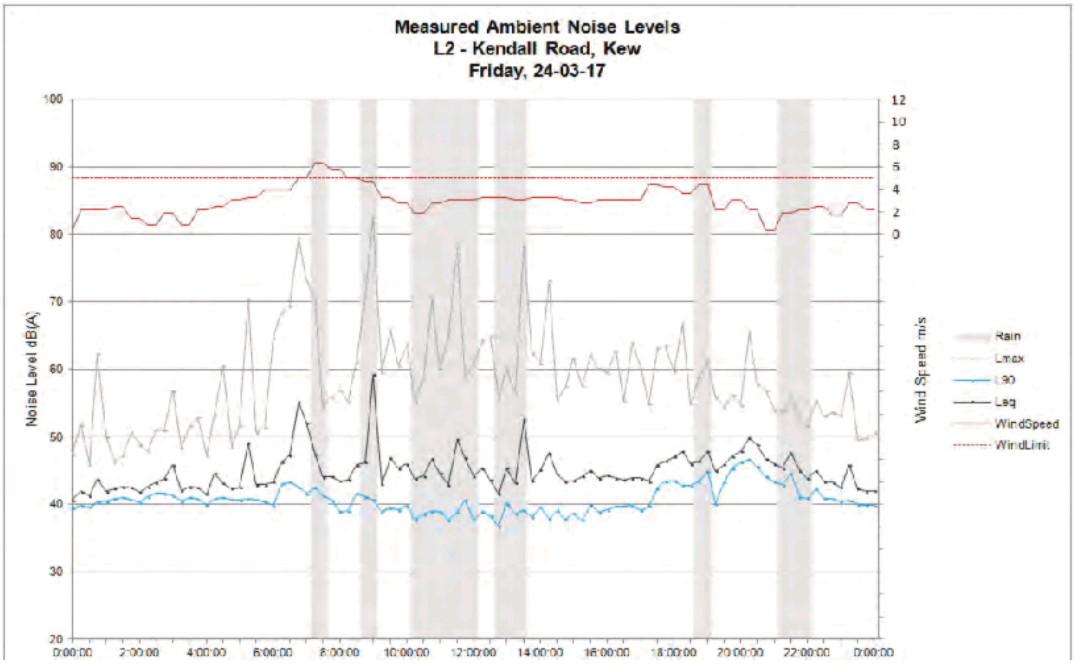
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Wind Speed m/s
Rain
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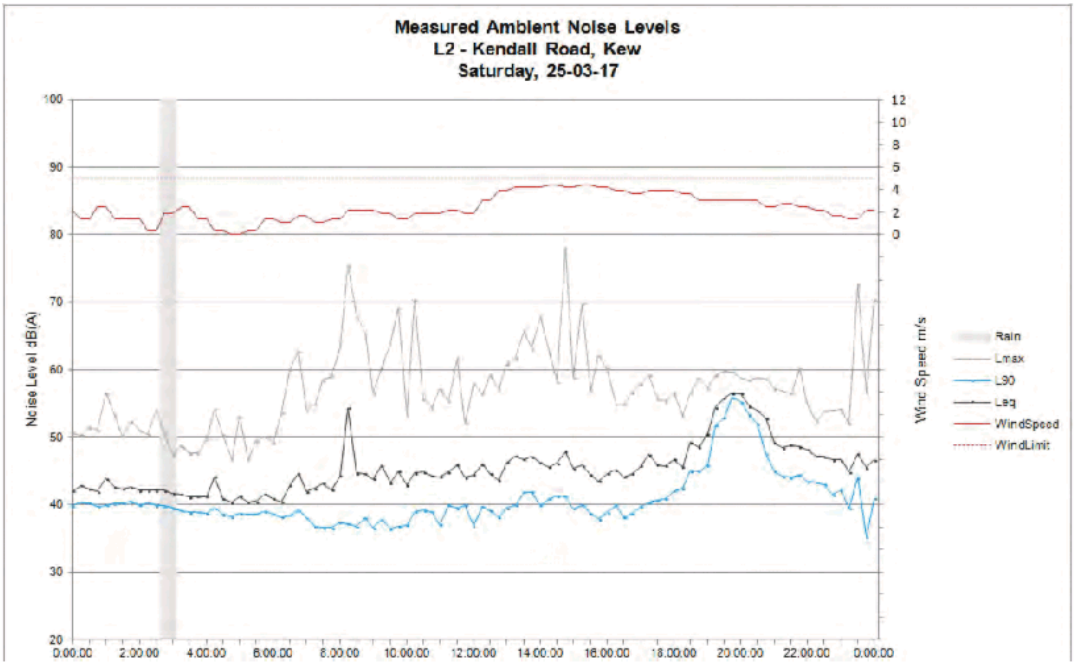
Leq
WindSpeed
WindLimit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Noise Level dB(A)
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Rain
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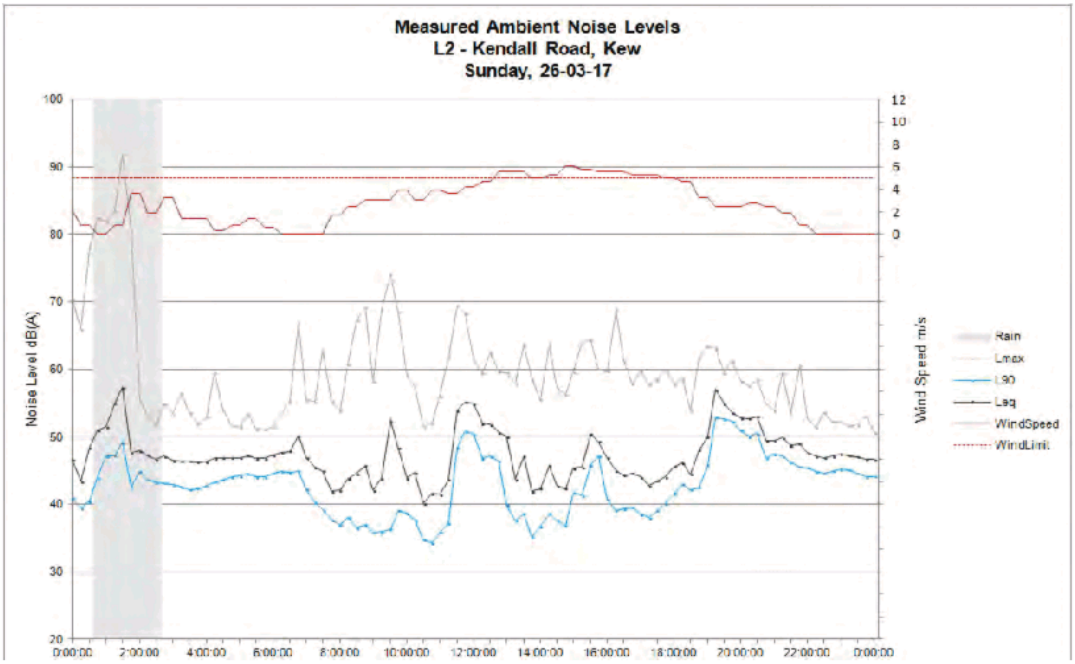
Leq
WindSpeed
WindLimit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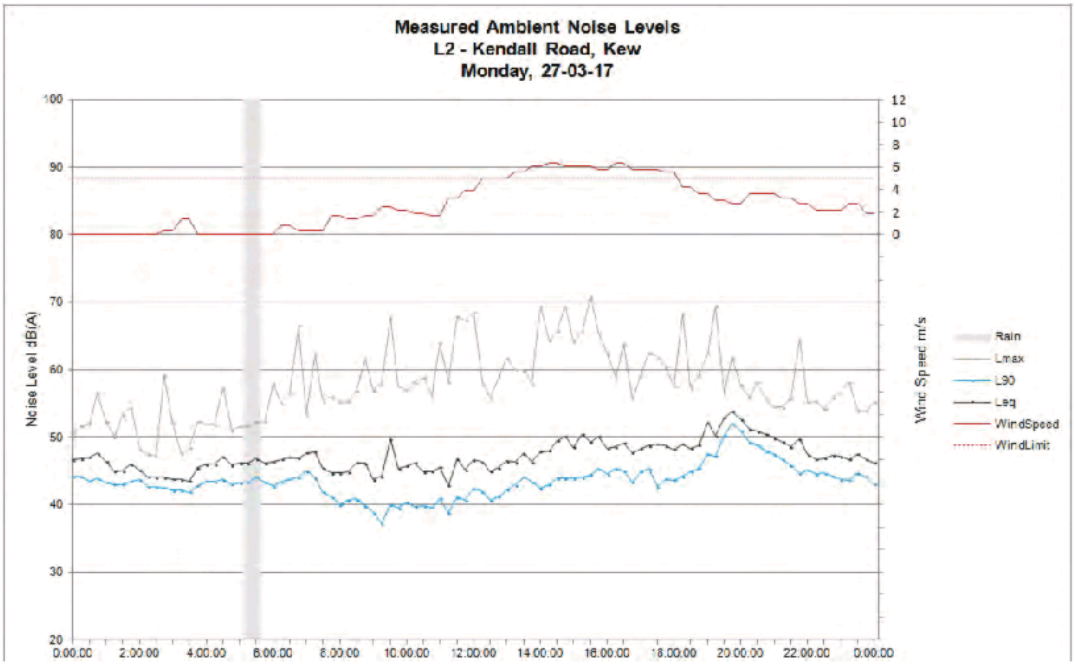
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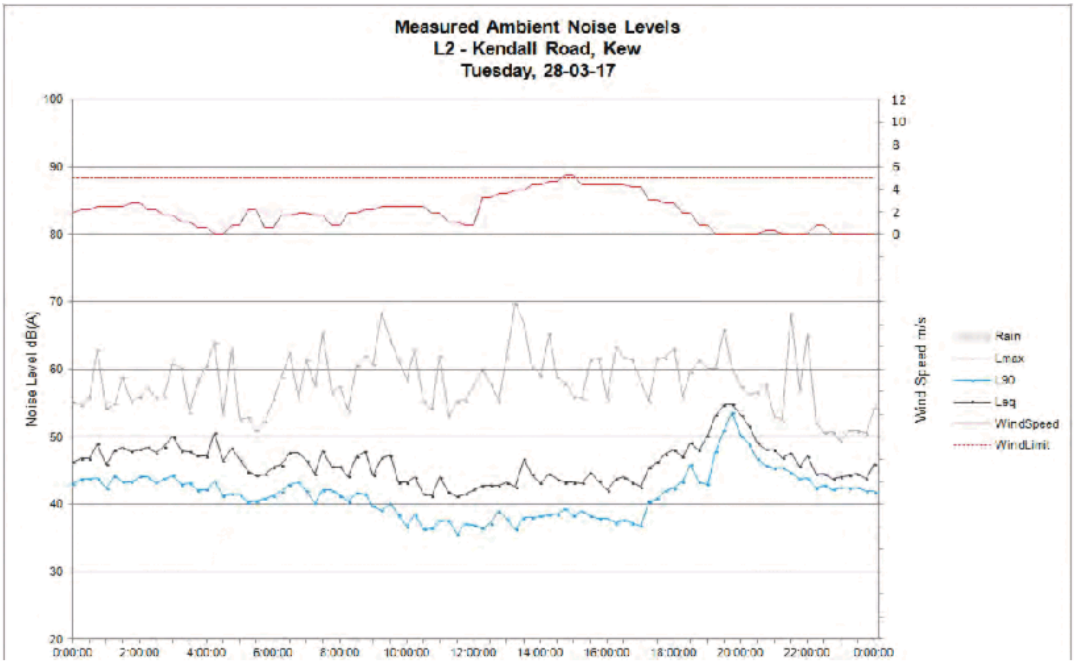
Noise Level dB(A)
Wind Speed m/s
Rain
Lmax
L90
Leq
WindSpeed
WindLimit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Noise Level dB(A)
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Rain
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WindSpeed
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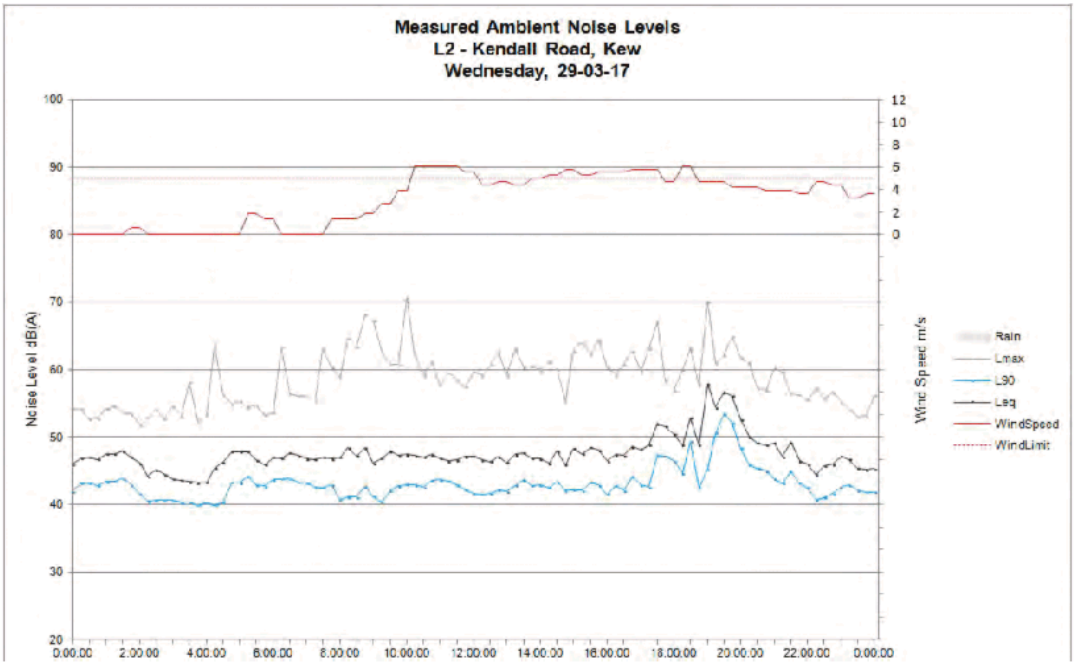
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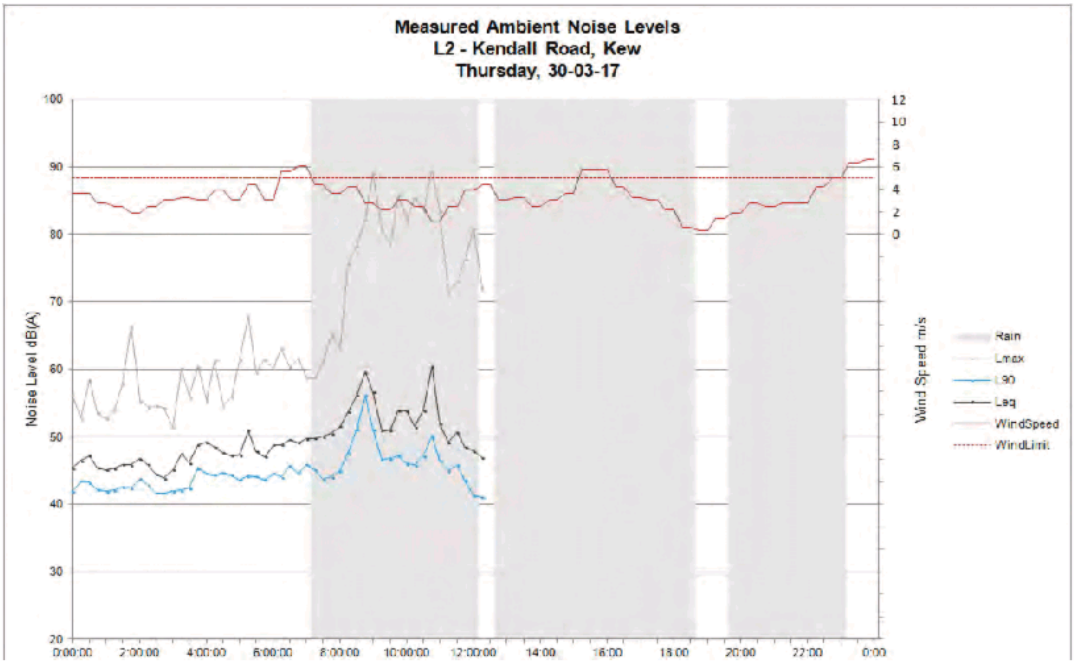
WindSpeed
WindLimit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L2 - Kendall Road, Kew
Thursday, 30-03-17
Noise Level dB(A)
Wind Speed m/s
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

ATTACHMENT 8 - AHIMS Search Result, Bunyah Correspondence & Assessment of Heritage Sensitivity (Appleton, 2004)

Office of Environment & Heritage
NSW GOVERNMENT

AHIMS Web Services (AWS)
Search Result

Purchase Order/Reference : HPK 6578

Client Service ID : 215580

GEM Planning Projects Pty Ltd

Date: 10 March 2016

P O Box 2068
Port Macquarie New South Wales 2444

Attention: Geraldine Haigh

Email: geraldine@gemplanningprojects.com.au

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lat, Long From : -31.638, 152.7078 - Lat, Long To : -31.6265, 152.7261 with a Buffer of 200 meters, conducted by Geraldine Haigh on 10 March 2016.

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

A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

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

[redacted]

BUNYAH LOCAL ABORIGINAL LAND COUNCIL

[redacted]

17th September 2004

Mr Philip Higgins
73 Bold Street
Laurieton 2443

Re: LOT 2 DP 1019318 – Homedale Road, Laurieton

Dear Sir

The setting aside of 0.2 of one hectare of land, separately fenced, at National Park Site No.30-6-03 as accepted by the owners of LOT 2 DP 1019318 is fully concurred in by the members of the Bunyah Local Aboriginal Land Council.

No signposting is required.

Yours faithfully

.....
Mike Dibbs: Coordinator

P.O. BOX 287, WAUCHOPE 2446. PHONE (02) 6585 3682

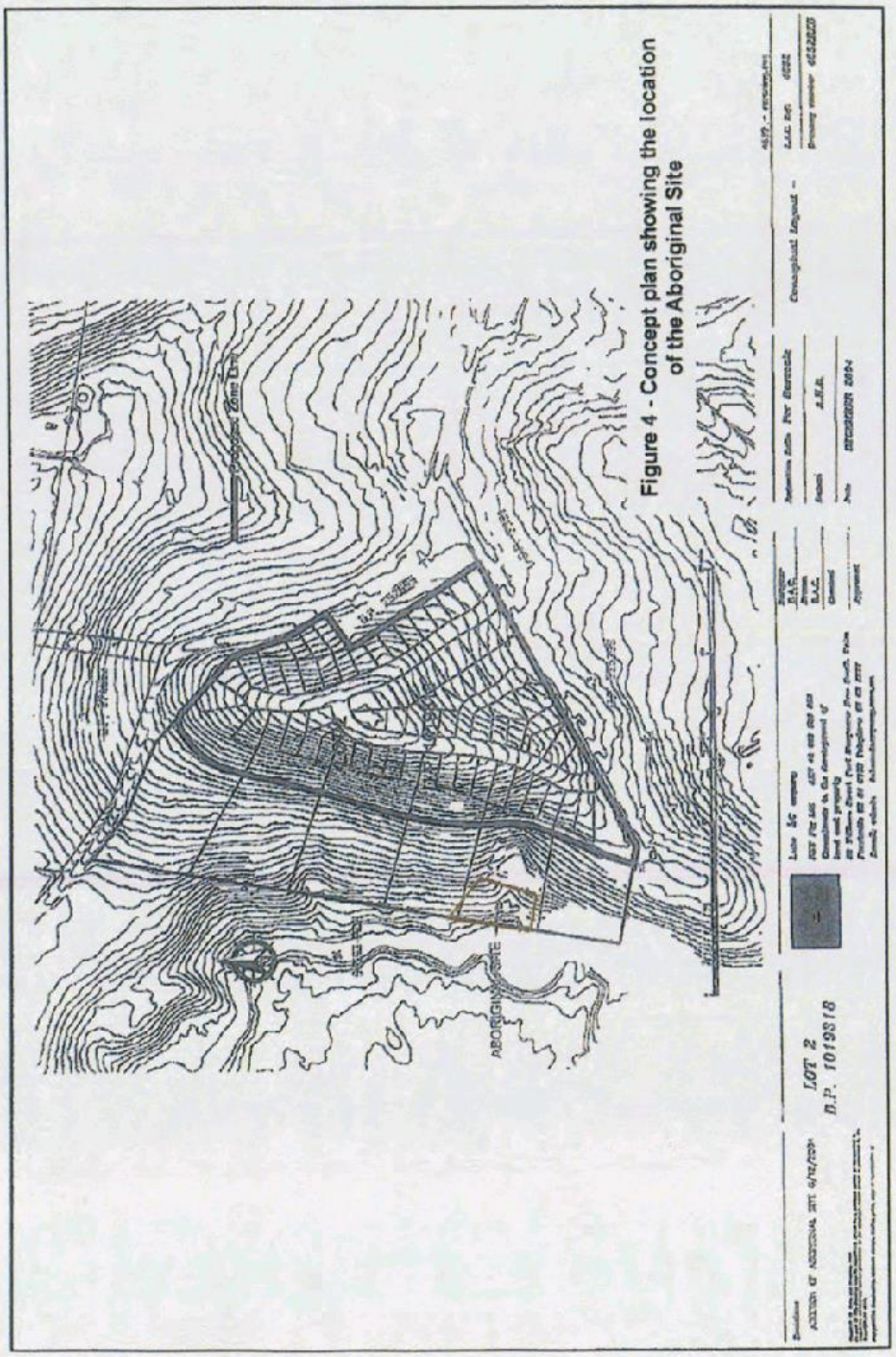

Figure 4 - Concept plan showing the location of the Aboriginal Site

ATTACHMENT 9 - Agricultural Land Use Assessment

PMHC Planning Proposal - Kendall Road, Kew (PP2014-12.1)

Agricultural Land Use Assessment for Lot 202 (DP 1133171) PMHCC

Land Suitability Assessment for Primary Production & Potential Conflict with Adjacent Primary Production Enterprises

Prepared by:
Matt Thompson, MNC Agronomy Pty Ltd
11th November 2015

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1.0 Foreword

I have been contracted by Geraldine Haigh, Director & Senior Planner, GEM Planning Projects, on behalf of Mr John Harvey, C/- Hopkins Consultants Pty Ltd, Port Macquarie, NSW, to provide my professional opinion, as an agronomist, regarding my clients land holding, Lot 202 in DP 1133171, Homedale and Kendall Roads, Kew NSW, and the proposed subdivision of this holding "The Links". Specifically, I have been asked to give a detailed report into the primary production capacity of the 1.78 ha section on the western boundary of the above-mentioned property, as it relates to its description as Regionally Significant Farmland under the 2008 Mid North Coast Farmland Mapping Project. I have also given consideration to potential conflict with adjacent agricultural land should re-zoning of the total 8.3ha lot be allowed, with my expert opinion into the sustainability of primary production enterprises in the region and in this scenario.

My client wishes to seek rezoning of this land in line with the current development area. Briefing notes supplied to me by GEM Planning Projects allows me to ascertain the main issue hindering re-zoning is possible impacts on the adjoining agricultural land, and council does not wish to set a precedent by allowing residential re-zoning of regionally significant farmland. In response, my comments relating to the potential re-zoning of this land address the following issues:

1) Are the owners, or potential future owners, able to utilise the 8.3ha lot (including the 1.78 ha regionally significant farmland) for primary production? And, if not;
2) Will the loss of the 1.78ha of regionally significant farmland in this location be significant?
3) Will utilizing the land for urban development potentially compromise the neighboring farmland? And, if so;
4) What buffers should be incorporated into the development to protect the farmland and its ongoing use for primary production.

The report herein details all aspects impacting on this properties ability to sustain primary production, potential impacts of the proposed residential sub-division on the adjoining agricultural land, and concludes with the properties ability to meet and adhere to the objectives above.

2.0 Site Details

The property is located between Homedale and Kendall Road, Kew NSW. It is identified as Lot 202 DP1133171 Parish of Macquarie and County of Macquarie (Lot 202 is shown in Figure 1 below).

The aspect of the property is to the West overlooking agricultural farmland of Lot 12 DP1041950 (Kendall).

Figure 1: Lot 202 Homedale/Kendall Road Kew

A crown road, running north/south, 1.21ha in area, which separates the proposed development site from the neighboring property, borders the western boundary of the site. A 1.78ha section on the southwest corner of the site, identified in Figure 2 below by the green line and finishing at the junction with the crown road, was identified as Regionally Significant Farmland as part of a NSW State Environment Planning Policy Rural Lands (SEPP) farmland mapping project in 2008 (see section 4.1 below).

Figure 2: Lot 202 illustrating Regionally Significant Farmland (green line) and 1 in 100 year flood zone (blue line)

3.0 Background

3.1 State Environment Planning Policy Rural Lands 2008

In 2008 the NSW Government released the State Environment Planning Policy Rural Lands 2008 (SEPP) with the main purpose of improving planning outcomes in rural areas of NSW. As part of SEPP, the 2008 Mid North Coast Mapping Project identified regionally significant farmland that would not be available for urban or rural residential rezoning. This land was identified on the basis of factors including slope, soil depth, drainage, water holding capacity, soil type and soil structure. Such land was identified as the best farmland in the region and is considered capable of sustained use with a reasonable level of input.

Under the Mid North Coast Regional Strategy of SEPP, only areas highlighted as regionally significant farmland must continue to exist for the main purpose of primary production. Also, urban or rural residential areas expanding towards regionally significant farmland must avoid compromising the farmland. The summary and final recommendations stated that land mapped as regionally significant farmland cannot be considered for urban or rural residential zoning unless the land is:

a) identified in a council rural residential strategy which has been agreed to by the Department of Planning as at the date of the Mind North Coast Regional Strategy; or
b) part of a Growth Area under the Mid North Coast Regional Strategy; or
c) already zoned, subdivided or approved for an urban or rural residential use under an LEP.

In respect to part b), above, regionally significant farmland cannot be included in a Growth Area unless:

a) the land forms an otherwise logical extension to the major regional centres of Grafton, Coffs Harbour or Port Macquarie, and
b) the land is needed for efficient urban development, and
c) there is no practicable alternative, or
d) where the encroachment onto mapped farmland is minor

3.2 Flood zones

On the Mid North Coast, many areas within, or immediately adjacent to, the 1 in 100 year flood zone were identified as Regionally Significant Farmland, predominantly due to the alluvial nature of soil (being of greatest agronomic potential in the region) but also due to the fact that these areas would not be suitable for residential development anyway (due to the flood risk). Indeed, Figure 1 (above) illustrates the 1 in 100 year flood zone (blue line) running adjacent to the regionally significant farmland boundary (dark green line) on Lot 202. Although the 1 in 100 flood zones do contain a large percentage of the more alluvial agricultural land in this this region, their propensity to flooding greatly restricts the viability of many agricultural enterprises due to the high flooding risk.

3.3 Primary Production

Primary production is the cultivation of plant or animal materials. There are many factors that determine the ability to carry out the business of primary production and the type of primary production suitable to a particular property.

The resources available to any parcel of land are the major determinant of the ability of that land to support and sustain primary production. The soil, climate, water, vegetation, topography, location, accessibility and numerous other factors can limit the ability of land to support primary production. The abundance of these resources, and the ability to utilize them in a sustainable way, determine whether it is economically feasible for land to support primary production. For taxation purposes, and as defined by the Australian Taxation Office (ATO), some indicators of carrying on a business of primary production are:

- Whether the activity has a significant commercial purpose or character
- Whether the taxpayer has more than just an intention to engage in business
- Whether the taxpayer has a purpose of profit as well as a prospect of profit from the activity
- Whether there is repetition and regularity of the activity
- Whether the activity is of the same kind and carried on in a similar manner to that of the ordinary trade in that line of business
- Whether the activity is planned, organised and carried on in a businesslike manner such that it is directed at making a profit
- The size, scale and permanency of the activity
- Whether the activity is better described as a hobby, a form of recreation or a sporting activity

It is important to keep these indicators in mind when determining the primary production potential of a property, as it is not only the environmental (soil, water, climate) factors that have a baring on a properties ability to support primary production.

3.4 Primary Production on the Mid North Coast

On the Mid-North Coast of NSW, climatic conditions are well suited to many primary production enterprises. The sub-tropical environment of Kendall supports year-round production through the growth of tropical (warm climate) species in summer, and temperate (cool climate) plant species in the cooler months. The benefit of such a climate is sub-tropical perennial grass species tend to dominate improved soils, and are only dormant during winter. A negative of this environment is winters are too cold to support year round growth of tropical species, as cold nights often kill tropical species. Due to these outcomes, and a slightly summer-dominant (although essentially year-round) rainfall pattern, pasture production for grazing livestock (beef and dairy) tends to be the most reliable and best-suited industry. Other factors that make a pasture based system ideal in this environment are:

- Permanent ground cover (to avoid erosion of highly weathered soils from high rainfall events)
- Increased competition against tropical and temperate weed species
- Reduced production costs
- Reduced risks (environmental and economic)
- Year-round forage production

Several horticultural industries are also suited to this area, but tend to be suited to only small pockets of alluvial soil types, or utilized as fully controlled systems in green or glasshouse environments. Such enterprises generally are intensive in nature, and as such generally require specific DA approval due to the intensity of their operation.

Given beef and dairy livestock grazing (pasture based) systems are well suited to this environment, and are the most common and least intensive form of primary production in this region, I will base this assessment on the potential of this property to establish and sustain pasture for a beef grazing enterprise.

3.5 Limitations to Primary Production on the Mid North Coast

The pasture improvement required to support the livestock industries varies depending on several factors including, but not limited to:

- Vegetation
- Slope
- Soil – type, depth, drainage, structure, nutrition
- Water
- Property size
- Infrastructure
- Government policy
- Environmental impact

Overwhelmingly, the one aspect that determines the success, or otherwise, of any primary production enterprise on the Mid North Coast is soil health. Being a high rainfall zone, the highly weathered soils tend to be acidic (low in essential cations such as Calcium), low in organic matter, shallow in depth, have poor nutrient and water holding capacity, prone to erosion when de-vegetated, and are expensive to maintain year-round growth (due to the poor natural fertility).

As the soil characteristics of any potential primary production land will be the key driver to its success, determining its limitations tend to be the first point of call before initiating any soil amelioration or far improvement programs. Other factors that impact (or visa versa) on the soil health, such as slope, vegetative species, aspect etc. are also important to the primary production potential of any property.

4.0 Current Site Analysis

A site inspection was carried-out on Thursday 23rd July 2015. The purpose of the inspection was to gather information to form a thorough judgment on the section of the property highlighted as regionally significant farmland, and to assess the property's potential impact on adjacent agricultural land if re-zoned for development. The following factors have the largest bearing on primary production in this instance.

4.1 Vegetation

The land is predominantly west facing with the vegetation fairly sparse, presumably due to exposed nature of this aspect. Figure 3, below, shows the typical pasture species present.

Figure 3 – Typical vegetation of lot 202 (23/7/2015)

The constraints caused by the aspect are evident in not only the soil type, but also the pasture species (i.e. grasses, herbs and legumes) present. Of the small numbers of species found, Whiskey grass (*x*) and Carpet Grass (*x)*, both considered as weed

species of the local pastoral environment, are dominant. Other species noted were Fireweed (*Medicago Sativa*), Wallaby Grass (*Danthonia spp.*), Guildford Grass (*Romulea rosea var. australis),* Rats Tail Grass *(Sporobolus spp)* and Kangaroo Grass (*Themeda trianda)*, Paspallum (*Paspallum Dilatatum).* All of these species are considered weed species of improved pastures of the region. Paspallum, which occurred in very small amounts (< 5% of the pasture species) is the only species noted that would be of any nutritional value to grazing livestock if it were present in much larger quantities.

Given the current vegetation, primary production is not possible without significant pasture improvement.

4.2 Slope

As defined on the topographical maps (Figure 2 for example) the slope of the sight varies from 5% incline to 30% incline, with large variability across the whole area. The variability of slope, combined with the shallow topsoil and fragile soil structure (see 4.3 below), means such land is only suitable for a permanent pasture base, as cultivation of such land will likely lead to erosion and loss of topsoil and further decline the ability of this land to support improved pasture species.

4.3 Soil

Observation of the soil type in the top 300mm (the primary root zone for a sub-tropical pasture based system) indicates a sandy clay soil, with clay content likely to be approximately 40%. The soil surface (top 100mm) has low organic matter (OM) content. The typical characteristics of this soil type in this environment are:

- Moderate dispersability
- Moderate permeability
- Low nutrient holding capacity
- Low to moderate water holding capacity
- Low pH, indicating low cation retention

OM % (and therefore carbon levels) at 100mm and beyond is very low. This indicates a soil with low cation exchange capacity and therefore a low nutrient and water holding capacity.

The soil in its current state is holding very low amounts of macro and micro elements, in particular cations, such as Calcium, that are essential for ensuring plant availability of anions, such as Phosphorus and Nitrogen, and also essential for adequate soil structure. To adequately support the growth of pasture species, significant capital inputs of soil ameliorants (in particular lime and organic matter)

would be required as an initial step of soil improvement. Once soil structure is improved, addition of significant amounts of macro and trace elements would also be required to ensure availability of plant available nutrients to establishing plant species.

An estimated cost of initial soil amendments alone would be in vicinity of $3500/ha, and that's not allowing for associated infrastructural, application and preparation works required before this could occur. In short, this soil in its current state will not support primary production, nor is clearing and improving it an economically viable option.

4.4 Property Size

The property is 8.3 hectares in total. I will address the property size in terms of scale of production for a beef grazing enterprise, to paint a true picture of maximum production possible should primary production commence. More specifically, I will simplify theoretical production to that of weight gains on beef steers.

We will assume the property is 95% cleared for the establishment of improved pastures (5% left for shade and higher erosion risk areas) so the actual land area available for production is approximately 7.9ha. Given the current soil state, and other pre-mentioned issues, in the initial 3 years (if primary production were to commence) it is pertinent to presume no production will occur. After initial capital improvements are made, and pasture established, maximum forage production available on this property in a medium input system is likely to be, in an average year, 6000kg/ha/ dry matter production. In a grazing system on sub-tropical pastures, maximum utilisation of pastures is typically 65% (ingested), so this equates to 3900kg/ha/DM utilized. The typical feed conversion ratio of steers on sub-tropical pastures (with no supplements) is at best 12:1 (i.e. 1kg of live weight gain per 12kg of feed ingested). So, maximum live weight production is 325kg/ha/year. With current live weight prices in the vicinity of $2.50/kg, this equates to maximum production of $812.50/ha/year (minus expenses). Over 7.9ha, the maximum property production is $6418.75/year.

Given this projection, this presents two very strong arguments that this property cannot support primary production:

1) The ATO classifies for a business to be engaged in primary production, it must meet the objective of at least $20,000/year turn-over, an objective which this property clearly cannot meet.

2) There is clearly no prospect for profit from the enterprise; neither initially nor in the future. In fact, the property can only run at a substantial loss in all scenarios.

The small scale of the property clearly limits any potential agricultural activities on this land to that of a hobby, and cannot possibly adhere to the requirements of carrying on a business of primary production.

4.5 Infrastructure

The property currently has no infrastructure available to support primary production. There are numerous capital improvements that would be required before primary production could even be considered for commencement. These include:

- Building structures to house plant and equipment
- Boundary fencing (some fencing was visible on the western and northern boundary but it was not stock proof)
- Internal fencing (to segregate livestock)
- Livestock yards
- Adequate water storage

Given the large amount of capital investment required for such a small area of extremely low production potential, such investment is neither economically sensible, nor does it prescribe to the indicators required for carrying on a business in primary production.

4.6 Land Classification

Given the above observations and explanations, it is pertinent to relate these findings to the NSW DPI's Agricultural Land Classification document (Agfact AC.25) as published by Hulme, Grosskof and Hindle for The State of New South Wales 2002 (Appendix 3). The property clearly can fit only one category, Class 5, as described as:

Land unsuitable for agriculture or at best suited only to light grazing. Agricultural production is very low or zero as a result of severe constraints, including economic factors which preclude land improvement.

Class 5 lands suffer extreme limitations for agricultural production. These limitations may be one of, or a combination of, the following features:

- *Productivity levels for all types of agricultural crops and pastures are very low.*

- *Access to local and export markets may be very restricted by location.*
- *Local infrastructure to support extensive forms of agriculture may be absent, as may suitable labour resources.*
- *Extremes of slope can be expected.*
- *The land is unsuitable for cultivation.*
- *The soil profile is very poorly drained.*
- *Erosion hazard is extreme, and economic control using conventional soil conservation measures is impractical.*
- *Soil physical and chemical properties present an extreme limitation to the growth of agricultural plant species.*
- *Recurrent extremes of climate may seriously affect productivity.*
- *Potential economic losses due to flooding are high, in the long term.*
- *The level of economic constraint from factors such as weeds, site contamination, standing timber and feral animals is very high to extreme.*

Understanding the current property condition, it is evident that several of these limitations are extremely pertinent to the property in question. Given the land is largely unsuitable for agriculture, the current rural zoning as it relates to its objective to "sustain primary production by maintaining and enhancing the natural resource base" cannot stand.

4.7 The Potential Loss of 1.78ha of Regionally Significant Farmland

Understanding the above points on the agricultural viability of the whole 8.3ha lot, and given only a 1.78ha (21%) section of this lot is identified as regionally significant farmland, the loss of this 1.78ha section of regionally significant farmland will have no significant bearing on agricultural productivity in the area now or in the future. Furthermore, the rezoning of this very small parcel of regionally significant farmland to urban or rural residential can be justified under part b) of the 2008 SEPP Rural Lands (see section 3.1) given it is within a growth area of PMHCC, and:

a) the land forms an otherwise logical extension to the major regional centres of Grafton, Coffs Harbour or Port Macquarie, and
b) the land is needed for efficient urban development, and
c) there is no practicable alternative, or
d) where the encroachment onto mapped farmland is minor

5.0 Potential Impacts on Adjacent Agricultural Land

Concern has been raised by PMHCC on the potential impact of the development on the adjoining agricultural land, which is also zoned as regionally significant farmland. The neighboring property is predominantly in 1 in 100 year flood zone, so intensive agriculture, such as horticulture (vegetables, citrus, stone fruit etc) and intensive livestock production (feedlotting, broiler or egg production, piggeries etc) are not economically viable due to flood risk for infrastructure, stock and vegetation. The section not within the flood zone (northern boundary adjacent to the road) is dominated by dwelling infrastructure (sheds, houses etc) and being such as small part of the farm cannot contribute significantly to any agricultural production system. The alluvial (flat) section of the land could potentially be used for more intensive grazing purposes than current land-use, based on improved pasture or seasonal cropping regimes.

Given the most productive agricultural pursuit on this land would be grazing for beef production (from section 3.4 above and due to the flood zoning) the following points detail the potential impacts to maintaining meaningful agricultural production, in the form of pasture and/or cropping improvements for livestock grazing, on the neighboring property.

5.1 Potential Toxic Backyard Plant Species Encroachment

With all residential development, there is potential for backyard plant species to encroach on the neighboring farmland, either through natural reproductive processes or even as simply as growing over the fence boundary. Only a very small percentage of backyard plant species are toxic to ruminant animals, and in most cases the toxic species need to make-up a large part of the animals daily diet to cause clinical symptoms.

In this case, the proposal of a 22m wide unformed road reserve between the boundary of the neighboring farmland and the fence line of the proposed subdivision blocks provides a large buffer-zone to negate such issues. Provided backyard plant species aren't allowed to spread vegetatively into the 22m wide reserve towards the neighboring properties boundary, there is minimal risk of grazing livestock ever coming in contact with the vegetation. Permanent fencing between the road reserve and the proposed residential block boundaries is recommended to prevent potential weed spread.

Another potential avenue of toxic plant encroachment is by seed (via wind, water, native animals or rodents) into the neighboring property, and germinating and establishing in the crop or pastures. Given the property is within a flood zone, the risk if weed seed deposit from flood events is high. As

flood events will impact the property from upstream, and not the proposed subdivision (see section 5.2 below) weed seed encroachment is unlikely. Other likely factors contributing to weeds species establishing include weeds seeds being inadvertently imported in grain, silage or hay purchased from other properties or areas, as well as on native animals (e.g. wallabies and kangaroos) from other neighboring properties and, in particular, the local waterways.

The most likely way weed seeds could enter the neighboring property is from wind transportation. Again, as there is a proposed road buffer zone, and given this will be maintained by way of fencing on the eastern (residential blocks) boundary and the western (neighboring farmland) boundary, the risk is low. Also, the potential for successful germination and establishment of the weed seeds, should they enter the property, is extremely low if the neighboring management maintains an established pasture cover year-round. The established kikuyu based pasture on the property, even if managed poorly, will largely outcompete most germinating weed species.

5.2 Potential contamination of livestock drinking water from subdivision stormwater

Contamination of the lagoon areas of the neighboring property, presumably currently used for stock drinking water, needs to be considered should stormwater run-off containing chemical or biological toxins enter these areas.

As the stormwater drainage plans (Figure 4 below) illustrate, all stormwater run-off from the proposed subdivision will be diverted into a 4000m^2 drainage reserve in the southwest corner of the proposed development. The discharge (overflow) for the drainage reserve basin will run into the existing natural waterflow channel present within a 40m vegetation buffer zone between the drainage reserve and the neighboring property boundary (to the west). In overflow events, the drainage water will follow into the existing gully to the south, away from the neighboring property. Therefore, no rainfall water runoff will be entering the neighboring property from the residential blocks, and any potential pollution of the livestock stock water has been negated.

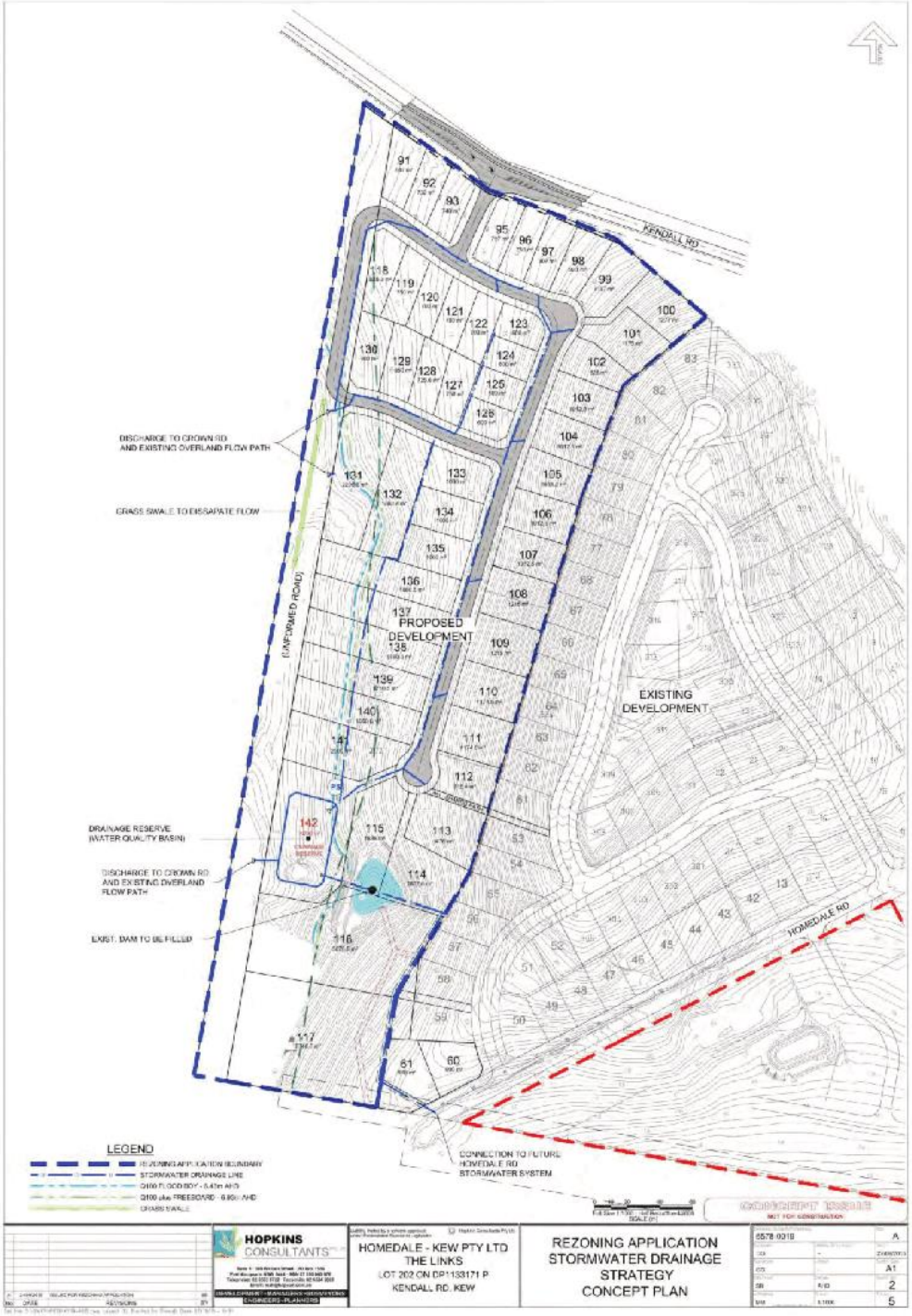

Figure 4: Stormwater drainage plans

5.3 Domestic Pets and Animals

The potential for domestic pets and animals to adversely affect the potential for primary production on the neighboring property is real, however the potential existence of pets on the newly proposed subdivision is no more likely to impact a beef grazing enterprise anymore than existing domestic pets and animals already within the Kew district. Domestic animal's chasing, and in rare cases attacking livestock, particularly calves, is always a possibility but is no more enhanced by the proposed subdivision.

Subclinical livestock production losses, due to stress events, can be caused by excessive noise, or startling noise such as dogs barking. In this case, the 22m proposed road buffer zone greatly reduces the potential impact domestic animals could have on livestock grazing the western boundary of the property. Provided fencing, of both the property boundary and the subdivision block boundaries, are maintained, the risk of impact on the agricultural viability of the neighboring property is negligible.

5.4 Animal disease

Residential areas, particularly those poorly maintained, can potentially harbor diseases that could cause sub-clinical production loss, and in extreme cases death of livestock. For example, rodent borne diseases, such as Botulism, have been know to kill livestock on the mid-north coast. However, such issues are just as likely on any farmland from disease vector sources such as silage, hay, imported feed and dead plant and/or animal material. As we have established the property is likely to support a beef grazing enterprise only (as it is currently doing) disease risk from domestic pets is unlikely.

6.0 Summary

The report above has detailed potential agricultural impacts of the proposed subdivision of this holding "The Links", Lot 202 in DP 1133171, Homedale and Kendall Roads, Kew NSW. Addressing the major points potentially impacting this subdivisions approval from an agricultural sustainability perspective, we have come to the following major conclusions:

1) It is not possible, in terms of both economical and environmental sustainability, to utilise the 8.3ha proposed development lot (including the 1.78 ha regionally significant farmland) for significant primary production now or in the future.
2) Re-zoning the 1.78ha of regionally significant farmland will have no significant impact on agriculture on the Mid North Coast or the immediate area.
3) The potential negative impact of the proposed urban development on the neighboring farmland is extremely low.
4) The proposed 22m-road reserve, as well as the storm water catchment plan, offers a sufficient buffer between the proposed development and the farmland for its ongoing use for primary production.

I recommend to PMHCC, as part of the approval guidelines, the 22m proposed road reserve is utilised as a buffer zone, to the prevent establishment of weed species that could potentially encroach on the neighboring farmland. The road reserve area, in its current state of predominantly naturalised grass species, provides an excellent buffer alone provided groundcover is maintained and the proposed residential blocks are fenced off from this area. It is also important that the 40m-vegetation buffer zone (in the south-west corner of the subdivision) is also maintained (through selective weed control processes) so not to harbor noxious weeds species that could encroach on the farmland and/or reduce discharge water flow from the drainage reserve during rainfall events.

Should you have any further questions please contact me.

Regards

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7.0 Appendices

7.1 Appendix 1 – Current CV for Matt Thompson

Matthew Thompson

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MT

Objective

To provide unbiased, independent, innovative advice to primary producers, private enterprise, government and corporate business. Specialising in soil, plant and animal interactions, my advice to primary producers covers pasture, crop and livestock improvements, as well as farm economic and environmental sustainability. To corporate and government bodies, my advice is often in the form of whole area planning, site impact assessments, agricultural feasibility studies, agricultural impact studies, effluent and waste product re-use, and site rehabilitation plans and monitoring. I always provide advice based upon comprehensive knowledge of agricultural systems, their economic and environmental requirements, and I do so impartially at all times.

Experience

Director & Agronomist MNC Agronomy Pty Ltd **September 2009 – Present (5 years & 6 months)**

I established my own private farm consultancy business 5 years ago, servicing predominantly dairy farms on the mid north coast of NSW. In this time, I have established a stable base of clients that I visit predominantly on a monthly basis. Currently I have 25 dairies on annual consultation programs, and up to 40 farms on an as-needs basis, each with slightly different requirements of my services.

I work closely with my clients to ensure their enterprises are economically and environmentally sustainable. Increasingly, I'm engaging with corporate business, providing advice on soils, pastures, crops, improvement strategies, farm and whole enterprise plans and many other aspects of agriculture.

Consulting Agronomist Seedforce Australia **March 2009 – September 2009 (6 months)**

Whilst travelling with my fiancé', I consulted part time to clients of Seedforce across Australia, predominantly in Western Australia and Eastern NSW. This role involved predominantly pasture and crop improvement advice to existing and potential clients of Seedforce.

CRT Taree & Wingham **February 2007 – March 2009 (2 years & 2 months)**

As the sales Agronomist, my role was to provide clients with advice on pasture improvement strategies to ensure they were maximizing production using the most efficient inputs. As part of this role I had to ensure the contracting part of the business was busy at all times through increasing seed, chemical and fertiliser sales. In 2008 we achieved CRT National and NSW store of the year for business growth and productivity.

Elders Ltd **December 2003 -Feb 2007 (3 years & 3 months)**

Initially as part of an Agronomy team in Mt Gambier, I transferred internally to Taree as sales Agronomist. I provided clients with advice on pasture improvement strategies to ensure they were maximizing production using the most efficient inputs.

Independent Fertilisers **October 2003 – Dec 2003 (3 months)**

On a short-term contract out of university, I joined part of an irrigation monitoring team providing advice on irrigation scheduling and water management for crops, pastures and vineyards. Elders purchased this business on December 2003 where I was employed as an agronomist.

Education

Bachelor of Rural Science, University of New England **2000 – 2003 (4 years)**

Rural Science provided me with a solid base of chemistry, biology, animal physiology, economics and holistic farm planning. Majoring in Pastures, my final year involved a thesis in conjunction with Dr John Ayres of NSW DPI Glen Innes, investigating the drought tolerance of several white clover trial lines and commercial cultivars. This experience greatly improved my report, research and negotiation skills.

Singleton High School **1994 – 1999 (6 years)**

In the final years I elected to focus on Engineering Science, Mathematics, Physics, and Agriculture. In Agriculture and Engineering science. I was able to achieve HSC results placing me in the top 1% of students in NSW.

Skills

Initiative to identify, understand and strive towards results for my clients. Challenging my clients to challenge themselves is key to my success. I am constantly pushing my clients to adopt new methods which I feel will enhance the efficiency of their farms. An example of this is the implementation of fodder testing of all conserved feed on many of my clients properties, and allocating these feeds for a strategic purpose; either filing feed quality or quantity gaps, or helping manage milk components. Pushing dairy farmers to identify, prioritize and focus on the most important aspect of their operation at any particular point in time is paramount to their level of success.

Relationships are central to success at all levels of agriculture. Having a practical yet technical approach at the farm level is integral to building strong bonds with primary producers. I thoroughly enjoy listening to my clients, helping them identify and segregate their difficulties, and together put protocols in place to mitigate or manage such issues. I believe my transparent and genuine desire to help my clients forges strong relationships for life. The continued success of MNC Agronomy is proof of my outstanding relationship building skills.

Excellent communication skills with all levels of primary production; from training and communicating of technical concepts to farm employees, to advising corporate business leaders which aspects of their businesses and their associated products require investment and/or alteration. I pride myself with my ability to talk on a practical, problem solving level with my clients, whilst I am equally comfortable engaging with agriculture professionals and corporate business at the boardroom level. Evidence of this is my current negotiation of potential milk contracts for a client with five processors, negotiating with their representatives, the clients bank manager and accountant; whilst on the same day helping the same client formulate his feed ration, alter their pasture rotation, calibrate their contractors precision seeder and give two staff members a lesson on utilizing pasture meters to determine plant growth rates.

Self-driven and motivated, time management is requirement for the success of my current business. Allocating sufficient time to undertake, evaluate and report to my clients, whilst doing so in a cost efficient manner for them, is valuable skill I have developed in recent years. Prioritization and delegation of tasks based upon urgency and importance of outcomes requires continual consideration. My current position often requires long hours and weekend work, but my passion for sustainable agriculture and a drive to provide for my young family always prevails.

Expertise in soil science, and its direct relationship with soil, plant and animal nutrition, is my key point of expertise. Given my clients profitability is driven largely by pasture production, the economics of soil amelioration, plant nutrition, and the management of soils, pastures and livestock, are my major areas of focus.

Project management and monitoring of on-farm projects is relentless in my current position. I'm also involved in the design, methodology, set-up, measurement, management and analysis of several R & D projects both independently, and in conjunction with agricultural industry providers such as seed, chemical and fertiliser companies. For example, I'm currently managing my own independently run pasture varietal trial audited by MLA as part of the PVTN program; I have done this for the past 3 years. This trial requires me to negotiate with seed company representatives, plant breeders, government representatives, independent auditors, contractors, produce stores, seed retailers and my clients to ensure the trial methodology and results are relevant to the farming community.

Involved in the NSW Dairy community since 2005 predominantly on the Mid North Coast. I have a strong network of clients, but also an extensive network of contacts in not only the local dairying community, but also the agricultural community in general. I have been involved in the Mid Coast Dairy Advancement Group intermittently, but have been unable to be fully involved recently due to my current business commitments.

Influence on my clients' decision-making processes continues as I strive to identify opportunities for improvement. As my current business model works on a fee for service arrangement with my clients, I naturally find my business servicing predominantly those that already have the ability to see the economic benefits of external advice in the success in their business. Although my clients and I find this arrangement extremely rewarding, I feel I have much to give the rest of the farming community.

Other Points

Current holder of a NSW Class C and R Drivers License.

Currently resident/owner of a property near Wingham on the Mid North Coast NSW. My current consultancy business is also run from a separate office building at this location.

Referees

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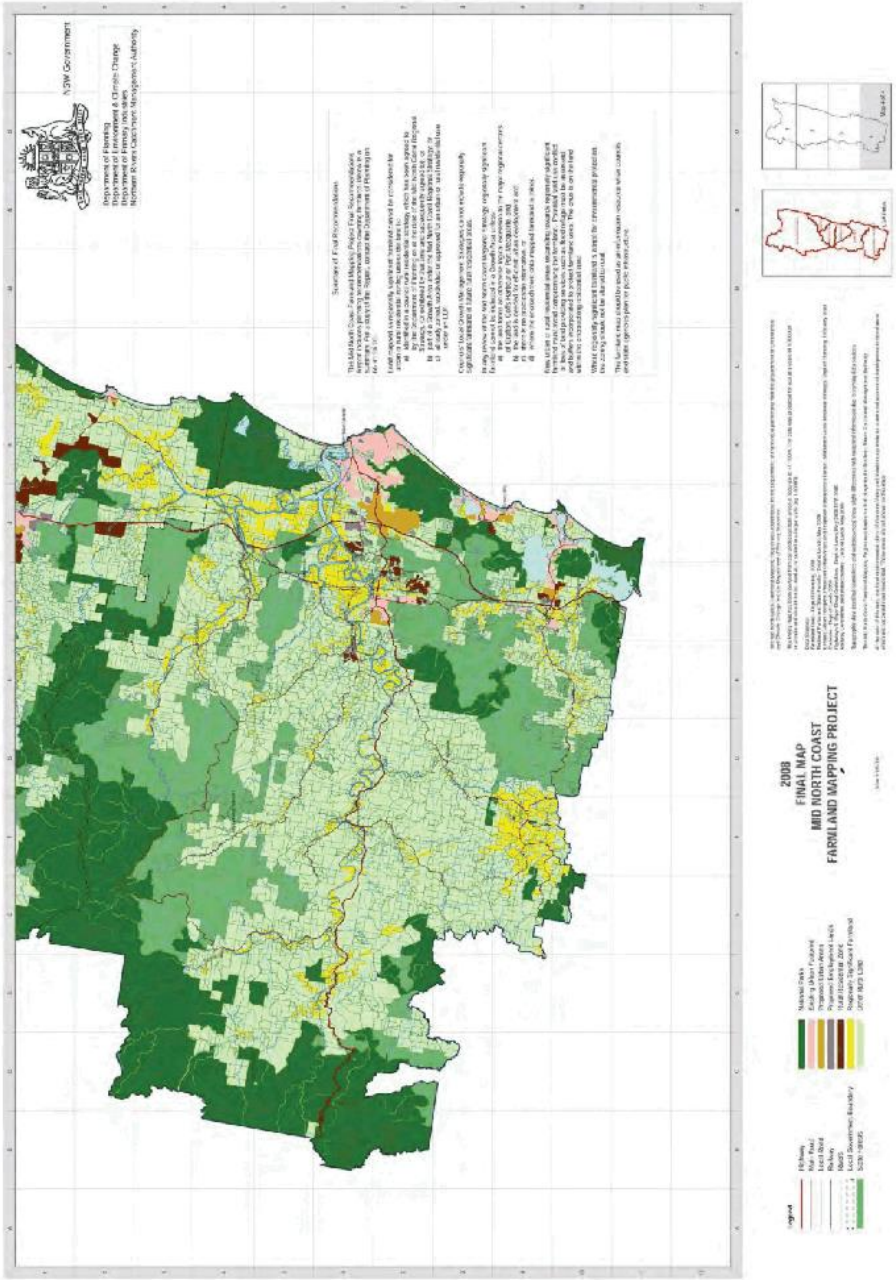
7.2 Appendix 2 - Final Map, Mid North Coast Farmland Mapping Project, 2008



7.3 Appendix 3 - NSW DPI'S Agricultural Land Classification document (Agfact AC. 25)

AGFACTS
AGFACTS
AGFACTS

NSW Agriculture

Agricultural Land Classification

Agfact AC.25

Therese Hulme, Agricultural Environment Officer

Tom Grosskopf, Agricultural Environment Officer

John Hindle, former Land Use Planning Officer (Spatial Information)

Agdex 520

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Acknowledgments

The authors would like to acknowledge Roy Lowrie and Cedric Hawkins for their inputs and comments on drafts of this Agfact

Cover: Agricultural land classes 2,3,4 and 5, Scone. The photo depicts a gradual change from class 2 land (cultivated and cropped river flats in the foreground) to class 3, class 4 (lower slopes) and class 5 (hills in the background). Photographer: John Hindle.

Inset: Class 5 land, Dorrigo, north coast NSW. The steepness of the slope and high erosion hazard are some of the severe constraints preventing agricultural land use.

Photos: Except for the cover photograph (see above), all photographs are from NSW Agriculture's Image Library. Photographers were Graham Johnson, John Gasparotto and Col Beg.

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1. Introduction

Land used for agriculture is often taken for granted. The popular belief is that Australia possesses unlimited resources, including land for agriculture.

Yet good quality agricultural land is a limited resource, and is under threat from a variety of sources. Urbanisation and land degradation alienate and deplete agricultural land resources. The reduced availability of lands highly suited to agricultural production reduces the sustainability of existing agricultural systems and encourages the use of more marginal lands for agriculture.

A knowledge of the relative suitability of land for agriculture will help with the development of strategic plans, which protect land highly suited to agriculture and identify land more suited to non-agricultural activities.

NSW Agriculture produces agricultural land classification maps, on a local government area basis, which rank land on its suitability for agricultural production. The maps are produced by evaluating biophysical, social and economic factors that influence the use of land for agriculture.

This publication describes NSW Agriculture's agricultural land classification system. It aims to help natural resource planners and managers in their use and interpretation of agricultural land classification maps. The publication is based on, and updates, information contained in *Rural Land Evaluation: A manual for conducting a rural land evaluation exercise at the local planning level*, revised edition (RLEM) (Department of Planning, 1988). It should be noted that the criteria on which the land classes are based remain unchanged from the RLEM.

2. Techniques for evaluating rural land

There are two techniques currently used to evaluate rural land in NSW: rural land capability and agricultural land classification. Although both systems are used to evaluate agricultural land, a direct comparison is difficult. Each system has a different aim and considers the various factors that influence land use in a different way.

A specific comparison between the systems was never intended and should not be attempted, because each system was established for a different purpose.

2.1 Rural land capability mapping

This eight class system, used by the Department of Land and Water Conservation (DLWC), considers the erosion hazards in the use of the land. It classifies land in terms of its inherent physical characteristics, or physical constraints, and denotes measures needed to protect the land from soil erosion and other forms of land degradation.

For further information on rural land capability, refer to *Rural Land Capability Mapping* (undated), available from the Department of Land and Water Conservation.

2.2 Agricultural land classification

This five class system used by NSW Agriculture classifies land in terms of its suitability for general agricultural use. This system was developed specifically to meet the objectives of the Environmental Planning and Assessment Act 1979, in particular 5(a) (i) 'to encourage the proper management, development and conservation of natural and man-made resources, including agricultural land...for the purpose of promoting social and economic welfare of the community and a better environment'.

Agricultural land is classified by evaluating biophysical, social and economic factors that may constrain the use of land for agriculture. In general terms, the fewer the constraints on the land, the greater its value for agriculture. Each type of agricultural enterprise has a particular set of constraints affecting production. A comprehensive list of all the constraints affecting each form of agriculture would be expensive to compile and unwieldy to use. Consequently, agricultural land classification is based on a set of constraining factors common to most agricultural industries. Section 6.3iii 'Factors that influence agricultural suitability' lists these factors.

Some types of agricultural enterprises do not depend on land suitability and so are not included in this system. Such activities include intensive animal industries (poultry, pig and cattle feedlots) as well as nurseries, glasshouses, hydroponics and mushroom sheds. NSW Agriculture and other agencies produce guidelines that address siting and management issues for these industries. However, many of these industries use agricultural land to manage effluent and provide a buffer zone, so agricultural land classification is still relevant.

It is an inherent feature of agricultural land classification maps that they have a limited life. The life span of the maps depends on changes to the biophysical, social and economic factors. For example, if an area classified as Class 3 agricultural land because of its ability to support occasional cropping becomes affected by salinity, and therefore becomes no longer suitable for cropping, it would need to be reclassified as Class 4 agricultural land.

In practice it takes a significant and widespread change of the factors to affect agricultural land classification maps. This is due to the scale of the mapping and the consideration of future trends at the time of map preparation. The types of changes that affect agricultural land classification maps are usually slow, so the maps produced are suitable for use for a number of years.

Agricultural land classification maps produced at small scales (1:50,000 to 1:100,000) are useful for strategic planning, including regional and local environmental planning instruments, regional economic development and natural resource management. They are inappropriate for making decisions relating to individual development applications or minor rezoning proposals. These types of applications involve decision making at the property level and require information at a scale of greater detail than is available from these agricultural land classification maps. See Section 4 'Limitations of scale' for further information.

In general, for small areas and detailed classification the use of a quantitative approach is appropriate. In order to use such an approach the range of agricultural enterprises to be considered needs to be reduced so that the number of biophysical, social and economic factors taken into consideration is manageable.

3. Agricultural land classification classes

Agricultural land classification maps place land into one of five classes according to its suitability for a wide range of agricultural activities. Class 1 land has few constraints to agricultural production, so a wide range of crops can be profitably grown; while Class 5 land has severe constraints and is, in general, unsuited to agriculture. The essential characteristics of these classes are described below.

Class 1: Arable land suitable for intensive cultivation where constraints to sustained high levels of agricultural production are minor or absent.

Class 2: Arable land suitable for regular cultivation for crops, but not suited to continuous cultivation. It has a moderate to high suitability for agriculture but edaphic (soil factors) or environmental constraints reduce the overall level of production and may limit the cropping phase to a rotation with sown pastures.

Class 3: Grazing land or land well suited to pasture improvement. It may be cultivated or cropped in rotation with sown pasture. The overall production level is moderate because of edaphic or environmental constraints. Erosion hazard, soil structural breakdown or other factors, including climate, may limit the capacity for cultivation and soil conservation or drainage works may be required.

Class 4: Land suitable for grazing but not for cultivation. Agriculture is based on native pastures or improved pastures established using minimum tillage techniques. Production may be seasonally high but the overall production level is low as a result of major environmental constraints.

Class 5: Land unsuitable for agriculture, or at best suited only to light grazing. Agricultural production is very low or zero as a result of severe constraints, including economic factors which prevent land improvement.

An additional class may occasionally be used where land has some special feature which allows a special crop to be grown (eg bananas and other tropical horticultural tree crops).

Specialist class: Land which, because of a combination of soil, climate and other features, is well suited to intensive production of a crop or a narrow range of crops whose special requirements limit their successful culture to such land. This class includes some lands formerly described as unique.
Refer to Section 7 'Agricultural land class descriptions' for a description of the major attributes, benefits and constraints to production for each of the land classes.

4. Limitations of scale

When using agricultural land classification maps it is important to understand the limitations of the scale at which the maps were produced. In addition, it is essential that the map only be used within the limitations of the scale of mapping reliability.

Map scale is the relationship between a unit of length on a map and the actual length it represents on the ground. This scale is usually expressed as a ratio. A scale of 1:100,000 means that one unit on a map corresponds to 100,000 units on the ground. For example, 1 cm on the map corresponds to 100,000 cm (1 km) on the ground. One square centimetre corresponds to one square kilometre; one square millimetre represents one hectare. The minimum area that can be legibly delineated on a map is usually about 40 square millimetres (a circle of about 7 mm in diameter). At a scale of 1:100,000, this represents an area on the ground of approximately 40 hectares. Table 2 provides a summary of the minimum mappable area for five commonly used scales.

Table 2: Relation between minimum mapable area and scale

Map Scale	Ground distance (metres) represented by 1 mm on the map	Minimum mapable area (ha) represented by 40 mm^2 on a map
1:100 000	100 m	40.0 ha
1:50 000	50m	10.0 ha
1:25 000	25 m	2.5 ha
1:10 000	10m	0.4 ha
1:5 000	5 m	0.1 ha

Source: Riddler 1987

Table 1: Guide to agricultural land classification

Suitability Classes	Land Uses									
Class Description	Horticulture				Field Crops		Grazing Pasture			
	Vegetables		Tree Crops				Improved		Native	
	Irrigated	Rainfed	Sensitive	Tolerant	Irrigated	Rainfed	Irrigated	Rainfed	Seasonal	Light
1 Arable land suited to continuous cultivation for uses such as intensive horticulture and field crops. Constraints to sustained high levels of production are absent or minor.	☆	★	☆	★	★	★	★	★	★	★
2 Arable land suited to regular cultivation for uses such as intensive horticulture and field crops. Constraints to sustained levels of production are minor to moderate.	●	☆	●	★	☆	☆	☆	★	★	★
3 Land suited to cropping but not continuous cultivation. Production risks are managed through a pasture phase, conservation tillage and/or fallowing. Constraints to sustained levels of production are moderate.	●	●	●	☆	●	●	●	☆	★	★
4 Land suited to grazing but not cultivation. Agriculture is based on native pastures and/or improved pastures established using minimum tillage techniques. Overall level of production is comparatively low due to major environmental constraints.	○	○	○	●	○	○	○	●	☆	★
5 Land not suited for agriculture or only light grazing. Agricultural production, if any, is low due to major environmental constraints.	○	○	○	○	○	○	○	○	○	●

★ Class having requirements in excess of those needed for sustained production from the land use
☆ Class having the minimum requirements for sustained production from the land use
● Class may be suited to the land use depending on the nature of the limiting factors to cultivation and crop production
○ Class not suited to land use because of limiting factors to cultivation and/or production

Notes:
1 The ability to cultivate is a pre-requisite for cropping in this table.
2 Tolerant to changes in soil conditions eg acidity, salinity.

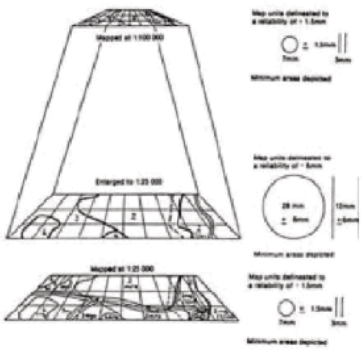
Biophysical features usually have transitional zones between unique groups or classes. In the field, there are few instances where a sharp boundary line divides classes. In the maps, the boundary line represents the best-fit position or a halfway point between the two classes. The accuracy for locating the class boundary lines is expressed as a confidence limit. For a 1:100,000 map this limit is 1.5 mm, representing a confidence limit of 150m in the field (Riddler 1987).

As the boundary precision is a function of the level of detail recorded and observed in the field, the scale of agricultural land classification maps should not be enlarged.

In addition, while the final maps show areas as being divided into discrete classes, in practice nature usually presents a mix of geology, terrain and soils, and sudden changes are unusual. Any map unit will include areas whose characteristics differ from those of the dominant class. For an area less than 40 mm^2 (7 mm diameter) on the map, these inclusions are too small to be legibly shown at the scale of mapping, but they may occupy up to 40% of the unit. This is important to note, as errors in interpretation will occur if the map is enlarged beyond its original scale because these inclusions will not be shown. It is particularly easy and, therefore tempting, to enlarge maps when they are in digital form; however, this should not be done. Figure 1 illustrates the affect of enlarging a map from 1:100,000 to 1:25,000. Note the increased level of detail provided when the area is originally mapped at 1:25,000.

For further information on the production of agricultural land classification maps and detailed surveys refer to Section 6 'The mapping process'.

Figure 1: Relationship between scale of mapping, enlargement and map reliability (adapted from Riddler 1987) - click for clearer, larger image.



5. Using agricultural land classification maps for land use planning

NSW Agriculture's agricultural land classification maps can be used to recommend the quality and quantity of rural land that should be zoned for agricultural production and protection from incompatible development.

Higher quality lands (Classes 1 and 2) have fewer constraints and a greater versatility for agriculture than the poorer quality lands (see table 1), and their long-term value to the state is often greater than a strict economic appraisal might indicate. Their relative lack of constraints allows greater flexibility in management and enables farmers to more easily adapt to changing economic conditions. The high suitability of these lands, also, significantly reduces the potential for environmental damage from agricultural activities.

Land use planning recommendations need to be drawn up on the basis of local government areas using the principle of protecting the land of greatest agricultural value, and directing nonagricultural uses onto lands less suitable for agriculture. Following are some general principles, which may help in formulating land use planning recommendations.

- Identify the main agricultural industries and their land requirements within the local government area. Many agricultural industries require access to a range of agricultural land classes for good management, to ensure diversity of enterprise and security of production.

  For example, land used for dairy cattle on the coastal plains is often a mix of Class 2 and/or 3 as well as Class 4 agricultural land. The Class 2 and 3 land is used for production of high value pastures or fodder crops, while the Class 4 land is used as the dry-run country. The mixture of land classes used by these industries should be protected.
- Protect highly productive agricultural land (Classes 1,2, 3 and Specialist Class) from competing land uses. It is preferable to use land of lower agricultural quality for incompatible developments where this is available and suitable for the purpose.
- Give priority to protection of Class 1 lands from incompatible development. They are elite, of limited extent and considered to be of significance to the state.
- Class 2 lands are also of superior quality and of limited extent. They are worthy of protection and retention for agriculture because of their state and regional importance.
- Protect Class 3 lands for agricultural production if adequate and suitable areas of Classes 4 and 5 are available for competing uses.
- Specialist Class lands which, by their nature, are unique in the state for agricultural activity need to be protected unless there are strong economic reasons for not doing so. This includes areas which, by virtue of their remoteness or special location, are under cultivation for foundation seed, bud stock or root stock production, or used as quarantine zones.
- Take into consideration social and economic factors when making recommendations about changes to land use in areas of Class 3 or lower quality land currently used for full time agriculture.
- Class 4 lands play an important role in some agricultural industries: for example, fine wool production on the tablelands of New South Wales depends on comparatively large areas of Class 4 agricultural land.
- Class 5 land can be of some value for agriculture: for example it may provide shelter for livestock, or offer flood-free refuge areas.
- When recommending rural lands for non-agricultural uses, the particular requirements for use need to be considered so that land is not inappropriately lost from agriculture. For example, rural residential use may best be located on non-productive land, preferably with trees, (usually Class 4 or 5), while hobby farms may require land with pastures suitable for year round grazing (land of Class 4 may often be suitable). Because of the environmental fragility of Classes 4 and 5 land, care is needed when proposing more intensive uses.
- Irrigated areas are generally recommended for retention in agriculture because of the existing infrastructure (channels, pipes, dams etc.) and relatively high production potential.
- Some farm forestry enterprises require good quality agricultural land, and may need to be situated on agricultural land.
- Agricultural lands that can use organic wastes need to be identified so that agricultural industries are able to use these wastes sustainably.

- Around the perimeter of urban areas where high land prices and small lot sizes are common, even the best agricultural land may have potential conflict with urban neighbours as one constraint, limiting versatility and affecting productivity. However, close proximity to urban markets may outweigh the constraints.

6. The mapping process

Two methods are used to produce agricultural land classification maps: field surveys, and interpretation of remotely sensed data. Both processes require personnel experienced in natural resource survey techniques and with local knowledge of the area to be mapped, particularly the details of agricultural management practice. Agricultural land classification maps are generally produced on a local government area basis. Figure 2 depicts an extract from an agricultural land classification map, while Figure 3 depicts the line work for the same map area laid over a false colour satellite image.

6.1 Field surveys

Using this technique, agricultural land classification maps are produced by mapping directly onto topographic sheets in the field. The scale of the maps used may be 1: 25 000, 1:50 000 or 1:100 000, depending on the scale of the topographic map available for the area. A preliminary investigation of the area identifies key factors such as soil, geology, slope and climatic data using available information and local expertise. If available, recent aerial photographs, photomaps, orthophotomaps and satellite imagery of the area under study may provide useful information.

Knowledge of the agricultural enterprises and estimates of productivity from well-managed farms provide reliable indications of the class of that particular type of land. Lands with similar properties (such as soil, slope and microclimate) are often placed in the same class although management may influence the productivity levels realised. Boundaries of any irrigation areas/districts are identified before mapping.

The field survey often starts in the better known areas, then concentrates on areas for which little information or knowledge is available. The mappers drive over a pre-determined route which, wherever possible, crosses the 'grain' of the country, geology or soils, so that the maximum variability is encountered.This makes it easier to place the boundaries between classes. Where access is poor, class boundaries may be identified using aerial photographs (stereoscopic series) or satellite imagery.

6.2 Remote sensing

Agricultural land classification maps can also be produced by mapping directly onto satellite images, either as hard copies or displayed on computer screens. The agricultural land class boundaries on hard copies of images can be digitised and entered into the computer for production of maps.

Satellite images contain detailed records of ground cover features, land use patterns and quality of agricultural land at the time of exposure. Systematic examination by a skilled interpreter familiar with the area can identify the nature of physical objects and landform features.

There are six characteristics recorded for each landform feature represented on an image. These are size, shape, shadow, tone or colour, pattern and texture. These characteristics are assessed using interpretation strategies such as location and association, temporal change and convergence of evidence to determine the agricultural land class boundaries.

As for field mapping, it is necessary to conduct a field reconnaissance survey of the area. This includes ground truthing the satellite image and acquiring the preliminary information as outlined for the field survey technique: soil, geological, slope and climatic data, relevant topographic map sheets and information on the type and productivity of agricultural enterprises.

6.3 General considerations

Regardless of the method used to produce agricultural land classification maps, the procedures below are followed in the production of the maps.

i. Lands that need not be evaluated

Before mapping begins, all lands that can be clearly excluded from agriculture are identified and marked on the map to reduce the area to be assessed. Such lands include:

- national parks, nature reserves, state recreation areas and other lands reserved under the National Parks and Wildlife Act 1974
- state forests and timber reserves, although sometimes these areas may be suitable and available for grazing
- designated foreshores and foreshores of prescribed streams and lakes where land use restrictions apply
- quarries and mining areas
- areas zoned urban or village
- land with slope greater than 50%, greater than 70% rock outcrop, coastal dunes and beaches, and land subject to permanent inundation (i.e. DLWC's land capability class VIII).

ii. Land management assumptions

In classifying agricultural land the following assumptions are made about agricultural land use:

- Land is managed using a moderate to high level of agricultural management practice.
- Land with constraints that have been modified or removed is assessed on its present status eg irrigation areas, flood mitigation areas, cleared land.
- Land with constraints that could be economically

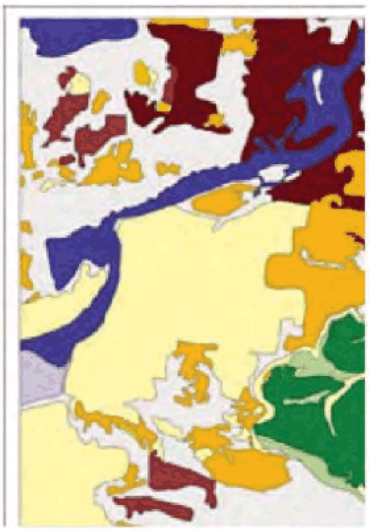


Figure 2: An extract of the Tweed Shire Agricultural Land Classification map - click for clearer, larger image.

Figure 3: The line work for the extract of the Tweed Shire Agricultural Land Classification map used in Figure 2 laid over a false colour satellite image - click for clearer, larger image.

removed (eg. soil acidity, low chemical fertility) is assessed as if they have been removed provided there are no regulatory or legislative constraints.

- Land suited for intensive uses such as cropping is also suited to less intensive land uses such as grazing, forestry etc.
- The assessment reflects long term capacity for sustainable agricultural productivity.
- The assessment reflects the versatility of the land for various agricultural activities (Class 1 is the most versatile, Class 5 the least versatile).
- The assessment may need to be reviewed if technological advances later permanently change the productive potential of the land eg. development of an irrigation area.

Given the above assumptions, existing land use may not always be a good indicator of appropriate land use and hence land class. The system of land classification is aimed at assessing physical, social and economic attributes of land rather than its current use. Nevertheless it must be noted that current land use often reflects land suitability. Where land is used beyond its physical capability land degradation is often evident.

iii. Factors that influence agricultural suitability

Biophysical, social and economic factors are all considered when determining agricultural land classification. These determine the types of agricultural enterprises that are, or could be, adapted to the area. Not all of these factors need to be considered in every assessment, and in some situations key factors may need to be considered in more detail than others are.

It must be recognised that the process of agricultural land classification relies upon interpretation of information by an expert, and that the map marks a point in time reflecting current understanding of agricultural systems, infrastructure, and market and resource conditions.

The following lists are not comprehensive:

Biophysical factors

- environmental impact: fertilisers, pesticides, wastes, erosion, salinisation, siltation, vegetation clearing
- topography: slope (angle and length), erosion hazard, aspect, altitude, flood liability, exposure, land slip, surface drainage
- soil physics: texture, structure, erodibility, depth, water holding capacity, internal and surface drainage, rockiness, stoniness, depth to watertable, permeability, clay type, colour, surface crusting, density, aeration, trafficability, stability under irrigation
- soil chemistry: fertility, toxicity, organic matter, soil reaction, cation exchange capacity, salinity, sodicity, rates of fixation, dispersibility
- climate: length of growing season, temperatures,

rainfall, evaporation, wind, humidity, frost occurrence, irrigation, hail, exposure
- pests and diseases: presence of noxious or pest animals, noxious weeds, insects, plant or animal pathogens (field and storage)

Social factors
- legislative and/or regulatory constraints
- potential conflict with other land users: eg. noise, odour, dust
- availability of permanent or seasonal, skilled or unskilled labour

Economic factors
- regional and local infrastructure to support agriculture
- geographic location
- accessibility and location with respect to transport requirements and costs
- accessibility to local and export markets
- presence of any comparative market advantage
- structure of local farming and marketing, e.g. co-operatives and marketing bodies
- availability and cost of land locally and elsewhere
- costs of removing biophysical constraints
- site contamination from previous land use

iv. Accompanying report
The report accompanying the agricultural land classification map outlines the major constraints and describes how these affect agricultural production. Decision rules used to delineate the agricultural land class boundaries are based on these constraints.

The report supplied with the map should be read in conjunction with the map to help with interpretation. Depending on major agricultural activities in the region, some areas may have been mapped with a different emphasis placed on the factors used in classifying the land.

7. Agricultural land class descriptions

This section describes the major attributes, benefits and constraints to production for each of the agricultural land classes. Appendix 1 includes a selection of photographs depicting examples of each agricultural land classes.

Class 1

Arable land suitable for intensive cultivation where constraints to sustained high levels of agricultural production are minor or absent.

Class 1 lands have all, or nearly all, of the following characteristics:
- Productivity is high to very high for a very wide range of field crops adapted to the area.
- Access to local and export markets is satisfactory.
- Local or regional infrastructure to support intensive forms of agriculture is present and a ready supply of suitable labour is available, if required.
- Potential for land use conflict with neighbours as a result of standard agricultural practices is low.
- Slopes are level to very gently inclined.
- Soils are deep.
- The land is capable of sustaining regular cultivation.
- The soil profile is well drained to moderately well drained.
- Erosion hazard is low, so only simple soil conservation management practices are required to protect the soils from erosion.
- Any soil physical and chemical constraints are capable of being economically overcome for a very wide range of field crops.
- A recurrent extreme of climate does not seriously affect productivity.
- Potential economic losses due to flooding are very low, in the long term.
- The level of economic constraint from factors such as weeds, site contamination, standing timber and feral animals is very low.

Class 2

Arable land suitable for regular cultivation for crops but not suited to continuous cultivation. It has a moderate to high suitability for agriculture but edaphic (soil factors) or environmental constraints reduce the overall level of production and may limit the cropping phase to a rotation with sown pastures.

Class 2 lands have all, or nearly all, of the following features:
- Productivity is high to very high for a wide range of field crops adapted to the area.
- Access to local and export markets is satisfactory.
- Local or regional infrastructure to support intensive forms of agriculture is present and a ready supply of suitable labour is available, if required.
- Potential for land use conflict with neighbours as a result of standard agricultural practices is low.
- Slopes are level to gently inclined.
- Soils are deep to moderately deep.
- The land is capable of sustaining regular cultivation; however, conservation tillage practices may be required.
- The soil profile is either moderately well drained or rapidly drained.
- Erosion hazard is low to moderate, so soil conservation measures may need to be adopted to avoid erosion.
- Any soil physical and chemical constraints are capable of being economically overcome for a wide range of field crops.
- Recurrent extremes of climate are unlikely to affect productivity.
- Potential economic losses due to flooding are low, in the long term.
- The level of economic constraint from factors such as weeds, site contamination, standing timber and feral animals is low.

Class 3

Grazing land or land well suited to pasture improvement. It may be cultivated or cropped in rotation with sown pasture. The overall production level is moderate because of edaphic factors or environmental constraints. Erosion hazard, soil structural breakdown or other factors including climate may limit the capacity for cultivation, and soil conservation or drainage works may be required.

Class 3 lands have generally moderate levels of social, economic or physical limitations, restricting the extent of arable agriculture. For example, erosion hazard, soil structural breakdown or other factors including climate may limit the capacity for cultivation, and soil conservation or drainage works may be required. However, a high to very high level of one particular characteristic may result in an area being classified as Class 3 even where other limitations are absent.

Class 3 lands are characteristically lands with the following features:

- Productivity is high for locally adapted pastures and moderate for crops well suited to the area.
- Access to local and export markets is satisfactory.
- Local and regional infrastructure to support extensive forms of agriculture is present, and a ready supply of suitable labour is available.
- Potential for land use conflict with neighbours as a result of standard agricultural practices may restrict agricultural activities.
- Slopes are level to moderately inclined.
- Soils are moderately deep to shallow.
- The land has moderate to limited suitability for cultivation, so cultivation is only sustainable in rotation with pastures.
- The soil profile is well drained to imperfectly drained.
- Erosion hazard is low to high, so intensive measures of soil conservation may be required to control erosion in the long term.
- Soil physical and chemical properties may limit crop and pasture productivity.
- Recurrent extremes of climate may affect productivity.
- Potential economic losses due to flooding are moderate, in the long term.
- The level of economic constraint from factors such as weeds, site contamination, standing timber and feral animals is moderate.

Class 4

Land suitable for grazing but not for cultivation. Agriculture is based on native pastures or improved pastures established using minimum tillage techniques. Production may be seasonally high, but the overall production level is low as a result of major environmental constraints.

Class 4 lands have generally moderate to high levels of social, economic or physical limitations, restricting the agricultural productivity. The inability for the preparation of a cultivated seedbed on these lands typifies their limitations. It should be noted that a severe to extreme level of one particular characteristic may result in an area being classified as Class 4 even where other limitations are absent.

Class 4 lands are characteristically lands with the following features:

- Productivity levels for locally adapted pastures are low to moderate; however, productivity for selected tree crops may be high.
- Access to local and export markets may be restricted by location.
- Local infrastructure to support extensive forms of agriculture is present, however suitable labour resources may be limited.
- Potential for land use conflict with neighbours as a result of standard agricultural practices may restrict agricultural activities.
- Slopes are level to steeply inclined.
- Soils are mostly shallow.
- The land is unsuitable for cultivation, but minimum tillage techniques can be used to establish perennial pastures.
- The soil profile is well drained to poorly drained.
- Erosion hazard is low to very high; intensive measures of soil conservation may be required, but erosion may still be significant in the long term.
- Soil physical and chemical properties limit crop and pasture growth, and low productivity levels limit the ability to economically manage this constraint.
- Recurrent extremes of climate are likely to affect productivity.
- Potential economic losses due to flooding are high, in the long term.
- The level of economic constraint from factors such as weeds, site contamination, standing timber and feral animals is high.

Class 5

Land unsuitable for agriculture or at best suited only to light grazing. Agricultural production is very low or zero as a result of severe constraints, including economic factors which preclude land improvement.

Class 5 lands suffer extreme limitations for agricultural production. These limitations may be one of, or a combination of, the following features:

- Productivity levels for all types of agricultural crops and pastures are very low.
- Access to local and export markets may be very restricted by location.
- Local infrastructure to support extensive forms of agriculture may be absent, as may suitable labour resources.
- Extremes of slope can be expected.
- The land is unsuitable for cultivation.

- The soil profile is very poorly drained.
- Erosion hazard is extreme, and economic control using conventional soil conservation measures is impractical.
- Soil physical and chemical properties present an extreme limitation to the growth of agricultural plant species.
- Recurrent extremes of climate may seriously affect productivity.
- Potential economic losses due to flooding are high, in the long term.
- The level of economic constraint from factors such as weeds, site contamination, standing timber and feral animals is very high to extreme.

Bibliography

Cunningham, GM, Higginson, F.R., Ridedler, A.M.H., and Emery, K.A. (1986) *Systems Used to Classify Rural Lands in New South Wales.* Soil Conservation Service and NSW Agriculture.

Department of Planning, (1988) *Rural Land Evaluation: a Manual for Conducting a Rural Land Evaluation Exercise at the Local Planning Level,* revised edition. Department of Planning, Sydney NSW.

Emery, K.A., (undated) *Rural Land Capability Mapping,* Soil Conservation Service of NSW, Soil Conservation Service and NSW Agriculture.

Hindle, J.P., (1984) *Agricultural Land Classification Mapping from Landsat False Colour Images,* Australian Landsat Station - Newsletter for the remote sensing industry Vol 3 No.5 September 1986, Australian Landsat Station, Belconnen, ACT.

Houghton, P.D. and Charman, P.E.V., (1986) *Glossary of Terms Used in Soil Conservation* Soil Conservation Service of New South Wales.

McDonald, R.C., Isbell, R.F., Speight, J.G., Walker, J. and Hopkins, M.S. (1990) *Australian Soil and Land Survey Field Handbook,* second edition Inkata Press, Melbourne

Riddler, A.M.H., (1987) *Agricultural Classification Maps – Uses and Limitations. 2. Reliability and Scale* Advisory Note No. 2/87, November 1987, Agdex 525.

ATTACHMENT 10 - Land Use Conflict Risk Assessment

PMHC Planning Proposal - Kendall Road, Kew (PP2014-12.1)

Land Use Conflict Risk Assessment & Matrix

Consideration of potential impacts on adjacent agricultural land is discussed below and includes a Land Use Conflict Risk Assessment (LUCRA)

The neighboring property is predominantly in 1 in 100 year flood zone, so intensive agriculture, such as horticulture (vegetables, citrus, stone fruit etc) and intensive livestock production (feedlotting, broiler or egg production, piggeries etc) are not economically viable due to flood risk for infrastructure, stock and vegetation. The section not within the flood zone (northern boundary adjacent to the road) is dominated by dwelling infrastructure (sheds, houses etc) and being such as small part of the farm cannot contribute significantly to any agricultural production system. The alluvial (flat) section of the land potentially used for grazing purposes under the current land-use, based on improved pasture or seasonal cropping regimes.

Given the most productive agricultural pursuit on this land would be grazing for beef production the following points detail the potential impacts to maintaining meaningful agricultural production, in the form of pasture and/or cropping improvements for livestock grazing, on the neighboring property.

Land Use Conflict Risk Assessment

Consideration	*Response*
The nature of the land use change and development proposed.	General Residential uphill to the east from existing grazing land protected by a 50m buffer zoned E3 Environmental Management.
The nature of the precinct where the land use change and development is proposed.	Adjacent land uses to the site and adjacent agricultural holding, include a Golf Course and rural residential housing to the north of the agricultural land, as well as light industrial and residential occupancy within the adjacent rural land. Further west more rural residential/lifestyle lots. To the east is fairly new residential housing and the village of Kew. Refer Image below of the nature of the uses in the precinct.
The topography, climate and natural features of the site and broader locality which could contribute either to minimising or to exacerbating land use conflict.	The sub-tropical environment of Kendall supports year round production through the growth of warm climate species in summer, and temperate plant species in the cooler months. The benefit of such a climate is sub-tropical perennial grass species tend to dominate improved soils, and are only dormant during winter. A negative of this environment is winters are too cold to support year round growth of tropical species, as cold nights often kill tropical species.

	Due to these outcomes, and a slightly summer-dominant (although essentially year-round) rainfall pattern, pasture production for grazing livestock (beef and dairy) tends to be the most reliable and best-suited industry. In terms of potential conflicting land uses Grazing livestock industries raise potential for conflict in terms of noise from cattleyards such as calves separated from their mothers, pumps and engines starting early, fenceline weed spraying and the like.
The typical industries and land uses in the area where the development is proposed. This provides for a broad test of compatibility with the dominant existing land uses in the locality.	The typical land uses in the area proposed for rezoning is general residential adjacent to the east and existing Kew Village, rural residential and grazing land to the west and north west. Kew golf course and Kew-Kendall road adjoin the site to the north.
The land uses and potential land uses in the vicinity of the proposed development or new land use. Identifying and describing what's happening within a minimum 1km radius of the subject land and development site helps to establish the specific land uses in the locality that are most likely to have some effect on and be affected.	Refer to figure below identifying land uses within 1 km radius.
Describe and record the main activities of the proposed land use and development as well as how regular these activities are likely to be. Note infrequent activities can create conflict.	Proposed land use is general residential. A 50m wide buffer to the adjacent grazing land is proposed to be zoned environmental management in the vicinity of the farmland mapped sections.
Describe and record the main activities of the adjoining and surrounding land uses as well as how regular these activities are, including periodic and seasonal activities that have the potential to be a source of complaint or conflict.	Adjoining agricultural land use activities to the west appear to be cattle grazing and a light industrial shed storing port a loos and fencing materials. To the east is general residential land uses.
Compare and contrast the proposed and adjoining/surround land uses for incompatibility and conflict issues.	Potential impacts on adjacent agricultural uses identified by MNC Agronomy include: a) Section 5.1 of the MNC Agronomy report identifies **Potential backyard plant species to encroach on the neighbouring farmland** either through natural reproductive processes or even as simply as growing over the fence boundary. Only a very small percentage of backyard plant species are toxic to ruminant animals, and in most cases the toxic species need to make-up a large part of the animals daily diet to cause clinical symptoms.

	The proposal now includes a 50m buffer. MNC Agronomy confirmed that a previously proposed 22m wide buffer was considered sufficient to negate those potential impacts, provided backyard vegetation weren't to spread into that buffer. The provision of an environmental management zone over the 50 m buffer is considered further support that protection. b) Section 5.2 of the MNC Agronomy report identifies **Contamination of the lagoon areas** of the neighboring property, presumably currently used for stock drinking water, needs to be considered should stormwater run-off containing chemical or biological toxins enter these areas. The intended outcome/ concept subdivision plans demonstrate a stormwater drainage solution directing all stormwater run-off through a purpose built water quality management basin prior to discharge into nearby water courses. In addition, the proposal is for fully serviced general residential use on large allotments, not industrial or other potentially contaminating land use. c) **Domestic Pets and Animals** Section 5.3 of the MNC Agronomy report identifies that the potential for domestic pets and animals to adversely affect the potential for primary production on the neighboring property is real, however the potential existence of pets on the newly proposed subdivision is no more likely to impact a beef grazing enterprise anymore than existing domestic pets and animals already within the Kew district. Domestic animal's chasing, and in rare cases attacking livestock, particularly calves, is always a possibility but is no more enhanced by the proposed subdivision. Subclinical livestock production losses, due to stress events, can be caused by

	excessive noise, or startling noise such as dogs barking. In this case, the 22m proposed road buffer zone (now 50 m E3 zone) greatly reduces the potential impact domestic animals could have on livestock grazing the western boundary of the property. Provided fencing, of both the property boundary and the subdivision block boundaries, are maintained, the risk of impact on the agricultural viability of the neighboring property is negligible. d) Section 5.4 of the MNC Agronomy report identifies **Animal disease** as a potential risk. It states that Residential areas, particularly those poorly maintained, can potentially harbor diseases that could cause sub-clinical production loss, and in extreme cases death of livestock. For example, rodent borne diseases, such as Botulism, have been known to kill livestock on the mid-north coast. However, such issues are just as likely on any farmland from disease vector sources such as silage, hay, imported feed and dead plant and/or animal material. As we have established the property is likely to support a beef grazing enterprise only (as it is currently doing) disease risk from domestic pets is unlikely. Further, new residential lots and housing similar to that adjacent to the east is proposed and is of good quality and well maintained by home owners. There is no reason to expect the same standard of estate construction and home maintenance from the proposal. The proposed 50 m buffer as an Environmental Management zone and northern perimeter road sections would be expected to mitigate any potential risk.

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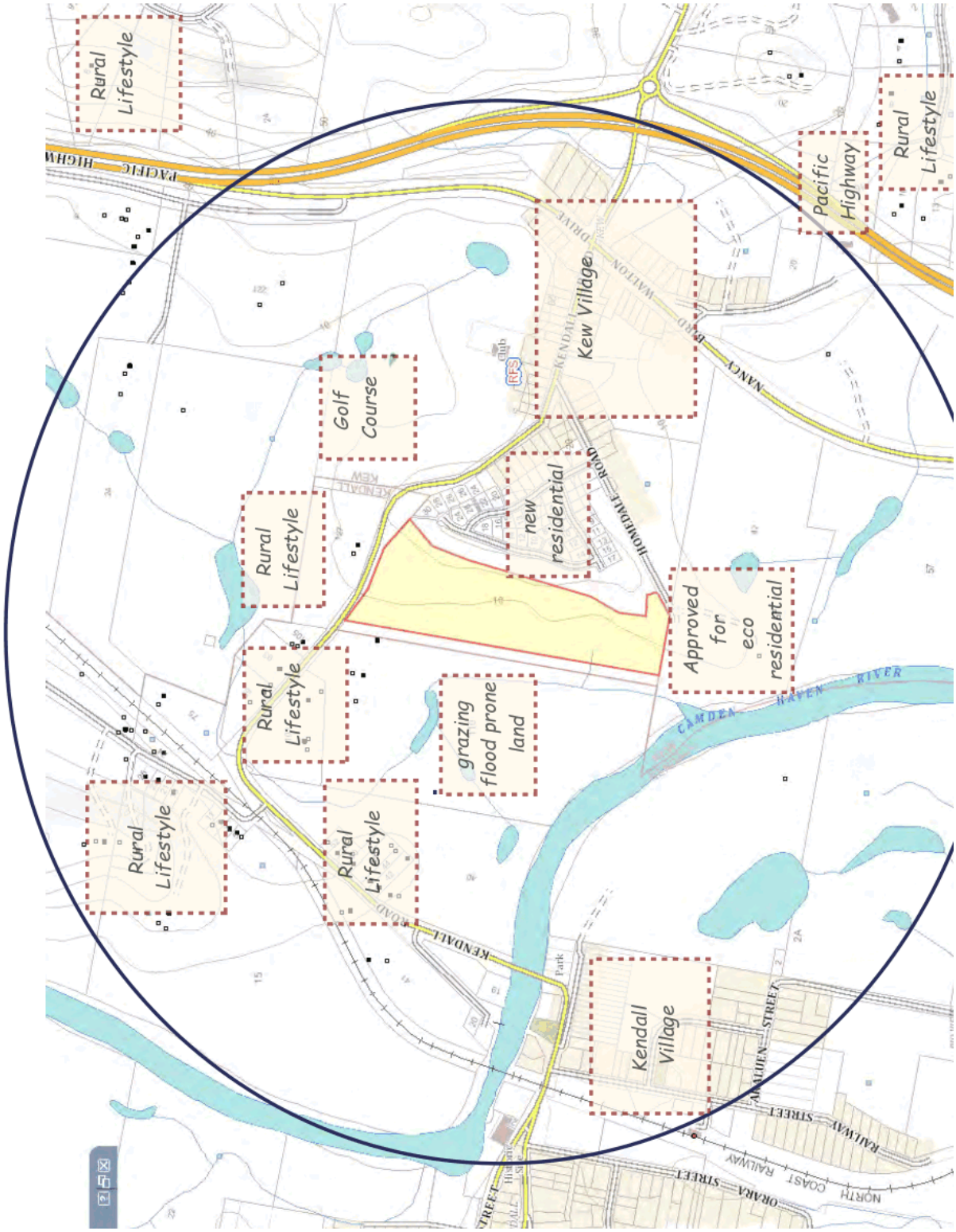
Rural Lifestyle
Pacific Highway
Rural Lifestyle
Kew Village
Golf Course
new residential
Rural Lifestyle
Approved for eco residential
Rural Lifestyle
grazing flood prone land
Rural Lifestyle
Rural Lifestyle
Kendall Village
PACIFIC HIGHWAY
NANCY BAY ROAD
HONEYDALE ROAD
KENDALL ROAD
CAMDEN HAVEN RIVER
RAILWAY STREET
NORTH COAST RAILWAY
ORARA STREET
RFS

ATTACHMENT 11 – Stage government agency correspondence

Department of Primary Industries

OUT17/39387

22 September 2017

Ms Sandra Bush
Senior Strategic Planner
Port Macquarie-Hastings Council
PO Box 84
PORT MACQUARIE NSW 2444
Via email: council@pmhc.nsw.gov.au

Dear Ms Bush

Re: Planning proposal – Proposed residential and environmental rezoning, Lot 202 DP 1133171 & Crown Road, Kendall Road, Kew, Port Macquarie-Hastings LGA

I refer to your letter of 31 August 2017 seeking comments in relation to the proposed planning amendment to Lot 202 DP 1182866 and Crown Road, Kendall Road, Kew, specifically, amendment to the *Port Macquarie-Hastings Local Environmental Plan 2011* to extend the R1 Residential zone over 5.7ha of the site to permit development for approximately 45 residential lots, including a residue which is proposed to be zoned partly E2 Environmental Conservation and partly E3 Environmental Management.

DPI Fisheries is responsible for ensuring that fish stocks are conserved and that there is "no net loss" of key fish habitats upon which they depend. To achieve this, the Aquatic Ecosystems Unit assesses activities under Part 4 and Part 5 of the *Environmental Planning and Assessment Act 1979* in accordance with the objectives of the *Fisheries Management Act 1994* (FM Act), the aquatic habitat protection and threatened species conservation provisions in Parts 7 and 7A of the FM Act, and the associated and *Policy and Guidelines for Fish Habitat Conservation and Management (2013 Update)* (the Policy and Guidelines). This document is available online at www.dpi.nsw.gov.au/fisheries/habitat/protecting-habitats/toolkit In addition, DPI Fisheries is responsible for ensuring the management of sustainable commercial fishing, quality recreational fishing and viable aquaculture within NSW.

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DPI Fisheries has no objection to the proposed planning modification but would request that appropriate riparian buffers to Key Fish Habitat are planned and implemented. It is noted that a 40m vegetated buffer is proposed which commences from the centreline of the creek. As stated within the DPI Fisheries the Policy and Guidelines, riparian buffer widths should be measured from the top of bank with the buffer width determined by the Habitat Type and Waterway Class (refer to s3.2.4.2 of the Policy and Guidelines for further details).

If you have any further enquiries, please contact me on [redacted] or [redacted].

Yours sincerely

[redacted]

Jonathan Yantsch
Fisheries Manager, Aquatic Ecosystems (North Coast)
Aquatic Environment, Primary Industries NSW

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Department of Primary Industries

OUT17/39255

29 September 2017

General Manager
Port Macquarie-Hastings Council
PO Box 84
PORT MACQUARIE NSW 2444

Attention: Sandra Bush
sandra.bush@pmhc.nsw.gov.au

Dear Sir/Madam

Planning Proposal – Proposed rezoning for residential and environmental purposes, Homedale Rd, Kew (PP2014-12.1)

Thank you for the opportunity to provide comment for the above proposal as per your correspondence dated 31 August 2017. The NSW Department of Primary Industries (NSW DPI) Agriculture provides advice to consent authorities about the protection and growth of agricultural industries and the resources upon which these industries depend to provide economic growth.

DPI Agriculture has reviewed the proposal documentation and has concerns with this proposal for the following reasons:

- The subject land was not strategically identified in the recent *Port Macquarie-Hastings Urban Growth Management Strategy 2011-2031* or within the urban growth areas of the *North Coast Regional Plan 2036*. Strategic planning is essential to ensure release areas meet the housing demand for an area. Adhoc rezoning unnecessarily sterilises land from other land use, in this case agriculture.
- The rezoning effectively removes regionally significant farmland in perpetuity. It is noted that this area may be small and has flooding constraints however is located on the fringe of a large expanse of regionally significant farmland, a highly important agricultural resource for the NSW North Coast.
- The agricultural limitations of the subject land identified within the agricultural assessment are noted however there are concerns that the Land Use Conflict Risk Assessment does not adequately mitigate potential impacts from the extension of the residential estate to neighbouring farmland. The intended mitigation of any potential risk has been identified as a 50m wide buffer for part of the western boundary and 22m for the remaining section of the western boundary closest to the road. This buffer includes the 22m wide crown land reserve. DPI Agriculture maintains that proponents have an obligation to provide and maintain adequate buffers within the land proposed for the rezoning. It is therefore not considered appropriate for the crown road reserve to be included as part of the separation distance. DPI Lands should be consulted with this regard.

NSW Department of Primary Industries - Agriculture
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> NSW DPI recommends a nominal 50 metre minimum setback between dwellings and adjoining rural lands where grazing is expected to be the primary adjoining land use. This level of separation allows for the carrying out of most routine farm practices and allows for some change in land use on adjoining lands with less risk of complaint and conflict. A 50 metre setback also provides the opportunity for the establishment of a vegetated buffer on the developed land should this deemed necessary or of benefit in the future.

The NSW government is committed to strengthening land use planning outcomes and reducing land use conflict risk between agricultural activities and other land use. The *NSW Right to Farm Policy* was released in December 2015 and provides a suite of actions under this commitment. Further information on the policy is available at:
https://www.dpi.nsw.gov.au/agriculture/lup/legislation-and-policy/right-to-farm-policy .

Should you require clarification on any of the information contained in this response please contact Resource Management Officer, Selina Stillman on [redacted].

DPI Agriculture is working to ensure that the advice provided is of the highest quality. Please take some time to provide us with feedback on our work by completing a short survey.

Yours sincerely

[redacted]

Lilian Parker
A/Manager Agricultural Land Use Planning

Department of Primary Industries
Water

Contact: Ryan Shepherd
Phone: 02 4904 2650
Fax: 02 4904 2501
Email: [redacted]

The General Manager
Port Macquarie-Hastings Council
PO Box 84
PORT MACQUARIE NSW 2444

File: V15/3876#94
Our Ref: OUT17/40132

via email: council@pmhc.nsw.gov.au

Attention: Ms Sandra Bush

Dear Sandra,

29 September 2017

Re: Consultation on planning proposal – Lot 202 DP 1133171 & Crown Road, Kendall Road, Kew - proposed Residential and Environmental rezoning

Thank you for providing the Department of Primary Industries – Water (DPI Water) the opportunity to comment on the above proposed rezoning. DPI Water provides the following comments and recommendations for Council's consideration in determination of the proposal.

Riparian Corridor Protection and Management

DPI Water notes the proposed rezoning includes a 40m wide riparian corridor buffer to be contained within an E2 Environmental Conservation zone. DPI Water is satisfied with this inclusion in the proposal.

It is shown on the Subdivision Concept Plan (Plan no. 6578-0019 Rev A) that there would be no works within 40m from the top of bank from the 2nd order unnamed stream that flows into the Camden Haven River. However, if any future works are proposed within 40 metres of the high bank of the watercourse, the works should be carried out in accordance with the Department of Primary Industries – Water's Guidelines for Controlled Activities. Any future development application submitted to Council will be required to outline any works proposed within 40 metres of the high bank of a watercourse in detail.

Vegetation Management Plan

DPI Water notes that a Vegetation Management Plan (VMP) will be required prior to development. DPI Water requests to be consulted on the VMP during its preparation.

Proposed Detention Basin

DPI Water notes that the proposal states that stormwater from all lots will be directed via piped drainage into a 2,400sqm detention basin. According to DPI Water guidelines, detention basins may be on 1st and 2nd order watercourses, however they must:

- Be dry and vegetated;
- Be for temporary flood detention only with no permanent water holding;

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- Have an equivalent Vegetated Riparian Zone (VRZ) for the corresponding watercourse order;
- Not be purely used for water quality treatment purposes.

In this instance, the proposed detention basin appears to comply with DPI water guidelines.

Should you have any questions in relation to this submission please do not hesitate to contact Ryan Shepherd on 02 4904 2650. [redacted]

Yours sincerely [redacted]

Vickie Chatfield
Regional Manager
Water Regulatory Operations
Department of Primary Industries – Water

Office of Environment & Heritage
NSW GOVERNMENT

Our Ref: DOC17/468192
Your Ref: PP2014-12.1

57488

PORT MACQUARIE HASTINGS
TRIM No CRM No
11 OCT 2017
Keyword
Activity
Subject
Folder PP 2014-12.1

General Manager
Port Macquarie Hastings Council
PO Box 84
Port Macquarie NSW 2444

Attention: Ms Sandra Bush

Dear Mr Swift-McNair

Re: Consultation on Planning Proposal – Lot 202 DP 1133171 and Crown Road, Kew

Thank you for your letter dated 31 August 2017 seeking comments from the Office of Environment and Heritage (OEH) on the above planning proposal. I appreciate the opportunity to provide input prior to public exhibition.

The land to which the planning proposal relates (henceforth referred to as the 'planning area') comprises the residue of the Links Residential Estate to the east and an unformed Crown road reserve on the western boundary. The planning area is approximately 9.3 ha and is currently zoned partly R1 General Residential and partly RU1 Primary Production.

We understand that the planning proposal seeks to make several changes to the Port Macquarie Hastings Local Environmental Plan 2011 (LEP 2011) including:

- Amending the Land Zoning Map from RU1 Primary Production to partly R1 General Residential, partly E3 Environmental Management and partly E2 Environmental Conservation.
- Amending the Lot Size Map to permit minimum lot sizes of 450 square metres on that part of the site proposed to be zoned R1.

We have reviewed the documents supplied and have determined that the proposed rezoning of parts of the site to R1 – General Residential is unlikely to affect areas of high biodiversity or historic heritage value, or National Park estate. We do, however, have concerns regarding the assessment of the Aboriginal cultural heritage values present within the planning area, and the appropriateness of the proposed zoning over and adjacent to known values. These issues are discussed in detail in **Attachment 1** to this letter.

In response to our concerns, we recommend that council:

1. Seeks clarification on how the Aboriginal cultural heritage values contained within the parcel that was nominated for protection in 2004, were determined.

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2. Seeks clarification on why the lesser area of 0.2ha was nominated for protection, rather than the 0.36ha area referred to in the Struggletown report, prepared by Appleton in 2004.
3. Ensures that further consultation is undertaken with the Aboriginal knowledge holders, and that it is conducted in a respectful, informed and consultative manner, to determine the cultural significance of the entire planning area, given its location in a landscape that is likely to have a high potential for further Aboriginal cultural material and usage, or is of ceremonial value.
4. Ensures that a cultural survey and assessment be undertaken in line with OEH guidelines to identify the values that may be present within the planning area.
5. Ensure that the future inclusion of the lot as an urban growth area, and the future zoning of the site, is determined by taking into consideration the outcomes of consultation, site survey and assessment.

If you have any further questions about this issue, please contact me on [redacted] or at [redacted].

Yours sincerely

Owner 4.10.2017.

NICKY OWNER
A/Senior Team Leader Planning, North East
Regional Operations

Enclosure: Attachment 1 - Detailed OEH Comments – Planning Proposal, Kendall Road, Kew

Attachment 1: Detailed OEH Comments – Planning Proposal, Kendall Road, Kew

A. Aboriginal Cultural Heritage

Registered Aboriginal Sites

There are currently no registered AHIMS sites recorded within the land that is subject to the planning proposal (henceforth referred to as the 'planning area'). There is also no documentation to indicate that a formal cultural survey has been undertaken to inform the proposed rezoning.

However, based on our desktop investigations, the landscape in which the planning area is situated shows a moderate to high density of known Aboriginal cultural sites. There are 50 known registered AHIMS sites within 10,000m radius of the planning area.

Furthermore, a small portion (0.2ha) of the planning area was confirmed as being culturally significant by the Bunyah Local Aboriginal Land Council (Bunyah LALC) in 2004. A letter from the Bunyah LALC, dated 2004, supported the future protection of this area. Their letter is appended to the report relating to the historic heritage assessment of locally listed historic heritage values that lie to the immediate south of the planning area, prepared by Mr John Appleton in 2004 in relation to the development of the adjoining residential area, then referred to as 'Struggletown' and now known as the 'Links Residential Estate'.

It is unclear as to the level and type of engagement undertaken with the Bunyah LALC or other Aboriginal knowledge holders, and whether an Aboriginal cultural heritage assessment has previously been undertaken.

The culturally significant area is described as having an area of 0.36ha within the Struggletown Heritage Assessment report prepared by Appleton. As such, we question why the lesser area of 0.2ha has been nominated for protection and rezoning to E2 – Environmental Protection, rather than the 0.36ha portion.

While we support the rezoning of culturally important areas to E2, based on the information contained within the planning proposal, it does not appear that the Bunyah LALC has been consulted in relation to the current planning proposal, including the extent of the E2 zone and the close proximity of the R1 zone to the significant heritage area.

Cultural Landscapes

The topographic location of the planning area in context of the Aboriginal cultural landscapes has high potential to contain cultural material give that:

- The area is situated on a high flood free point adjacent to the Camden Haven River at distances of between ~100 and 600m. It is expected that the river would have been a major resource for Aboriginal people with areas of higher elevation such as high levee banks, knolls or ridgelines adjacent to rivers often used as campsites or ceremonial grounds. High elevation areas were of particular importance during the Holocene highstand (~3000 yr BP) where sea levels higher than current levels lead to significant inundation of low lying areas along the coast. Parts of Lot 202/1133171 contain points of higher elevation of up to 20m in an otherwise flat to low lying landscape.
- The area is situated on a major topographic ridgeline (i.e Ocean Drive) that would have allowed access to the various coastal lakes and embayments and coastline resources to the east by Aboriginal people. Ridgelines have often been demonstrated to have provided pathways for the movement of Aboriginal people across landscapes offering sheltered flood free movement as well as being of strategic observation value.

- The proximity of the area to the Three Brothers (Biripi) Mountains (identified Aboriginal Place). Aboriginal sites are often found surrounding important cultural or topographically significant features particularly if campsites or ceremonial areas offer views of these features.
- An area of high Aboriginal cultural heritage value is known to occur within the planning area, having been identified in 2004, in association with the adjoining residential area.

North Coast Regional Plan

The residue of the adjoining Links Residential Estate to the east is currently zoned R1 and forms part of the planning area. The residue portion also lies within the mapped Urban Growth area as identified on the Port Macquarie- Hastings urban growth area map contained within the North Coast Regional Plan (NCRP). However, the remaining parts of planning area do not lie within the urban growth area, and it is not identified as an Investigation Area for urban land.

The NCRP states that *Any variations* (to the urban growth boundaries) *must be in accordance with the* Urban Growth Area Variation Principles *(Appendix A) and will need to be considered and justified through a strategic planning or rezoning process.*

We have examined Table 1 of the planning proposal, and the discussion therein of the Urban Growth Area Variation Principles, contained at Appendix A of the NCRP.

The 'Environmental and farmland protection' principle requires that *the variation should avoid areas:*

- *Of high environmental or heritage value; and*
- *Mapped as important farmland, unless consistent with the interim variation criteria prior to finalising the farmland mapping review.*

Given the lack of information on the significant Aboriginal cultural heritage values present, and the lack of recent consultation with the Aboriginal knowledge holders with respect to the planning proposal, it is currently unknown if the inclusion of the planning area as a variation to the NCRP urban growth area boundary sufficiently avoids area/s of Aboriginal cultural heritage value.

OEH Recommendations:

We recommend that council:

1. Seeks clarification on how the Aboriginal cultural heritage values contained within the parcel that was nominated for protection in 2004, were determined.
2. Seeks clarification on why the lesser area of 0.2ha was nominated for protection, rather than the 0.36ha area referred to in the Struggletown report, prepared by Appleton in 2004.
3. Ensures that further consultation is undertaken with the Aboriginal knowledge holders, and that it is conducted in a respectful, informed and consultative manner, to determine the cultural significance of the entire planning area, given its location in a landscape that is likely to have a high potential for further Aboriginal cultural material and usage or is of ceremonial value.
4. Ensures that a cultural survey and assessment be undertaken in line with OEH guidelines to identify the values that may be present within the planning area.
5. Ensure that the future inclusion of the lot as an urban growth area, and the future zoning of the site, is determined by taking into consideration the outcomes of consultation, site survey and assessment.

B. Flooding

Background

Part of the planning area is located within the flood planning area associated with Camden Haven River.

Flooding issues

Most the flood prone land contained within the planning area is proposed to be zoned as E2 and E3 environmental land, which we support. While several of the future lots located within the proposed R1 zoned area contain flood prone land, sufficient flood free land is available within those lots to allow dwelling construction outside of the flood planning area.

A stormwater treatment basin is proposed within the flood planning area. No modelling on the impacts of the basin on flooding is provided, however any impact is likely to be insignificant and it is reasonable that this be addressed at the development application stage.

Rising road access to Kendall Road is available.

We are therefore of the view that the proposed rezoning adequately addresses flood risk.

NSW GOVERNMENT | Department of Industry

Our Ref: 17/00129

4 October 2017

The General Manager
Port Macquarie Hastings Council
PO Box 84
Port Macquarie NSW 2444

Attention: Sandra Bush

Dear Sir / Madam,

RE: PLANNING PROPOSAL LOT 202 DP1133171 & CROWN ROAD KENDALL ROAD, KEW PP2014-12.1 - PROPOSED RESIDENTIAL AND ENVIRONMENTAL REZONING

NSW Department of Industry – Crown Lands & Water (the Department) is writing in response to your letter dated 31 August 2017 regarding the above mentioned proposal. Thank you for the extension of time to respond.

A Crown road exists within the western boundary of the site. The Crown road network is a historical network of land reserved to facilitate access should such need arise. The proposal must not restrict the potential future use of this Crown road nor burden the Crown road in any way. It is noted there is intention to utilise the Crown road as road (street) within the Subdivision Concept map.

For any Crown road affected by a development proposal:

a) Council must concur to the ownership of the road being transferred to Council, in terms of Section 151 of the Roads Act, 1993 at the time of approving the proposal.
b) Alternatively to a) above, "Road Closure & Purchase" by the adjoining landowner may be appropriate.
c) Any requirements under Planning for Bushfire Protection 2006 for Bush Fire Asset Protection Zones or other bush fire protection measures are to be contained entirely within the development site and must not impact on the adjoining Crown lands including Crown roads.

For any further enquiries, please do not hesitate to contact Jaimee Vlastuin using the details provided below.

Yours faithfully

[redacted]

Jaimee Vlastuin
Acting Senior Bushfire Officer, Taree
NSW Department of Industry – Crown Lands & Water

P: [redacted]
E: [redacted]

All communications to be addressed to:

Headquarters
15 Carter Street
Lidcombe NSW 2141

Headquarters
Locked Bag 17
Granville NSW 2142

Telephone: 1300 NSW RFS
e-mail: [redacted]

Facsimile: 8741 5433

The General Manager
Port Macquarie-Hastings Council
PO Box 84
PORT MACQUARIE NSW 2444

Your Ref: PP2014-12.1
Our Ref: L09/0007
DA17090509087 AB

ATTENTION: Sandra Bush

11 October 2017

Dear Ms Bush

Planning Instrument for Planning Proposal - Amendment No 45 - Port Macquarie LEP 2011 - Homedale Road Kew

I refer to your letter dated 31 August 2017 seeking advice for the above Planning Instrument in accordance with the 'Environmental Planning and Assessment Act 1979'.

The Service has reviewed the plans and documents received for the proposal and subsequently raise no concerns or issues in relation to bush fire.

For any queries regarding this correspondence please contact Alan Bawden on 1300 NSW RFS.

Yours sincerely

[redacted]

John Ball
Manager

Transport Roads & Maritime Services

File No: NTH17/00124
Your Ref: PP2014-12.1

The General Manager
Port Macquarie Hastings Council
PO Box 84
PORT MACQUARIE NSW 2444

Attention: Sandra Bush

Dear Sir / Madam,

Planning Proposal Homedale Road, Kew - Lot 202, DP 1133171 & Crown Road, Kendall Road, Kew

I refer to your letter of 31 August 2017 requesting comments for the subject planning proposal.

Roles and Responsibilities

The key interests for Roads and Maritime Services are the safety and efficiency of the road network, traffic management, integrity of infrastructure assets and the integration of land use and transport.

Kendall Road (MR538) is a classified (Regional) road. In accordance with Section 7 of the *Roads Act 1993* (the Act) Port Macquarie Hastings Council is the Roads Authority for this road and all other public roads in the subject area. Roads and Maritime's concurrence is required prior to Council's approval of works on this road under Section 138 of the *Roads Act 1993*.

In accordance with Clause 101 of the *State Environmental Planning Policy (Infrastructure) 2007* (ISEPP) the Consent Authority is to have consideration for the safety, efficiency and ongoing operation of the classified road as the development has frontage to a classified road.

Roads and Maritime Response

Roads and Maritime has reviewed the information provided and suggests that the Planning Proposal include a Traffic Impact Assessment (TIA) prepared by a suitably qualified person to identify likely traffic impacts on the classified (State) road.

The TIA should be prepared in accordance with the current Austroads Guide to Traffic Management Part 12, the complementary Roads and Maritime Supplement and the RTA Guide to Traffic Generating Developments. The TIA should include, but not be limited, to the following;

- The impact of the proposed development on the road network with consideration for a 10 year design horizon.
- The volume and distribution of traffic generated by the proposed development.
- Background traffic data, including current traffic counts and relevant growth rates.

- Sight distance measurements at site access locations and affected intersections.
- Proposed site access arrangements and details of proposed improvements to any affected intersections.
- Details of servicing and parking arrangements, including swept paths for the largest vehicle requiring access to the site.
- Impact on public transport (public and school bus routes).
- Connectivity for active transport modes such as walking and cycling.

Any new access or works proposed on the classified (Regional) road should be designed in accordance with the current Austroads Guidelines, Australian Standards and Roads and Maritime Supplements, to the satisfaction of Council, prior to referral to Roads and Maritime for concurrence under Section 138 of the Roads Act.

If you have any further enquiries regarding the above comments please do not hesitate to contact Liz Smith Manager Land Use Assessment on [redacted] or via email at: [redacted]

Yours faithfully

[redacted]

For Monica Sirol
Network & Safety Manager, Northern Region
16/10/2017

NSW GOVERNMENT | Office of Environment & Heritage

Our Ref: DOC18/492319
Your Ref: PP2014-12.1

General Manager
Port Macquarie Hastings Council
PO Box 84
Port Macquarie NSW 2444

Attention: Ms Sandra Bush

Dear Mr Swift-McNair

Re: Additional Information - Aboriginal Cultural Heritage – Planning Proposal - Lot 202 DP 1133171 & Crown Road, Homedale Road, Kew

Thank you for your letter dated 13 July 2018 about the additional Aboriginal cultural heritage information for the planning proposal at Homedale Road, Kew, seeking comments from the Office of Environment and Heritage (OEH). I appreciate the opportunity to provide further input.

We have reviewed the letter from GEM Planning dated 22 June 2018 to Port Macquarie Hastings Council about Aboriginal cultural heritage at Lot 202 DP 1133171 & Crown Road, Homedale Road Kew.

The OEH notes the steps taken by GEM Planning in consultation with the Bunyah Local Aboriginal Land Council (LALC) to ascertain and detail the Aboriginal archaeological site outlined in Appleton's (2004) report including contacting the author of the report.

We are satisfied with the measures undertaken in collaboration with the Bunyah LALC to relocate the site area and to allow for an on-ground survey for any Aboriginal cultural heritage during which no cultural material was identified.

We note that there may have been some inaccuracy regarding the original site location or registration process and acknowledge the comments provided to GEM Planning by the Bunyah LALC that they were unable to provide any knowledge of cultural material at the site outlined in Appleton's report, including feedback from the broader community.

The OEH supports the proposed concept zoning plan attached to council's letter and is satisfied with the proposal for the Bunyah LALC sites officers to be present during any proposed diggings or disturbance of the originally identified archaeological site as part of future development to be enabled by the planning proposal.

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www.environment.nsw.gov.au

If you have any further questions about this issue, Mr Paul Houlder, Project Officer (Data Support), Conservation and Regional Delivery, OEH, can be contacted on [redacted] or at [redacted]

Yours sincerely

[redacted] 14 August 2018

DIMITRI YOUNG
Senior Team Leader Planning, North East Branch
Conservation and Regional Delivery

Contact officer: PAUL HOULDER
6659 8239

Draft Amendment to Port Macquarie-Hastings Development Control Plan 2013 (Part 5 Southern Coastal Towns area-based provisions)

Homedale Road, Kew

Land to which this section applies

This section applies to the land shown below in Figure 1.

Figure 1: Land to which this section applies

Strategic Context

The site specific rezoning was informed by a concept plan submitted by GEM Planning consultants, on behalf of the landowner, and provides development potential for approximately 45 residential lots and an environmental residue lot. The environmental residue comprises significant vegetation, area for stormwater detention and a 50m wide separation buffer to Regionally Significant Farmland on the neighbouring rural property to the west.

The concept road layout allows for internal connectivity to the Links Residential Estate to the east and a 22m separation buffer to an approved bulk storage (temporary fencing) business operating on the Kendall Road frontage of the neighbouring rural property.

Purpose

The purpose of these provisions are:

a) To minimise the potential for land use conflict as a result of adverse noise impacts.
b) To provide for internal road connectivity.
c) To ensure adequate measures to minimise the potential for adverse impacts to indigenous heritage significance.

These provisions supplement the relevant provisions in Parts 2 and 3 of the Port Macquarie Development Control Plan. Where there is inconsistency between these Area Based Provisions and the provisions in Parts 3 and 4, for the extent of the inconsistency these Area Based Provisions prevail.

The maps shown in this plan are not to scale and show indicative locations only.

Development Guide

Noise attenuation
Objective • To mitigate the potential for adverse noise impacts on residents in proximity to the neighbouring bulk storage development.
Development Provisions The first subdivision adjoining Kendall Road must provide a minimum 1.8m high acoustic fence for noise attenuation extending along the north-west boundary generally in the location shown on Figure 2. The fence is to: ○ Be constructed of concrete, lapped and capped timber, or other suitable materials. ○ Be located within, or on the boundary of private property. ○ Be constructed prior to issuing the Subdivision Certificate. The development application must demonstrate the suitability of the barrier design and material to achieve the required relevant noise criteria at the time of noise barrier installation.

Road network connectivity
Objective • To ensure an appropriate road network that links to adjoining residential areas.
Development Provisions The subdivision design is to provide a connecting road through the site that links to the adjoining residential Estate, generally in accordance with Figure 3.

Aboriginal cultural heritage
Objective • To ensure Aboriginal archaeological values are respected in the design of development and in the development process.
Development Provisions A cultural site officer from the Bunyah Local Aboriginal Land Council must be present during any proposed diggings or disturbance of the potential archaeology site identified in Figure 4. If any Aboriginal artefacts are discovered, all works are to immediately stop in the vicinity of the site, the area cordoned off and contact made with the NSW Office of Environment and Heritage so that the site can be appropriately assessed and managed.

Figure 2: Indicative location for acoustic barrier

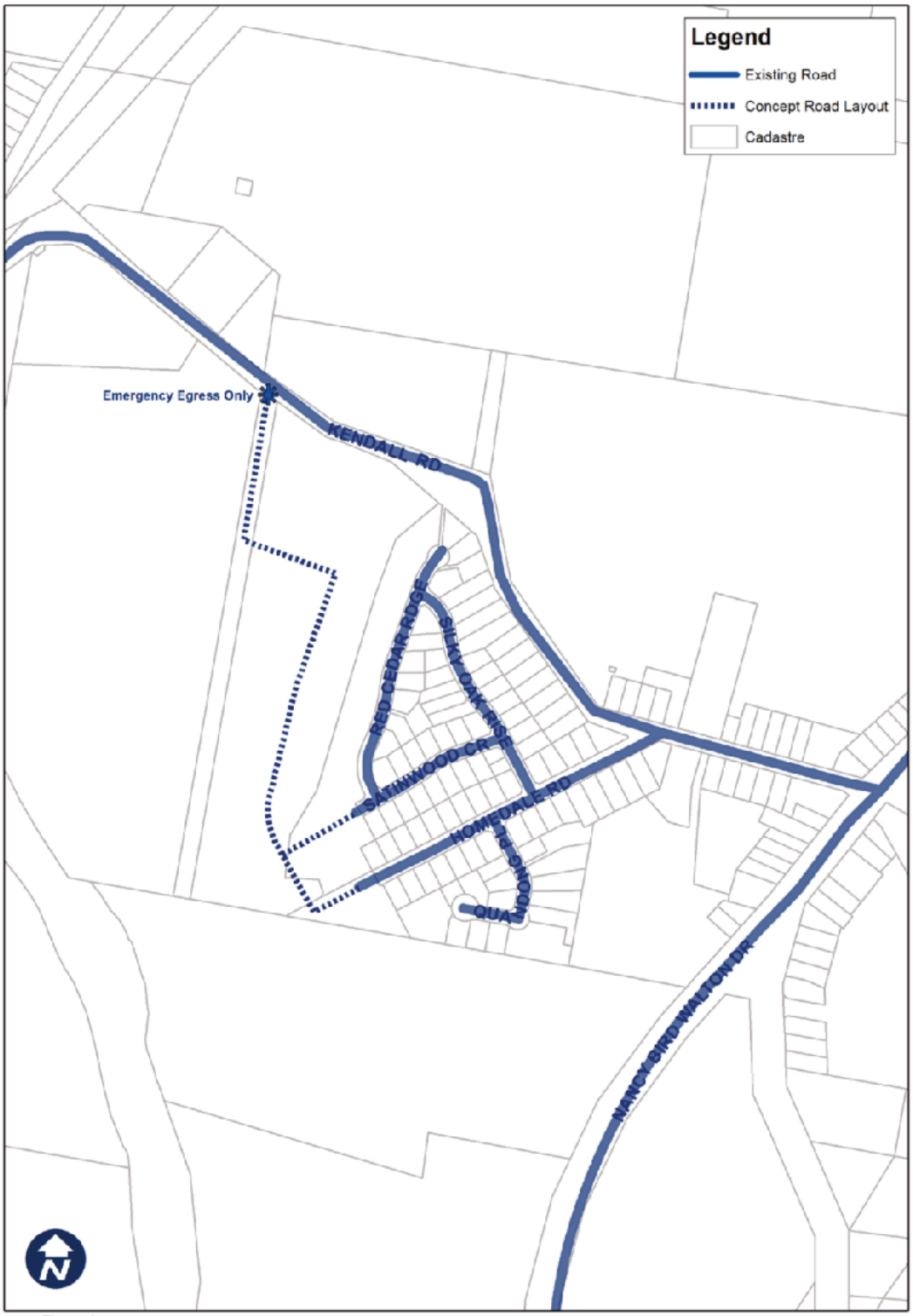


Figure 3: Concept road layout

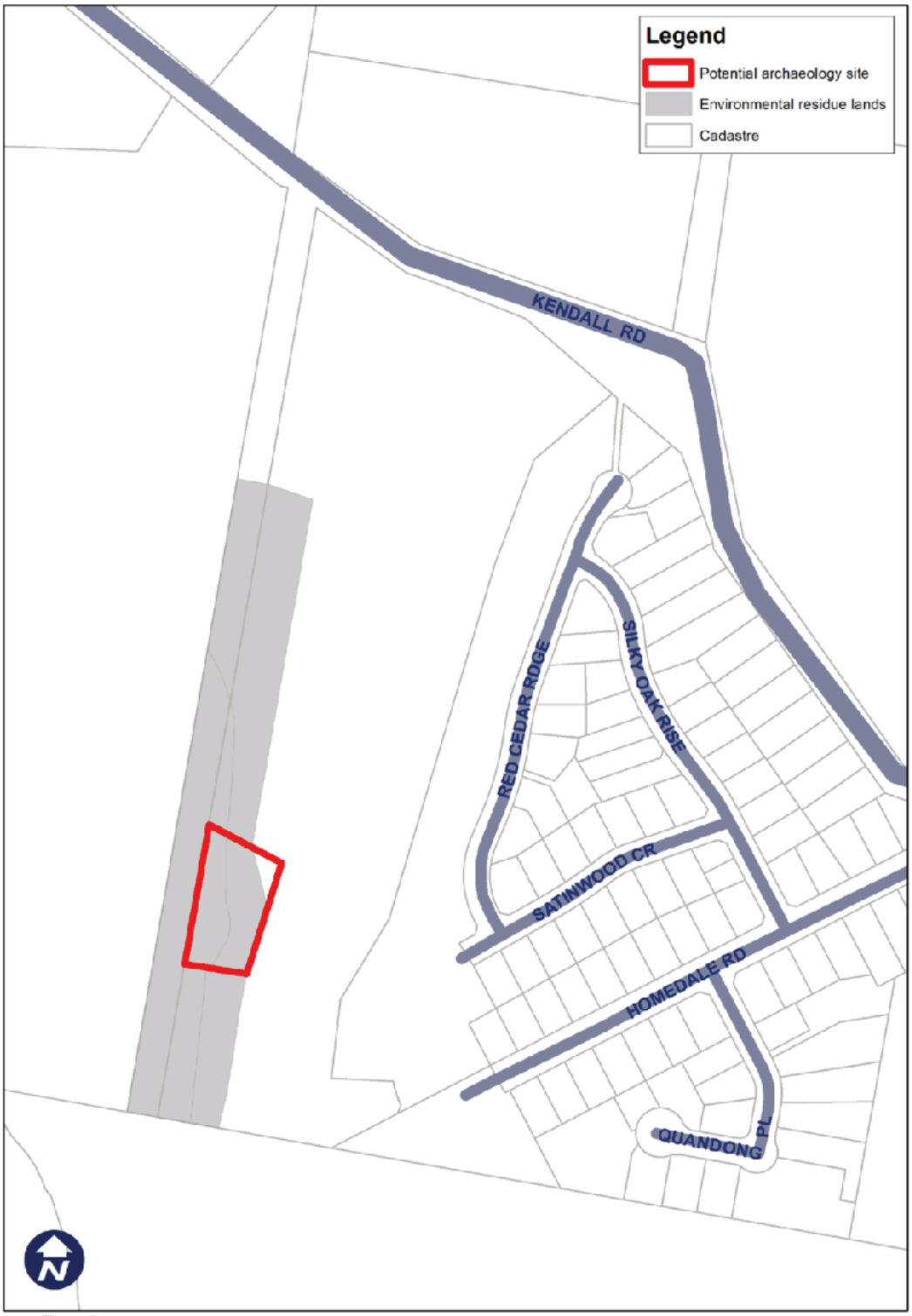


Figure 4: Potential archaeology site

FOR USE BY PLANNERS/SURVEYORS TO PREPARE LIST OF PROPOSED CONDITIONS - 2011

NOTE: THESE ARE DRAFT ONLY

DA NO: 2017/667 **DATE: 10/12/2018**

PRESCRIBED CONDITIONS

The development is to be undertaken in accordance with the prescribed conditions of Part 6 - Division 8A of the *Environmental Planning & Assessment Regulations* 2000.

A – GENERAL MATTERS

(1) (A001) The development is to be carried out in accordance with the plans and supporting documents set out in the following table, as stamped and returned with this consent, except where modified by any conditions of this consent.

Plan / Supporting Document	Reference	Prepared by	Date
Development Plans as stamped	Sailability	Jim Bignell	July 2018

In the event of any inconsistency between conditions of this development consent and the plans/supporting documents referred to above, the conditions of this development consent prevail.

(2) (A002) No work shall commence until a Construction Certificate has been issued and the applicant has notified Council of:

a. the appointment of a Principal Certifying Authority; and

b. the date on which work will commence.

Such notice shall include details of the Principal Certifying Authority and must be submitted to Council at least two (2) days before work commences.

(3) (A008) Any necessary alterations to, or relocations of, public utility services to be carried out at no cost to council and in accordance with the requirements of the relevant authority including the provision of easements over existing and proposed public infrastructure.

(4) (A011) The design and construction of all public infrastructure works shall be in accordance with Council's adopted AUSPEC Specifications.

(5) (A013) The general terms of approval from the following authorities, as referred to in section 93 of the Environmental Planning and Assessment Act 1979, and referenced below, are attached and form part of the consent conditions for this approval.

- **NSW Government Natural Resources Access Regulator** - The General Terms of Approval, Reference GTA105323 and dated 27 July 2018, are attached and form part of this consent.

(6) (A014) This approval does not provide any indemnity to the owner or applicant under the Disability Discrimination Act 1992 with respect to the provision of access and facilities for people with disabilities.

(7) (A017) A separate development application for any proposed advertising signs (other than signs which are exempt development or approved under this consent) must be submitted to and approved by council prior to the erection or display of any such signs.

(8) (A032) The developer is responsible for any costs relating to minor alterations and extensions to ensure satisfactory transitions of existing roads, drainage and Council services for the purposes of the development.

(9) (A195) All plumbing fixtures shall comply with the current version of the Plumbing Code of Australia and Australian Standard 3500. For the purpose of the code and standard the declared flood level is the 1 in 100 year flood level of 2.84m AHD. Details demonstrating compliance shall be clearly illustrated on plans accompanying the section 68 application.

(10) (A196) All parts of the structure below the applicable Flood Planning Level (1 in 100 flood level including climate change plus the relevant freeboard) shall be constructed from flood compatible materials compliant with the ABCB Standard for Construction of Buildings in Flood Hazard Areas. Consideration should also be given to the relevant provisions contained with the Hawkesbury-Nepean Floodplain Management Steering Committee document Reducing Vulnerability of Buildings to Flood Damage (2007).

B – PRIOR TO ISSUE OF A CONSTRUCTION CERTIFICATE

(1) (B001) Prior to release of the Construction Certificate, approval pursuant to Section 68 of the Local Government Act, 1993 to carry out water supply, stormwater and sewerage works is to be obtained from Port Macquarie-Hastings Council. The following is to be clearly illustrated on the site plan to accompany the application for Section 68 approval:

- Position and depth of the sewer (including junction)
- Stormwater drainage termination point
- Easements
- Water main
- Proposed water meter location

(2) (B003) Submission to the Principal Certifying Authority prior to the issue of a Construction Certificate detailed design plans for the following works associated with the developments. Public infrastructure works shall be constructed in accordance with Port Macquarie-Hastings Council's current AUSPEC specifications and design plans are to be accompanied by AUSPEC DQS:

1. Public parking areas including;
   a. Parking bays;
2. Sewerage reticulation.
3. Water supply plans shall include hydraulic plans for internal water supply services and associated works in accordance with AS 3500, Plumbing Code of Australia and Port Macquarie-Hastings Council Policies.
4. Retaining walls.
5. Stormwater systems including works to provide a trafficable lid and re-enforcement to any stormwater pit within new parking bays.
6. Erosion & Sedimentation controls.
7. Landscaping.

(3) (B038) Footings and/or concrete slabs of buildings adjacent to sewer lines or stormwater easements are to be designed so that no loads are imposed on

the infrastructure. Detailed drawings and specifications prepared by a practising chartered professional civil and/or structural engineer are to be submitted to the Principal Certifying Authority with the application for the Construction Certificate.

(4) (B045) A schedule of existing and proposed fire safety measures is to be submitted to the Principal Certifying Authority with the application for the Construction Certificate.

(5) (B072) A stormwater drainage design is to be submitted and approved by Council prior to the issue of a Construction Certificate. The design must be prepared in accordance with Council's AUSPEC Specifications and the requirements of Relevant Australian Standards and make provision for the following:

a) The legal point of discharge for the proposed development is defined as Council's piped drainage system.

(6) (B053) The design of the carpark and accesses is to be in accordance with Australian Standard 2890 (including AS 2890.1, AS 2890.2 and AS 2890.6). Certification of the design by a suitably qualified consultant is to be provided to Port Macquarie-Hastings Council prior to release of the building Construction Certificate.

(7) (B063) Prior to release of the building Construction Certificate submission to and approval by Councils Parks and Gardens Manger of a detailed landscape plan that provides for a minimum of thirteen (13) replacement trees in suitable locations at the site. The species and size of the replacement trees shall be determined by Council's Parks and Gardens staff. A copy of the approval by Council shall be provided to the Principal Certifying Authority.

(8) (B064) The applicant's landscape consultant shall consult with service authorities regarding the selection and placement of replacement trees near services. The location of all proposed and existing overhead and underground service lines shall be indicated on the Detailed Landscape Plan to be submitted to Port Macquarie-Hastings Council.

(9) (B065) The applicant shall implement a landscape maintenance program for a minimum period of twelve (12) months to ensure that all landscape work becomes well established by regular maintenance. Details of the program must be submitted with the Detailed Landscape Plan.

(10) (B071) Prior to the issue of any Construction Certificate, the provision of water and sewer services to the land are to be approved by the relevant Water Authority and relevant payments received.

(11) (B195) The floor level of the amenities area must be at or above the 1 in 20 year flood level. For the purpose of this requirement, the 1 in 20 year flood level may be assumed to be RL2.35m AHD. Prior to release of the Construction Certificate floor levels satisfying this requirement shall be clearly illustrated on the plans.

(12) (B196) The floor level of the boat shed area is to be at or above 2.056m AHD. Prior to release of the Construction Certificate floor levels satisfying this requirement shall be clearly illustrated on the plans.

(13) (B197) The development must incorporate storage (shelves/racks) at or above 3.74m AHD being the 1:100 year flood level including climate change allowance plus freeboard. Prior to release of the Construction Certificate storage shelf details satisfying this requirement shall be clearly illustrated on the plans.

(14) (B198) Prior to release of the Construction Certificate a practising chartered professional structural engineer is to provide certification to the PCA that the building is designed so that all structural members are capable of withstanding flood forces and the impact of any debris (carried by floodwaters) likely to occur for a range of floods up to and including the 1 in 100 year flood including climate change and the relevant freeboard level of 500mm. For the purpose of this requirement, the 1 in 100 year flood level including climate change may be assumed to be RL3.24m AHD. Velocities to be adopted for the calculation of forces created by flood waters and debris loading shall be at least three (3) times the velocities for a 1 in 100 year flood including climate change plus freeboard. For the purpose of this requirement, the velocity for the 1 in 100 flood including climate change may be assumed to be 0.90m/s.

(15) A building colours and materials schedule shall be submitted to and approved by Port Macquarie-Hastings Council prior to the issue of the building Construction Certificate.

C – PRIOR TO ANY WORK COMMENCING ON SITE

(1) (C001) A minimum of one (1) week's notice in writing of the intention to commence works on public land is required to be given to Council together with the name of the principal contractor and any major sub-contractors engaged to carry out works. Works shall only be carried out by a contractor accredited with Council.

(2) (C008) No access through the reserve shall be allowed without first obtaining written approval from Council's Parks and Gardens Manager. No clearing or damage to any vegetation on the reserve is permitted. No spoil, fill, waste liquids or solid materials shall be stockpiled on or allowed to move beyond the fence line for any period on the adjoining reserve during or after the development. In the event of accidental damage, the site must be revegetated to the satisfaction of Council. Such approval would need to be undertaken in accordance with Council Policy.

(3) (C013) Where a sewer manhole and Vertical Inspection Shaft exists within a property, access to the manhole/VIS shall be made available at all times. Before during and after construction, the sewer manhole/VIS must not be buried, damaged or act as a stormwater collection pit. No structures, including retaining walls, shall be erected within 1.0 metre of the sewer manhole or located so as to prevent access to the manhole.

(4) The attached General Terms of Approval (GTAs) issued by NSW Government Natural Resources Access Regulator do not constitute an approval under the Water Management Act 2000. The development consent holder must apply to NSW Government Natural Resources Access Regulator for a Controlled Activity approval after development consent has been issued by Council and before the commencement of any work or activity.

D – DURING WORK

(1) (D001) Development works on public property or works to be accepted by Council as an infrastructure asset are not to proceed past the following hold points without inspection and approval by Council. Notice of required inspection must be given 24 hours prior to inspection, by contacting Council's Customer Service Centre on (02) 6581 8111. You must quote your Construction Certificate number and property description to ensure your inspection is confirmed:

a. at completion of installation of erosion control measures

b. at completion of installation of traffic management works

c. when trenches are open, stormwater/water/sewer pipes and conduits jointed and prior to backfilling;

d. prior to the pouring of concrete for sewerage works and/or works on public property;

All works at each hold point shall be certified as compliant in accordance with the requirements of AUSPEC Specifications for Provision of Public Infrastructure and any other Council approval, prior to proceeding to the next hold point.

(2) (D029) The demolition of the existing structure shall be carried out in accordance with Australian Standard AS 2601-1991: *The Demolition of Structures*. No demolition materials shall be burnt or buried on site. The person responsible for the demolition works shall ensure that all vehicles leaving the site carrying demolition materials have their loads covered and do not track soil or waste materials onto the road. Should the demolition works obstruct or inconvenience pedestrian or vehicular traffic on an adjoining public road or reserve, separate application shall be made to Council to enclose the public place with a hoarding fence.

Should asbestos be present, its removal shall be carried out in accordance with the National OH&S Committee – *Code of Practice for Safe Removal of Asbestos* and *Code of Practice for the Management and Control of Asbestos in Workplaces*.

(3) (D033) Should any Aboriginal objects be discovered in any areas of the site then all excavation or disturbance to the area is to stop immediately and the National Parks and Wildlife Service, Department of Environment and Conservation is to be informed in accordance with Section 91 of the *National Parks and Wildlife Act 1974*. Subject to an assessment of the extent, integrity and significance of any exposed objects, applications under either Section 87 or Section 90 of the *National Parks and Wildlife Act 1974* may be required before work resumes.

E – PRIOR TO OCCUPATION OR THE ISSUE OF OCCUPATION CERTIFICATE

(1) (E001) The premises shall not be occupied or used in whole or in part until an Occupation Certificate has been issued by the Principal Certifying Authority.

(2) (E016) Prior to occupation or the issue of the Occupation Certificate (or Interim Occupation Certificate) the owner of the building must cause the Principal Certifying Authority to be given a fire safety certificate (or interim fire safety certificate in the case of a building or part of a building occupied before completion) in accordance with Clause 153 of the Environmental Planning and Assessment Regulation 2000 for each measure listed in the schedule. The certificate must only be in the form specified by Clause 174 of the Regulation. A copy of the certificate is to be given to the Commissioner of the New South Wales Fire Brigade and a copy is to be prominently displayed in the building.

(3) (E030) Vehicle ramps, driveways, turning circles and parking spaces being paved, sealed and line marked prior to occupation or the issue of the Occupation Certificate or commencement of the approved land use.

(4) (E036) Certification by a suitably qualified consultant is to be submitted to the Principal Certifying Authority (PCA) confirming that the car park and internal accesses have been constructed in accordance with Port Macquarie-Hastings Development Control Plan 2013 and Australian Standard 2890 (including AS 2890.1, AS 2890.2 and AS 2890.6) prior to occupation or issue of the Occupation Certificate.

(5) (E044) The applicant will be required to submit prior to occupation or the issue of the Occupation Certificate, certification by a Registered Surveyor that the development has met the necessary flood planning levels specified in this consent.

(6) (E045) All electrical meter boxes shall be placed at a level which is above the 1 in 100 year flood level including the applicable climate change allowance. The positioning of meter boxes shall comply with the requirements of the relevant electricity authority. For the purpose of this requirement, the 1 in 100 year flood level including climate change may be assumed to be RL 3.24m AHD.

(7) (E051) Prior to occupation or the issuing of any Occupation Certificate a section 68 Certificate of Completion shall be obtained from Port Macquarie-Hastings Council.

(8) (E056) A Certificate of Compliance under the provisions of Section 307 of the *Water Management Act* must be obtained prior to the issue of any occupation certificate.

(9) (E061) Landscaped areas being completed prior to occupation or issue of the Occupation Certificate. Public landscaping may be bonded as agreed to by Council.

(10) (E082) Submission of a compliance certificate accompanying Works as Executed plans with detail included as required by Council's current AUSPEC Specifications. The information is to be submitted in electronic format in accordance with Council's "CADCHECK" requirements detailing all infrastructure for Council to bring in to account its assets under the provisions of AAS27. This information is to be approved by Council prior to issue of the Occupation Certificate. The copyright for all information supplied, shall be assigned to Council.

F – OCCUPATION OF THE SITE

(1) (F195) The development is only permitted to be used for the storage of small boats and directly associated equipment. No storage of unrelated items or use of the development for other purposes is permitted.

DRAFT

Natural Resources Access Regulator

General Terms of Approval

for proposed development requiring approval under s89, 90 or 91 of the Water Management Act 2000

Reference Number:	GTA105323
Issue date of GTA:	27 July 2018
Type of Approval:	Controlled Activity
Description:	Boat Storage and Amenities Building
Location of work/activity:	9 McInherney Close PORT MACQUARIE NSW 2444
DA Number:	DA2017/667/1
LGA:	Hastings Council

The GTA issued by NRAR do not constitute an approval under the *Water Management Act 2000*. The development consent holder must apply to NRAR for the relevant approval **after development consent** has been issued by Council **and before** the commencement of any work or activity.

Condition Number	Details
	Design of works and structures
GT0009-00001	Before commencing any proposed controlled activity on waterfront land, an application must be submitted to DPI Water, and obtained, for a controlled activity approval under the Water Management Act 2000.
GT0013-00001	A. Any proposed controlled activity carried out under a controlled activity approval must be directly supervised by a suitably qualified person. B. A copy of this approval must be: i. kept at the site where the controlled activity is taking place, and ii. provided to all personnel working on the controlled activity.
	Erosion and sediment controls
GT0006-00001	The following plan(s): - Erosion and Sediment Controls Plan must be: A. prepared in accordance with Managing Urban Stormwater: Soils and Construction, Volume 1 (Landcom, 2004), as amended or replaced from time to time, and B. submitted with an application for a controlled activity approval.
GT0014-00001	A. The consent holder must ensure that any proposed materials or cleared vegetation, which may: i. obstruct water flow, or ii. wash into the water body, or iii. cause damage to river banks, are not stored on waterfront land, unless in accordance with a plan held by DPI Water as part of a controlled activity approval. B. When the construction of the controlled activity has been completed, surplus materials must be removed from waterfront land.
GT0021-00002	The proposed erosion and sediment control works must be inspected and maintained throughout the construction period of the controlled activity and must not be removed until the site is fully stabilised.
	Plans, standards and guidelines
GT0002-00026	A. This General Terms of Approval (GTA) only applies to the proposed controlled activity described in the plans and associated documents found in Schedule 1, relating to Development Application 2017.667 provided by Council to DPI Water. B. Any amendments or modifications to the proposed controlled activity may render the GTA invalid. If the proposed controlled activity is amended or modified, DPI Water, Grafton Office, must be notified in writing to determine if any variations to the GTA will be required.
GT0003-00007	The application for a controlled activity approval must include the following document(s): - site plan, map and/or surveys; Works Schedule; structural

Natural Resources Access Regulator

General Terms of Approval

for proposed development requiring approval under s89, 90 or 91 of the Water Management Act 2000

Reference Number:	GTA105323
Issue date of GTA:	27 July 2018
Type of Approval:	Controlled Activity
Description:	Boat Storage and Amenities Building
Location of work/activity:	9 McInherney Close PORT MACQUARIE NSW 2444
DA Number:	DA2017/667/1
LGA:	Hastings Council

design and specifications; Erosion and Sediment Control Plan.

Reporting requirements

GT0016-00001	The consent holder must inform DPI Water in writing when any proposed controlled activity carried out under a controlled activity approval has been completed.

SCHEDULE 1

The plans and associated documentation listed in this schedule are referred to in general terms of approval (GTA) issued by NRAR for integrated development associated with DA2017/667/1 as provided by Council:

- Statement of Environmental Effects
- Plans (Drawings 17-364 marked 'Revised Layout 2')

Subject: DA2017 – 667 DEMOLITION OF EXISTING BUILDING AND CONSTRUCTION OF BOAT STORAGE FACILTY AND PUBLIC AMENITIES, TREE REMOVAL AND ROAD WORKS

Report Author: Ben Oliver - Development Assessment Coordinator (Coffs Harbour City Council)

Applicant:	**Sailability NSW**
Owner:	**Port Macquarie-Hastings Council**
Estimated Cost:	**$420,000**
Parcel no:	**22006**

Alignment with Delivery Program

4.3.1 Undertake transparent and efficient development assessment in accordance with relevant legislation.

RECOMMENDATION

That DA 2017 – 667 for Demolition of Existing Building and Construction of Boat Storage Facility and Public Amenities, Tree Removal and Road Works at Lot 2, DP535212, No. 9 McInherney Close, Port Macquarie, be determined by granting consent subject to the recommended conditions.

……
Ben Oliver
Development Assessment Coordinator (Coffs Harbour City Council)
11 December 2018

Executive Summary

The development application (DA) proposes the construction of a new building on public foreshore land, which will be used for the storage of boats and include public amenities.

Public notification of the DA resulted in some community interest and several submissions from members of the public. In the interests of probity, Coffs Harbour City Council were engaged by Port Macquarie Hastings Council, to undertake an independent assessment of the development application and provide a recommendation to the Development Assessment Panel.

The DA was renotified after significant changes were made to the original design in response to the concerns raised in the initial public consultation phase.

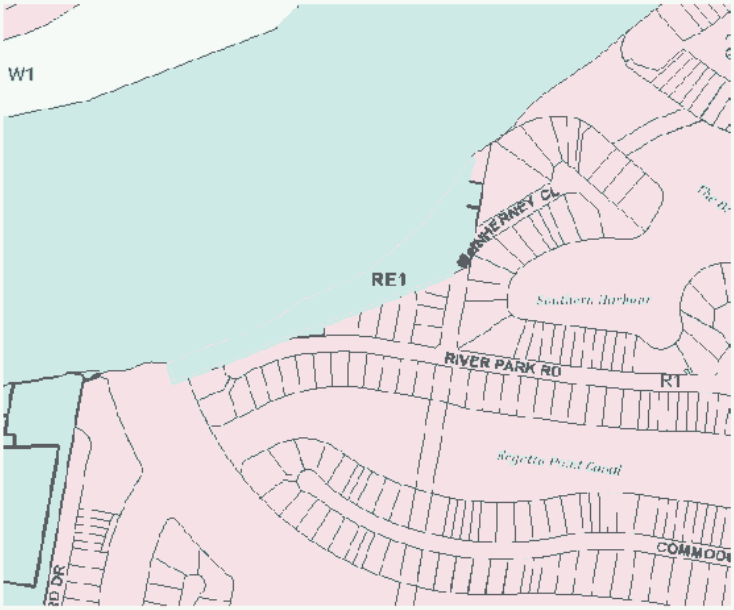
The amended design proposes a smaller building with a reduced footprint, which will be more complementary to the adjoining buildings and in keeping with the recreational status of the land. It is considered that the amended design addresses the substantive objections to the original DA and is now worthy of Council support.

1. BACKGROUND

Existing sites features and surrounding development

The site consists of foreshore public land with public use facilities and amenities encouraging opportunities for both passive and active recreation activities. The land has undergone some capital works improvements, most notably the installation of a pontoon which facilitates recreational boating and sailing.

The site is zoned RE1 Public Recreation in accordance with the Port Macquarie-Hastings Local Environmental Plan 2011, as shown in the following zoning plan:



The existing subdivision pattern and location of existing development within the locality is shown in the following aerial photograph:

2. DESCRIPTION OF DEVELOPMENT

The proposal involves:

- Demolition of the existing public amenities building;
- Construction of a new building which includes public amenities and a boat storage area;
- Removal of several trees located within the building footprint.
- Minor road works including new car parking spaces.

The building will be primarily used as a *community facility* providing boat storage facilities for use by Sailability and a small storage area for the Port Macquarie Triathlon Club The building will be constructed of pre-cast concrete walls with a colourbond roof on a concrete slab. The dimensions of the building will be 10.9m x 22.4m with an approximate roof height of 4.0m.

The Proponent (Sailability NSW - Port Macquarie Club) is a not for profit organisation providing sailing opportunities for people with disabilities in specially designed sailing dinghies. Currently all of the equipment used by Sailability including sailing boats, IRB's and trailers is stored at the homes of volunteers.

The development will enable Sailability to provide a continued service to the local community in a new building that has easy access to the foreshore and will allow the consolidated storage of boats and equipment. It is expected that the building will be used in a limited capacity, noting that Sailability currently operate one day per week.

The development is *integrated development* for the purposes of section 4.46 of the EP&A Act 1979. General Terms of Approval have been issued by the Department of Primary Industries and included in the recommended conditions of consent.

Plans of the development are attached at the end of this report.

Application Chronology

- 2 August 2017 – Application lodged.
- 24 August 2017 – 22 September 2017 – DA notified.
- 30 May 2018 – Amended plans submitted by the Applicant.
- 4 June 2018 - 18 June 2018 – DA renotified.

3. STATUTORY ASSESSMENT

Section 4.15(1) Matters for Consideration

In determining the application, Council is required to take into consideration the following matters as are relevant to the development that apply to the land to which the development application relates:

(a) The provisions (where applicable) of:
(i) Any Environmental Planning Instrument:

State Environmental Planning Policy No. 44 - Koala Habitat Protection

A site specific SEPP44 assessment was undertaken by JB Enviro Consultants on behalf of the Proponent. The assessment noted the removal of several trees and concluded:

- *the natural environment was consistent with an artificially established parkland,*
- *the site did not qualify as potential koala habitat and there was no evidence of koala*
- *activity.*
- *assessment for Core Koala Habitat is not required, nor is a Koala Plan of Management required.*

It is considered that adequate assessment has been undertaken in relation to koala habitat protection and the proposed development can proceed.

State Environmental Planning Policy No. 55 – Remediation of Land

The Policy requires the consent authority to consider whether the land is contaminated and suitable for its intended purpose and whether remediation is required prior to the land being used.

The site forms part of an established recreational precinct. Site investigations and a search of Council records, do not indicate that the subject land is contaminated or potentially contaminated. It is noted that the new building will replace an aged building in the same location. The site is considered suitable for its proposed use and no further detailed investigations are considered necessary.

State Environmental Planning Policy No. 62 – Sustainable Aquaculture

The new development will include standard stormwater controls and is not expected to have any adverse impact on water quality and the viability of existing aquaculture industries.

State Environmental Planning Policy 71 – Coastal Protection

The Policy requires Council to take matters as listed in Clause 8 into consideration when determining development applications. Clause 8 matters have been taken into consideration in the assessment of the proposed development.

- The proposed development has frontage to a highly modified foreshore reserve and the development will have no discernible impact on the dunes or coastal vegetation comprising the foreshore.
- The proposed development does not change, impede or diminish public access to or along the coastal foreshore.
- The development is considered suitable given its type, location and design and its relationship with the surrounding area.
- The proposed development will not result in a detrimental impact on the amenity or scenic qualities of the coastal foreshore, including significant overshadowing of the coastal foreshore and no significant loss of views from a public place to the coastal foreshore. There is no expected impact on existing wildlife corridors, animals, fish or plants and their inhabitants.
- The proposed development site is affected by coastal flooding which has been adequately addressed in the conditions and restrictions which apply to the development of the land. The proposed development will not result in potential for conflict between land-based and water-based coastal activities.
- The proposed development will not result in the discharge of untreated stormwater that would adversely affect the water quality of waterways.

In conclusion, it is considered that the proposed development meets the relevant provisions and is consistent with the aims of the policy.

Port Macquarie-Hastings Local Environmental Plan 2011

The proposal is consistent with the LEP having regard to the following:

- Clause 2.2 - the subject site is zoned RE1 Public Recreation. In accordance with clause 2.3(1) and the RE1 zone landuse table, the construction of the building and its use as a *community facility* with public amenities is a permissible landuse with consent.

  community facility *means a building or place:*
  (a) owned or controlled by a public authority or non-profit community organisation, and
  (b) used for the physical, social, cultural or intellectual development or welfare of the community,
  but does not include an educational establishment, hospital, retail premises, place of public worship or residential accommodation.

  The objectives of the RE1 zone are as follows:
  - *To enable land to be used for public open space or recreational purposes.*
  - *To provide a range of recreational settings and activities and compatible land uses.*
  - *To protect and enhance the natural environment for recreational purposes.*

  In accordance with Clause 2.3(2), the proposal is consistent with the zone objectives

- Clause 4.3 – Height of Buildings: The maximum overall height of the building above ground level (existing) is approximately 4.0m which complies with the height limit of 8.5m. The proposed building design is compatible with the established character of the area and will not cause significant amenity impacts in terms of overshadowing, obstruction of views and visual impact.
- Clause 5.10 – Heritage: The site does not contain or adjoin any known heritage items or sites of significance.
- Clause 7.1 – Acid Sulphate Soils: The subject land is mapped as being class 3 potential acid sulfate soils. The proposed development does not involve significant excavation

and/or earthworks as it is considered that no further detailed consideration of acid sulfate soils is required.

- Clause 7.3 - Flood Planning: The site is identified as flood prone waterfront land. In addition to the requirement for engineering design which accommodates flooding impacts, a minimum floor level will be required and an operational condition will be applied to restrict the use of the building to storage purposes only.
- Clause 7.13 – Services: Satisfactory arrangements are in place for provision of essential services including water supply, electricity supply, sewer infrastructure, stormwater drainage and suitable road access to service the development.

(ii) Any draft instruments that apply to the site or are on exhibition:

No draft instruments apply to the site.

(iii) Any Development Control Plan in force:

Port Macquarie-Hastings Development Control Plan 2013

Chapter	Response
1.3 Community Participation	The DA was notified on two separate occasions and members of the public have been provided with an opportunity to make a submission. Any submission received have been acknowledged and the issues raised have been addressed in this report.
2.3 Environmental Management	The development will be designed, located and constructed in a manner which minimises the impact to the environment, consistent with the aims and objectives of the DCP.
2.4 Hazards Management	The development will be designed, located and constructed in a manner which minimises hazards, consistent with the aims and objectives of the DCP.
2.5 Transport Traffic Management Access and Car parking	The development has good access to transport services and public parking. Three (3) existing angled spaces will be removed to accommodate the building and four (4) new car parking spaces will be provided alongside existing car parking bays, resulting in a net increase of one (1) space.
2.6 Tree Management	The development will result in the removal of several trees that are located within the footprint of the new building. The loss of vegetation will be offset by replanting around the perimeter of the building and the reserve, which is consistent with Councils compensatory principles and the aims and objectives of the DCP.
2.7 Social Impact Assessment and Crime Prevention	The development proposes a functional and utilitarian building that will be located in an open and public area with good passive surveillance. The design of the building will minimise the opportunity for negative social impacts and antisocial behaviour consistent with the aims and objectives of the DCP.

(iiia) Any planning agreement that has been entered into under section 7.4, or any draft planning agreement that a developer has offered to enter into under section 7.4:

No planning agreement has been offered or entered into relating to the site.

iv) Any matters prescribed by the Regulations:

Demolition of buildings AS 2601:

The proposal includes demolition work and a condition is recommended to ensure that the work is carried out in accordance with the relevant Australian Standard.

(b) The likely impacts of that development, including environmental impacts on both the natural and built environments, social and economic impacts in the locality:

The subject site is located within in a highly modified urban environment surrounded by public buildings and recreational parkland. The construction of the new single storey building on the site to replace an aged public amenities building in the same location, is unlikely to have any adverse impact on the built environment or the amenity and aesthetics of the area.

The development will not involve any significant earthworks, disturbance of acid sulfate soils or impact on the water table. The environmental impacts of the development are limited to the removal of nine (9) trees, which will be compensated by replanting around the perimeter of the building and foreshore reserve. In summary, it is considered that the impacts of the development on the natural environment are minor and acceptable and can be addressed by standard conditions of consent.

The building will be a community asset and enable a community organisation to continue to provide an important and valued service to the community. It is considered that the positive social and civic impacts of the development, will outweigh any negative perceptions regarding the appearance or use of the building

Access, Traffic and Transport

The development has frontage to a public road and is in close proximity to public transport and multiple car parking spaces. An existing drop off bay will provide adequate access and egress to the building and adequate car parking spaces are located in close proximity to the building. The existing road network and parking will cater for any increase in traffic generation as a result of the development.

Service Connection,

The site and building will be adequately serviced by reticulated sewer and water and will be connected to Councils stormwater infrastructure.

Other Utilities

Telecommunication and electricity services are available to the site.

Heritage

This site does not contain or adjoin any known European heritage item or conservation area. An electronic search of the Aboriginal Heritage Information System (AHIMS) register did not indicate any known sites, places of significance or relics on or in close proximity to the development site.

Other land resources

The site is within an established public recreation area and the development will not sterilise any significant mineral or agricultural resources.

Water cycle

The proposed development will be unlikely to have any adverse impacts on water resources and the water cycle.

Soils

The proposed development will have no adverse impacts on soils, subject to standard conditions requiring erosion and sediment controls to be in place during the construction phase.

Air and microclimate

The construction and/or operations of the proposed development will be unlikely to result in any adverse impacts on the existing air quality or result in any pollution.

Flora and fauna

Construction of the building will require the removal of nine (9) trees located within the building footprint and immediate surrounds. The trees are isolated and within an established parkland environment and do not form part of an active habitat corridor. It is therefore unlikely that the loss of the trees will have any significant adverse impacts on biodiversity or threatened species of flora and fauna. The loss of the trees will be compensated by landscape plantings around the perimeter of the building and within the reserve.

Waste

Satisfactory arrangements will be in place during construction for the proposed storage and collection of waste and recyclables. No adverse impacts are anticipated and standard precautionary site management conditions are recommended.

Energy

The proposed building will incorporate measures to address energy efficiency and water conservation in accordance with Councils sustainability commitments.

Noise and vibration

Standard conditions will address any noise and vibration impacts during the construction phase. The building is expected to have a limited usage, noting Sailability currently operate one day per week.

Bushfire

The site is not identified as being bushfire prone land.

Safety, security and crime prevention

The proposed development is considered acceptable from a safety, security and crime prevention perspective and will not create any concealment/entrapment areas or crime spots

that would result in any identifiable loss of safety or reduction of security in the immediate area.

Social impacts in the locality

The development will have a positive social impact resulting from the availability of accessible public amenities and the continued operation of a community organisation, in a location that has easy access to the foreshore.

Economic impact in the locality

The development will have a positive economic impact resulting from construction works and ongoing usage.

Site design and internal design

The amended design of the development addresses the substantive concerns raised to the original design and responds positively to the site attributes and constraints.

Construction

The demolition and construction works will be temporary and managed by Council to ensure minimal adverse impacts to surrounding residents and property owners.

Cumulative impacts

The proposed development will have positive cumulative impacts associated with the efficient delivery or services to the community.

(c) The suitability of the site for the development:

The site is ideally suited to the construction of the building providing modern and accessible public amenities for users of the reserve. The building will also enable the efficient operation of a community organisation, in a location that has easy access to the foreshore, including the newly constructed pontoon and boat launching facilities.

(d) Any submissions made in accordance with this Act or the Regulations:

The DA was notified on two (2) separate occasions. The first public exhibition of the DA resulted in seven (7) submissions being received.

The submissions raised numerous objections including:

- The loss of trees
- The size and perceived “industrial” appearance of the building and amenity and aesthetic impacts
- Site constraints primarily flooding
- The removal of public amenities and potential for antisocial behaviour by users of the new public amenities building
- The use of public space
- The costs to Council associated with the building and future funding arrangements
- The public consultation process

An amended design was subsequently prepared and submitted to Council which supersedes the original design. The amended design proposes a smaller building with a reduced footprint.

The re notification of the DA resulted in further submissions which reiterated the previous concerns. The key issues raised in the submissions received and comments in response to these issues are provided as follows:

Submission Issue/Summary	Planning Comment/Response
Loss of trees	The loss of mature trees is unfortunate in terms of their ability to provide shade and amenity, however the location of the trees conflicts with the new building footprint. It is noted that there will be replacement plantings undertaken around the perimeter of the building and within the reserve, which is considered appropriate and acceptable as a compensatory measure.
Amenity and aesthetic impacts	The amended design proposes a modern, functional and utilitarian building expected for its intended purpose in that location. Design details clarifying final material finishes and colour schemes will be submitted to Council for approval prior to the issue of the construction certificate. The amenity and aesthetic impacts of the building are considered reasonable and expected in the area.
Site constraints (flooding)	Councils flood engineers have identified flooding as a constraint and have recommended specific conditions to ensure the design of the building withstands flooding impacts and the ongoing use is limited to storage purposes only. The potential for flooding does not preclude the development proceeding.
Removal of public amenities and antisocial behaviour	The building will provide new and accessible public amenities which will be an improvement in the area. The risk of antisocial behaviour can be managed and does not preclude the development proceeding.
Use of public space	It is considered that the building and its function is ideally suited to the area and will provide a continued and valued service to the community in terms of public amenities and boat storage for a community organisation.
Costs and funding arrangements	The costs and funding arrangements associated with the building are not a relevant consideration in the assessment of the DA.
Public consultation process	The DA has undergone an open and transparent public consultation process in accordance with Councils expectations and requirements.

(e) The Public Interest:

The proposed development satisfies relevant planning controls and has undergone an open and transparent public consultation process on two separate occasions. The assessment of the application has considered the public interest matters and determined that the proposal will have a distinct positive impact. It is therefore recommended that the DA be supported.

4. DEVELOPMENT CONTRIBUTIONS

Sailability NSW is a not for profit organisation relying on volunteer service, grants and donations. Clause 2.3 of Councils Development Contributions Assessment Policy states that:

"Development by non-profit organisations on Council owned or controlled land is exempt from payment of developer contributions, provided that the Council determines that the development is for an essential community service".

In this instance, Councils Contributions Officer has confirmed that the development is exempt from payment of developer contributions.

5. CONCLUSION AND STATEMENT OF REASON

The DA has been assessed in accordance with Section 4.15 of the Environmental Planning and Assessment Act 1979.

The issues raised in response to the public exhibition of the DA have been considered in the assessment of the application and where relevant, conditions have been recommended to manage the impacts attributed to these issues.

The site is ideally suited for the proposed development, which will provide new public amenities and a storage space for a valuable community organisation. Approval of the DA is in the public interest and no significant adverse social, environmental or economic impacts are anticipated as a result of the development. It is recommended that the application be approved, subject to the recommended conditions of consent.

Attachments

COMBINED BOAT STORAGE FACILITIES

LOT 2 D.P 535 212
MC. INHERNEY CLOSE ,,
PORT MACQUARIE.

FOR **SAILABILITY N.S.W**
PORT MACQUARIE.

REVISED LAYOUT.

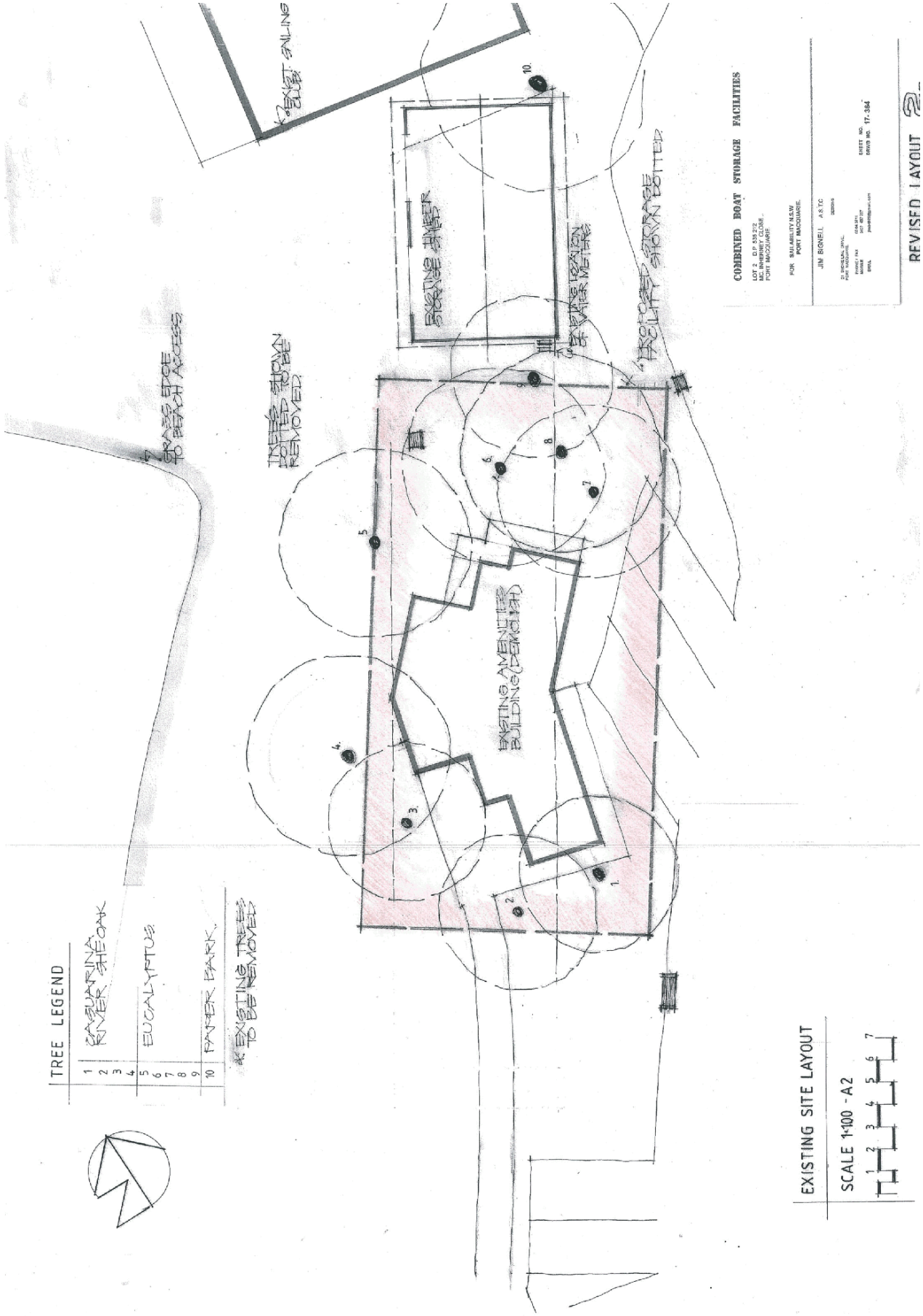
JIM BIGNELL A.S.T.C DESIGNS

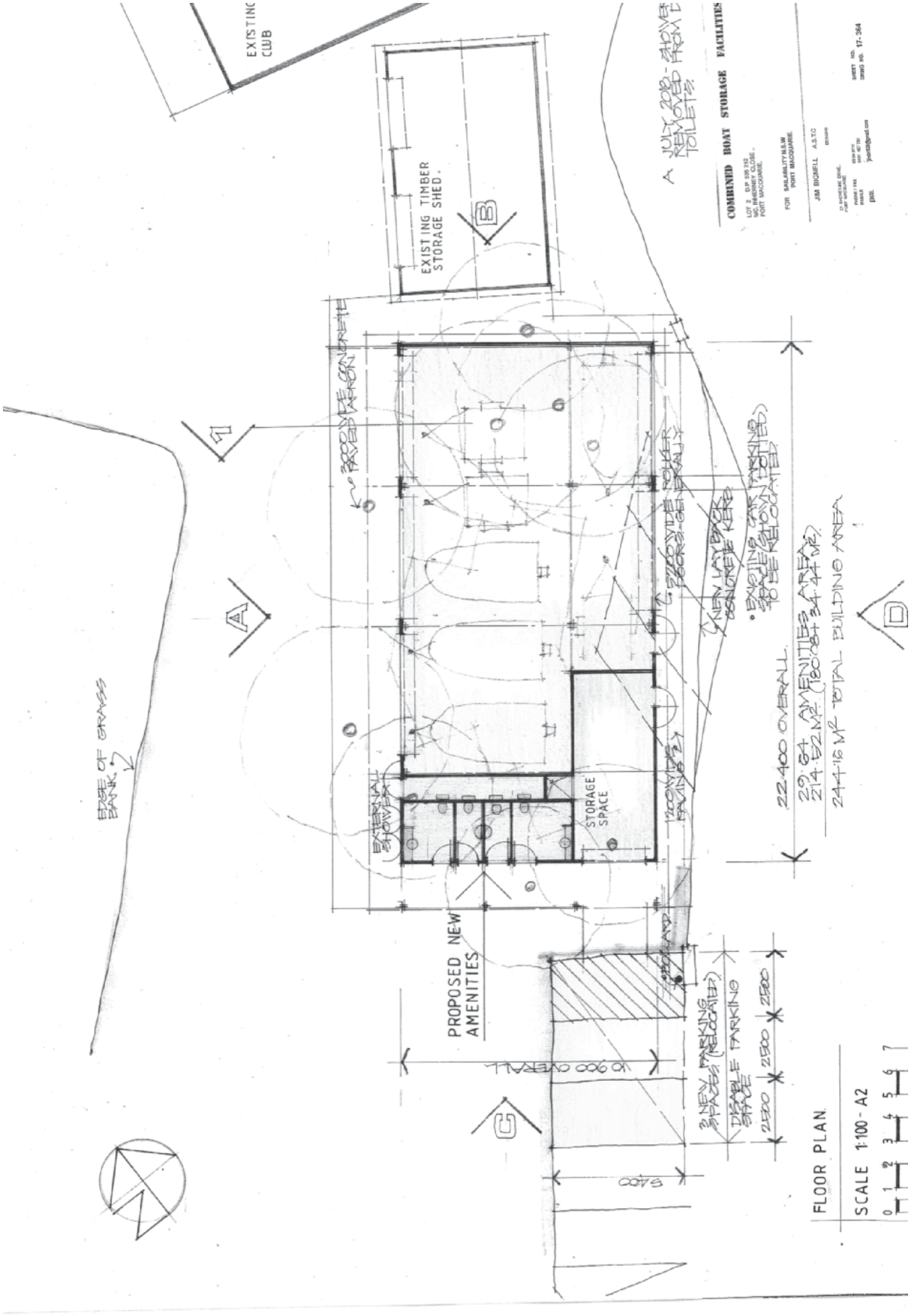
21 SHORE LINE DRIVE,.
PORT MACQUARIE.

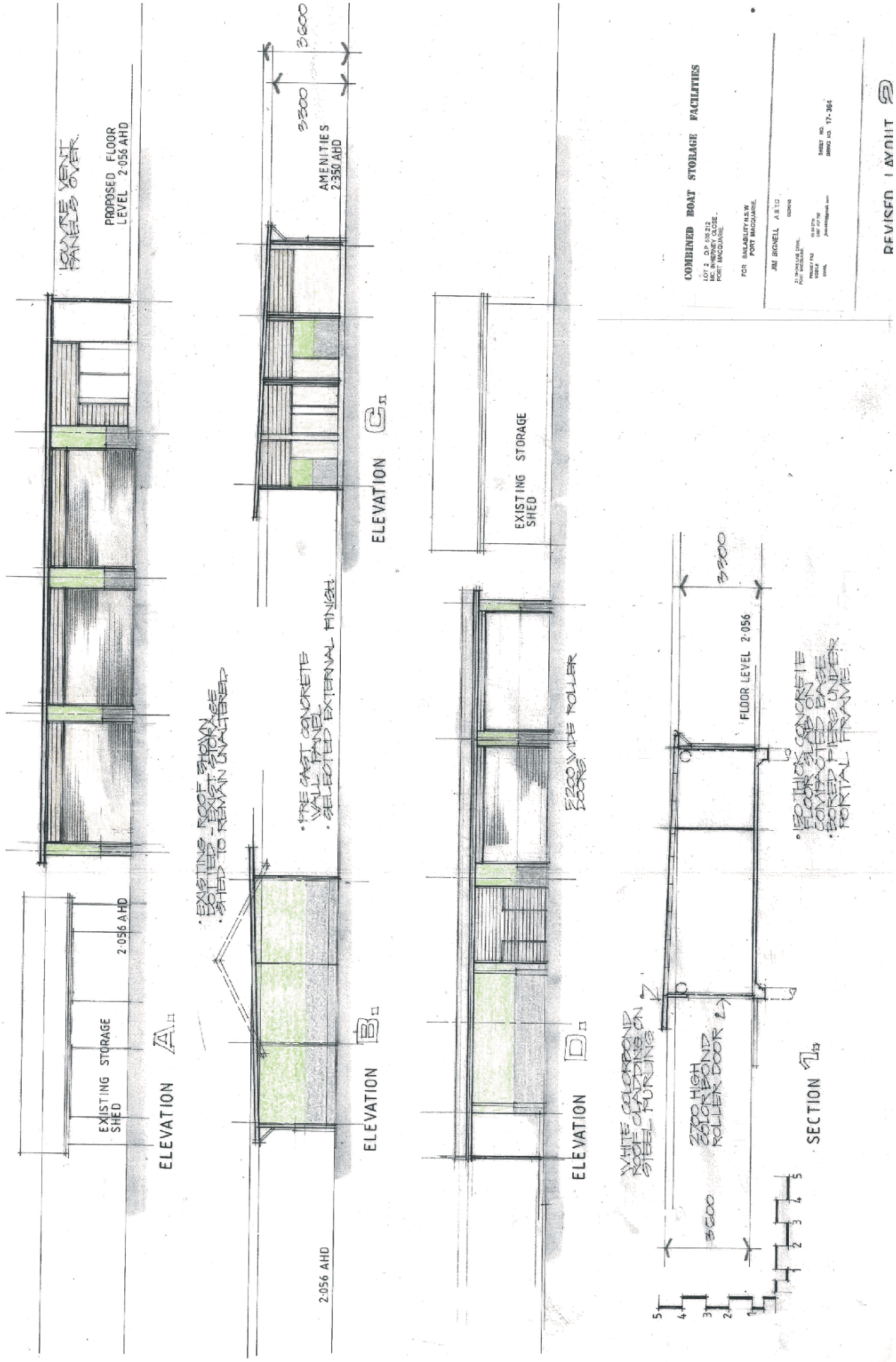
PHONE / FAX 65 84 3711
MOBILE 0407 457 797

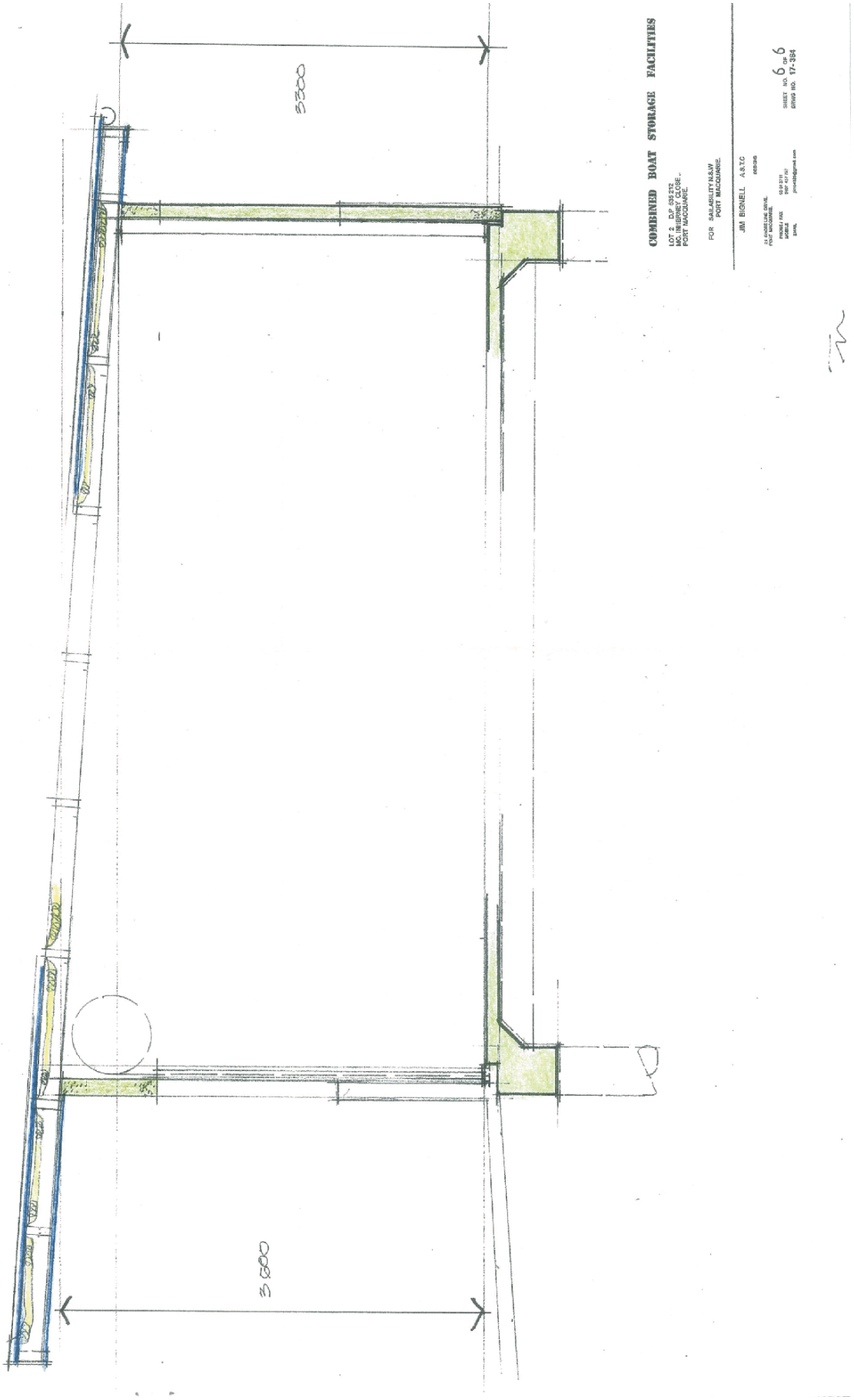
EMAIL jimb4628@gmail. com

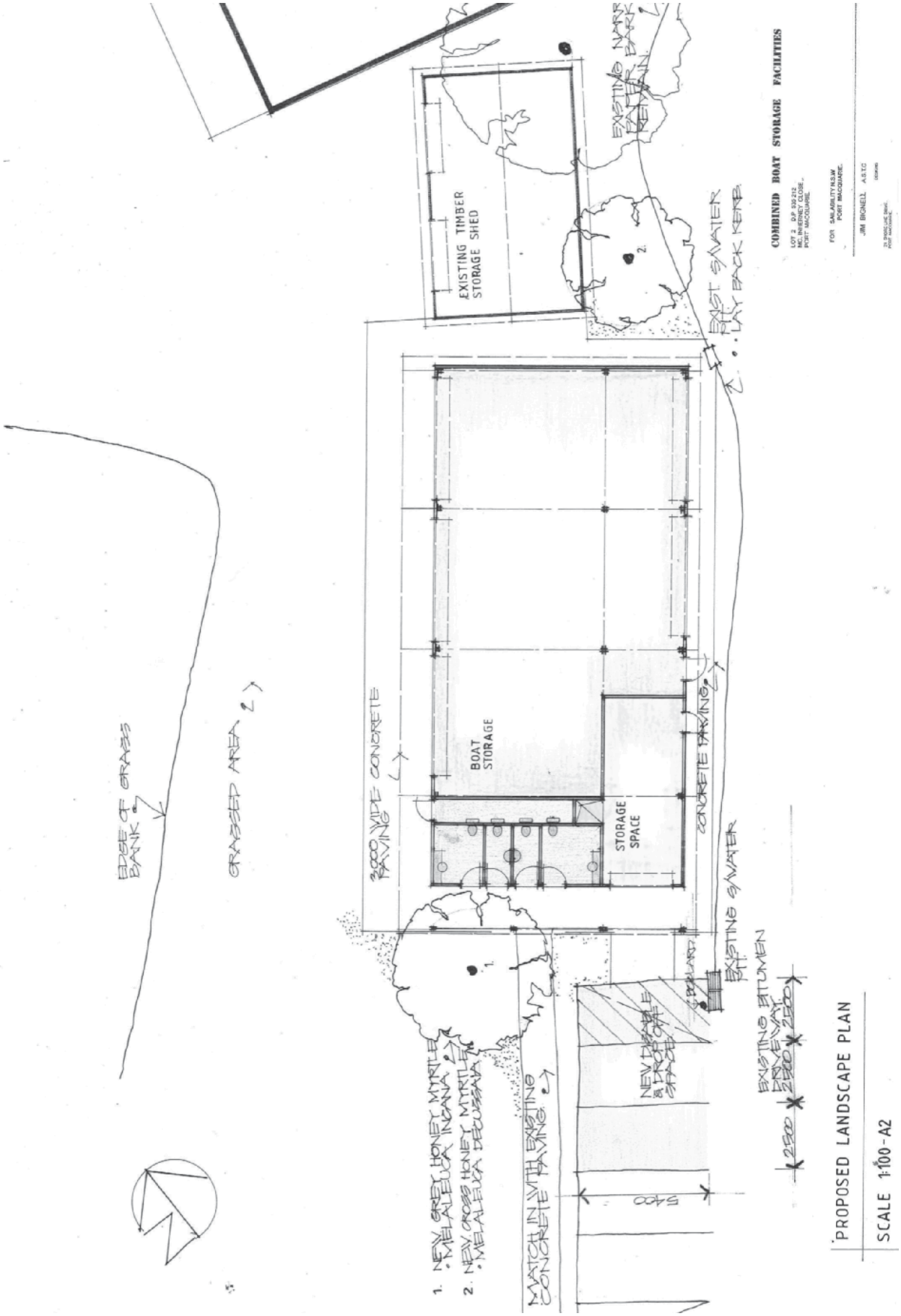
SHEET NO. OF
DRWG NO. 17-364

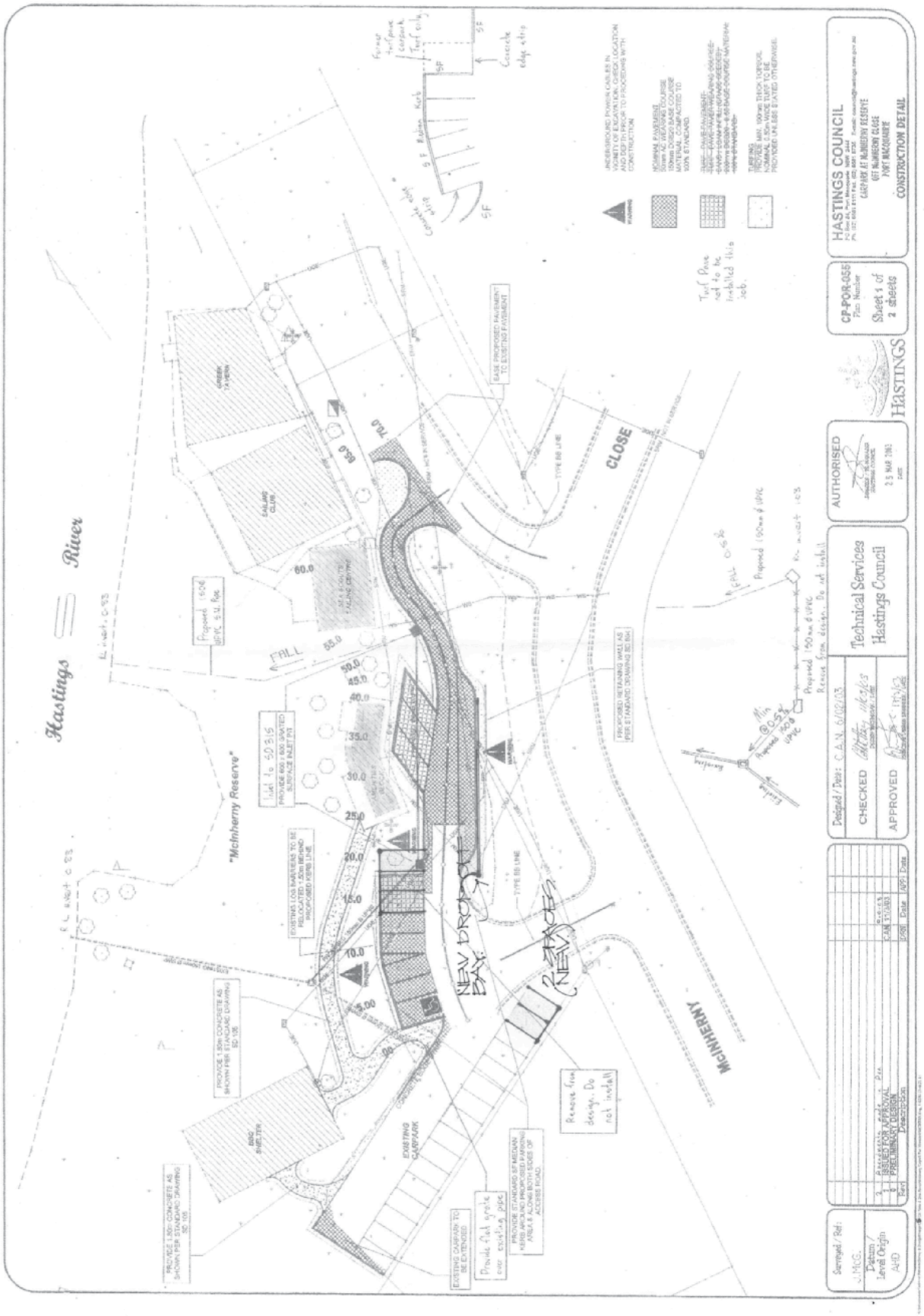

COMBINED BOAT STORAGE FACILITIES
REVISED LAYOUT 2
EXISTING SITE LAYOUT
SCALE 1:100 - A2
TREE LEGEND
1 CASUARINA RIVER SHEOAK
2
3
4
5 EUCALYPTUS
6
7
8
9
10 PAPER BARK
EXISTING TREES TO BE REMOVED
EXISTING AMENITIES BUILDING (DEMOLISH)
EXISTING INNER STORAGE SHED
EXISTING LOCATION OF WATER METERS
PROPOSED STORAGE FACILITY SHOWN DOTTED
TREES SHOWN DOTTED TO BE REMOVED
GRASS EDGE TO BEACH ACCESS
EXIST. SAILING CLUB


EXISTING CLUB
EXISTING TIMBER STORAGE SHED.
COMBINED BOAT STORAGE FACILITIES
PROPOSED NEW AMENITIES
STORAGE SPACE
EXTERNAL SHOWER
EDGE OF GRASS BANK
22400 OVERALL
29.64 AMENITIES AREA
214.52 M2 (180.08+34.44 M2)
244.16 M2 TOTAL BUILDING AREA
10900 OVERALL
3 NEW PARKING SPACES (RELOCATED)
DISABLE PARKING SPACE
FLOOR PLAN
SCALE 1:100 - A2


LOUVRE VENT PANELS OVER
PROPOSED FLOOR LEVEL 2·056 AHD
EXISTING STORAGE SHED
2·056 AHD
ELEVATION A
AMENITIES 2·350 AHD
3300
3600
ELEVATION C
EXISTING ROOF SHOWN DOTTED - EXIST. STORAGE SHED TO REMAIN UNALTERED
PRE CAST CONCRETE WALL PANEL
SELECTED EXTERNAL FINISH
ELEVATION B
2·056 AHD
EXISTING STORAGE SHED
5200 WIDE ROLLER DOORS
ELEVATION D
WHITE COLORBOND ROOF CLADDING ON STEEL PURLINS
2700 HIGH COLORBOND ROLLER DOOR
FLOOR LEVEL 2·056
3300
3600
SECTION 1
COMBINED BOAT STORAGE FACILITIES
LOT 2 D.P. 838.212
MC. INHERNEY CLOSE
PORT MACQUARIE
FOR SAILABILITY N.S.W
PORT MACQUARIE
JIM BIGNELL A.S.T.C.
SHEET NO.
DRWG NO. 17-364
REVISED LAYOUT 2


3300
3000
COMBINED BOAT STORAGE FACILITIES
LOT 2 D.P 535 212
MC. INHERNEY CLOSE,
PORT MACQUARIE.
FOR SAILABILITY N.S.W
PORT MACQUARIE.
JIM BIGNELL A.S.T.C
SHEET NO. 6 OF 6
DRWG NO. 17-384


COMBINED BOAT STORAGE FACILITIES
EXISTING TIMBER STORAGE SHED
BOAT STORAGE
STORAGE SPACE
3000 WIDE CONCRETE PAVING
CONCRETE PAVING
EXISTING S/WATER PIT
EXIST. S/WATER PIT
LAY BACK KERB
EDGE OF GRASS BANK
GRASSED AREA
1. NEW GREY HONEY MYRTLE • MELALEUCA INCANA
2. NEW CROSS HONEY MYRTLE • MELALEUCA DECUSSATA
MATCH IN WITH EXISTING CONCRETE PAVING
NEW DISABLE & DROP OFF SPACE
EXISTING BITUMEN DRIVEWAY
5400
2500
PROPOSED LANDSCAPE PLAN
SCALE 1:100-A2


Hastings River
"McInherny Reserve"
CLOSE
MCINHERNY
HASTINGS COUNCIL
CONSTRUCTION DETAIL
Technical Services
Hastings Council
AUTHORISED
CHECKED
APPROVED
Sheet 1 of 2 sheets
CP-POR-055
Surveyed / Ref: J.McG.
Datum / Level Origin AHD
Issues for Approval
Preliminary Design
Description
Date
Fall
Existing carpark
Big Bender
Provide 1.50m concrete as shown per standard drawing SD 105
Existing carpark to be extended
Provide flat grate over existing pipe
Provide standard semi-mount kerb around proposed parking area & along both sides of access road
Remove from design. Do not install
Proposed 150mm ø UPVC
Base proposed pavement to existing pavement
Proposed retaining wall as per standard drawing SD 104
Type BD line
Existing log barriers to be relocated to conform to proposed kerb line
Provide 600 x 600 spotted surface matrix
Lot 1 to 60 315
Proposed 150ø UPVC
Turf Pave not to be installed this job.
Underground power cables in vicinity of excavation. Check location and depth prior to proceeding with construction
Bitumen pavement
Bitumen seal
150mm DGSB base course material, compacted to 100% ETA/MDD.
Turfing
Provide min. 100mm topsoil, nominal 2.50m wide turf to be provided unless otherwise.
New proposed base
Replaces existing
Existing kerb
Existing pipe
Proposed 300ø UPVC
Min 0.05%
Remove from design. Do not install
Fall 0.5%
Proposed 150mm ø UPVC
Turf Pave not to be installed this job.
Concrete edge strip
Existing pavement
Proposed kerb
Existing kerb
Existing carpark
Creek Tavern
Sailing Club
Sailing Centre
Boat Shed
Boat Ramp
Proposed 150ø UPVC
Fall
55.0
60.0
50.0
45.0
40.0
35.0
30.0
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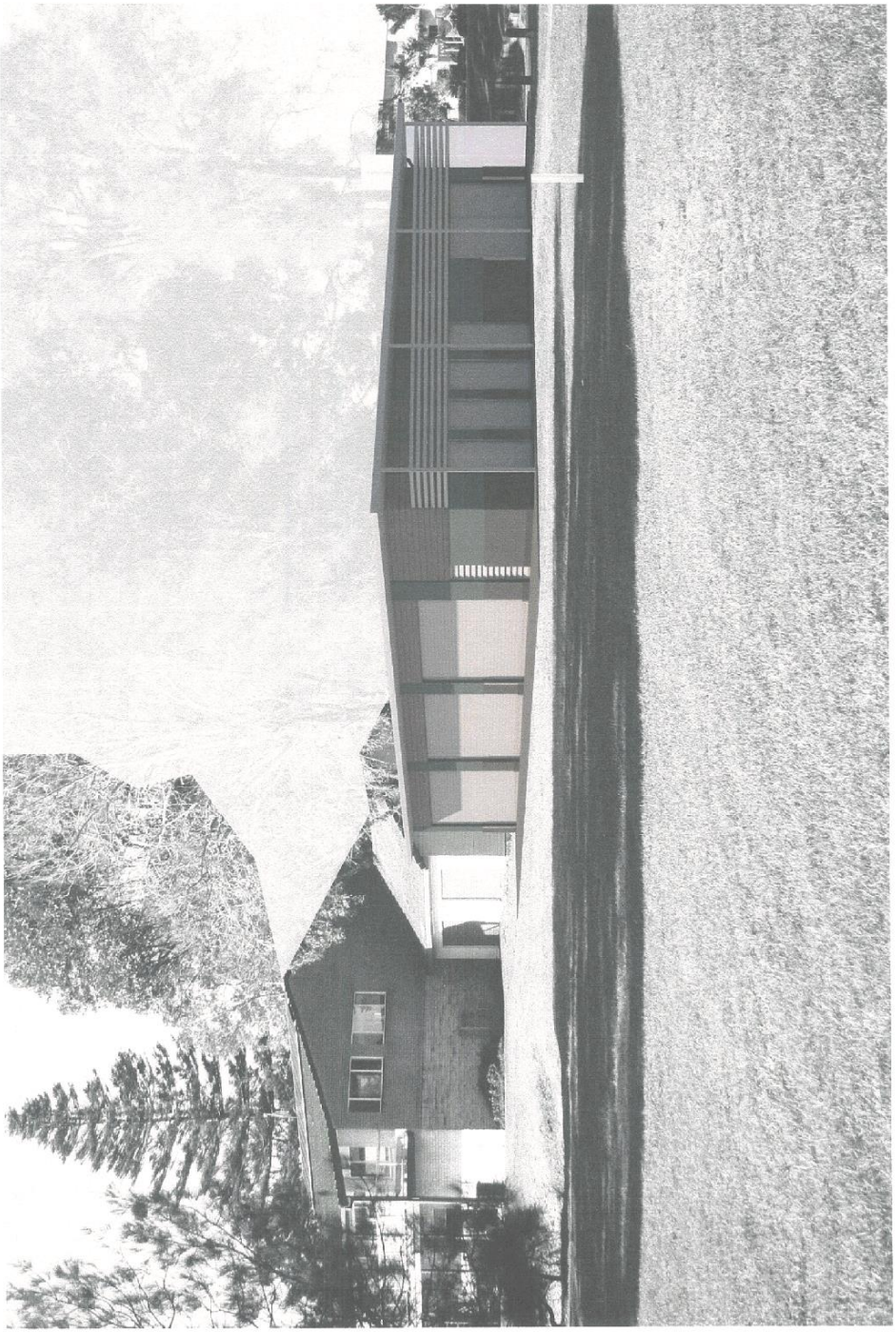
10.0
5.00
00
EL invert 0.03
EL invert 0.03
17-361

CP-POR-055



1 BOAT STORAGE FACILITIES - VIEW 1

Arghi ECO
Steve Lockhart Architectural Graphics
P.O.B. 2510 Port Macquarie
M. 0474352043

1 BOAT STORAGE FACILITIES - VIEW 2

Archi ECO
Steve Lockhart Architectural Graphics
P.O.B. 2510 Port Macquarie
M. 0474352043

FOR USE BY PLANNERS/SURVEYORS TO PREPARE LIST OF PROPOSED CONDITIONS - 2011

NOTE: THESE ARE DRAFT ONLY

DA NO: 2018/562 **DATE: 11/12/2018**

PRESCRIBED CONDITIONS

The development is to be undertaken in accordance with the prescribed conditions of Part 6 - Division 8A of the *Environmental Planning & Assessment Regulations* 2000.

A – GENERAL MATTERS

(1) (A001) The development is to be carried out in accordance with the plans and supporting documents set out in the following table, as stamped and returned with this consent, except where modified by any conditions of this consent.

Plan / Supporting Document	Reference	Prepared by	Date
Plans	1719 Drawing No: 01 – 09 Rev A	Craig Teasdell Architect	25 July 2018
Deep Soil Diagram	1719 Drawing No: 10 Rev B	Craig Teasdell Architect	8 October 2018
Stormwater and Subdivision Plans	7265-0002, 003 and 004 Rev A	Hopkins Consultants	18 July 2018
BASIX Certificate	946465M_02	Concept Designs Australia	27 July 2018
Statement of Environmental Effects	-	Gem Planning Projects	July 2018
Noise Impact Assessment	15-1889-R1	Reverb Acoustics	June 2015

In the event of any inconsistency between conditions of this development consent and the plans/supporting documents referred to above, the conditions of this development consent prevail.

(2) (A002) No work shall commence until a Construction Certificate has been issued and the applicant has notified Council of:

a. the appointment of a Principal Certifying Authority; and

b. the date on which work will commence.

Such notice shall include details of the Principal Certifying Authority and must be submitted to Council at least two (2) days before work commences.

(3) (A004) An application for a Construction Certificate will be required to be lodged with Council prior to undertaking subdivision works and a Subdivision Certificate is required to be lodged with Council on completion of works.

(4) (A008) Any necessary alterations to, or relocations of, public utility services to be carried out at no cost to council and in accordance with the requirements of

the relevant authority including the provision of easements over existing and proposed public infrastructure.

(5) (A009) The development site is to be managed for the entirety of work in the following manner:

1. Erosion and sediment controls are to be implemented to prevent sediment from leaving the site. The controls are to be maintained until the development is complete and the site stabilised with permanent vegetation;
2. Appropriate dust control measures;
3. Building equipment and materials shall be contained wholly within the site unless approval to use the road reserve has been obtained. Where work adjoins the public domain, fencing is to be in place so as to prevent public access to the site;
4. Building waste is to be managed via an appropriate receptacle;
5. Toilet facilities are to be provided on the work site at the rate of one toilet for every 20 persons or part of 20 persons employed at the site.
6. Building work being limited to the following hours, unless otherwise permitted by Council;
   - Monday to Saturday from 7.00am to 6.00pm
   - No work to be carried out on Sunday or public holidays

   The builder to be responsible to instruct and control his sub-contractors regarding the hours of work.

(6) (A011) The design and construction of all public infrastructure works shall be in accordance with Council's adopted AUSPEC Specifications.

(7) (A030) The restoration of any vehicle access rendered redundant by the development, to standard kerb and footpath formation at no cost to Council, in accordance with Council's current AUSPEC Specifications and Standards. All works must be approved by Council pursuant to Section 138 of the Roads Act.

(8) (A032) The developer is responsible for any costs relating to minor alterations and extensions to ensure satisfactory transitions of existing roads, drainage and Council services for the purposes of the development.

(9) (A033) The applicant shall provide security to the Council for the payment of the cost of the following:

a. making good any damage caused to any property of the Council as a consequence of doing anything to which the consent relates,
b. completing any public work (such as road work, kerbing and guttering, footway construction, utility services, stormwater drainage and environmental controls) required in connection with the consent,
c. remedying any defects in any such public work that arise within twelve (12) months after the work is completed.

Such security is to be provided to Council prior to the issue of the Subdivision Certificate/Construction Certificate or Section 138 of the Roads Act, 1993.

The security is to be for such reasonable amount as is determined by the consent authority, being an amount that is 10% of the contracted works for Torrens Title subdivision development/the estimated cost plus 30% for building development of public works or $5000, whichever is the greater of carrying out the development by way of:

i. deposit with the Council, or

ii. an unconditional bank guarantee in favour of the Council.

The security may be used to meet any costs referred to above and on application being made to the Council by the person who provided the security any balance remaining is to be refunded to, or at the direction of, that person. Should Council have to call up the bond and the repair costs exceed the bond amount, a separate invoice will be issued. If no application is made to the Council for a refund of any balance remaining of the security within 6 years after the work to which the security relates has been completed the Council may pay the balance to the Chief Commissioner of State Revenue under the Unclaimed Money Act 1995.

(10) (A057) The applicant is to ensure the proposed development will drain to the existing point of connection to Council's sewerage system.

B – PRIOR TO ISSUE OF A CONSTRUCTION CERTIFICATE

(1) (B001) Prior to release of the Construction Certificate, approval pursuant to Section 68 of the Local Government Act, 1993 to carry out water supply, stormwater and sewerage works is to be obtained from Port Macquarie-Hastings Council. The following is to be clearly illustrated on the site plan to accompany the application for Section 68 approval:

- Position and depth of the sewer (including junction)
- Stormwater drainage termination point
- Easements
- Water main
- Proposed water meter location

(2) (B003) Submission to the Principal Certifying Authority prior to the issue of a Construction Certificate detailed design plans for the following works associated with the developments. Public infrastructure works shall be constructed in accordance with Port Macquarie-Hastings Council's current AUSPEC specifications and design plans are to be accompanied by AUSPEC DQS:

1. Public parking areas including;
   a. Driveways and access aisles;
   b. Parking bays;
   c. Delivery vehicle service bays & turning areas in accordance with AS2890.
2. Sewerage reticulation.
3. Water supply plans shall include hydraulic plans for internal water supply services and associated works in accordance with AS 3500, Plumbing Code of Australia and Port Macquarie-Hastings Council Policies.
4. Stormwater systems.
5. Erosion & Sedimentation controls.
6. Location of all existing and proposed utility services including:
   a. Conduits for electricity supply and communication services (including fibre optic cable).
   b. Water supply
   c. Sewerage
   d. Stormwater
7. Provision of a 1.5m (unless varied in writing by Council) concrete footpath across the full road frontage of the property.

(3) (B006) An application pursuant to Section 138 of the Roads Act, 1993 to carry out works required by the Development Consent on or within public road is to be submitted to and obtained from Port Macquarie-Hastings Council prior to release of the Construction Certificate.

Such works include, but not be limited to:

- Civil works
- Traffic management
- Work zone areas
- Hoardings
- Concrete foot paving

(4) (B009) The applicant shall surrender the consent relating to DA No. DA2015 - 230 for Demolition of Dwellings, Lot Consolidation, Boundary Adjustment, Construction of Residential Flat Building for the Purpose of Seniors Housing and Construction of Commercial Premises at 15 - 27 Cameron Street, 28 - 30 Hastings Street, and Young Street, Wauchope by submitting an application for "Surrender of a Consent" to Council in accordance with the Environmental Planning and Assessment Regulation 2000, prior to release of the Construction Certificate.

(5) (B010) Payment to Council, prior to the issue of the Construction Certificate of the Section 94 contributions set out in the "Notice of Payment – Developer Charges" schedule attached to this consent unless deferral of payment of contributions has been approved by Council. The contributions are levied, pursuant to the Environmental Planning and Assessment Act 1979 as amended, and in accordance with the provisions of the following plans:

- Port Macquarie-Hastings Administration Building Contributions Plan 2007
- Hastings S94 Administration Levy Contributions Plan
- Port Macquarie-Hastings Contributions Plan 1993 - Part C – Car Parking
- Port Macquarie-Hastings Open Space Contributions Plan 2018
- Hastings S94 Major Roads Contributions Plan
- Port Macquarie-Hastings Community Cultural and Emergency Services Contributions Plan 2005

The plans may be viewed during office hours at the Council Chambers located on the corner of Burrawan and Lord Streets, Port Macquarie, 9 Laurie Street, Laurieton, and High Street, Wauchope.

The attached "Notice of Payment" is valid for the period specified on the Notice only. The contribution amounts shown on the Notice are subject to adjustment in accordance with CPI increases adjusted quarterly and the provisions of the relevant plans. Payments can only be made using a current "Notice of Payment" form. Where a new Notice of Payment form is required, an application in writing together with the current Notice of Payment application fee is to be submitted to Council.

(6) (B011) As part of Notice of Requirements by Port Macquarie-Hastings Council as the Water Authority under Section 306 of the Water Management Act 2000, the payment of a cash contribution, prior to the issue of a Construction Certificate, of the Section 64 contributions, as set out in the "Notice of Payment – Developer Charges" schedule attached to this consent unless deferral of payment of contributions has been approved by Council. The contributions are levied in accordance with the provisions of the relevant Section 64 Development Servicing Plan towards the following:

- augmentation of the town water supply headworks
- augmentation of the town sewerage system headworks

(7) (B024) Submission to Council of an application for water meter hire, which is to be referred to the Water Supply section so that a quotation for the installation can be prepared and paid for prior to the issue of a Construction Certificate. This application is also to include an application for the disconnection of any existing service not required.

(8) (B038) Footings and/or concrete slabs of buildings adjacent to sewer lines or stormwater easements are to be designed so that no loads are imposed on the infrastructure. Detailed drawings and specifications prepared by a practising chartered professional civil and/or structural engineer are to be submitted to the Principal Certifying Authority with the application for the Construction Certificate.

(9) (B048) Prior to the issue of a Construction Certificate, provision shall be made for the storage of garbage containers and containers for recyclable material in designated garbage areas. If an external area is used for the storage of putrescible material then the area shall be:

a. Bunded with a minimum volume of the bund being capable of containing 110% of the capacity of the largest container stored, or 25% of the total storage volume, whichever is the greatest.
b. Provided with a hose tape connected to the water supply;
c. Paved with impervious material;
d. Graded and drained to the sewer system, and
e. Designed to prevent the entry rainwater.

(10) (B072) A stormwater drainage design is to be submitted and approved by Council prior to the issue of a Construction Certificate. The design must be prepared in accordance with Council's AUSPEC Specifications and the requirements of Relevant Australian Standards and make provision for the following:

a) The legal point of discharge for the proposed development is defined as Council's piped drainage system.

In this regard, Council's piped drainage system Cameron Street must be extended by an appropriately sized pipeline (minimum 375mm diameter) to the frontage of the site, where a kerb inlet pit (minimum 2.4m lintel) must be installed, to allow direct piped connection from the development site into the public drainage system.

The pipeline must be designed to have the capacity to convey flows that would be collected at that section of street as generated by a 20 year Average Recurrence Interval storm event.

b) The design is to be generally in accordance with the stormwater drainage concept plan on Drawing No 7265-0002 prepared by Hopkins Consultants and dated 18 July 2018.

c) All allotments must be provided with a direct point of connection to the public piped drainage system. Kerb outlets are not permitted.

d) The design requires the provision of interallotment drainage in accordance with AUSPEC D5

e) The design shall incorporate on-site stormwater detention facilities to limit site stormwater discharge to pre development flow rates for all storm events up to and including the 100 year ARI event. Note that pre

development discharge shall be calculated assuming that the site is a 'greenfield' development site as per AUSPEC requirements.

f) The design shall include water quality controls designed to achieve the targets specified within AUSPEC D7.

g) Where works are staged, a plan is to be provided which demonstrates which treatment measure/s is/are are to be constructed with which civil works stage. Separate plans are required for any temporary treatment (where applicable e.g. for building phase when a staged construction methodology is adopted) and ultimate design.

h) The design is to make provision for the natural flow of stormwater runoff from uphill/upstream properties/lands. The design must include the collection of such waters and discharge to the Council drainage system.

i) An inspection opening or stormwater pit must be installed inside the property, adjacent to the boundary, for all stormwater outlets.

j) The design shall provide details of any components of the existing stormwater drainage system servicing the site that are to be retained.

(11) (B053) The design of the carpark and accesses is to be in accordance with Australian Standard 2890 (including AS 2890.1, AS 2890.2 and AS 2890.6). Certification of the design by a suitably qualified consultant is to be provided to the Principal Certifying Authority prior to release of the Construction Certificate.

(12) (B057) The existing sewer including junction and/or stormwater drainage shall be located on the site and the position and depth indicated on the plans which accompany the application for the Construction Certificate.

(13) (B063) Prior to release of the Construction Certificate submission of a detailed landscape plan to the Principal Certifying Authority.

(14) (B071) Prior to the issue of any Construction Certificate, the provision of water and sewer services to the land are to be approved by the relevant Water Authority and relevant payments received.

(15) (B195) Each dwelling shall be individually metered for water supply with a master meter installed at the Cameron Street road frontage. Final water service sizing will need to be determined by a hydraulic consultant to suit the domestic and commercial components of the development, as well as fire service and backflow protection requirements in accordance with AS3500. Details are to be submitted with the application for a Construction Certificate.

(16) (B196) Council records indicate that the development site has multiple connections to Council's sewer system. A sewer reticulation plan shall be submitted to Sewer Section for approval prior to the issue of a Construction Certificate. Redundant sewer junctions shall be capped at the main.

(17) (B197) Prior to the issue of a Construction Certificate, certification is to be submitted to the Principal Certifying Authority from a suitably qualified acoustic consultant that the buildings will satisfy the noise criteria in Section 5 of the Noise Impact Assessment prepared by Reverb Acoustics and dated June 2015.

(18) (B198) Prior to the issue of a Construction Certificate, the Applicant shall demonstrate that the internal access roads are capable of accommodating the swept path of a garbage collection vehicle in accordance with AS 2890. The western access may be widened if necessary to meet this requirement.

(19) (B199) Prior to release of a construction certificate, an accessibility report and certification prepared by a suitably qualified access consultant is to be

submitted confirming that the design of building satisfies the design and construction criteria contained in SEPP (Housing for Seniors or People with a Disability) 2004.

(20) (B200) Prior to the issue of the Construction Certificate, the developer shall submit to Council written acknowledgement that:

a) Prior to the removal of the existing buildings occurring, all lead, asbestos or Asbestos Containing Materials (ACM) in the buildings shall be removed and disposed of properly by an appropriately licensed asbestos remover; and

b) All landfill receipts for the disposal of all asbestos and/or ACM will be required to be submitted to Council prior to the issuing of the Occupation Certificate; and

c) Certification of all asbestos/lead removal work and asbestos/lead disposal will be required to be submitted to Council prior to the issue of the Occupation Certificate; and

d) A Clearance Certificate for all premises where asbestos/ACM was removed will be required to be submitted to Council prior to the issuing of the Occupation Certificate.

C – PRIOR TO ANY WORK COMMENCING ON SITE

(1) (C001) A minimum of one (1) week's notice in writing of the intention to commence works on public land is required to be given to Council together with the name of the principal contractor and any major sub-contractors engaged to carry out works. Works shall only be carried out by a contractor accredited with Council.

(2) (C013) Where a sewer manhole and Vertical Inspection Shaft exists within a property, access to the manhole/VIS shall be made available at all times. Before during and after construction, the sewer manhole/VIS must not be buried, damaged or act as a stormwater collection pit. No structures, including retaining walls, shall be erected within 1.0 metre of the sewer manhole or located so as to prevent access to the manhole.

(3) (C195) Prior to works commencing a photographic heritage record of dwellings at numbers 15 & 21 Cameron Street is to be made and submitted to Council. In recognition of their potential heritage value it is recommended that these dwellings are preserved and relocated off site.

D – DURING WORK

(1) (D001) Development works on public property or works to be accepted by Council as an infrastructure asset are not to proceed past the following hold points without inspection and approval by Council. Notice of required inspection must be given 24 hours prior to inspection, by contacting Council's Customer Service Centre on (02) 6581 8111. You must quote your Construction Certificate number and property description to ensure your inspection is confirmed:

a. at completion of installation of erosion control measures

b. at completion of installation of traffic management works

c. when trenches are open, stormwater/water/sewer pipes and conduits jointed and prior to backfilling;

d. prior to the pouring of concrete for sewerage works and/or works on public property;

All works at each hold point shall be certified as compliant in accordance with the requirements of AUSPEC Specifications for Provision of Public Infrastructure and any other Council approval, prior to proceeding to the next hold point.

(2) (D003) The site is in an area known to contain rock that may contain naturally occurring asbestos (NOA). Should potential NOA be located on site notification shall be provided to Council and Workcover prior to works proceeding. No work shall recommence until a NOA management plan has been approved by Council or Workcover.

(3) (D006) A copy of the current stamped approved construction plans must be kept on site for the duration of site works and be made available upon request to either the Principal Certifying Authority or an officer of the Council.

(4) (D029) The demolition of any existing structure shall be carried out in accordance with Australian Standard AS 2601-1991: *The Demolition of Structures*. No demolition materials shall be burnt or buried on site. The person responsible for the demolition works shall ensure that all vehicles leaving the site carrying demolition materials have their loads covered and do not track soil or waste materials onto the road. Should the demolition works obstruct or inconvenience pedestrian or vehicular traffic on an adjoining public road or reserve, separate application shall be made to Council to enclose the public place with a hoarding fence.

Should asbestos be present, its removal shall be carried out in accordance with the National OH&S Committee – *Code of Practice for Safe Removal of Asbestos* and *Code of Practice for the Management and Control of Asbestos in Workplaces*.

For further information on asbestos handling and safe removal practices refer to the following links:

Safely disposing of asbestos waste from your home

Fibro & Asbestos - A Renovator and Homeowner's Guide

Asbestos Awareness

(5) (D040) Wastes shall not be disposed of by burning.

(6) (D195) Prior to the removal of the existing buildings any lead, asbestos or Asbestos Containing Materials (ACM) in the buildings shall be removed and disposed in full accordance with all current legislation, standards, codes of practice and guidelines. Please note that certification of the satisfactory removal of all lead and/or asbestos will be required to be submitted to Council, prior to be the buildings being removed.

E – PRIOR TO OCCUPATION OR THE ISSUE OF SUBDIVISION CERTIFICATE

(1) (E001) The premises shall not be occupied or used in whole or in part until an Occupation Certificate has been issued by the Principal Certifying Authority.

(2) (E004) Evidence of the registration of the proposed consolidation and boundary adjustment shall be submitted to the Principal Certifying Authority prior to the issue of an Occupation Certificate.

(3) (E005) Prior to the release of any bond securities held by Council for infrastructure works associated with developments, a formal written application is to be submitted to Council specifying detail of works and bond amount.

(4) (E010) Driveways, access aisles and parking areas shall be provided with a concrete surface. Such a surface shall be on a suitable pavement, constructed and maintained in accordance with Council's Development, Design and Construction Manuals (as amended).

(5) (E030) Vehicle ramps, driveways, turning circles and parking spaces being paved, sealed and line marked prior to occupation or the issue of the Occupation Certificate or commencement of the approved land use.

(6) (E031) Provision of a sign at the front vehicular access point within the property, prior to occupation or the issue of the Occupation Certificate, indicating that visitor/customer parking is available on-site.

(7) (E034) Prior to occupation or the issuing of the Occupation (Final or Interim) or Subdivision Certificate provision to the Principal Certifying Authority of documentation from Port Macquarie-Hastings Council being the local roads authority certifying that all matters required by the approval issued pursuant to Section 138 of the Roads Act have been satisfactorily completed.

(8) (E036) Certification by a suitably qualified consultant is to be submitted to the Principal Certifying Authority (PCA) confirming that the car park and internal accesses have been constructed in accordance with Port Macquarie-Hastings Development Control Plan 2013 and Australian Standard 2890 (including AS 2890.1, AS 2890.2 and AS 2890.6) prior to occupation or issue of the Occupation Certificate.

(9) (E038) Interallotment drainage shall be piped and centrally located within an inter-allotment drainage easement, installed in accordance with Council's current AUSPEC standards (minimum 225mm pipe diameter within a minimum 1.5m easement). Details shall be provided:

- As part of a Construction Certificate application for subdivision works with dedication of the easement as part of any Subdivision Certificate associated with interallotment drainage.

(10) (E040) Each onsite detention system is to be marked by a plate in a prominent position which states:

"This is an onsite detention system. It is an offence to reduce the volume of the tank or basin or interfere with any part of the structure that controls the outflow".

This plate is to be fixed into position prior to occupation or the issue of the Occupation or Subdivision Certificate.

(11) (E046) Prior to the issue of an Occupation Certificate, a positive covenant is to be created under Section 88E of the Conveyancing Act 1919, burdening the owner(s) with the requirement to maintain the on-site stormwater detention facilities on the property.

The terms of the 88E instrument with positive covenant shall include, but not be limited to, the following:

a. The Proprietor of the property shall be responsible for maintaining and keeping clear all pits, pipelines, trench barriers and other structures associated with the on-site stormwater detention facilities ("OSD").

b. The Proprietor shall have the OSD inspected annually by a competent person.

c. The Council shall have the right to enter upon the land referred to above, at all reasonable times to inspect, construct, install, clean, repair and maintain in good working order all pits, pipelines, trench barriers and other structures in or upon the said land which comprise the OSD or which

convey stormwater from the said land; and recover the costs of any such works from the proprietor.

d. The registered proprietor shall indemnify the Council and any adjoining land owners against damage to their land arising from the failure of any component of the OSD, or failure to clean, maintain and repair the OSD.

The proprietor or successor must bear all costs associated in the preparation of the subject 88E instrument. Evidence of registration with the Lands and Property Information NSW shall be submitted to and approved by the Principal Certifying Authority prior to the issue of an Occupation Certificate.

(12) (E047) Prior to the issue of any Occupation Certificate, a positive covenant is to be created under Section 88E of the Conveyancing Act 1919, burdening the owner(s) with the requirement to ensure the ongoing maintenance of the existing overland flowpath through the site.

The terms of the 88E instrument with positive covenant are to include, but not be limited to, the following:

a. The proprietor of the property shall be responsible for maintaining and keeping clear the overland flowpath traversing the site.

b. The Council shall have the right to enter upon the land referred to above, at all reasonable times to inspect, construct, install, clean, repair and maintain in good working order all components or structures in or upon the said land which comprise the overland flowpath; and recover the costs of any such works from the proprietor.

c. The registered proprietor shall indemnify the Council and any adjoining land owners against damage to their land arising from the failure of any component of the overland flowpath, or failure to clean, maintain and repair the overland flowpath.

Evidence of registration with the Lands and Property Information NSW shall be submitted to and approved by the Principal Certifying Authority prior to the issue of any Occupation Certificate.

(13) (E048) Prior to the issue of an Occupation Certificate, a positive covenant is to be created under Section 88E of the Conveyancing Act 1919, burdening the owner(s) with the requirement to maintain the water quality control facilities within the site.

In addition, a maintenance schedule for the water quality controls must be submitted to Council for approval with the stormwater work-as executed plans. This maintenance schedule and work as executed plan shall be registered and referred to as part of the positive covenant.

The terms of the 88E instrument with positive covenant shall include, but not be limited to, the following:

a. The Proprietor of the property shall be responsible for inspecting, maintaining and keeping clear all components of and structures associated with the stormwater quality improvement device (SQID) in accordance with the maintenance plan in order to achieve the design system performance targets.

b. The Proprietor shall have the SQID inspected annually by a competent person.

c. The Council shall have the right to enter upon the land referred to above, at all reasonable times to inspect, construct, install, clean, repair and maintain in good working order all components or structures in or upon the said land

which comprise the SQID and recover the costs of any such works from the proprietor.

d. The registered proprietor shall indemnify the Council and any adjoining land owners against damage to their land arising from the failure of any component of the SQID, or failure to clean, maintain and repair the SQID.

The instrument shall be created and registered on the title of the relevant lot(s) with the Lands and Property Information (LPI) NSW. The plan and terms of the easement must be endorsed by Council through formal application prior to lodgement at the Lands and Property Information NSW. Evidence of registration shall be submitted to and approved by the Principal Certifying Authority prior to the issue of an Occupation Certificate.

(14) (E050) Prior to Council accepting new stormwater infrastructure, a CCTV inspection of all new and modified stormwater assets must be undertaken in accordance with the Conduit Inspection Reporting Code of Australia WSA 05.

A copy of the CCTV inspection footage and inspection report prepared and certified by a suitably qualified person shall be provided to Council prior to the acceptance of works into the nominated 'into maintenance period'.

(15) (E051) Prior to occupation or the issuing of any Occupation Certificate a Section 68 Certificate of Completion shall be obtained from Port Macquarie-Hastings Council.

(16) (E056) A Certificate of Compliance under the provisions of Section 307 of the *Water Management Act* must be obtained prior to the issue of any occupation or subdivision certificate.

(17) (E058) Written confirmation being provided to the Principal Certifying Authority (PCA) from any properly qualified person (eg the builder), stating that all commitments made as part of the BASIX Certificate have been completed in accordance with the certificate.

(18) (E061) Landscaped areas being completed prior to occupation or issue of the Occupation Certificate.

(19) (E062) Prior to occupation or the issue of any Occupation Certificate, evidence must be provided to the Principal Certifying Authority that satisfactory arrangements are in place for collection of general waste (rubbish), recycling and food and garden organics from the premises by a private waste contractor. All wastes are to be collected as separate waste streams.

(20) (E068) Prior to the issue of a Subdivision or Occupation Certificate (whichever occurs first), evidence to the satisfaction of the Certifying Authority from the electricity and telecommunications providers that satisfactory services arrangements have been made to the lots and dwellings (including street lighting and fibre optic cabling where required).

(21) (E076) The plan of subdivision and Section 88B instrument shall establish the following restrictions, easements and/or covenants; with Council having the benefit and having the sole authority to release, vary or modify each restriction, easement and/or covenant. Wherever possible the extent of the land affected by these covenants shall be defined by bearings and distances shown on the plan of subdivision.

a. Easement for access and parking over Lot 3, benefitting Lot 2.

Details are to be submitted to Council prior to issue of the Subdivision Certificate.

(22) (E079) Submission to the Principal Certifying Authority of certification by a Registered Surveyor prior to the issue of a Subdivision Certificate that all

services and domestic drainage lines are wholly contained within the respective lots and easements.

(23) (E082) Submission of a compliance certificate accompanying Works as Executed plans with detail included as required by Council's current AUSPEC Specifications. The information is to be submitted in electronic format in accordance with Council's "CADCHECK" requirements detailing all infrastructure for Council to bring into account its assets under the provisions of AAS27. This information is to be approved by Council prior to issue of the Subdivision or Occupation Certificate. The copyright for all information supplied, shall be assigned to Council.

(24) (E195) Prior to the issue of the Occupation Certificate, all receipts for the asbestos and/or ACM disposal at a licensed waste facility shall be submitted to Council.

(25) (E196) Prior to release of an occupation certificate, an accessibility report and certification prepared by a suitably qualified access consultant is to be submitted confirming that the completed building satisfies the design and construction criteria contained in SEPP (Housing for Seniors or People with a Disability) 2004.

(26) (E197) Residents are restricted to persons specified in Clause 18(1) of State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004. The application for a Subdivision Certificate shall include a restriction on proposed Lot 2 in accordance with section 88E of the Conveyancing Act 1919, limiting the use of any accommodation to which the application relates to the kinds of people referred to above.

(27) (E198) Prior to the issue of an Occupation Certificate, certification is to be submitted to the Principal Certifying Authority from a suitably qualified acoustic consultant that the completed buildings satisfy the noise criteria in Section 5 of the Noise Impact Assessment prepared by Reverb Acoustics and dated June 2015.

F – OCCUPATION OF THE SITE

(1) (F001) On site car parking in accordance with the approved plans to be provided in an unrestricted manner at all times during the operations of development for use by both staff and patrons of the RSL Club and residents and visitors of the seniors housing. A minimum of 15 spaces are to be provided on Lot 2 for the seniors housing, and a minimum of 101 spaces are to be provided on Lot 3 for the RSL Club.

(2) (F003) All loading and unloading operations associated with servicing the site must be carried out within the confines of the site, at all times and must not obstruct other properties/units or the public way.

(3) (F004) The dwellings are approved for permanent residential use and not for short term tourist and visitor accommodation.

(4) (F036) Any exterior lighting on the site shall be designed and installed so as not to cause a nuisance or adverse impact on the amenity of the surrounding area by light overspill. The lighting shall be the minimum level of illumination necessary for safe operation and must be designed, installed and used in accordance with AS 4282 - 1997 control of the obtrusive effects of outdoor lighting. No flashing, moving or intermittent lighting is permitted on the site.

CONCEPT VIEW FROM CAMERON STREET

DEVELOPMENT APPLICATION

DRAWING LIST

01 CONTENT
02 LOCALITY PLAN
03 SITE PLAN
04 ROOF PLAN
05 NORTH + EAST ELEVATIONS
06 SOUTH + WEST ELEVATIONS
07 UNITS 1 - 6
08 UNITS 7 - 12
09 UNITS 13 - 15

NOTE: TO BE READ IN CONJUNCTION WITH THE STATEMENT OF ENVIRONMENTAL EFFECTS PREPARED BY GEM PLANNING PROJECTS PTY LTD

CAMERON GRANGE - SELF CONTAINED DWELLINGS

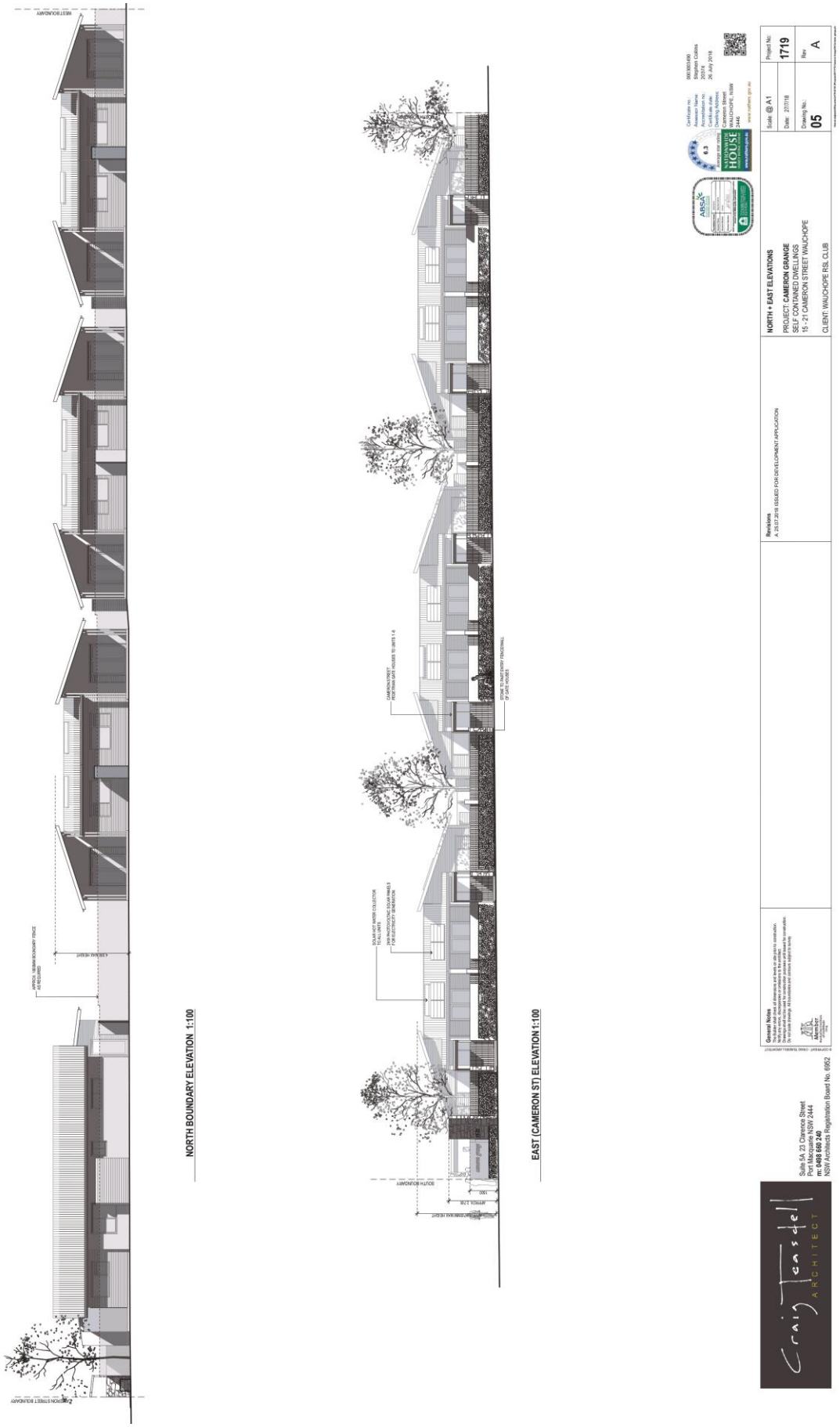
SEPP (HOUSING FOR SENIORS OR PEOPLE WITH A DISABILITY) 2004
15-21 CAMERON STREET
WAUCHOPE

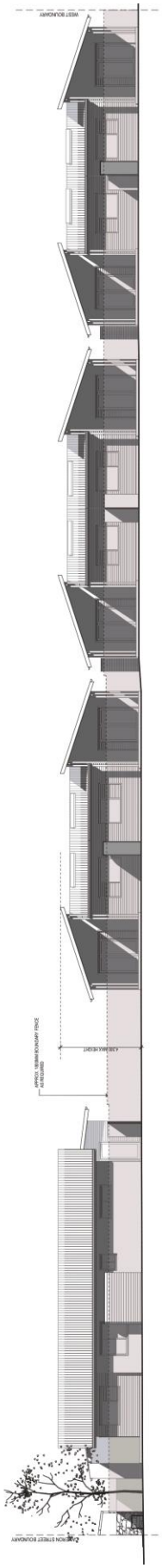
Craig Teasdell ARCHITECT
Suite 9A, 23 Clarence Street
Port Macquarie NSW 2444
m: 0408 660 240
NSW Architects Registration Board No. 6952

© COPYRIGHT - CRAIG TEASDELL ARCHITECT

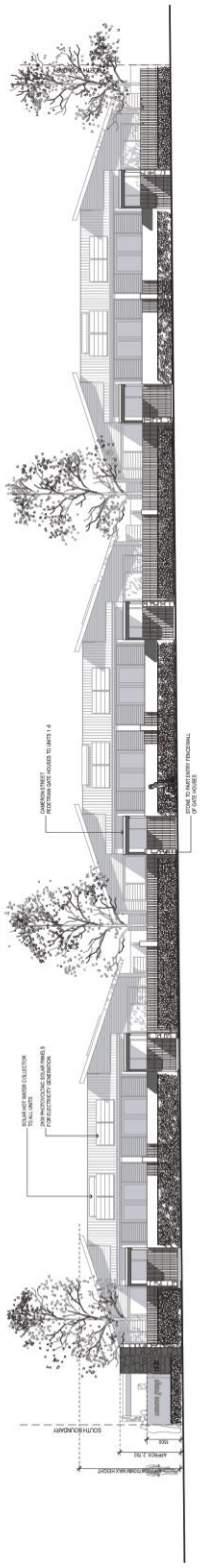
N
CAMERON STREET
61,792
80,500
46203
26,077
34232
35924
4,089 m²
DEVELOPMENT SITE AREA
U1
U2
U3
U4
U5
U6
U7
U8
U9
U10
U11
U12
U13
U14
U15
YOUNG STREET
2 DRAFT SUBDIVISION
HASTINGS RIVER
CAMERON STREET
OXLEY HIGHWAY
PUBLIC RESERVE
PUBLIC SWIMMING POOL
'OLD PARK'
150 METRES (APPROX.) FROM DEVELOPMENT SITE
DEVELOPMENT SITE
100 METRES (APPROX.) FROM DEVELOPMENT SITE
WAUCHOPE RSL CLUB
RAILWAY STATION
200 METRES (APPROX.) FROM DEVELOPMENT SITE
BUS ROUTE
PHARMACIES
BANKS
POST OFFICE
1 LOCALITY PLAN
Craig Teasdell ARCHITECT
Suite 5A 23 Clarence Street
Port Macquarie NSW 2444
m: 0408 666 240
NSW Architects Registration Board No. 6952
General Notes
Revisions
A 25.07.2018 ISSUED FOR DEVELOPMENT APPLICATION
LOCALITY PLAN
PROJECT: CAMERON GRANGE
SELF CONTAINED DWELLINGS
15 - 21 CAMERON STREET WAUCHOPE
CLIENT: WAUCHOPE RSL CLUB
Scale:
Date: 27/7/18
Drawing No.: 02
Project No.: 1719
Rev: A

CAMERON STREET
BOUNDARY 61,792
BOUNDARY 80,500
INTERNAL ACCESS ROAD
COMMUNAL AREA
ROOF OF LIFTHOUSE
ROOF OF COMMUNAL LIFTHOUSE
ROOF OVER COMMUNAL BBQ AREA
46203
26,077
34232
35924
ROOF PLAN 1:200
ABSA Assessor # 20374 July 2018 CDA Reference: 3868
Cameron Grange - 15-21 Cameron Street WAUCHOPE NSW 2446
Concept Designs Australia
conceptdesigns@ozy.com.au Ph: 0418877371
Thermal Performance Specifications
External Wall Construction Insulation Colour (Solar Absorptance) Detail
FC Sheeting Polystyrene R2.0 Medium
FC Cladding Antigram foil R2.0 Medium Except Garages
Internal Wall Construction Insulation Detail
Plasterboard on studs None
Plasterboard on walls 2 x R2.0 (Acoustical requirements only, see manufacturer's specifications for acoustic and fire requirements) Between Units
Ceiling Construction Insulation Detail
Plasterboard R2.5 All ceilings adjacent to roof space
Roof Construction Insulation Colour (Solar Absorptance) Detail
Colorbond 50mm antisun blanket Medium
Floor Construction Insulation Covering
50mm waffle pod None, Timber and Tiles
Windows Glass and frame type U Value SHGC Details
Aluminium Powder coated frame 5.8 0.39 As drawn
Skylights Double glazed metal in frames. Suitable as drawn
U and SHGC values are according to WFRC. Remote products may be used if the U value is lower and the SHGC is less than 10% higher or lower than the above figures.
Fixed shading - Eaves Width includes guttering, offset is distance above windows
Fixed - Side Walls Depth Distance from Top of Window Height Distance from Top of Window
Fixed - Other Depth Distance from Top of Window Height Distance from Top of Window
Shaded areas and shade devices on drawn, adjoining buildings and boundary fences.
Building Sealing
External doors to be weather stripped and windows to comply with AS 2047
LED downlights to be sealed
Exhaust fans to have dam dampers as per BCC.
Certificate no: 0003003480
Assessor Name: Stephen Collins
Accreditation no: 20374
Certificate date: 26 July 2018
Dwelling Address: 15-21 CAMERON STREET WAUCHOPE, NSW 2446
www.nathers.gov.au
6.3
ABSA
ASSESSED WITH NATIONAL HOUSE ENERGY RATING SCHEME
Revisions
A 25.07.2018 ISSUED FOR DEVELOPMENT APPLICATION
ROOF PLAN
PROJECT: CAMERON GRANGE
SELF CONTAINED DWELLINGS
15 - 21 CAMERON STREET WAUCHOPE
CLIENT: WAUCHOPE RSL CLUB
Scale: 1:200 @ A1
Date: 27/7/18
Drawing No.: 04
Project No: 1719
Rev: A
General Notes
Craig Teasdell ARCHITECT
Suite 5A 23 Clarence Street
Port Macquarie NSW 2444
m: 0408 666 240
NSW Architects Registration Board No. 6952


NORTH BOUNDARY ELEVATION 1:100
EAST (CAMERON ST) ELEVATION 1:100
NORTH + EAST ELEVATIONS
PROJECT: CAMERON GRANGE
SELF CONTAINED DWELLINGS
15 - 21 CAMERON STREET WAUCHOPE
CLIENT: WAUCHOPE RSL CLUB
Scale: @ A1
Date: 27/7/18
Drawing No.: 05
Project No: 1719
Rev A
Revisions
A 25.07.2018 ISSUED FOR DEVELOPMENT APPLICATION
General Notes
Suite 5A 23 Clarence Street
Port Macquarie NSW 2444
m: 0498 660 240
NSW Architects Registration Board No. 6952
Craig Teasdell
ARCHITECT



NORTH BOUNDARY ELEVATION 1:100



EAST (CAMERON ST) ELEVATION 1:100

Certificate no: 0035930480
Assessor Name: Stephen Collins
Accreditation No: 20015
Certificate date: 26 July 2018
Property Address: Cameron Street WAUCHOPE, NSW 2446

www.nationalhouse.com.au

STREET ELEVATIONS
PROJECT: **CAMERON GRANGE**
SELF CONTAINED DWELLINGS
15 - 21 CAMERON STREET WAUCHOPE
CLIENT: WAUCHOPE RSL CLUB

Scale @ A1
Date: 27/7/18
Drawing No: **05**
Project No: **1719**
Rev: A

Revisions
A 25.07.2018 ISSUED FOR DEVELOPMENT APPLICATION

General Notes
This drawing and all dimensions and levels on site prior to construction.
Do not scale drawings. Use only dimensions and levels shown.
Drawings shall not be used for construction purposes until issued for construction.
Do not commence any work or fabrication without notice.
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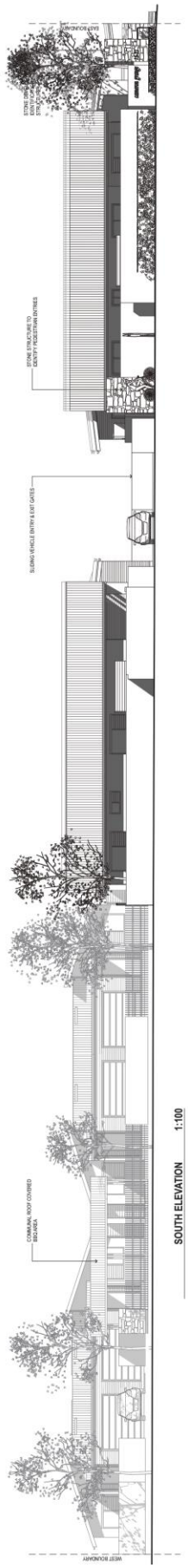
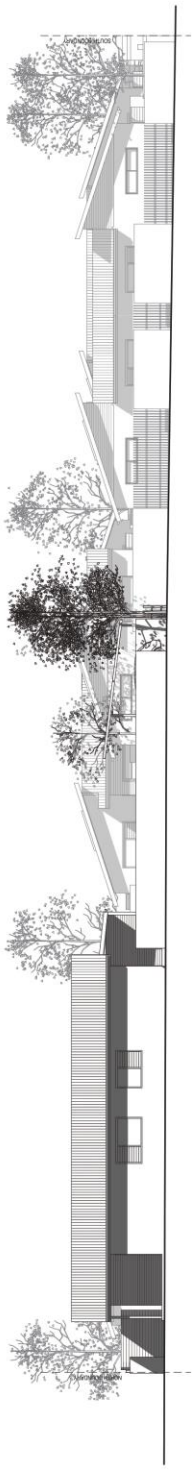
Member
AIA
2018

Craig Teasdell
ARCHITECT

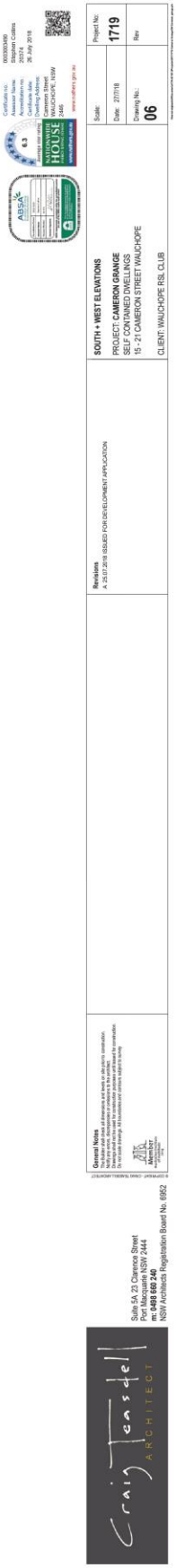
Suite 5A 23 Clarence Street
Port Macquarie NSW 2444
m: 0408 666 240
NSW Architects Registration Board No. 6952



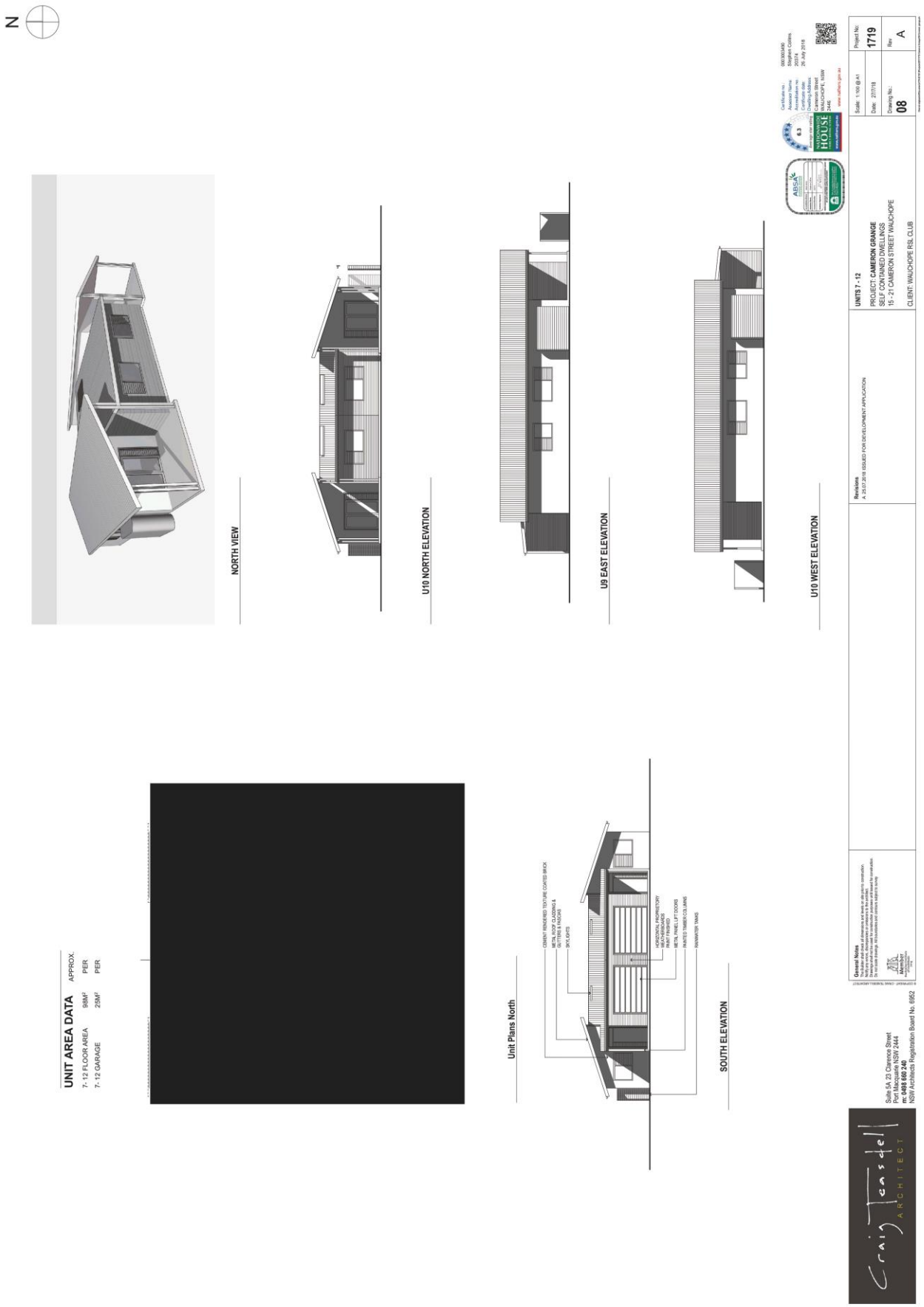
SOUTH ELEVATION 1:100

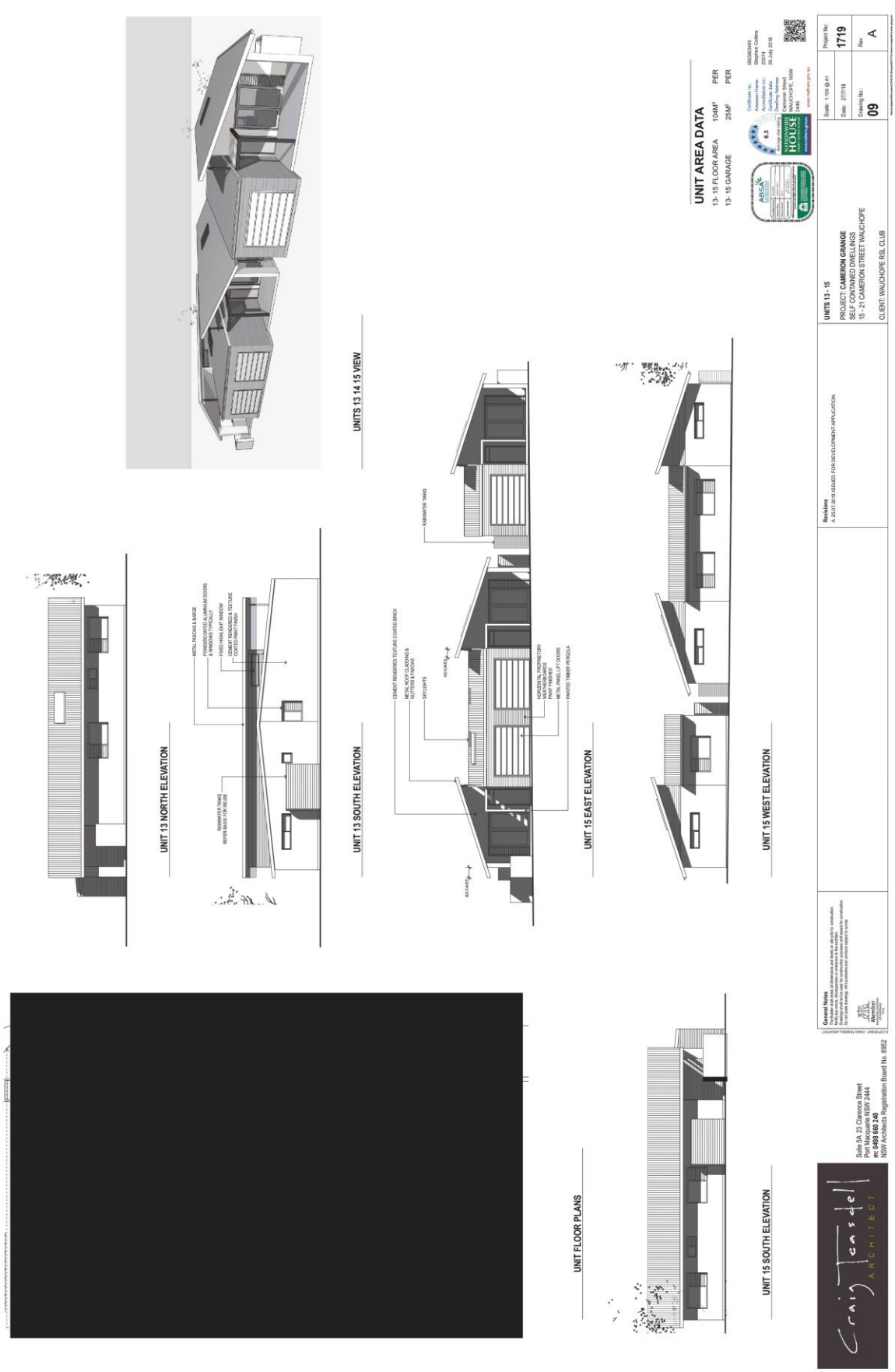


WEST BOUNDARY ELEVATION 1:100



N
EAST VIEW
UNIT 5 EAST ELEVATION
UNIT 5 WEST ELEVATION
UNIT 5 NORTH ELEVATION
UNIT AREA DATA
APPROX.
1- 6 FLOOR AREA 103M² PER
1- 6 GARAGE 24M² PER
CAMERON STREET UNITS
UNIT 5 SOUTH ELEVATION
UNITS 1 - 6
PROJECT: CAMERON GRANGE
SELF CONTAINED DWELLINGS
15 - 21 CAMERON STREET WAUCHOPE
CLIENT: WAUCHOPE RSL CLUB
Revisions
A 26.07.2018 ISSUED FOR DEVELOPMENT APPLICATION
General Notes
Project No: 1719
Rev: A
Drawing No.: 07
Date: 27/7/18
Scale: 1:100 @ A1
Craig Teasdell
ARCHITECT
Suite 5A 23 Clarence Street
Port Macquarie NSW 2444
m: 0408 666 240
NSW Architects Registration Board No. 6952


N
NORTH VIEW
U10 NORTH ELEVATION
U9 EAST ELEVATION
U10 WEST ELEVATION
UNIT AREA DATA
APPROX.
7- 12 FLOOR AREA 98M² PER
7- 12 GARAGE 25M² PER
Unit Plans North
CEMENT RENDERED TEXTURE COATED BRICK
METAL ROOF CLADDING &
GUTTERS & FASCIAS
SPOTLIGHTS
HORIZONTAL PROPRIETORY
SECTIONAL DOORS
PAINT FINISHED
METAL PANEL LIFT DOORS
PAINTED TIMBER COLUMNS
RAINWATER TANKS
SOUTH ELEVATION
Revisions
A 25.07.2018 ISSUED FOR DEVELOPMENT APPLICATION
UNITS 7 - 12
PROJECT: CAMERON GRANGE
SELF CONTAINED DWELLINGS
15 - 21 CAMERON STREET WAUCHOPE
CLIENT: WAUCHOPE RSL CLUB
Scale 1:100 @ A1
Date 27/7/18
Project No: 1719
Drawing No: 08
Rev A
General Notes
Member
Suite 5A 23 Clarence Street
Port Macquarie NSW 2444
m: 0498 686 240
NSW Architects Registration Board No. 6952
Craig Teasdell
ARCHITECT


N
UNITS 13 14 15 VIEW
UNIT 13 NORTH ELEVATION
UNIT 13 SOUTH ELEVATION
UNIT 15 EAST ELEVATION
UNIT 15 WEST ELEVATION
UNIT 15 SOUTH ELEVATION
UNIT FLOOR PLANS
UNIT AREA DATA
13- 15 FLOOR AREA 104M² PER
13- 15 GARAGE 25M² PER
UNITS 13 - 15
PROJECT: CAMERON GRANGE
SELF CONTAINED DWELLINGS
15 - 21 CAMERON STREET WAUCHOPE
CLIENT: WAUCHOPE RSL CLUB
Revisions
A 25.07.2018 ISSUED FOR DEVELOPMENT APPLICATION
General Notes
Scale: 1:100 @ A1
Date: 27/7/18
Project No: 1719
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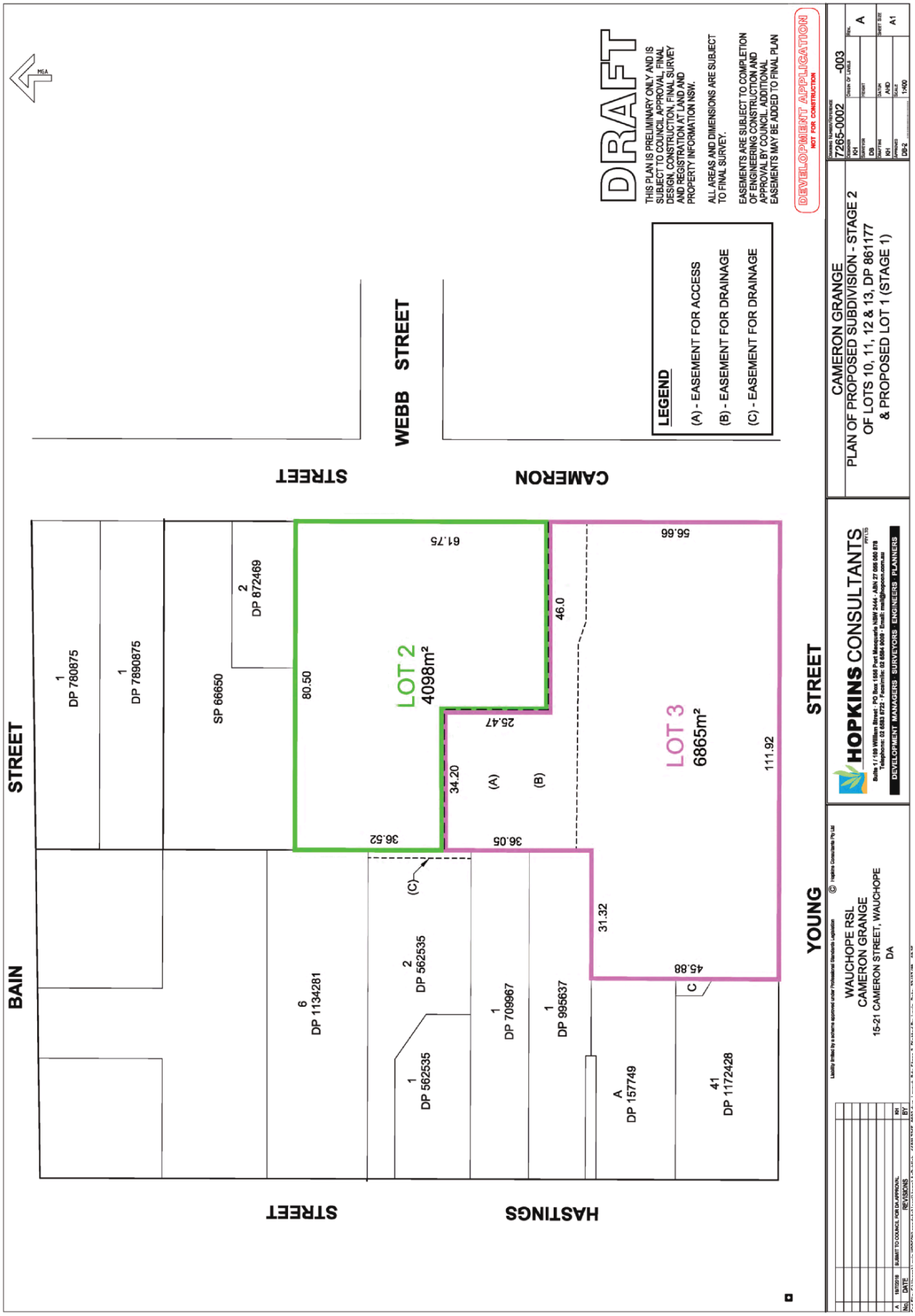
Rev: A
Craig Teasdell ARCHITECT
Suite 5A 23 Clarence Street
Port Macquarie NSW 2444
m: 0498 686 240
NSW Architects Registration Board No. 6952


DRAFT
THIS PLAN IS PRELIMINARY ONLY AND IS SUBJECT TO COUNCIL APPROVAL, FINAL DESIGN, CONSTRUCTION, FINAL SURVEY AND REGISTRATION AT LAND AND PROPERTY INFORMATION NSW.
ALL AREAS AND DIMENSIONS ARE SUBJECT TO FINAL SURVEY.
EASEMENTS ARE SUBJECT TO COMPLETION OF ENGINEERING CONSTRUCTION AND APPROVAL BY COUNCIL. ADDITIONAL EASEMENTS MAY BE ADDED TO FINAL PLAN
DEVELOPMENT APPLICATION
NOT FOR CONSTRUCTION
LEGEND
(A) - EASEMENT FOR ACCESS
(B) - EASEMENT FOR DRAINAGE
(C) - EASEMENT FOR DRAINAGE
WEBB STREET
CAMERON STREET
BAIN STREET
YOUNG STREET
HASTINGS STREET
LOT 2
4098m²
LOT 3
6865m²
1 DP 780875
1 DP 7890875
SP 66650
2 DP 872469
6 DP 1134281
2 DP 562535
1 DP 562535
1 DP 709967
1 DP 995637
A DP 157749
41 DP 1172428
80.50
61.75
46.0
56.66
25.47
34.20
36.52
36.05
31.32
45.88
111.92
(A)
(B)
(C)
CAMERON GRANGE
PLAN OF PROPOSED SUBDIVISION - STAGE 2
OF LOTS 10, 11, 12 & 13, DP 861177
& PROPOSED LOT 1 (STAGE 1)
7265-0002
-003
A
A1
HOPKINS CONSULTANTS
DEVELOPMENT MANAGERS SURVEYORS ENGINEERS PLANNERS
WAUCHOPE RSL
CAMERON GRANGE
15-21 CAMERON STREET, WAUCHOPE
DA
SUBMIT TO COUNCIL FOR DA APPROVAL
REVISIONS

Graeme Falvey

From: John Patrick <JPatrick@jppc.com.au>
Sent: Friday, 11 November 2016 9:03 AM
To: Graeme Falvey
Subject: Fwd: da 2000/670 - crossland estate - final release Stage 3
Attachments: image002.jpg; image003.jpg; image004.jpg; image001.jpg; image002.jpg; image003.jpg; image004.jpg; image005.jpg; image002.jpg; image003.jpg; image004.jpg; image006.png; image001.jpg

Sent from my iPhone

Begin forwarded message:

From: Matt Rogers <Matt.Rogers@pmhc.nsw.gov.au>
Date: 10 November 2016 4:57:04 pm AEDT
To: 'John Patrick' <JPatrick@jppc.com.au>, 'Rob Beukers' <rob@brconsulting.net.au>
Cc: Clinton Tink <Clinton.Tink@pmhc.nsw.gov.au>, Grant Burge <Grant.Burge@pmhc.nsw.gov.au>, Thor Aaso <Thor.Aaso@pmhc.nsw.gov.au>, Dan Croft <Dan.Croft@pmhc.nsw.gov.au>, Peter Cameron <Peter.Cameron@pmhc.nsw.gov.au>
Subject: RE: da 2000/670 - crossland estate - final release Stage 3

John/Rob

Further to our meeting this morning, I confirm the following.

I acknowledge your position that it is not reasonable that Council seeks to enforce the conditions of consent that required environmental lands restoration as part of stage 1 of the development, given the time that has passed and that this requirement should have been enforced on the original developer. I also note your position that the environmental lands can be incorporated into proposed residential lots as per the current subdivision proposal.

While it is Council's position that the conditions requiring the restoration works can be enforced, it is also apparent from a review of the consent conditions and the approved landscaping plan, that there is a lack of clarity about which lands are to be dedicated.

Having considered the above, and the broader interests of the community in terms of the long-term management of the environmental lands, we discussed the option of the environmental lands being dedicated to Council as public reserve.

As part of this discussion a contribution to the initial maintenance of these lands was considered. Your position on this matter is that you will suffer a loss of value on proposed residential lots, particularly associated with proposed lot 234 (est. in the order of$50-$60k), and on this basis a contribution to the maintenance of the E2 land is unreasonable.

We also discussed the opportunity to secure the lot 16 environmental lands in public ownership, given the bushfire implications of the current lot layout, and the opportunity to reconfigure the lot boundaries associated with proposed dwellings on lots 16 & proposed lot 234 that would potentially see a better E2 lands outcomes. It was noted that an adjustment to the E2 zone boundaries and a DA mod would be needed to facilitate a revised lot layout that would enable APZs to be contained within proposed lots and the dedication of the residue as public land. A bushfire assessment would be required to determine APZ requirements and therefore lot layouts and it was noted that there

may be implications for any proposed APZ given the location of the proposed dwelling sites relative to the vegetation in the drainage line. It was also noted that zone boundary adjustment can take a long time to be finalised.

In summary, the following was agreed in principle:

- Residue E2 lands to be dedicated to Council (those lands associated with current lot 16 and proposed lot 234 and pt lot 225).
- In recognition of the loss in value of lots associated with excising the E2 lands and your agreement to dedicate the E2 land associated with the current lot 16, Council will not require establishment of the revegetation on the lands to be dedicated.
- A revised lot layout for the proposed dwellings and APZs (lot 16 and proposed lot 234) will be developed for consultation with Council staff prior to a DA mod and rezoning.
- Given the time that it will take to deal with a DA mod for the revised lot layout and rezoning associated with the current lots 16 proposed lot 234, a residue lot would be created with a caveat that prevents the sale of the land until the DA mod and rezoning is resolved.

Can you please confirm your agreement or otherwise.

Regards
Matt

Matt Rogers
Director Development & Environment
Port Macquarie-Hastings Council
PO Box 84
PORT MACQUARIE NSW 2444
(02) 6581 8111
(02) 6581 8788 (Fax)
Connect with Council:

From: Rob Beukers [mailto:rob@brconsulting.net.au]
Sent: Wednesday, 9 November 2016 1:21 PM
To: Matt Rogers
Cc: 'John Patrick'
Subject: RE: da 2000/670 - crossland estate - final release Stage 3

Hi Matt.

Are we still OK for 9:00 am tomorrow?

Kind Regards

Rob Beukers

Form: 08X
Release: 4·4

CAVEAT

Prohibiting Recording of a Dealing or Plan
or Granting of a Possessory Application
New South Wales
Section 74F Real Property Act 1900

Leave this space clear. Affix additional pages to the top left-hand corner.

PRIVACY NOTE: Section 31B of the Real Property Act 1900 (RP Act) authorises the Registrar General to collect the information required by this form for the establishment and maintenance of the Real Property Act Register. Section 96B RP Act requires that the Register is made available to any person for search upon payment of a fee, if any.

STAMP DUTY

Office of State Revenue use only

(A) **TORRENS TITLE**

17/1221921

(B) **REGISTERED DEALING**

Number	Torrens Title

(C) **LODGED BY**

Document Collection Box	Name, Address or DX, Telephone, and Customer Account Number if any	CODE
	Reference:	X

(D) **REGISTERED PROPRIETOR**

KILDARIUS (WHOLESALE) PTY LIMITED ACN 069 568 216
PO Box 5333, Port Macquarie

Postcode: 2444

(E) **CAVEATOR**

Insert the full name and address (residential if individual/registered office if body corporate)

PORT MACQUARIE HASTINGS COUNCIL Cnr Lord and Burrawan Streets, Port Macquarie and DX 7415 Port Macquarie

Postcode: 2444

(F) **NAME AND ADDRESS IN AUSTRALIA SERVICE OF NOTICES ON THE CAVEATOR**

IMPORTANT NOTE: The address *must* be a street address. If desired, a Document Exchange box in NSW may be provided *in addition*. If the caveator's name or address for service of notices changes, notification *must* be lodged on form 08CX.

Name:
Street Address:

Postcode:

Document Exchange Box in NSW (additional):

(G) **ACTION PROHIBITED**

1, 2, 4 and 7

(H) The caveator claims to be entitled to the estate or interest in the above land specified in Schedule 1 by virtue of the facts set out in that schedule and prohibits the Registrar General from taking, with respect to the above land, the action specified above unless the caveator has consented in writing or this caveat has lapsed or been withdrawn.

ALL HANDWRITING MUST BE IN BLOCK CAPITALS. 1605

Page 1 of 2

WARNING: care should be exercised in completing a caveat form. An unsupported caveat may be challenged in the Supreme Court; compensation may be awarded for lodging a caveat without justification (section 74P Real Property Act 1900). Failure to observe the requirements of regulations 7 and 8 of the current Real Property Regulation may make the caveat invalid.

(I) **SCHEDULE 1 Estate or interest claimed**

Particulars of the estate or interest in the abovementioned land		
Interest in part of the land pursuant to terms of Development Consent 2000/670 (as to be modified).		
By virtue of the instrument referred to below		
Nature of Instrument	Date	Parties
By virtue of the facts stated below		
Proposed modification to DA 2000/670 whereby part of the land will be rezoned.		

(J) **SCHEDULE 2 Action prohibited by this caveat**

1. The recording in the Register of any dealing other than a plan affecting the estate or interest claimed by the caveator and set out in Schedule 1.
2. The registration or recording of any plan other than a delimitation plan affecting the estate or interest claimed by the caveator and set out in Schedule 1.
3. The registration of delimitation plan [1] No. NOT APPLICABLE
4. The granting of any possessory application [2] with respect to the land in the Torrens Title referred to above.
5. ~~The recording in the register of any dealing affecting the estate or interest of which the caveator is registered proprietor.~~
6. The granting of an application to extinguish the NOT APPLICABLE created by NOT APPLICABLE No. NOT APPLICABLE
7. The recording in the Register of a writ affecting the estate or interest claimed by the caveator and set out in Schedule 1.

(K) **STATUTORY DECLARATION** [3]

I, GRAEME PETER FALVEY

solemnly and sincerely declare that

1. To the best of my knowledge, information and belief
   (a) the caveator has a good and valid claim to the estate or interest set out in Schedule 1.
   (b) the address specified at (D) as the address of the registered proprietor is the correct address.
2. This caveat does not require the leave of the Supreme Court or the endorsed consent of the SELECT >>> >>> >>> ;

I make this solemn declaration conscientiously believing the same to be true and by virtue of the Oaths Act 1900 and I certify this caveat to be correct for the purposes of the Real Property Act 1900.

Made and subscribed at _____ in the _____ on _____

in the presence of _____ of _____,

☐ Justice of the Peace (J.P. Number: _____) ☐ Practising Solicitor

☐ Other qualified witness *[specify]* _____

** who certifies the following matters concerning the making of this statutory declaration by the person who made it:

1. I saw the face of the person *OR* I did not see the face of the person because the person was wearing a face covering, but I am satisfied that the person had a special justification for not removing the covering; and
2. I have known the person for at least 12 months *OR* I have confirmed the person's identity using an identification document and the document I relied on was a _____ *[Quit ID No.]*

Signature of witness: _____ Signature of declarant: _____

Capacity of declarant if other than the caveator: _____

(L) **CONSENT (section 74O Real Property Act 1900)**[4]

I, the registered proprietor named at (D)/possessory applicant, for the purposes of section 74O only, consent to this caveat.

Signature of registered proprietor/possessory applicant _____

1. A plan defining the boundaries of land in a limited folio of the Register. See Part IVB Real Property Act 1900.
2. An application made by a person claiming title to land by virtue of adverse possession. See Part VIA Real Property Act 1900.
3. As the services of a qualified witness cannot be provided at lodgment, the declaration should be signed and witnessed prior to lodgment.** If made outside NSW, cross out the witness certification. If made in NSW, cross out the text which does not apply.
4. Only one capacity can be selected, either registered proprietor or possessory applicant, cross out whichever does not apply.

ALL HANDWRITING MUST BE IN BLOCK CAPITALS. **Page 2 of 2** 1605

Form: 08X
Release: 4·4

CAVEAT

Prohibiting Recording of a Dealing or Plan
or Granting of a Possessory Application
New South Wales
Section 74F Real Property Act 1900

Leave this space clear. Affix additional pages to the top left-hand corner.

PRIVACY NOTE: Section 31B of the Real Property Act 1900 (RP Act) authorises the Registrar General to collect the information required by this form for the establishment and maintenance of the Real Property Act Register. Section 96B RP Act requires that the Register is made available to any person for search upon payment of a fee, if any.

STAMP DUTY

Office of State Revenue use only

(A) **TORRENS TITLE**

234/1224670

(B) **REGISTERED DEALING**

Number	Torrens Title

(C) **LODGED BY**

Document Collection Box	Name, Address or DX, Telephone, and Customer Account Number if any	CODE
	Reference:	X

(D) **REGISTERED PROPRIETOR**

KILDARIUS (WHOLESALE) PTY LIMITED ACN 069 568 216
PO Box 5333, Port Macquarie

Postcode: 2444

(E) **CAVEATOR**

Insert the full name and address (residential if individual/registered office if body corporate)

PORT MACQUARIE HASTINGS COUNCIL Cnr Lord and Burrawan Streets, Port Macquarie and DX 7415 Port Macquarie

Postcode: 2444

(F) **NAME AND ADDRESS IN AUSTRALIA SERVICE OF NOTICES ON THE CAVEATOR**

IMPORTANT NOTE: The address *must* be a street address. If desired, a Document Exchange box in NSW may be provided *in addition*. If the caveator's name or address for service of notices changes, notification *must* be lodged on form 08CX.

Name:
Street Address:

Postcode:

Document Exchange Box in NSW (additional):

(G) **ACTION PROHIBITED**

1, 2, 4 and 7

(H) The caveator claims to be entitled to the estate or interest in the above land specified in Schedule 1 by virtue of the instrument and facts set out in that schedule and prohibits the Registrar General from taking, with respect to the above land, the action specified above unless the caveator has consented in writing or this caveat has lapsed or been withdrawn.

ALL HANDWRITING MUST BE IN BLOCK CAPITALS. 1605

WARNING: care should be exercised in completing a caveat form. An unsupported caveat may be challenged in the Supreme Court; compensation may be awarded for lodging a caveat without justification (section 74P Real Property Act 1900). Failure to observe the requirements of regulations 7 and 8 of the current Real Property Regulation may make the caveat invalid.

(I) **SCHEDULE 1 Estate or interest claimed**

Particulars of the estate or interest in the abovementioned land		
Interest in part of the land pursuant to terms of Development Consent 2000/670 (as to be modified).		
By virtue of the instrument referred to below		
Nature of Instrument	Date	Parties
By virtue of the facts stated below		
Proposed modification to DA 2000/670 whereby part of the land will be rezoned.		

(J) **SCHEDULE 2 Action prohibited by this caveat**

1. The recording in the Register of any dealing other than a plan affecting the estate or interest claimed by the caveator and set out in Schedule 1.
2. The registration or recording of any plan other than a delimitation plan affecting the estate or interest claimed by the caveator and set out in Schedule 1.
3. The registration of delimitation plan[1] No. NOT APPLICABLE
4. The granting of any possessory application[2] with respect to the land in the Torrens Title referred to above.
5. The recording in the register of any dealing affecting the estate or interest of which the caveator is registered proprietor.
6. The granting of an application to extinguish the NOT APPLICABLE created by NOT APPLICABLE No. NOT APPLICABLE
7. The recording in the Register of a writ affecting the estate or interest claimed by the caveator and set out in Schedule 1.

(K) **STATUTORY DECLARATION**[3]

I, GRAEME PETER FALVEY

solemnly and sincerely declare that—

1. To the best of my knowledge, information and belief
   (a) the caveator has a good and valid claim to the estate or interest set out in Schedule 1.
   (b) the address specified at (D) as the address of the registered proprietor is the correct address.
2. This caveat does not require the leave of the Supreme Court or the endorsed consent of the SELECT >>> >>> >>> ;

I make this solemn declaration conscientiously believing the same to be true and by virtue of the Oaths Act 1900 and I certify this caveat to be correct for the purposes of the Real Property Act 1900.

Made and subscribed at _____ in the _____ on _____

in the presence of _____ of _____,

☐ Justice of the Peace (J.P. Number: _____) ☐ Practising Solicitor

☐ Other qualified witness *[specify]* _____

** who certifies the following matters concerning the making of this statutory declaration by the person who made it:

1. I saw the face of the person *OR* I did not see the face of the person because the person was wearing a face covering, but I am satisfied that the person had a special justification for not removing the covering; and
2. I have known the person for at least 12 months *OR* I have confirmed the person's identity using an identification document and the document I relied on was a _____ *[Omit ID No.]*

Signature of witness: _____ Signature of declarant: _____

Capacity of declarant if other than the caveator: _____

(L) **CONSENT (section 74O Real Property Act 1900)**[4]

I, the registered proprietor named at (D)/possessory applicant, for the purposes of section 74O only, consent to this caveat.

Signature of registered proprietor/possessory applicant _____

1. A plan defining the boundaries of land in a limited folio of the Register. See Part IVB Real Property Act 1900.
2. An application made by a person claiming title to land by virtue of adverse possession. See Part VIA Real Property Act 1900.
3. As the services of a qualified witness cannot be provided at lodgment, the declaration should be signed and witnessed prior to lodgment.** If made outside NSW, cross out the witness certification. If made in NSW, cross out the text which does not apply.
4. Only one capacity can be selected, either registered proprietor or possessory applicant, cross out whichever does not apply.

ALL HANDWRITING MUST BE IN BLOCK CAPITALS. **Page 2 of 2** 1605

FALVEY KAY
LAWYERS

GRAEME FALVEY, B.A., LL.B.
JAMES KAY BEc. Dip Law

Telephone: 02 6583 8199
Facsimile: 02 6583 4743
Email: office@falveykaylawyers.com.au
DX 7422

Our Ref.: GF:JH:32616

Your Ref.:

65418

PORT MACQUARIE HASTINGS
TRIM No
- 7 DEC 2018
Keyword
Activity
Subject
Folder DA 2000 - 670.1

6 December 2018

Mr Dan Croft
Port Macquarie-Hastings Council
DX 7415
PORT MACQUARIE

Dear Sir,

RE: KILDARIUS (WHOLESALE) PTY LIMITED - FINAL STAGE OF BRENCHLEY CIRCUIT (RIVERBREEZE) SUBDIVISION

We refer to our telephone discussions with Dan Croft on 30 November in relation to Council providing a Withdrawal of the Caveat lodged over Lots 16 and 234 in the final stage of the Brenchley Circuit subdivision owned by Kildarius (Wholesale) Pty Limited.

We note that Council is prepared to provide a Withdrawal of Caveat over both those lots to then enable our client to seek to list, and subsequently sell, both lots.

We further note, however, that Council requests confirmation that with respect to the listing and selling process, our client will make full and frank disclosure to prospective Purchasers that the possible future use of each lot for residential purposes will be subject to, inter alia, any Purchaser seeking to obtain consent from Council to the construction of a dwelling on either lot, is specifically aware that there will be major obstacles given the bushfire prone nature of each lot and the likelihood that no further clearing of each lot will be permitted.

Our client has confirmed to us that both it and its Selling Agent (Kevin Debreceny Real Estate) will most certainly make such full and frank disclosure to prospective Purchasers.

-2-

On that basis we do ask that Council execute the **enclosed** Withdrawal of Caveat (on the annexure page attached) and return it to us as soon as possible. With respect to execution we also **enclose** a copy of the Registrar General's Guidelines and can you please ensure that the method of execution by Council is either:-

(a) under Council's seal and appropriately attested; or

(b) pursuant to registered Power of Attorney – with full details to be included; or

(c) by an authorised delegate with the particulars of the section of the Local Government Act 1993 pursuant to which the delegate is signing to be inserted.

Yours faithfully
FALVEY KAY LAWYERS

GRAEME FALVEY
gfalvey@falveykaylawyers.com.au
enc.

Form 08WX
Release: 3.1
Licence: 01-05-065
Licensee: LEAP Legal Software Pty Limited
Firm name: Falvey Kay Lawyers

WITHDRAWAL OF CAVEAT

New South Wales
Real Property Act 1900

Leave this space clear. Affix additional pages to the top left-hand corner.

PRIVACY NOTE: Section 31B of the Real Property Act 1900 (RP Act) authorises the Registrar General to collect the information required by this form for the establishment and maintenance of the Real Property Act Register. Section 96B RP Act requires that the Register is made available to any person for search upon payment of a fee, if any.

(A)	**TORRENS TITLE**	16/1221921 and 234/1224670
(B)	**REGISTERED DEALING**	Number: Torrens Title:
(C)	**LODGED BY**	Document Collection Box Name, Address or DX, Telephone, and Customer Account Number if any Reference: **CODE** WX
(D)	**CAVEATOR**	PORT MACQUARIE HASTINGS COUNCIL
(E)	**CAVEAT WITHDRAWN**	AK978502 and AM225925

(F) The caveator in the above caveat withdraws that caveat so far as it affects the above land .

DATE

(G) I certify that I am an eligible witness and that the caveator signed this dealing in my presence. [See note* below]

Signature of witness:

Name of witness:

Address of witness:

Certified correct for the purposes of the Real Property Act 1900 by the caveator.

Signature of caveator: See Annexure "A" for execution by Caveator

*s117 RP Act requires that you must have known the signatory for more than 12 months or have sighted identifying documentation

ALL HANDWRITING MUST BE IN BLOCK CAPITALS. **Page 1 of 2** 1303

Annexure "A"
to Withdrawal of Caveat

PARTIES:

PORT MACQUARIE HASTINGS COUNCIL - Caveator

DATED:

** s117 RP Act requires that you must have known the signatory for more than 12 months or have sighted identifying documentation.*

NSW Land Registry Services

Registrar General's **Guidelines**

Local councils

The following sets out the rules for execution of dealings by a Council.

These rules also apply to Water Access Licence dealings and Old System deeds.

See s.377 and s.378 *Local Government Act 1993*.

An administrator appointed under section 256 *Local Government Act 1993* exercises all the functions of the Council: section 258(1)(6) *Local Government Act 1993*.

The dealing must be executed either:

- under the Councils seal, or
- by an attorney under power of attorney
- by an authorised delegate.

Note: A solicitor, barrister or licensed conveyancer may sign on behalf of the council where the council is benefiting from the dealing.

Where the council signs pursuant to a resolution being passed the relevant section of the '*Local Government Act 1993*' must be stated.

Under the Councils seal

The affixing of the seal must be attested by:

- the general manager and the mayor, or
- the general manager and at least one councillor, or
- the mayor and at least one councillor, or
- at least two councillors.

See Clause 400 *Local Government (General) Regulation 2005*.

The name & capacity of the persons attesting the affixing of the seal must be stated.

By Power of Attorney

A suggested form of words is:

(name of Council) by its Attorney (name of Attorney) pursuant to Power of Attorney Book..... Number..... in the presence of:

(Signature of Attorney)

(Name of Attorney)

I certify that I am an eligible witness and that the Attorney signed in my presence

(Signature of Witness)

(Name of Witness)

(Address of Witness)

By an authorised delegate

A suggested form of words is:

(name of Council) by its authorised delegate pursuant to [insert relevant section] *Local Government Act 1993*

(Signature of delegate)

(Name of delegate)

I certify that I am an eligible witness and that the delegate signed in my presence

(Signature of Witness)

(Name of Witness)

(Address of Witness)

Alternatively when using interactive forms the 'Authorised officer of a company or of a government department or authority' option from the list of forms of execution may be selected. The use of the word 'officer' in lieu of 'delegate' is acceptable. The applicable authority of the officer being either 's.377 *Local Government Act 1993'* or 's.378 Local Government Act 1993 ' must be stated.

An eligible witness is a person who has known the authorised delegate for more than 12 months or who has sighted identifying documentation.

It is a matter for Council to make sure that an authorised delegate actually has the requisite authority to sign on behalf of Council. The Registrar General is entitled, under section 36(3) of the Real Property Act 1900, to assume that the signature by the authorised delegate is properly authorised by Council.

Consenting to a dealing

The consent may be:

- endorsed on the dealing, or
- embodied in a separate document annexed to the dealing.

It must be signed by:

- an authorised delegate(the authorised delegate's capacity must be stated and the signature must be witnessed), or
- a solicitor for the Council (the solicitors capacity must be stated but the signature need not be witnessed).

From:	Graeme Falvey
To:	Dan Croft
Cc:	Kildarius (Wholesale) Pty Limited (Vendor); Kevin Debreceny Real Estate (Agent)
Subject:	RE: Emailing - D2018 282555 Correspondence - Withdrawal of Caveat - Lots 16 and 234 Brenchley Circuit Crosslands - Kildarius Pty Ltd - Falvey Kay Lawyers 65418.PDF
Date:	Wednesday, 30 January 2019 9:59:28 AM
Attachments:	image001.jpg image002.jpg image003.jpg image004.jpg image005.png

Dan,

Council has already approved the subdivision and my client only agreed to lodgement of the caveats for a very specific reason.

Council should have raised these issues as part of the original consent process but did not and cannot now re-visit that process!

Again with respect, council will now need to be very mindful of its, legal position and the rights and entitlements of my client. If we do not received signed withdrawals following the next Council meeting I expect my client will instruct me to take the necessary legal steps to have both caveats removed.

I have also already assured you that my client intends to make full and frank disclosure to potential purchasers and, indeed, marketing will not commence until both my client and the selling agent (Kevin Debreceney) have the necessary advise and facts from the Consultants.

I await receipt of the withdrawals please Dan.

Graeme P. Falvey
Lawyer

Falvey Kay Lawyers
1st Floor, 33 Hay Street
PORT MACQUARIE NSW 2444
AUSTRALIA
(PO Box 643)
DX 7422 PORT MACQUARIE
Ph: 02 6583 8199
Fax: 02 6583 4743

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From: Dan Croft <Dan.Croft@pmhc.nsw.gov.au>
Sent: Wednesday, 30 January 2019 8:59 AM
To: Graeme Falvey <gfalvey@falveykaylawyers.com.au>
Subject: RE: Emailing - D2018 282555 Correspondence - Withdrawal of Caveat - Lots 16 and 234 Brenchley Circuit Crosslands - Kildarius Pty Ltd - Falvey Kay Lawyers 65418.PDF

Hi Graeme

I understand your position although I can see potential questions around this very issue at the Council meeting and there is a risk that the matter will not be resolved without this supporting information.

Also, do you have an electronic copy of the executed caveat so I can attach to the report (I only have a draft). Thanks

Regards

Dan Croft
Group Manager Development Assessment

Development & Environment

p (02) 6581 8628
m 0439 818 621

From: Graeme Falvey [mailto:gfalvey@falveykaylawyers.com.au]
Sent: Tuesday, 29 January 2019 4:58 PM
To: Dan Croft
Subject: RE: Emailing - D2018 282555 Correspondence - Withdrawal of Caveat - Lots 16 and 234 Brenchley Circuit Crosslands - Kildarius Pty Ltd - Falvey Kay Lawyers 65418.PDF

Hi Dan,

I know my client has been pressing Rob Buekers (with limited success) re these issues and will follow up John Patrick again.

With respect, however, I don't think these issues are entirely relevant given the specific basis upon

which my client consented to Council lodging a caveat in the first instance.

Regards

Graeme P. Falvey
Lawyer

Falvey Kay Lawyers
1st Floor, 33 Hay Street
PORT MACQUARIE NSW 2444
AUSTRALIA
(PO Box 643)
DX 7422 PORT MACQUARIE
Ph: 02 6583 8199
Fax: 02 6583 4743

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From: Dan Croft <Dan.Croft@pmhc.nsw.gov.au>
Sent: Tuesday, 29 January 2019 4:01 PM
To: Graeme Falvey <gfalvey@falveykaylawyers.com.au>
Subject: FW: Emailing - D2018 282555 Correspondence - Withdrawal of Caveat - Lots 16 and 234 Brenchley Circuit Crosslands - Kildarius Pty Ltd - Falvey Kay Lawyers 65418.PDF

Hello Graeme

Further to our correspondence last December I am progressing the report to Council regarding the withdrawal of caveats. Are you able to advise whether investigations have been undertaken by the owner and bushfire consultant to determine whether a dwelling and associated asset protection zone can be established wholly within the residentially zoned land on Lot 16 and Lot 234? This question is likely to be asked by Council and I would like to include this detail in the report. Can you please advise. Thanks

Regards

Dan Croft
Group Manager Development Assessment

Development & Environment

p (02) 6581 8628
m 0439 818 621

From: Dan Croft
Sent: Thursday, 13 December 2018 12:11 PM
To: 'gfalvey@falveykaylawyers.com.au'
Subject: FW: Emailing - D2018 282555 Correspondence - Withdrawal of Caveat - Lots 16 and 234 Brenchley Circuit Crosslands - Kildarius Pty Ltd - Falvey Kay Lawyers 65418.PDF

Graeme

Further to our recent discussion and your attached correspondence, I have discovered that staff do not have delegations to remove caveats. Unfortunately it requires a resolution of the elected councillors. Council does not meet in January so February will be the first opportunity to put this to a Council meeting.

Apologies about this delay.

Please contact me if you would like to discuss further.

Regards

Dan Croft
Group Manager Development Assessment

Development & Environment

p (02) 6581 8628
m 0439 818 621

cid:image008.png@01D48278.C6A89390

From: Dan Croft
Sent: Thursday, 13 December 2018 12:04 PM
To: Dan Croft
Subject: Emailing - D2018 282555 Correspondence - Withdrawal of Caveat - Lots 16 and 234 Brenchley Circuit Crosslands - Kildarius Pty Ltd - Falvey Kay Lawyers 65418.PDF

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