

*(FUTURE) PUBLIC EXHIBITION DATES*  
(Start) to (Finish)

# Planning Proposal

*Draft Port Macquarie-Hastings LEP 2011*  
*(Amendment No \*)*

## Highway Service Centre

**Lot 11 DP 1029846**  
**No 1179 Oxley Highway Sancrox**

Ccl ref: PP2017-10.1  
DP&E ref: PP\_2018\_PORTM\_\*  
Date: 10 August 2018 (s3.3 version)



**Planning Proposal status (for this copy)**

Stage	Version Date (blank until achieved)
Reported to Council (section 3.33)	16/5/18
Referred to DP&E (sec 3.34 (1))	10/8/18
Gateway Panel determination (sec 3.34 (2))	
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For Council review (sec 3.35 (1))	
Adopted by Council for submission to Minister's delegate (sec 3.36 (2))	

**Council reference:** PP2017 – 10.1*(Amendment No will initially be blank)* Port Macquarie-Hastings LEP 2011 (Amendment No \*)**Department of Planning & \*****Environment reference:****Council Address**

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**Adoption of the Planning Proposal****1. For initial Gateway determination**

This Planning Proposal was endorsed on 10 August 2018 by the undersigned Council delegate:

Signed



Name Steve Schwartz

Position Acting 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



## Executive Summary & Exhibition information

### Planning Proposal

This is a Planning Proposal to permit development of a Highway Service Centre on the south-western corner of the intersection of the Oxley Highway and Pacific Highway at Sancrox, west of Port Macquarie. The Highway Service Centre is to incorporate ancillary hotel or motel accommodation for heavy vehicle drivers. The Planning Proposal is also intended to permit subdivision of the land to excise the Highway Service Centre site from the residue area, subsequent subdivision of the Highway Service Centre site following construction to create separate title for individual tenancies, and to retain a dwelling entitlement on the residue lot.

### What is a Planning Proposal?

The preparation of a Planning Proposal is the first step in making an amendment to the Port Macquarie-Hastings Local Environmental Plan (LEP) 2011. A Planning Proposal is a document that explains the intended effect and justification for the proposed amendment. Under the *Environmental Planning and Assessment Act 1979*, Council must prepare and submit a Planning Proposal to the Department of Planning and Environment for consideration of an amendment to the Port Macquarie-Hastings LEP 2011.

This Planning Proposal is set out in the manner required by the State government and it contains information required by the State government when Councils prepare changes to their LEPs.

### What is the intent of this Planning Proposal?

The intent of this Planning Proposal is to amend the Port Macquarie-Hastings LEP 2011 to allow development for the purpose of a Highway Service Centre on No 1179 Oxley Highway Sancrox being Lot 11 DP 1029846. It is also intended to permit overnight accommodation for heavy vehicle drivers.

The site will be subdivided into two lots, with one lot containing a Highway Service Centre site and the other lot containing an existing dwelling. Following construction of a Highway Service Centre, the Planning Proposal will permit further subdivision of the individual tenancies within the Highway Service Centre.

This Planning Proposal will be publicly exhibited for a minimum of twenty-eight (28) days from \* to \*. Hard copies of the Planning Proposal and supporting information will be available for the duration of the exhibition period at Council's offices between 8.30am and 4.30pm on normal business days. The Planning Proposal will also be available on Council's website:

[www.pmhc.nsw.gov.au](http://www.pmhc.nsw.gov.au)

Agencies and the general public can comment on the Planning Proposal during the exhibition period. All comments received during the exhibition will be reported to Council for a final decision. Note that any submission may be made public. Written submission can be made online or send your submission by email or post to:

The General Manager  
Port Macquarie-Hastings Council  
PO Box 84  
Port Macquarie NSW 2444  
Email: [council@pmhc.nsw.gov.au](mailto:council@pmhc.nsw.gov.au)

Any enquires, please contact:  
Sandra Bush on 6581 8111 or via email  
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## Summary of Planning Proposal

<b>Proposal</b>	Port Macquarie Highway Service Centre
<b>Property Details</b>	Part of Lot 11 DP 1029846 No 1179 Oxley Highway, Sancrox
<b>Current Land Zone</b>	RU1 Primary Production
<b>Applicant Details</b>	Scott PDI No 6 Pty Ltd
<b>Land owner</b>	MM Hore
<b>Location</b>	A location map is included in Part 4 - Mapping

## Background

This is a Planning Proposal prepared in accordance with the *Environmental Planning and Assessment Act 1979* and the Department of Planning and Environment's *A guide to preparing planning proposals 2016* and *A guide to preparing local environmental plans 2016*.

This Planning Proposal explains the intended effects of a proposed amendment to the *Port Macquarie-Hastings Local Environmental Plan (LEP) 2011* to enable development of a Highway Service Centre for northbound traffic on the south-west corner of the Pacific Highway and the Oxley Highway, being Lot 11 DP 1029846, No 1179 Oxley Highway, Sancrox.

The land is the subject of a request to prepare a Planning Proposal lodged by GEM Planning Projects on behalf of Scott PDI on 27 February 2018. A Development Application has been lodged in conjunction with the Planning Proposal for the subdivision of the land and the construction of a Highway Service Centre.

The land is identified in the Port Macquarie-Hastings Urban Growth Management Strategy 2011-2031 as a Gateway Site and is identified by the Roads and Maritime Services (RMS) as a location for a future Highway Service Centre. However, under the Port Macquarie-Hastings LEP 2011, the current RU1 Primary Production zoning of the land prohibits development for the purpose of a Highway Service Centre.

On 16 May 2018, Council considered a planning report on the proponent's Planning Proposal (**Attachment 1**) and resolved to proceed with its preparation (Minutes at **Attachment 2**).

### The Site

The site is located on the south-west corner of the Pacific Highway and the Oxley Highway, being Lot 11 DP 1029846, and known as No 1179 Oxley Highway, Sancrox (Refer Figure 1).

Under the Port Macquarie-Hastings LEP 2011, the site is zoned RU1 Primary Production, which is a rural zone that prohibits Highway Service Centres.

The site has frontage to both the Pacific Highway and the Oxley Highway and has a total area of 51.81 hectares (ha). The request for preparation of a Planning Proposal is for an area of about 18 ha, to be excised from the land for construction of a Highway Service Centre and associated parking and effluent disposal areas plus ancillary motel accommodation for heavy vehicle drivers.

The site is mostly cleared with a stand of vegetation along the eastern and northern boundaries and a larger patch of forest in the south-east corner. There is a ridge that runs east west through the middle of the site, with a saddle that extends north south from the centre to a point to the west of the centre of the northern boundary.

Land surrounding the site to the north, south and west is generally zoned RU1 Primary Production. There is a small area south-west of the site along Birralelee Drive and Burrawan Forest Drive which is zoned RU5 Village.

Land to the east of the site on the opposite side of the Pacific Highway (south of the Oxley Highway) is generally zoned RU1 Primary Production and further to the east, R1 General Residential. An existing service centre is located on the south-eastern corner of the Pacific Highway and Oxley Highway in Thrumster.



Figure 1: Subject Site

## Part 1 - Objectives or Intended Outcomes

This Planning Proposal aims to amend the *Port Macquarie-Hastings Local Environmental Plan 2011* to permit a Highway Service Centre to be located on the south-western corner of the intersection of the Oxley Highway and Pacific Highway at Sancrox, west of Port Macquarie.

*Port Macquarie-Hastings Local Environmental Plan 2011* provides the following definitions:

**Highway Service Centre** means a building or place used to provide refreshments and vehicle services to highway users. It may include any one or more of the following:

- (a) a restaurant or café,
- (b) take away food and drink premises,
- (c) service stations and facilities for emergency vehicle towing and repairs,
- (d) parking for vehicles,
- (e) rest areas and public amenities.

**Service station** means a building or place used for the sale by retail of fuels and lubricants for motor vehicles, whether or not the building or place is also used for any one or more of the following:

- a) the ancillary sale by retail of spare parts and accessories for motor vehicles,
- b) the cleaning of motor vehicles,
- c) installation of accessories,
- d) inspecting, repairing and servicing of motor vehicles (other than body building, panel beating, spray painting, or chassis restoration),
- e) the ancillary retail selling or hiring of general merchandise or services or both.

It is proposed to excise an area of about 18 ha from the lot to contain the proposed Highway Service Centre. The residue lot will have an area of about 33 ha and will contain the existing dwelling house.

In addition to the Highway Service Centre use, it is proposed to permit:

- ancillary hotel or motel accommodation for heavy vehicle drivers
- subdivision to excise the Highway Service Centre site from the residue area
- subsequent subdivision of the Highway Service Centre site following construction to create separate title for individual tenancies, and
- retention of a dwelling entitlement on the residue lot.

## **Part 2 - Explanation of Provisions**

The Planning Proposal seeks to amend the *Port Macquarie-Hastings Local Environmental Plan 2011* by:

1. Amending Schedule 1 to:
  - a) Allow a Highway Service Centre, with ancillary hotel or motel accommodation for heavy vehicle drivers, as additional permitted uses on Lot 11 DP 1029846, and
  - b) Allow a two lot subdivision of Lot 11 DP 1029846 to excise the Highway Service Centre site despite the minimum lot size provisions, and
  - c) Allow a dwelling house on the residue of Lot 11 DP 1029846 following excision of the Highway Service Centre site despite the minimum lot size provisions, and
  - d) Allow subdivision of the land parcel containing the Highway Service Centre site following its construction despite the minimum lot size provisions.
2. Amending the Additional Permitted Uses Map to identify the Highway Service Centre site which will be referred to in the amendment to Schedule 1.

See Part 4 for proposed mapping changes.

## 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

#### 1. Is the Planning Proposal a result of any strategic study or report?

The land is identified in Council's Urban Growth Management Strategy as a Gateway Site, and is identified by the RMS as an approved location for a Highway Service Centre. Action 9.3 of the North Coast Regional Plan 2036 includes the establishment of a Highway Service Centre at this intersection.

The land is the subject of a rezoning request lodged by GEM Planning Projects on behalf of development group, Scott PDI. The following supporting information and reports were submitted with the request:

1. Planning Proposal (GEM Planning Projects) (**Attachment 3**),
2. Site Plans (Hopkins Consultants) (**Attachment 4**),
3. Concept Plans and Photomontages (TRG Queensland Pty Ltd) (**Attachment 5**),
4. Biodiversity Development Assessment Report, April 2018 (Biodiversity Australia) (**Attachment 6**),
5. Traffic Impact Assessment (TTM) (**Attachment 7**),
6. Acoustic Assessment (Matrix Thornton) (**Attachment 8**),
7. Preliminary Lighting Assessment (Light Harmony, Queensland) (**Attachment 9**),
8. Onsite Sewage Management – Site Feasibility Assessment (HMC Environmental Consulting Pty Ltd) (**Attachment 10**),
9. Stormwater Management Plan (Hopkins Consultants) (**Attachment 11**),
10. Stage 1 Contaminated Site Assessment (Commercial Asset Management Services Pty Ltd) (**Attachment 12**),
11. Aboriginal Cultural Heritage Assessment (Birpai Local Aboriginal Land Council) (**Attachment 13**),
12. Economic Impact Assessment (Foresight Partners Pty Ltd) (**Attachment 14**),
13. Bushfire Hazard Assessment (Midcoast Building and Environmental) (**Attachment 15**).

#### 2. Is the Planning Proposal the best means of achieving the objectives or intended outcomes, or is there a better way?

Highway Service Centres are prohibited in all zones under the *Port Macquarie-Hastings Local Environmental Plan 2011* (LEP). The proposed LEP amendment is the best means of achieving the objectives of the Planning Proposal and the listing of a Highway Service Centre on the land as an additional permitted use is necessary and appropriate.

It is not appropriate for Highway Service Centres to be listed as permissible with consent in the RU1 zone as this zone is widespread throughout the local government area and will have the effect of making Highway Service Centres permissible with consent in inappropriate locations.

The additional permitted use for subdivision of the site into two (2) lots could be achieved through amendment to the minimum lot size map. However, this option was not preferred, because it would likely require a particular minimum lot size for the Highway Service Centre site that would

be different to the minimum lot size for the residue lot. Detailed design of the development may result in the Highway Service Centre site boundary being modified.

The “Additional Permitted Uses” approach retains flexibility in the final development footprint and lot size requirement and locates all the special development controls for the site in the same clause of the LEP.

## **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?**

#### **Goal 1 - The most stunning environment in NSW**

##### Direction 2: Enhance biodiversity, coastal and aquatic habitats, and water catchments

*Action 2.1: Focus development to areas of least biodiversity sensitivity in the region and implement the “avoid, minimise, offset” hierarchy to biodiversity, including areas of high environmental areas.*

The Highway Service Centre is to be developed predominately on the cleared areas of the site, with the forested area in the south-east intended to be retained. To achieve visibility of the site and traffic safety outcomes to the satisfaction of the NSW Roads and Maritime Services (RMS), existing vegetation within the Pacific Highway and Oxley Highway road reserves is to be cleared. Through the development application process, the clearing is to be offset using the Biodiversity Offsets Scheme and the retirement of biodiversity credits. The development will comply with the “avoid, minimise, offset” consistent with Action 2.1 of the Regional Plan.

##### Direction 3: Manage natural hazards and climate change

*Action 3.1 Reduce the risk from natural hazards, including the projected effects of climate change, by identifying, avoiding and managing vulnerable areas and hazards.*

The site is mapped as bushfire prone land. A bushfire hazard assessment report has demonstrated that the hazard is able to be managed in respect to the proposed development.

#### **Goal 2 - A thriving, interconnected economy**

##### Direction 9: Strengthen regionally significant transport corridors

*Action 9.3 Ensure the effective management of the State and regional road network by:*

- *preventing development directly adjoining the Pacific Highway;*
- *preventing additional direct ‘at grade’ access to motorway-class sections of the Pacific Highway;*
- *locating highway service centres on the Pacific Highway at Chinderah, Ballina, Maclean, Woolgoolga, Nambucca Heads, Kempsey and Port Macquarie, approved by the Department of Planning and Environment and Roads and Maritime Services; and*
- *identifying strategic sites for major road freight transport facilities.*

The site is specifically identified for a Highway Service Centre and is entirely consistent with Action 9.3, pending the approval of the NSW Department of Planning and Environment (DP&E) and the RMS.

##### Direction 16: Collaborate and partner with Aboriginal communities

*Action 16.2 Ensure Aboriginal communities are engaged throughout the preparation of local growth management strategies and local environmental plans.*



The Planning Proposal request was supported by an Aboriginal Cultural Heritage Assessment prepared by the Birpai Local Aboriginal Land Council who have advised that there is no reason that the rezoning cannot proceed in respect to Aboriginal Cultural Heritage issues.

### **Goal 3 Vibrant and engaged communities**

#### **Direction 20 Maintain the region's distinctive built character**

*Action 20. 1 Deliver new high-quality development that protects the distinct character of the North Coast, consistent with the North Coast Urban Design Guidelines (2009).*

The Guidelines do not relate to Highway Service Centres. However, Council intends to prepare development control plan provisions for the site to ensure that the development is of a high quality that promotes the character of the Port Macquarie-Hastings area.

#### **Direction 21: Coordinate local infrastructure delivery**

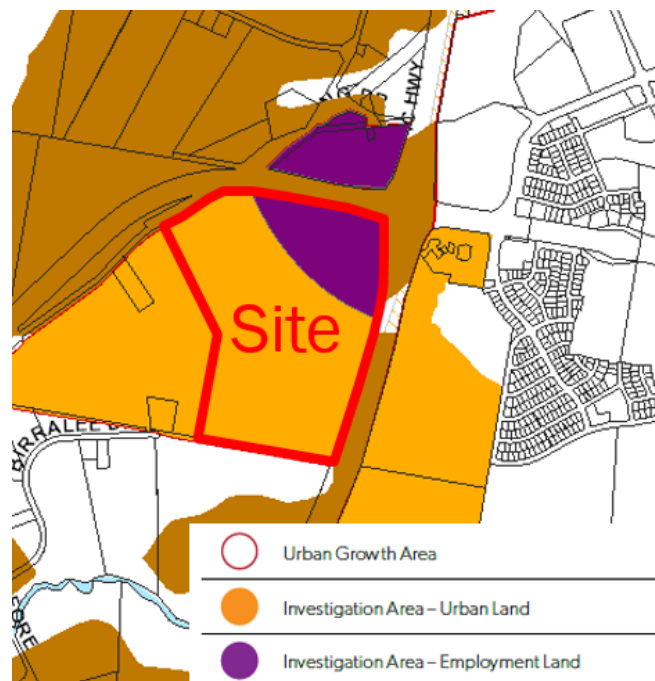
*Action 21. Maximise the cost-effective and efficient use of infrastructure by directing development towards existing infrastructure or promoting the co-location of new infrastructure.*

The Highway Service Centre site is identified for longer term urban development but is unable to be connected to reticulated sewer at this time. The proponent has offered to enter into a planning agreement with Council to come to satisfactory arrangements for the connection of the site to sewer in the medium to longer term.

### **Local Government Narratives**

#### **Urban Growth Area Maps**

The site is identified on the Urban Growth Area Map for Port Macquarie-Hastings as part Investigation Area – Employment Land (over the Highway Service Centre site) and part Investigation Area – Urban land (over the residue area of the land). An extract from the Urban Growth Area Map showing the site is provided in Figure 2.



**Figure 2: Extract From North Coast Regional Plan – Port Macquarie-Hastings Urban Growth Area Map**

#### **4. Is the Planning Proposal consistent with Council's Community Strategic Plan and Urban Growth Management Strategy 2010 – 2031?**

The Port Macquarie-Hastings Council's **Towards 2030 Community Strategic Plan 2017 (CSP)** identifies the following overarching vision of the community: *A sustainable high quality of life for all.*

Objective 3 Your Business and Industry seeks to achieve a region that is a successful place that has a vibrant, diversified and resilient regional economy. Key strategies include:

*3.3 Embrace opportunity and attract investment to support the wealth and growth of the community.*

The site is a key gateway to the Port Macquarie-Hastings region and provides an opportunity to promote the region and attract investment. The proposed Highway Service Centre will attract grant funding due to the priority for the establishment of Highway Service Centres along the Pacific Motorway.

Objective 4 Your Natural and Built Environment seeks to achieve a connected, sustainable, accessible community and environment that is protected now and into the future. Key strategies include:

*4.1 Provide (appropriate) infrastructure and services including water cycle management, waste management, and sewer management.*

*4.3 Facilitate development that is compatible with the natural and built environment.*

*4.4 Plan for integrated transport systems that helps people get around and link our communities.*

Development of the site requires strategic planning for future connection of the site to reticulated sewerage, protection of ecological values and the identification of access solutions to ensure traffic safety on the Pacific Motorway and Oxley Highway.

The proponent has offered to enter into a planning agreement with Council to ensure satisfactory arrangements for connection of the proposed Highway Service Centre to reticulated sewerage in the medium to longer term. The planning agreement is currently being drafted and will be exhibited with this Planning Proposal.

Ecological impacts have been assessed in accordance with the Biodiversity Conservation Act (see **Attachment 6**) and it is considered the “avoid, minimise, mitigate” test will be able to be satisfied for the development.

In relation to traffic safety and access design, Council is seeking to establish that the road infrastructure arrangements proposed for the Highway Service Centre are compatible with what is needed in the longer term to service future development in the wider Sancro area.

The proponent has offered to enter into a planning agreement with Council to ensure satisfactory arrangements are in place for a co-ordinated access point from the proposed Highway Service Centre to the Oxley Highway, which can service the subject site and lands to the north. Also, the proponent has engaged consultants to undertake additional traffic modelling in accordance with a detailed brief prepared in consultation with the RMS and Council.

A draft planning agreement can include options for location of the proposed Highway Service Centre access and intersection treatment requirements, with final location and design to be in accordance with RMS requirements.

Further consultation with the RMS on this matter will occur following the issue a Gateway Determination and prior to public exhibition of the Planning Proposal.

The 2017-2021 Delivery Plan and Operational Plan provides Objective 4.5.1 Carry out strategic planning to manage population growth and provide for co-ordinated urban development. Actions include the implementation of high priority actions under the Port Macquarie **Urban Growth Management Strategy 2011 – 2031**.

It is considered that the proposal is consistent with Council's Community Strategic Plan.

The Draft Port Macquarie **Urban Growth Management Strategy 2017 – 2036** (Draft UGMS) provides the strategic framework for residential, rural residential, retail, industrial and tourism development in the Port Macquarie-Hastings local government area.

The Draft UGMS provides that Council will promote tourism in our major centres by facilitating a range of tourist uses, including large scale tourism facilities. This will include planning for the 'gateway sites' at the intersection of the Pacific and Oxley Highway (p.24), and Action 16 specifically lists "Planning for the 'gateway sites' at the intersection of the Pacific and Oxley Highways in Port Macquarie" as an action to be taken in the first 5 years of the Draft Strategy. Figure 3 provides an extract from the Draft UGMS that identifies the Gateway sites, which includes the subject land.

It is considered that the proposal is consistent with the existing and Draft UGMS.

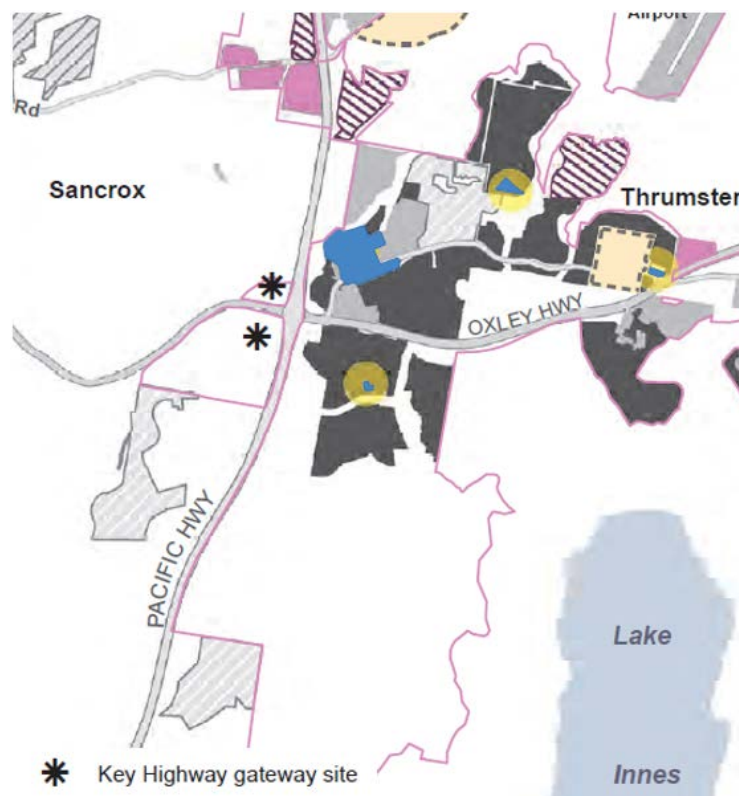


Figure 3 - Extract from Draft UGMS (Page 33)

## 5. Is the Planning Proposal consistent with applicable State Environmental Planning Policies?

An assessment of consistency with State Environmental Planning Policies (SEPPs) of relevance is below. Appendix B provides a detailed list.

<i>SEPP</i>	<i>Consistent</i>	<i>Reason for inconsistency or comment</i>
No 55 - Remediation of Land	Yes	<p><i>Introduces 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 because it is contaminated.</i></p> <p>A Stage 1 Contaminated Site Assessment Report (Commercial Asset Management Services Pty Ltd) (<b>Attachment 12</b>) concluded that the land is suitable, or is able to be made suitable, for the proposed use, in terms of potential contamination.</p>
No 64 Advertising and Signage	Yes	<p><i>Introduces state-wide planning controls for signage including advertising.</i></p> <p>Clause 15 of SEPP 64 limits the display of advertisements on rural or non-urban land to advertisements that relate to the land, or premises situated on the land, or is a notice directing the travelling public to tourist facilities or activities. The development only intends to display advertisements that relate to the site. Assessment of any development application will be required to consider the assessment criteria under the SEPP.</p>
Infrastructure 2007	Yes	<p><i>The aim of this Policy is to facilitate the effective delivery of infrastructure across the State.</i></p> <p>Clause 101 of the Policy provides controls over development with frontage to classified roads to ensure that new development does not compromise the effective and ongoing operation and function of classified roads, and to prevent or reduce the potential impact of traffic noise and vehicle emission on development adjacent to classified roads.</p> <p>The proponent's Traffic Impact Assessment (TTM Consulting, 2017) proposed the construction of an off ramp from the Pacific Highway and a roundabout on the Oxley Highway to provide direct access to the site. The Oxley Highway is a State road and the RMS is the Road Authority responsible for approval of any new access points.</p> <p>As discussed under Section D, Question 10 (pp15), the proponent has engaged consultants to undertake additional traffic modelling in accordance with a detailed brief prepared in consultation with the RMS and Council. The proponent's Traffic Impact Assessment may need to be updated prior to public exhibition of the Planning Proposal to reflect the outcomes of the modelling.</p> <p>Further consultation will occur with the RMS in relation to this matter following the issue of a Gateway determination and prior to public exhibition of the Planning Proposal.</p>

		Clause 104 requires applications for traffic generating development of certain types and scale to be referred to the RMS and for Council to consider any comments. Any future development application that includes a service station will be required to be referred to the RMS.
Rural Lands 2008	Yes	<i>The aim of this policy is to facilitate the orderly and economic use and development of rural lands for rural and related purposes. The SEPP contains a number of 'Rural Planning Principles' that must be considered in preparing any Planning Proposals affecting rural land.</i>  The site has not been identified as regionally significant farmland and is considered to have limited agricultural value.
State and Regional Development 2011	Yes	<i>The aims of this Policy are to identify development that is State significant development, State significant infrastructure and critical State significant infrastructure, and that is regionally significant development.</i>  Development with a capital investment value of more than \$30 million is declared to be regionally significant development, and is required to be determined by the relevant Regional Planning Panel. It is likely that the Highway Service Centre will be regionally significant development and will be reported to the Regional Planning Panel for determination.

## 6. Is the Planning Proposal consistent with applicable Ministerial Directions?

An assessment of consistency with Ministerial Directions of relevance is below. Appendix C provides a complete list of all Directions.

### 1. Employment and Resources

<i>S117 Direction</i>	<i>Consistent</i>	<i>Reason for inconsistency or comment</i>
No 1.2 - Rural Zones	No	<i>The objective of this direction is to protect the agricultural production value of rural land.</i>  The proposal does not rezone the land from rural to an urban zone, however, it does propose provisions to allow development that is of an urban character.  The inconsistency is allowed to occur if it is in accordance with the relevant Regional Plan. The Planning Proposal is in accordance with the North Coast Regional Plan, which identifies the site for a Highway Service Centre.
No - 1.5 Rural Lands	No	<i>This direction aims to protect the agricultural production value of rural land and to facilitate the orderly and economic development of rural lands for rural and related purposes.</i>  The land is not considered to provide significant agricultural production land, and the inconsistency is considered to be of minor significance.

## 2. Environment and Heritage

<i>S117 Direction</i>	<i>Consistent</i>	<i>Reason for inconsistency or comment</i>
No 2.1 - Environmental Protection Zones	Yes	<p><i>The objective of this direction is to protect and conserve environmentally sensitive areas.</i></p> <p>The site and adjoining road reserves contain native vegetation. The Biodiversity Development Assessment Report (Biodiversity Australia) (<b>Attachment 6</b>) has demonstrated that the development is capable of satisfying the “avoid, minimise, mitigate” test under the <i>Biodiversity Conservation Act</i>. Proposed clearing within the road reserve to promote visibility and traffic safety for the Highway Service Centre is to be offset through the retirement of credits or payment into the biodiversity offsets fund.</p>

## 4. Hazard and Risk

<i>S117 Direction</i>	<i>Consistent</i>	<i>Reason for inconsistency or comment</i>
No 4.4 - Planning for Bushfire Protection	Yes	<p><i>The objectives of this direction are to protect life, property and the environment from bush fire hazards by discouraging the establishment of incompatible land uses in bush fire prone areas; and to encourage sound management of bush fire prone areas.</i></p> <p>The site is mapped bushfire prone land. A Bushfire Hazard Assessment (Midcoast Building and Environmental) (<b>Attachment 15</b>) has assessed the bushfire hazard and it is considered that the proposed development is capable of complying with Planning for Bushfire Protection 2006, and will provide for adequate Asset Protection Zones, access roads, and water supply.</p>

## 5. Regional Planning

<i>S117 Direction</i>	<i>Consistent</i>	<i>Reason for inconsistency or comment</i>
5.4 Commercial and Retail Development along the Pacific Highway, North Coast	Yes	<p><i>The objectives for managing commercial and retail development along the Pacific Highway are:</i></p> <ul style="list-style-type: none"> <li><i>(a) to protect the Pacific Highway’s function, that is to operate as the North Coast’s primary inter- and intra-regional road traffic route;</i></li> <li><i>(b) to prevent inappropriate development fronting the highway;</i></li> <li><i>(c) to protect public expenditure invested in the Pacific Highway;</i></li> <li><i>(d) to protect and improve highway safety and highway efficiency;</i></li> <li><i>(e) to provide for the food, vehicle service and rest needs of travellers on the highway; and</i></li> <li><i>(f) to reinforce the role of retail and commercial development in town centres, where they can best serve the populations of the towns.</i></li> </ul> <p>The Direction controls new development on the Pacific Highway to ensure the ongoing safety and efficiency of the highway.</p>

		<p>The establishment of Highway Service Centres are permitted at the localities listed in Table 1 (which includes the subject site), provided that the RMS is satisfied that the Highway Service Centre(s) can be safely and efficiently integrated into the Highway interchange(s) at those localities.</p> <p>As later discussed under Section D, Question 10 (p15), Council will be undertaking further consultation with RMS on this matter following issue of a Gateway determination and prior to public exhibition of the Planning Proposal.</p>
5.10 - Implementation of Regional Plans	Yes	<p><i>The objective of this direction is to give legal effect to the vision, land use strategy, goals, directions and actions contained in Regional Plans.</i></p> <p>The Planning Proposal is consistent with the North Coast Regional Plan 2036. The site is within the mapped urban growth area.</p>

## 6. Local Plan Making

<i>S117 Direction</i>	<i>Consistent</i>	<i>Reason for inconsistency or comment</i>
No 6.1 - Approval and Referral Requirements	Yes	<p><i>The objective of this direction is to ensure that LEP provisions encourage the efficient and appropriate assessment of development.</i></p> <p>The Planning Proposal is consistent with this Direction.</p>
6.3 Site Specific Provisions	Yes	<p><i>The objective of this direction is to discourage unnecessarily restrictive site specific planning controls.</i></p> <p>The Planning Proposal allows a Highway Service Centre with ancillary hotel or motel accommodation on the site without imposing any development standards or requirements in addition to those already contained in the Port Macquarie-Hastings LEP 2011. The Planning Proposal also allows subdivision of the site despite the minimum lot size provisions.</p>

## 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?

The proposed development will require removal of approximately 3 ha of native vegetation and associated habitat components. Other potential indirect impacts include, habitat fragmentation and weed invasion. The loss of vegetation will be offset through the purchase of biodiversity credits. The credit requirement for the proposal is detailed in Biodiversity Development Assessment Report, April 2018 (Biodiversity Australia) (**Attachment 6**). A range of mitigation measures will be implemented to reduce other impacts associated with the proposal.

Consideration of 'Serious and Irreversibly Impacts' (SAIL) determined that there are no potential SAIL species or ecological communities that will be impacted by the proposal. Further, the proposal will not have any effect on 'Areas of Outstanding Biodiversity Value'.

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

Disposal of Sewage

The site is identified for future urban development, however, reticulated sewerage services are not available as yet.

The Onsite Sewage Management – Site Feasibility Assessment (HMC Environmental Consulting Pty Ltd) (**Attachment 10**) provides a concept design for the site. It is considered that the system will be acceptable in the short term.

The proponent has offered to enter into a planning agreement with Council to ensure satisfactory arrangements to connect the site to reticulated sewer in the medium to longer term. The planning agreement will be publicly exhibited in conjunction with the Planning Proposal.

Stormwater

A Stormwater Management Plan (Hopkins Consultants) (**Attachment 11**) provides concept design for the management of stormwater flows from the site. It is considered that stormwater is able to be managed for the development, with detailed design and assessment to be undertaken at the development application and subsequent construction certificate design stages.

Noise

The Acoustic Assessment (Matrix Thornton) (**Attachment 8**) provides reasonable demonstration that noise emission from vehicles using the proposed Highway Service Centre is predicted to comply with trigger levels at the nearest residential receivers.

**9. How has the Planning Proposal adequately addressed any social and economic effects?**

Aboriginal heritage

The Aboriginal Cultural Heritage Assessment (Birpai Local Aboriginal Land Council) (**Attachment 13**) provides an assessment of cultural heritage values of the site and concludes there is no reason for the rezoning not to proceed.

Visual amenity

The proposal as described by the proponent will involve large scale earth works, removal of existing vegetation along the Pacific and Oxley Highway boundaries to the site and large-scale development features such as pylon signs.

Due to the significance of the site, and its importance as a showcase site for the Port Macquarie-Hastings region for tourists and the travelling public, Council has commissioned the preparation of development control plan (DCP) provisions in relation to the visual appearance of development on the proposed Highway Service Centre site in addition to the gateway site to the north. The draft DCP provisions are currently being prepared and will be exhibited in conjunction with this Planning Proposal.



## Section D - State and Commonwealth interests

### 10. Is there adequate public infrastructure for the Planning Proposal?

#### Access and traffic

Council has received a letter from the NSW RMS, dated 25 June 2018 (at **Attachment 16**) noting that the proponent "...has committed to undertaking additional traffic modelling that is required to determine the impact of their proposal on the surrounding road network and further has committed to pursue an appropriate planning mechanism to ensure no further direct access to the Oxley highway from the subdivided land parcel should it be developed in the future."

On this basis the RMS advised that it is "...satisfied that a traffic solution can be found that will enable the proposed Highway Service Centre to be safely and efficiently integrated into the Pacific highway/Oxley highway interchange and the local road network."

The proponent's Traffic Impact Assessment may need to be updated prior to public exhibition of the Planning Proposal to reflect the outcomes of the modelling.

Council will be undertaking further consultation with RMS on this matter following the issue of a Gateway determination and prior to public exhibition of the Planning Proposal.

#### Water supply

An existing 300mm water main located at the intersection of Billabong Drive and the Oxley Highway has sufficient capacity to supply the development. The site will require an extension to this water main (approx. 400m) to service the development site.

#### Sewer

As noted in 8 above, the proponent has offered to enter into a planning agreement with Council to ensure satisfactory arrangements to connect the site to reticulated sewer in the medium to longer term. The planning agreement will be publicly exhibited in conjunction with the Planning Proposal.

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

The Department of Planning and Environment's Gateway Determination will specify consultation requirements with State government authorities concerning the Planning Proposal. Prior to public exhibition, it is anticipated that consultation will be required with the NSW Roads and Maritime Services, NSW Office of Environment and Heritage, NSW Rural Fire Service, the Local Aboriginal Land Council and NSW Department of Primary Industries.

## Part 4 – Mapping

Proposed LEP map amendments, as described in Part 2 of this Planning Proposal, are shown below.

### Additional Permitted Uses Map

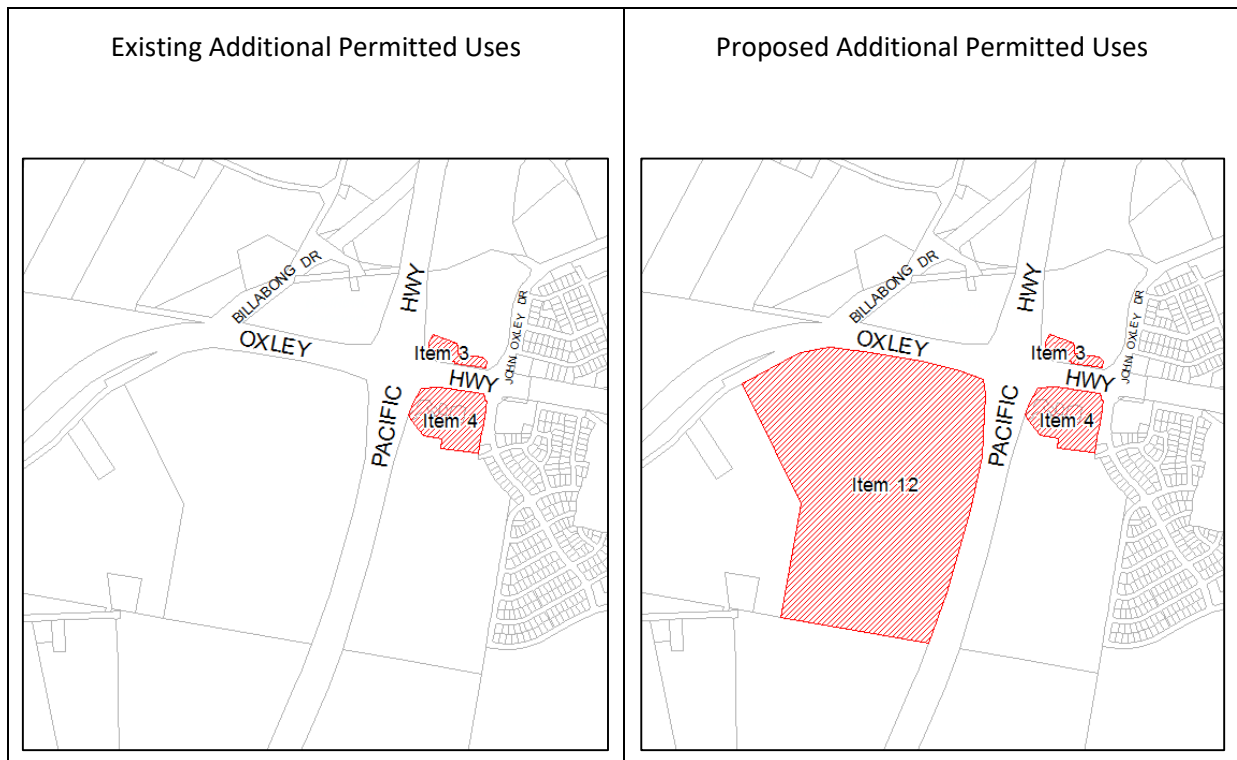


Figure 4: Additional Permitted Uses - existing & proposed

## **Part 5 – Community Consultation**

The proposal is not considered to be a low impact proposal and therefore, a 28 day public exhibition period is nominated.

Consultation in accordance with the Council's *Public Consultation Policy* is proposed. The consultation strategy in conjunction with the public exhibition for this Planning Proposal will include notification in a locally circulating newspaper, notification on Council's website and written notification to affected and adjoining landowners.

## Part 6 – Project Timeline

This project timeline is based on anticipated dates and timeframes, noting that there can be unexpected delays.

It is assumed that Council has delegation to carry out certain plan-making functions. Delegation would be exercised by Council's General Manager or the Director of Strategy and Growth.

Planning Proposal process outline	Aug 2018	Sep	Oct	Nov	Dec	Jan 2019
Commencement (date of Gateway determination)	X					
Timeframe for the completion of required additional information		X				
Timeframe for government agency consultation (pre and post exhibition as required by Gateway determination)		X		X		
Commencement and completion dates for public exhibition period			X			
Dates for public hearing (if required)						
Timeframe for consideration of submissions				X		
Timeframe for the consideration of a proposal post exhibition					X	
Date of submission to the department to finalise the LEP (if not delegated)					X	
Date Council will make the plan (if delegated)						X
Date Council will forward to the department for notification						X

## **Appendix A – Gateway Determination**

A copy of the Gateway Determination for this Planning Proposal will be included in this Appendix after it is issued.

The Determination will identify processing requirements, such as:

- community consultation, or
- possible changes to this proposal.

At the time of preparation of this version of the Planning Proposal there has been no Gateway Determination.

## Appendix B – Consistency with State Environmental Planning Policies

Listed below are the State Environmental Planning Policies (SEPPs) that currently apply to land within the Port Macquarie-Hastings Local Government Area.

State Environmental Planning Policies	Consistency
21 Caravan Parks	Not applicable
30 Intensive Agriculture	Not applicable
33 Hazardous and Offensive Development	Not applicable
36 Manufactured Home Estates	Not applicable
44 Koala Habitat Protection	Not applicable
50 Canal Estate Development	Not applicable
55 Remediation of Land	A Stage 1 Contaminated Site Assessment Report (Commercial Asset Management Services Pty Ltd) ( <b>Attachment 12</b> ) which concluded that the land was suitable, or is able to be made suitable, for the proposed use, in terms of potential contamination.
62 Sustainable Aquaculture	Not applicable
64 Advertising and Signage	Clause 15 of SEPP 64 limits the display of advertisements on rural or non-urban land to advertisements that relate to the land, or premises situated on the land, or is a notice directing the travelling public to tourist facilities or activities. The development only intends to display advertisements that relate to the site. Assessment of any development application will be required to consider the assessment criteria under the SEPP.
65 Design Quality of Residential Flat Development	Not applicable
(Affordable Rental Housing) 2009	Not applicable
(Building Sustainability Index: BASIX) 2004	Not applicable
(Coastal Management) 2018	Not applicable
(Educational Establishments and Child Care Facilities) 2017	Not applicable
(Exempt and Complying Development Codes) 2008	Not applicable
(Housing for Seniors or People with a Disability) 2004	Not applicable
(Infrastructure) 2007	Clause 101 of the Policy provides controls over development with frontage to classified roads to ensure that new development does not compromise the effective and ongoing operation and function of classified roads, and to prevent or reduce the potential impact of traffic noise and vehicle emission on development adjacent to classified roads.

State Environmental Planning Policies	Consistency
	<p>The proponent's Traffic Impact Assessment (TTM Consulting, 2017) proposed the construction of an off ramp from the Pacific Highway and a roundabout on the Oxley Highway to provide direct access to the site. The Oxley Highway is a State road and the RMS is the Road Authority responsible for approval of any new access points.</p> <p>As discussed under Section D, Question 10 (pp15), the proponent has engaged consultants to undertake additional traffic modelling in accordance with a detailed brief prepared in consultation with the RMS and Council. The proponent's Traffic Impact Assessment may need to be updated prior to public exhibition of the Planning Proposal to reflect the outcomes of the modelling.</p> <p>Further consultation will occur with the RMS in relation to this matter following the issue of a Gateway determination and prior to public exhibition of the Planning Proposal.</p> <p>Clause 104 requires applications for traffic generating development of certain types and scale to be referred to the RMS and for Council to consider any comments. Any future development application that includes a service station will be required to be referred to the RMS.</p>
(Mining, Petroleum Production and Extraction Industries) 2007	Not applicable
(Miscellaneous Consent Provisions) 2007	Not applicable
(Rural Lands) 2008	The site has not been identified as regionally significant farmland and is considered to have limited agricultural value.
(State and Regional Development) 2011	Development with a capital investment value of more than \$30 million is declared to be regionally significant development, and is required to be determined by the relevant Joint Regional Planning Panel (JRPP). It is likely that the Highway Service Centre will be regionally significant development and will be reported to the JRPP for determination.
(State Significant Precincts) 2005	Not applicable
(Vegetation in Non-Rural Areas) 2017	Not applicable



## Appendix C – Consistency with Ministerial Directions

Listed below are the Section 9.1 (2) Directions (including Objectives) that currently apply to land in the Port Macquarie-Hastings Local Government Area.

Copies of the full Directions are available on the Department of Planning & Environment website ([www.planning.nsw.gov.au](http://www.planning.nsw.gov.au)).

Ministerial Directions and Objectives	Consistency
<b>1 Employment and Resources</b>	
<b>1.1 Business and Industrial Zones</b> The objectives of this direction are to: (a) encourage employment growth in suitable locations, (b) protect employment land in business and industrial zones, and (c) support the viability of identified strategic centres.	Not applicable.
<b>1.2 Rural Zones</b> The objective of this direction is to protect the agricultural production value of rural land.	The proposal does not rezone the land from rural to an urban zone, however, it does propose provisions to allow development that is of an urban character.  The inconsistency is allowed to if it is in accordance with the relevant Regional Plan. The Planning Proposal is in accordance with the North Coast Regional Plan, which identifies the site for a Highway Service Centre.
<b>1.3 Mining, Petroleum Production and Extractive Industries</b> The objective of this direction is to ensure that the future extraction of State or regionally significant reserves of coal, other minerals, petroleum and extractive materials are not compromised by inappropriate development.	Not applicable.
<b>1.4 Oyster Aquaculture</b> The objectives of this direction are: (a) to ensure that Priority Oyster Aquaculture Areas and oyster aquaculture outside such an area are adequately considered when preparing a Planning Proposal, (b) to protect Priority Oyster Aquaculture Areas and oyster aquaculture outside such an area from land uses that may result in adverse impacts on water quality and consequently, on the health of oysters and oyster consumers.	Not applicable.
<b>1.5 Rural Lands</b> The objectives of this direction are to: (a) protect the agricultural production value of rural land,	The land is not considered to provide significant agricultural production land, and the inconsistency is considered to be of minor significance.

Ministerial Directions and Objectives	Consistency
(b) facilitate the orderly and economic development of rural lands for rural and related purposes.	
<b>2 Environment and Heritage</b>	
<b>2.1 Environmental Protection Zones</b> The objective of this direction is to protect and conserve environmentally sensitive areas.	The site and adjoining road reserves contain native vegetation. The Biodiversity Development Assessment Report (Biodiversity Australia) ( <b>Attachment 6</b> ) has demonstrated that the development is capable of satisfying the “avoid, minimise, mitigate” test under the Biodiversity Conservation Act. Proposed clearing within the road reserve to promote visibility and traffic safety for the Highway Service Centre is to be offset through the retirement of credits or payment in to the biodiversity offsets fund.
<b>2.2 Coastal Protection</b> The objective of this direction is to implement the principles in the NSW Coastal Policy.	Not applicable.
<b>2.3 Heritage Conservation</b> The objective of this direction is to conserve items, areas, objects and places of environmental heritage significance and indigenous heritage significance.	Not applicable.
<b>2.4 Recreation Vehicle Areas</b> The objective of this direction is to protect sensitive land or land with significant conservation values from adverse impacts from recreation vehicles.	Not applicable.
<b>3 Housing, Infrastructure and Urban Development</b>	
<b>3.1 Residential Zones</b> The objectives of this direction are: (a) to encourage a variety and choice of housing types to provide for existing and future housing needs, (b) to make efficient use of existing infrastructure and services and ensure that new housing has appropriate access to infrastructure and services, and (c) to minimise the impact of residential development on the environment and resource lands.	Not applicable.
<b>3.2 Caravan Parks and Manufactured Home Estates</b> The objectives of this direction are: (a) to provide for a variety of housing types, and	Not applicable.

Ministerial Directions and Objectives	Consistency
(b) to provide opportunities for caravan parks and manufactured home estates.	
<b>3.3 Home Occupations</b> The objective of this direction is to encourage the carrying out of low-impact small businesses in dwelling houses.	Not applicable.
<b>3.4 Integrating Land Use and Transport</b> The objective of this direction is to ensure that urban structures, building forms, land use locations, development designs, subdivision and street layouts achieve the following planning objectives: (a) improving access to housing, jobs and services by walking, cycling and public transport, and (b) increasing the choice of available transport and reducing dependence on cars, and (c) reducing travel demand including the number of trips generated by development and the distances travelled, especially by car, and (d) supporting the efficient and viable operation of public transport services, and (e) providing for the efficient movement of freight.	Not applicable.
<b>3.5 Development Near Licensed Aerodromes</b> The objectives of this direction are: (a) to ensure the effective and safe operation of aerodromes, and (b) to ensure that their operation is not compromised by development that constitutes an obstruction, hazard or potential hazard to aircraft flying in the vicinity, and (c) to ensure development for residential purposes or human occupation, if situated on land within the Australian Noise Exposure Forecast (ANEF) contours of between 20 and 25, incorporates appropriate mitigation measures so that the development is not adversely affected by aircraft noise.	Not applicable.
<b>3.6 Shooting Ranges</b> The objectives are: (a) to maintain appropriate levels of public safety and amenity when rezoning land adjacent to an existing shooting range, (b) to reduce land use conflict arising between existing shooting ranges and rezoning of adjacent land, (c) to identify issues that must be addressed when giving consideration to rezoning land adjacent to an existing shooting range.	Not applicable.

Ministerial Directions and Objectives	Consistency
<b>4 Hazard and Risk</b>	
<b>4.1 Acid Sulfate Soils</b> The objective of this direction is to avoid significant adverse environmental impacts from the use of land that has a probability of containing acid sulfate soils.	Not applicable.
<b>4.2 Mine Subsidence and Unstable Land</b> The objective of this direction is to prevent damage to life, property and the environment on land identified as unstable or potentially subject to mine subsidence.	Not applicable.
<b>4.3 Flood Prone Land</b> The objectives of this direction are: (a) to ensure that development of flood prone land is consistent with the NSW Government's Flood Prone Land Policy and the principles of the <i>Floodplain Development Manual 2005</i> , and (b) to ensure that the provisions of an LEP on flood prone land is commensurate with flood hazard and includes consideration of the potential flood impacts both on and off the subject land.	Not applicable.
<b>4.4 Planning for Bushfire Protection</b> The objectives of this direction are: (a) to protect life, property and the environment from bush fire hazards, by discouraging the establishment of incompatible land uses in bush fire prone areas, and (b) to encourage sound management of bush fire prone areas. <i>Further details:</i> <b>When this direction applies</b> This direction applies when a relevant planning authority prepares a Planning Proposal that will affect, or is in proximity to land mapped as bushfire prone land. <b>What a relevant planning authority must do if this direction applies</b> (4) In the preparation of a Planning Proposal the relevant planning authority must consult with the Commissioner of the NSW Rural Fire Service following receipt of a gateway determination under section 56 of the Act, and prior to undertaking community consultation in satisfaction of section 57 of the Act, and take into account any comments so made,	The site is mapped bushfire prone land. A Bushfire Hazard Assessment (Midcoast Building and Environmental) ( <b>Attachment 15</b> ) has assessed the bushfire hazard and it is considered that the development is capable of complying with Planning for Bushfire Protection 2006, and will provide for adequate Asset Protection Zones, access roads, and water supply.

Ministerial Directions and Objectives	Consistency
<p>(5) A Planning Proposal must:</p> <ul style="list-style-type: none"> <li>(a) have regard to <i>Planning for Bushfire Protection 2006</i>,</li> <li>(b) introduce controls that avoid placing inappropriate developments in hazardous areas, and</li> <li>(c) ensure that bushfire hazard reduction is not prohibited within the APZ.</li> </ul> <p>(6) A Planning Proposal must, where development is proposed, comply with the following provisions, as appropriate:</p> <ul style="list-style-type: none"> <li>(a) provide an Asset Protection Zone (APZ) incorporating at a minimum: <ul style="list-style-type: none"> <li>(i) an Inner Protection Area bounded by a perimeter road or reserve which circumscribes the hazard side of the land intended for development and has a building line consistent with the incorporation of an APZ, within the property, and</li> <li>(ii) an Outer Protection Area managed for hazard reduction and located on the bushland side of the perimeter road,</li> </ul> </li> <li>(b) for infill development (that is development within an already subdivided area), where an appropriate APZ cannot be achieved, provide for an appropriate performance standard, in consultation with the NSW Rural Fire Service. If the provisions of the Planning Proposal permit Special Fire Protection Purposes (as defined under section 100B of the <i>Rural Fires Act 1997</i>), the APZ provisions must be complied with,</li> <li>(c) contain provisions for two-way access roads which links to perimeter roads and/or to fire trail networks,</li> <li>(d) contain provisions for adequate water supply for firefighting purposes,</li> <li>(e) minimise the perimeter of the area of land interfacing the hazard which may be developed,</li> <li>(f) introduce controls on the placement of combustible materials in the Inner Protection Area.</li> </ul>	
<b>5 Regional Planning</b>	
<p><b>5.4 Commercial &amp; Retail Development along the Pacific Hwy, North Coast</b></p> <p>The objectives for managing commercial and retail development along the Pacific Highway are:</p>	<p>The Direction controls new development on the Pacific Highway to ensure the ongoing safety and efficiency of the highway.</p>

Ministerial Directions and Objectives	Consistency
<ul style="list-style-type: none"> <li>(a) to protect the Pacific Highway's function, that is to operate as the North Coast's primary inter- and intra-regional road traffic route;</li> <li>(b) to prevent inappropriate development fronting the highway;</li> <li>(c) to protect public expenditure invested in the Pacific Highway;</li> <li>(d) to protect and improve highway safety and highway efficiency;</li> <li>(e) to provide for the food, vehicle service and rest needs of travellers on the highway; and</li> <li>(f) to reinforce the role of retail and commercial development in town centres, where they can best serve the populations of the towns.</li> </ul>	<p>The establishment of Highway Service Centres are permitted at the localities listed in Table 1 (which includes the subject site), provided that the RMS is satisfied that the Highway Service Centre(s) can be safely and efficiently integrated into the Highway interchange(s) at those localities.</p> <p>As discussed under Section D, Question 10 (p15), Council will be undertaking further consultation with RMS on this matter following issue of a Gateway determination and prior to public exhibition of the Planning Proposal.</p>
<b>5.10 Implementation of Regional Plans</b> The objective of this direction is to give legal effect to the vision, land use strategy, goals, directions and actions contained in Regional Plans.	The Planning Proposal is consistent with the North Coast Regional Plan 2036. The site is within the mapped urban growth area,
<b>6 Local Plan Making</b>	
<b>6.1 Approval and Referral Requirements</b> The objective of this direction is to ensure that LEP provisions encourage the efficient and appropriate assessment of development.	The proposal is consistent with this direction.
<b>6.2 Reserving Land for Public Purposes</b> The objectives of this direction are: <ul style="list-style-type: none"> <li>(a) to facilitate the provision of public services and facilities by reserving land for public purposes, and</li> <li>(b) to facilitate the removal of reservations of land for public purposes where the land is no longer required for acquisition.</li> </ul>	Not applicable.
<b>6.3 Site Specific Provisions</b> The objective of this direction is to discourage unnecessarily restrictive site specific planning controls.	The Planning Proposal allows a Highway Service Centre with ancillary hotel or motel accommodation on the site without imposing any development standards or requirements in addition to those already contained in the principal planning instrument. The Planning Proposal also allows subdivision of the site despite the minimum lot size provisions.

## **Attachment 1 Report to Council 16 May 2018**



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Item: 12.06

Subject: PLANNING PROPOSAL: PROPOSED HIGHWAY SERVICE CENTRE, 1179 OXLEY HIGHWAY, SANCROX

Presented by: Strategy and Growth, Jeffery Sharp

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#### Alignment with Delivery Program

4.5.2 Plan for infrastructure that supports population growth.

#### RECOMMENDATION

That Council:

1. Prepare a Planning Proposal pursuant to section 3.33 of the Environmental Planning and Assessment Act 1979 for the amendment of the provisions of Port Macquarie-Hastings Local Environmental Plan 2011 to permit development of Lot 11 DP 1029846, 1179 Oxley Highway, Sancrox:
  - a) To permit development for the purpose of a Highway Service Centre, including ancillary hotel or motel accommodation for heavy vehicle drivers, and
  - b) to permit subdivision to excise the Highway Service Centre from the balance of the site, despite the minimum lot size provisions.
2. Forward the Planning Proposal to the NSW Department of Planning and Environment requesting a Gateway Determination pursuant to section 3.34 of the Environmental Planning and Assessment Act 1979, upon:
  - a) Satisfactory arrangements being demonstrated by the Applicant for a coordinated access point from the proposed highway service centre to the Oxley Highway, which can service the southern and northern gateway sites and Billabong Drive, and
  - b) Written advice being received from the Roads and Maritime Services that the proposed highway service centre can be safely and efficiently integrated into the Pacific and Oxley Highways, and
  - c) Satisfactory arrangements being in place for the connection of the site to reticulated sewer.
3. Request the General Manager facilitate a meeting between the Applicant, their traffic consultants and Roads and Maritime Services, to discuss the resolution of transport planning issues associated with the Planning Proposal, including the location and design of access from the Highway Service Centre to the Oxley Highway.



4. **Request that the Secretary of the Department of Planning & Environment issue a Written Authorisation to Council to Exercise Delegation of the plan making functions under section 3.36 of the Act in respect of the Planning Proposal.**
5. **Delegate authority to the General Manager to prepare a planning proposal in accordance with this report and to make any minor amendments to the Planning Proposal as a result of the Section 3.34 Gateway Determination, prior to public exhibition of the proposal.**
6. **Undertake community consultation in accordance with the Gateway Determination.**
7. **Prepare a draft Development Control Plan, in respect to the land and the northern Gateway site, incorporating provisions described in this report accordance with clause 18 of the Environmental Planning and Assessment Regulation 2000.**
8. **Receive a further report providing details of proposed amendments to the Development Control Plan for approval prior to the Planning Proposal and draft Development Control Plan being exhibited concurrently.**
9. **Receive a report following the public exhibition period to demonstrate compliance with the Gateway Determination and to assess any submissions received.**

### **Executive Summary**

The purpose of this report is to consider a Planning Proposal request to enable the development of a Highway Service Centre on land which is located on the south west corner of the Pacific Highway and the Oxley Highway, being Lot 11 DP 1029846, 1179 Oxley Highway, Sancrox.

The land is the subject of a request to prepare a Planning Proposal lodged by GEM Planning Projects on behalf of Scott PDI on 27 February 2018. A Development Application has been lodged in conjunction with the Planning Proposal for the subdivision of the land and the construction of the Highway Service Centre.

The land is currently zoned RU1 Primary Production under Port Macquarie-Hastings LEP 2011 and development for the purposes of a Highway Service Centre is prohibited in the zone.

The land is identified in the current *Port Macquarie-Hastings Urban Growth Management Strategy 2011-2031* as a Gateway Site, and the western side of the Pacific Highway has been identified by the Roads and Maritime Services (RMS) as a potential location for a future Highway Service Centre.

Key issues are traffic generation and access arrangements to the site from both the Pacific and Oxley Highways, which will need to be to RMS satisfaction, disposal of effluent and the design of the proposed Highway Service centre to create a positive at this key gateway site to Port Macquarie and Wauchope.

Ecological impacts, bushfire and stormwater are considered capable of being addressed for the site.

The Applicant has proposed a north bound exit ramp from the Pacific Highway directly into the site, with entry and exit to the site from the Oxley Highway. Traffic modelling has been undertaken by the proponent and this is currently being reviewed by NSW Roads and Maritime Services (RMS). The RMS has not formally accepted the proposed access arrangements at the time of preparation of this report.

Council's Transport and Stormwater Network (TSN) section advises that any access to/from the Oxley Highway should achieve a four way intersection with Billabong Drive to coordinate with the future local road network. Subject to this being satisfactorily addressed and written advice that the RMS has accepted the proposed access arrangements, access issues will have been satisfactorily addressed to enable the proposal to proceed to Gateway determination.

On-site sewage management is proposed by the Applicant. However, this is not considered an acceptable long-term solution for a high intensity commercial use of this nature, particularly as a reticulated sewerage system is expected to be available to this locality in the future.

It is proposed that Council staff consult with the proponent regarding on-site disposal as a potential short-term, interim arrangement and to identify satisfactory arrangements for connection to reticulated sewer in the future.

It is also proposed that Council prepare draft Development Control Plan provisions for the Gateway sites, including provisions related to visual impact, landscaping and signage for concurrent exhibition with a Planning Proposal, as recommended in this report.

Subject to satisfactory resolution of the access and sewerage issues, it is recommended that Council prepare and forward a Planning Proposal to the NSW Department of Planning and Environment requesting a Gateway Determination.

## **Discussion**

### Background

The Port Macquarie-Hastings *Urban Growth Management Strategy (UGMS) 2011-2031* flagged the potential for a highway service centre at the intersection of the Pacific and Oxley Highways. The draft UGMS 2017-2036 lists "*consider proposals to plan for Highway Service centre and associated tourist uses*" for the gateway site at this intersection as a short term (5 years) action to promote economic development (Vol. 1, p.25).

Action 9.3 of the *North Coast Regional Plan 2036* includes the establishment of a highway service centre at this intersection. A policy review of *Highway Service Centres along the Pacific Highway* undertaken by the RMS (May 2014) identified that a Highway Service Centre may be established on the western side of the Pacific Highway at the interchange of the Pacific and Oxley highways.

At its meeting of 16 August 2017, Council resolved to commence investigations for a site-specific planning proposal to allow the development of a highway service centre on this site.

Lodgement of Planning Proposal

On 27 February 2018, a formal request for Council to prepare a Planning Proposal to amend the Port Macquarie Hastings LEP 2011 was received from GEM Planning Projects, together with the following supporting information and reports:

1. Planning Proposal (GEM Planning Projects)
2. Site Plans (Hopkins Consultants)
3. Concept Plans and Photomontages (TRG Queensland Pty Ltd)
4. Biodiversity Development Assessment Report (Biodiversity Australia)
5. Traffic Impact Assessment (TTM)
6. Acoustic Assessment (Matrix Thornton)
7. Preliminary Lighting Assessment (Light Harmony, Queensland)
8. Onsite Sewage Management – Site Feasibility Assessment (HMC Environmental Consulting Pty Ltd)
9. Stormwater Management Plan (Hopkins Consultants)
10. Stage 1 Contaminated Site Assessment (Commercial Asset Management Services Pty Ltd)
11. Aboriginal Cultural Heritage Assessment (Birpai Local Aboriginal Land Council)
12. Economic Impact Assessment (Foresight Partners Pty Ltd)
13. Bushfire Hazard Assessment (Midcoast Building and Environmental)

The Planning Proposal request is contained in Attachment 1 of this report and the supporting information and reports are contained in Attachments 2 and 3.

A Development Application (DA) has been lodged in conjunction with the Planning Proposal for the construction of the Highway Service Centre and to create the lot upon which the Highway Service Centre will be situated. The DA is unable to be determined until such time as the making of an amendment to the LEP to allow a Highway Service Centre on the site is imminent and certain.

Highway Service Centres

Highway Service Centre is a land use defined in the State Government's Standard Instrument LEP as follows:

**Highway service centre** means a building or place used to provide refreshments and vehicle services to highway users. It may include any one or more of the following:

- a) a restaurant or cafe,
- b) take away food and drink premises,
- c) service stations and facilities for emergency vehicle towing and repairs,
- d) parking for vehicles,
- e) rest areas and public amenities.

Further to this the RMS Policy Review imposes the following requirements on Highway Service Centres:

- Centre to open 24 hours, 7 days a week
- All traffic arrangements to be safe and efficient
- At least 25 heavy vehicle parking spaces to be provided (nominally to suit B-Doubles, with capacity to expand to cater for longer combinations in the future)
- A number of parking spaces for recreation vehicles and coaches
- The provision of children's play areas and tourist information
- Use of toilets and other amenities to be free of obligation to purchase goods and services
- Separate undercover fuel areas for heavy and light vehicles
- No alcohol to be sold on site.

### The Site

The site is located on the south west corner of the Pacific Highway and the Oxley Highway, being Lot 11 DP 1029846, and known as 1179 Oxley Highway, Sancrox (Refer Figure 1).

Under Port Macquarie-Hastings Local Environmental Plan (LEP) 2011, the site is zoned RU1 Primary Production, which is a rural zone that prohibits highway service centres.

The site has frontage to both the Pacific Highway and the Oxley Highway and has a total area of 51.81ha. The request for preparation of a Planning Proposal is for an area of about 18.43ha, to be excised from the land to accommodate the highway service centre and associated parking and effluent disposal areas.

The site is mostly cleared with a stand of vegetation along the eastern and northern boundaries and a larger patch of forest in the south east corner of the site. There is a ridge that runs east west through the middle of the site, with a saddle that extends north south from the centre of the site to a point to the west of the centre of the northern boundary.

Land surrounding the subject site to the north, south and west is generally zoned RU1 Primary Production. There is a small area south west of the site along Birralelee Drive and Burrawan Forest Drive which is zoned RU5 Village. Land to the east of the site on the opposite side of the Pacific Highway (south of the Oxley Highway) is generally zoned RU1 Primary Production and further to the east, R1 General Residential. An existing highway service centre is located on the south eastern corner of the Pacific Highway and Oxley Highway in Thrumster.





**Figure 1: Subject Site**

Applicant's Planning Proposal Request

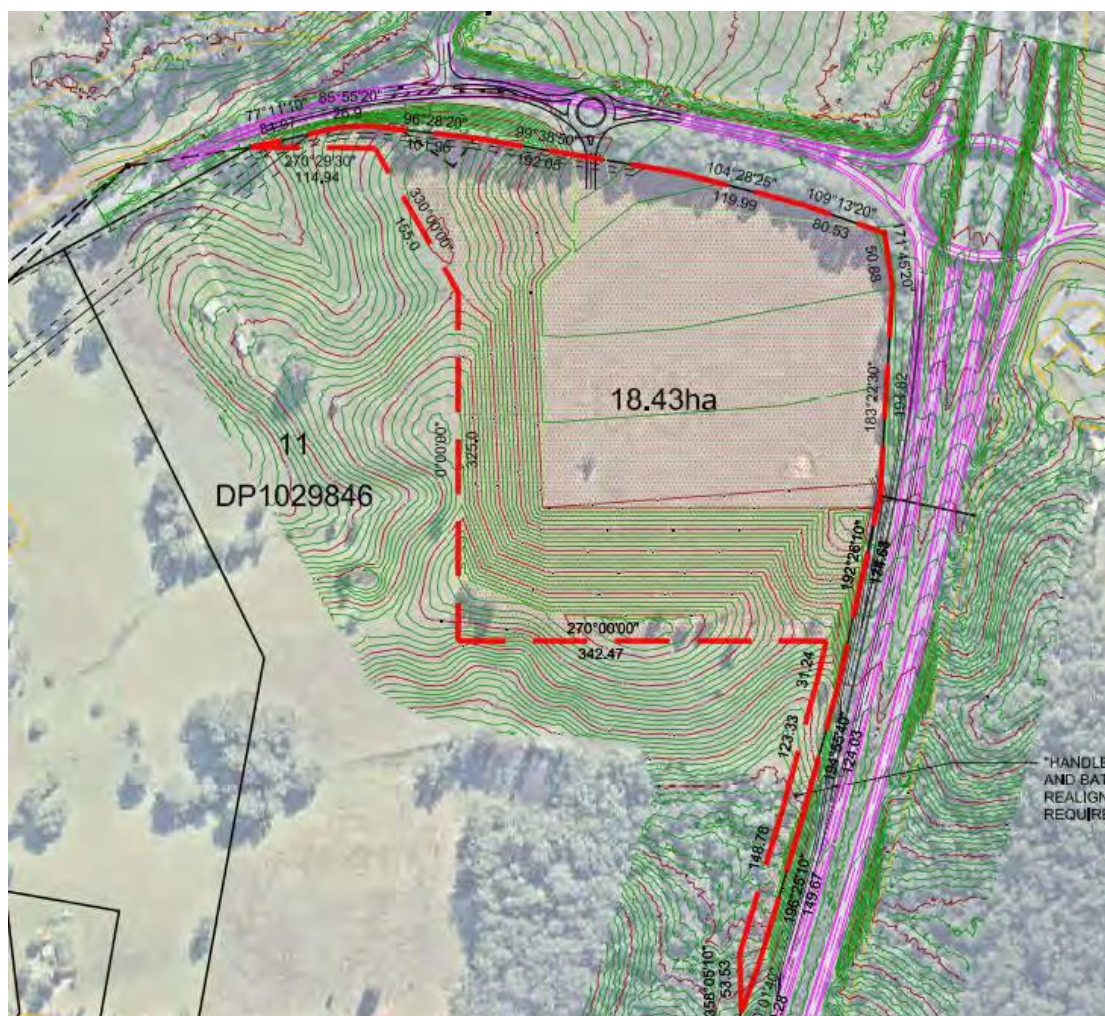
1. Proposed amendments to Port Macquarie-Hastings LEP 2011

The request for preparation of a Planning Proposal relates to an area of the land in the north east corner of the site with an area of 18.43 hectares (Refer Figure 2). The Applicant's Planning Proposal request (Attachment 1) seeks to:

- Amend Schedule 1 Additional Permitted Uses of LEP 2011 to insert a clause to make permissible with development consent a Highway Service Centre and ancillary uses on part of the subject site,
- Include the land on the Additional Permitted Uses Map Sheet,
- Remove part of the site (approximately 18.43ha) from the application of the Lot Size Map which requires a minimum lot size of 40 hectares.

The Planning Proposal does not propose to change the zoning of the land as RU1 Primary Production, and the Applicant advises that the residual area of Lot 11 (approximately 33.38ha) would remain zoned rural.





**Figure 2: Land subject to Planning Proposal request (Source: Hopkins Consultants)**

## 2. Indicative Development Concept

The Applicant's indicative development concept for the site is shown in Figure 3 and includes:

- Service station
- Service station restaurant with 3 food & drink outlets and drive through
- Stand-alone food and drink outlet with drive-through
- 8 room motel
- Truck service facility including truck wash
- 102 car parking spaces
- 5 x car and trailer (boat, caravan) parking spaces
- 25 x semi-trailer (<19 metres) parking spaces
- 70 parking spaces suitable for B-doubles
- 10 B-double plus parking spaces
- 4 Pylon Signs



The area proposed to be developed is largely cleared and generally located below the ridge and saddle, meaning that the subject area falls to the Pacific Highway and Oxley Highway frontages.

The area is relatively steep, and the development proposal is to excavate the site to create a level pad for the development. A north bound exit ramp from the Pacific Highway directly into the site is proposed with entry and exit from Oxley Highway.



**Figure 3: Applicant's Indicative Development Concept (February, 2018)**

### Key Issues

#### 1. Traffic and Access Arrangements

##### a. Applicant's Traffic Report

The Applicant has submitted a Traffic Impact Assessment (TTM Consulting, 2017) that assessed access arrangements for the site. A copy of the traffic assessment is

included as part of the supporting information for the Planning Proposal in Attachment 3 to this report.

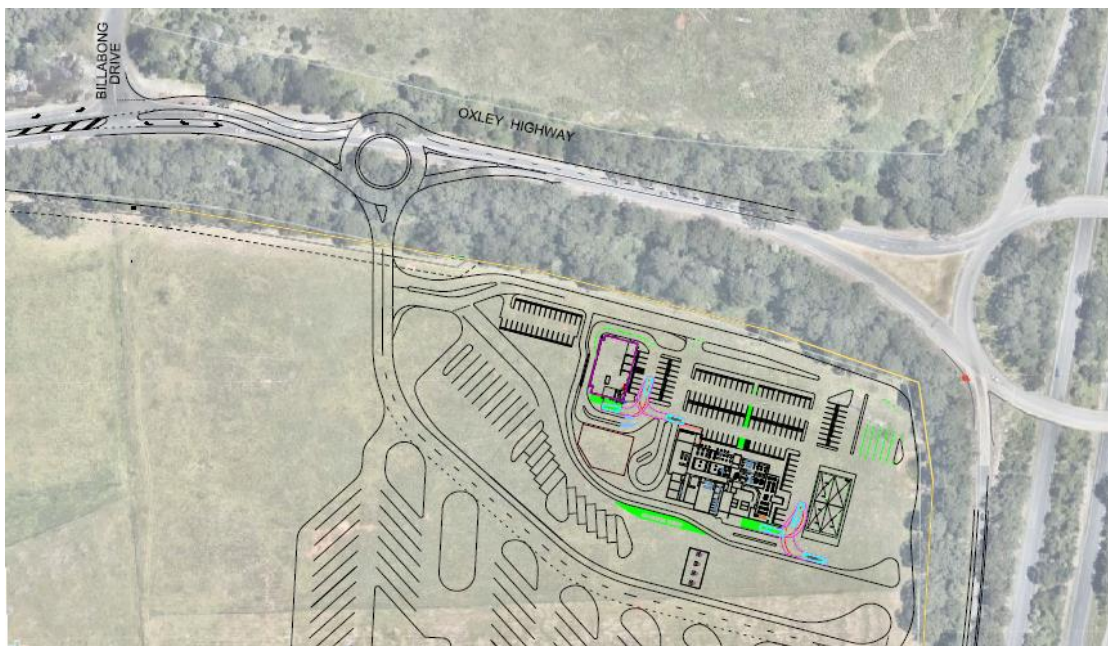
The Applicant's submission proposes the construction of an off ramp from the Pacific Highway and a roundabout on the Oxley Highway to provide direct access to the site. The proposed roundabout on the Oxley Highway is located between the Pacific and Oxley highways interchange and the T-intersection with Billabong Drive as shown in Figure 4.

The Oxley Highway is a State road and the Roads and Maritime Services is the Road Authority responsible for approval of any new access points. The RMS has not formally endorsed the proposal as submitted at the time of preparation of this report.

Council's Senior Transport Engineer has recommended that the preferred solution would be to align access to the site with the Billabong Drive intersection (or alternatively realigning Billabong Drive to achieve the required four way intersection). This is necessary to provide for a safe and efficient intersection that will cater for future growth in the Bushlands Drive, Sancrox Road and Rawdon Island Road areas. It will also preserve suitable access provisions for future development on the northern gateway site.

The assessment report by TTM rejected the option of aligning the access with Billabong Drive because of the embankment on the southern side of Oxley Highway in this location, which is about 14m high. It is noted that the proposal includes excavations of approximately 15m within the development site.

It is also noted that no planning work has been carried out by the Applicant to determine the feasibility of realigning Billabong Drive to match a more preferred access point for the service centre thus achieving a four way intersection.



**Figure 4: Applicant's Concept Plan – Oxley Highway Roundabout Access Option (Source: TTM Consulting Pty Ltd)**



b. Council's Preferred Access Option for Oxley Highway

As discussed above, a new roundabout on the Oxley Highway in the location proposed by the Applicant is not supported by Council's Transport engineers. An aligned four way intersection between the proposed highway service centre access, Oxley Highway and Billabong Drive is the preferred access solution.

Alignment of the access intersection with Billabong Drive is to provide a safe and efficient access point but also to minimise traffic impacts on the arterial road network. Major intersections on arterial roads should ideally be spaced as far apart as possible to minimise queuing between adjacent intersections.

A Billabong Drive access point is preferable to increase the separation from the Pacific /Oxley Highway interchange.

The Applicant's Traffic Impact Assessment assumes that the majority of traffic generated by the development will be "pass-by" traffic, i.e. traffic already on the road network. However, highway service centres are destinations in their own right and attract new trips onto the road network. The proposed highway service centre will attract new trips from places such as Port Macquarie and Wauchope because they will offer facilities and experiences not available elsewhere in the region.

Resolution of access arrangements at the Oxley Highway with RMS and Council will therefore be needed and satisfactory arrangements demonstrated for a coordinated access point to service both southern and northern gateway sites as well as Billabong Drive, prior to the Planning Proposal being forwarded to the DPE for a Gateway determination.

It is proposed that Council facilitate a meeting between the proponent, RMS and Council representatives to seek a resolution to these issues.

c. Ministerial Planning Direction for the Pacific Highway

In order to submit the Planning Proposal for a Gateway Determination, it is necessary for Council to comply with a series of Ministerial directions, or to justify any inconsistency.

In respect to Planning Proposals for highway service centres, *Local Planning Direction 5.4 Commercial and Retail Development along the Pacific Highway, North Coast* is of key relevance. This direction applies when a Council prepares a Planning Proposal for land in the vicinity of the existing and/or proposed alignment of the Pacific Highway and provides that development with frontage to the Pacific Highway must consider the impact on the safety and efficiency of the highway.

The Direction identifies that the establishment of a highway service centre may be permitted on the western side of the Pacific and Oxley Highway Interchange, provided that the RMS is satisfied that the highway service centre can be safely and efficiently integrated into the Highway interchange.

At the time of finalising this report, consultation is ongoing between Council staff, RMS and the Applicant's traffic consultants (TTM Consulting) in relation to traffic and access issues for the proposed highway service centre. This is a major Planning Proposal on a key gateway entry site into Port Macquarie, and it is critical for this

issue to be resolved to both the RMS and Council's satisfaction at this stage of the rezoning process.

To date, the RMS has not provided formal endorsement of the proposed access arrangements for a Highway Service Centre in this location and its integration into the Pacific and Oxley highways.

d. Next Steps

This report recommends that Council facilitate a meeting between the Applicant, their traffic consultants and Roads and Maritime Services, prior to forwarding the Planning Proposal to the Department of Planning and Environment, to discuss the resolution of transport planning issues associated with the Planning Proposal, including the location and design of access of the highway service centre to the Oxley Highway.

The Planning Proposal to be prepared by Council and forwarded to DPE will include the advice received from the RMS and further consultation with the RMS would occur in accordance with any Gateway Determination.

2. Sewage Management

The Applicant has submitted an Onsite Sewage Management – Site Feasibility Assessment report (HMC Environmental Consulting Pty) that proposes to provide an on-site sewage management system for the proposed development and seeks to demonstrate that sewage is able to be disposed on-site. A copy of the feasibility report is included as part of the supporting information for the Planning Proposal contained in Attachment 3 to this report.

Council staff have reviewed the report and identified a range of concerns with the long term feasibility of on-site disposal for the proposed highway service centre. The key concerns are summarised below and include:

- The report does not cite examples of successful on-site disposal of service station waste-waters to show that long term effluent disposal and compliance with standards can be achieved.
- The proposed disposal method of sub-surface irrigation requires a higher level of treatment before disposal which means higher, ongoing operational and maintenance costs for the system.
- Sub-surface irrigation is also prone to blockages, which over large sites can be problematic and increase when there is insufficient maintenance of the treatment system.
- The wastewater calculations in the report have been based on the Chinderah highway service centre south of Tweed Heads. Whilst this site is also on the Pacific Highway this service station disposes to a mound system, not sub-surface irrigation as is proposed by the Applicant, and the size of the service station at Sancrox is larger than the one at Chinderah.
- The new highway service centre at South Kempsey ('Puma site') whilst being designed for wastewater loading greater than predicted in the original application

to Kempsey Council, has had continual issues since installation and started to fail soon after commissioning. The system is currently on pump-out requirements once the design limit is breached and effluent quality cannot be maintained.

Council experienced issues with onsite disposal for the highway service centre on the eastern side of the Pacific Highway at Thrumster, prior to its connection to sewer.

The development is considered to be of an urban nature and connection of the site to a reticulated sewerage system is the preferred and recommended option for sewage disposal.

Council's engineers advise that the site is able to be serviced by the Sancrox Sewerage Pumping Station (SPS), located on the western side of the Pacific Highway, and on the northern side of Sancrox Road, some 2.5km north of the site.

The Applicant has not proposed to connect the site to the sewer due to the costs and issues relating to the location of a suitable route to connect to the Sancrox Road SPS.

It is proposed that the Applicant prepare a Sewer Strategy, in consultation with Council, to examine options for connecting the site to sewer, and undertake further analysis of the costs associated with the onsite sewage management system as against the costs associated with connection of the site to sewer. The Sewer Strategy should identify proposed arrangements for connection to sewer where on-site disposal is proposed as a short term interim arrangement.

It is necessary that satisfactory arrangements are established for the connection of the site to sewer, prior to the exhibition of the Planning Proposal to guarantee that the developer, or any future owner of the development, will contribute to the cost of a future sewerage system in the Sancrox area and connect the site to sewer once a reticulated system is available.

Due to the tight timeframe for the reporting of this Planning Proposal to the May Council meeting, it has not been possible to discuss these concerns with the Applicant. If Council resolves to proceed in accordance with the recommendation, it is proposed to meet with the Applicant to further discuss how the issue will be resolved, prior to proceeding to a Gateway Determination.

### 3. Water Quantity and Quality

The proposed change in land use type from pasture to predominantly hardstand will result in a significant increase in the volume of stormwater runoff, which if not properly managed could result in downstream erosion, the waterlogging of land and damage to habitat.

Water quality control facilities must be incorporated into the proposed development to ensure that the quality of stormwater discharge from the development is appropriate for the downstream receiving waters. Water quality controls will need to be designed to achieve the same targets specified for the downstream Area 13 development.

The stormwater management plan submitted in support of the proposal (Attachment 3) indicates that the proposed development includes:

- on-site stormwater detention (OSD) facilities designed to limit site stormwater discharge to pre-development rates, and
- water quality controls designed to achieve the percentage reduction targets specified within AUSPEC D7 via the provision of mechanical gross pollutant traps.

The report does not indicate whether the existing culvert downstream of the site has capacity to convey pre-development flow rates. The large size of the site appears sufficient to provide additional OSD storage if required to further reduce the site stormwater discharge.

The stormwater management plan does not consider stormwater volume management and it is likely that the design will need to include a “water sensitive urban design” approach to the extensive areas of pavement and the use of landscaped areas for water retention.

The proposal to treat water quality via the use of mechanical gross pollutant traps is acceptable, subject to detailed design and the submission of modelling/computations. It is considered that these issues can be addressed as part of a future development application for the proposal.

#### 4. Ecological Impacts

The Planning Proposal to be forwarded to the DPE will be required to address the environmental impacts of the proposal in terms of whether any critical habitat or threatened species or ecological communities will be adversely affected.

The Applicant has identified the need to clear the existing vegetation along the eastern and northern boundaries, including vegetation within the road reserve. The RMS have provided written confirmation to the Applicant that they support the proposed clearing from a traffic safety perspective.

The Applicant has submitted a Biodiversity Development Assessment Report (BDAR) in accordance with the new *Biodiversity Conservation (BC) Act 2016* (Biodiversity Australia, April 2018). This is contained in Attachment 3 to this report. The assessment report identifies the need to remove approximately 3ha of native vegetation which exceeds the threshold for triggering the Biodiversity Assessment Method under the BC Act.

The assessment identifies measures to avoid, minimise and mitigate impacts, including the purchase of biodiversity credits to offset vegetation losses. The assessment report concludes that the proposal will not have serious and irreversible impacts on threatened species or ecological communities.

It is considered that the proposed development is able to be approved under the BC Act 2016.



## 5. Proposed Motel

The Applicant's overall development concept for the site (Figure 2) includes an eight (8) room motel. The Applicant has advised that the motel is only for the truck drivers attending the highway service centre and contends that it is an ancillary use to the highway service centre.

The proposed motel is included within a standalone building located in the south western part of the site which also contains a truck office, and is surrounded by heavy vehicle parking.

The definition of a highway service centre in the Standard Instrument LEP does not include a motel. A motel is included within the definition of "hotel or motel accommodation" in the Standard LEP as follows:

***Hotel or motel accommodation*** means a building or place (whether or not licensed premises under the Liquor Act 2007) that provides temporary or short-term accommodation on a commercial basis and that:

- (a) comprises rooms or self-contained suites, and
- (b) may provide meals to guests or the general public and facilities for the parking of guests' vehicles,

*but does not include backpackers' accommodation, a boarding house, bed and breakfast accommodation or farm stay accommodation.*

Therefore, while the motel may be development which is ancillary to the highway service centre, in terms of the Planning Proposal request, the amendment to Schedule 1 of LEP 2011 will need to identify that "hotel or motel accommodation" is permissible with consent, in addition to the highway service centre. The Department of Planning & Environment has confirmed this is the case, and advised that "hotel or motel accommodation" would need to be listed as permissible with consent in Schedule 1 of the LEP.

## 6. Minimum Subdivision Lot Size

The site is currently zoned RU1 Primary Production and is subject to a minimum lot size requirement of 40 hectares under clause 4.1 (Minimum Subdivision Lot Size) and the Lot Size Map of Port Macquarie-Hastings LEP 2011.

The total site area is 51.81ha. It is intended to excise the Highway Service Centre site on a lot with an area of 18.43ha, leaving a residue of about 33.4ha.

The Applicant has requested that the Lot Size Map be amended to remove the lot size restriction over the land.

However, it is not appropriate to remove the minimum lot size provisions. The provisions ensure that the land is not further subdivided, which may create additional access issues on the Pacific and Oxley Highways. The existing controls should continue to apply in the event that the Highway Service Centre does not proceed.

It is proposed to permit in Schedule 1 Additional Permitted Use of Port Macquarie-Hastings LEP 2011, subdivision of the site to excise the Highway Service Centre site from the residual area of the existing lot.

#### 7. Design and appearance

The design of development on the gateway sites has been highlighted as an important issue due to the visual prominence of these sites at the gateway entry points for Port Macquarie and Wauchope.

Figures 5, 6, and 7 provide the Applicant's photomontages of the concept design viewed from the Pacific Highway Roundabout and the Oxley Highway.



**Figure 5: Applicant's photomontage – Pacific Highway Roundabout View**





**Figure 6: Applicant's photomontage – Oxley Highway Access View****Figure 7: Applicant's photomontage – Oxley Highway View**

The photomontages are useful as a starting point at the Planning Proposal stage but do not confirm that development can take place in a form that will be acceptable to Council and the community on the gateway site.

The proposal as described by the proponent will involve large scale earth works, removal of existing vegetation along the Pacific and Oxley Highway boundaries to the site and large-scale development features such as pylon signs.

Due to the significance of the site, and its importance as a showcase site for the Port Macquarie Hastings region for tourists and the travelling public, it is recommended that Council establish development control plan provisions in relation to the visual appearance of development on the gateway sites.

#### 8. Preparation of Development Control Plan Provisions

It is proposed that Council prepare a draft Development Control Plan (DCP) in consultation with the Applicant for the subject site and the northern Gateway site, including but not limited to provisions related to design and appearance, landscaping, advertising and signage and access, for concurrent exhibition with a Planning Proposal, as recommended in this report.

If adopted, Council will then receive a further report providing details of proposed amendments to the DCP for endorsement, prior to the draft DCP being concurrently exhibited with the Planning Proposal.

It is noted that there are requirements in *State Environmental Planning Policy No 64 – Advertising and Signage* in relation to advertisements on rural land which will be considered further in the preparation of the Planning Proposal and draft DCP.

**9. Other Assessment Issues**

The Applicant has submitted assessment reports in respect to potential contamination of the site, bushfire hazard, Aboriginal Cultural Heritage Assessment, and noise impacts. It is considered that these issues are able to be addressed and would not prevent the Planning Proposal proceeding for a Gateway Determination. Council's engineers have also advised that the site is able to be supplied with reticulated water.

**Options**

Council's options include:

1. To not support the Planning Proposal.
2. To defer a decisions pending resolution of access and sewage disposal issues before resolving to support the Planning Proposal.
3. To resolve to proceed to Gateway Determination subject to access and sewage disposal issues.
4. To proceed directly to seek a Gateway determination prior to resolution of access and sewerage disposal issues.

Option 1 is not supported. The proposal generally has merit and is consistent with the Urban Growth Management Strategy 2011, Action 9.3 of the *North Coast Regional Plan 2036* and *Ministerial Direction 5.4 Commercial and Retail Development along the Pacific Highway, North Coast*.

Option 2 will ensure that Council has resolved key issues associated with the development before proceeding with the rezoning. However, this will require a further report to Council following resolution of the outstanding issues described in this report.

Option 3 is the recommended option. Due to the Ministerial directions regarding highway service centres, it is critical for the RMS to agree to the access arrangements in order to secure a Gateway determination to proceed. In respect to sewage disposal, the intensity of development and the development type is considered to be urban in nature and experience indicates problems arise in the short term with the effectiveness and viability of onsite disposal systems. The development should be incorporated into a strategic plan for its connection to a reticulated sewerage system. The solution may include on-site disposal in the short term with commitments in place for connection at a later date. This will avoid potential water quality impacts and health issues in the future.

Option 4 is not recommended because the key issues of access and sewerage infrastructure are fundamental to Council's support for this proposal and to the consideration of the Gateway panel. The approval of the RMS for the proposed highway access arrangements is also important in terms of Ministerial Direction 5.4 *Commercial and Retail Development along the Pacific Highway, North Coast*.

**Community Engagement & Internal Consultation**

The Department of Planning and Environment's Gateway Determination will specify consultation requirements.



Community consultation for Planning Proposals will include notification in a local newspaper, notification to adjoining landowners and on Council's website for the duration of the exhibition. In addition, the exhibition material will be available at the Council's Wauchope and Port Macquarie Customer Service Centres.

Consultation will be undertaken with the Applicant and the land owner of the northern Gateway site in relation to the preparation of the draft DCP.

**Planning & Policy Implications**

The proposal is consistent with the recommendations of the draft UGMS, the North Coast Regional Plan 2036 and a policy review undertaken by RMS in relation to highway service centres along the Pacific Highway.

**Financial & Economic Implications**

The provision of a highway service centre on the western side of the Pacific Highway is considered to be a key economic action under the draft UGMS to be investigated in the short term.

**Attachments**

- 1 [View](#). Attachment 1 - Planning Proposal Request Submitted by GEM
- 2 [View](#). Attachment 2 - Applicant's Concept Plans and Photomontages
- 3 [View](#). Attachment 3 - Supporting Information and Reports

## **Attachment 2 Council Meeting Minutes 16 May 2018**

- 
2. Forward the Planning Proposal to the NSW Department of Planning and Environment requesting a Gateway Determination pursuant to section 3.34 of the Environmental Planning and Assessment Act 1979.
  3. Request that the Secretary of the Department of Planning & Environment issue a Written Authorisation to Council to Exercise Delegation of the plan making functions under section 3.36 of the Act in respect of the Planning Proposal.
  4. Delegate authority to the General Manager to make any minor amendments to the Planning Proposal as a result of the Section 3.34 Gateway Determination, prior to public exhibition of the proposal.
  5. Undertake community consultation in accordance with the Gateway Determination.
  6. Receive a report following the public exhibition period to demonstrate compliance with the Gateway Determination and to assess any submissions received.

*CARRIED: 6/3*  
*FOR: Cusato, Dixon, Griffiths, Hawkins, Pinson and Turner*  
*AGAINST: Alley, Intemann and Levido*

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#### **12.06 PLANNING PROPOSAL: PROPOSED HIGHWAY SERVICE CENTRE, 1179 OXLEY HIGHWAY, SANCROX**

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Councillor Intemann declared a Pecuniary Interest in this matter and left the room and was out of sight during the Council's consideration, the time being 07:23pm.

Councillor Cusato left the meeting, the time being 07:23pm.

Councillor Cusato returned to the meeting, the time being 07:25pm.

Mr Michael Mowle, Hopkins Consultants, addressed Council in support of the recommendation.

*RESOLVED: Alley/Cusato*

That Council:

1. Prepare a Planning Proposal pursuant to section 3.33 of the Environmental Planning and Assessment Act 1979 for the amendment of the provisions of Port Macquarie-Hastings Local Environmental Plan 2011 to permit development of Lot 11 DP 1029846, 1179 Oxley Highway, Sancrox:
    - a) To permit development for the purpose of a Highway Service Centre, including ancillary hotel or motel accommodation for heavy vehicle drivers, and
    - b) to permit subdivision to excise the Highway Service Centre from the balance of the site, despite the minimum lot size provisions.
    - c) To permit subdivision, following construction of the Highway Service Centre, without being subject to the minimum lot size shown in the lot size map.
    - d) To retain a dwelling entitlement on the residue lot.
  2. Forward the Planning Proposal to the NSW Department of Planning and
-

---

Environment requesting a Gateway Determination pursuant to section 3.34 of the Environmental Planning and Assessment Act 1979, upon:

- a) Satisfactory arrangements being demonstrated by the Applicant for a coordinated access point from the proposed highway service centre to the Oxley Highway, which can service the southern and northern gateway sites and Billabong Drive, and
  - b) Written advice being received from the Roads and Maritime Services that the proposed highway service centre can be safely and efficiently integrated into the Pacific and Oxley Highways, and
  - c) Satisfactory arrangements being in place for the connection of the site to reticulated sewer.
3. Request the General Manager facilitate a meeting between the Applicant, their traffic consultants and Roads and Maritime Services, to discuss the resolution of transport planning issues associated with the Planning Proposal, including the location and design of access from the Highway Service Centre to the Oxley Highway.
  4. Request that the Secretary of the Department of Planning & Environment issue a Written Authorisation to Council to Exercise Delegation of the plan making functions under section 3.36 of the Act in respect of the Planning Proposal.
  5. Delegate authority to the General Manager to prepare a planning proposal in accordance with this report and to make any minor amendments to the Planning Proposal as a result of the Section 3.34 Gateway Determination, prior to public exhibition of the proposal.
  6. Undertake community consultation in accordance with the Gateway Determination.
  7. Prepare a draft Development Control Plan, in respect to the land and the northern Gateway site, incorporating provisions described in this report accordance with clause 18 of the Environmental Planning and Assessment Regulation 2000.
  8. Receive a further report providing details of proposed amendments to the Development Control Plan for approval prior to the Planning Proposal and draft Development Control Plan being exhibited concurrently.
  9. Receive a report following the public exhibition period to demonstrate compliance with the Gateway Determination and to assess any submissions received.

*CARRIED: 8/0*

*FOR: Alley, Cusato, Dixon, Griffiths, Hawkins, Levido, Pinson and Turner*

*AGAINST: Nil*

Deputy Mayor Intemann returned to the meeting, the time being 07:30pm.

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#### **12.10 DA2017 - 1084.1 CLUBHOUSE - LOT 7054 DP 1074173, NO. 12 MARITIME LANE (OXLEY OVAL), PORT MACQUARIE**

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Councillor Hawkins left the meeting, the time being 07:31pm.

Councillor Hawkins returned to the meeting, the time being 07:32pm.

Mr Teale Bryan, Vikings and Cricket, addressed Council in support of the recommendation and answered questions from Councillors.

## **Attachment 3 Planning Proposal Request**

# PLANNING PROPOSAL

PART LOT 11 DP 1029846  
OXLEY HIGHWAY  
SANCROX

SCOTT PDI NO 6 PTY LTD

## PORT MACQUARIE SERVICE CENTRE, NSW



FEBRUARY 2018



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## APPENDIX

Appendix A:	Intended Outcome – Site & Architectural Concept
Appendix B:	State Environmental Planning Policies
Appendix C:	Section 117 Directions
Appendix D:	Ecological Assessments
Appendix E:	Road traffic & access arrangements
Appendix F:	Acoustic Impact Assessment
Appendix G:	Visual Impact - 3 D Renders
Appendix H:	Lighting specification
Appendix I:	On -site Sewage Management Feasibility
Appendix J:	Stormwater Management Strategy
Appendix K:	SEPP 55 Contamination Stage 1 Assessment
Appendix L:	Cultural Heritage Assessment
Appendix M:	Economic Impact Assessment
Appendix N:	Attachment 1 checklist



This planning proposal and impacts assessment has been undertaken with skill, care and diligence by the staff of GEM Planning Project Pty Ltd. This assessment is based on information provided by the client, third party sources and investigations by GEM Planning Projects Pty Ltd. Independent verification of the documents relied upon has not been undertaken.

GEM Planning Projects' disclaims any responsibility to the client and others in respect of any matters outside the scope of this report.

This report has been prepared on behalf of and for the exclusive use of the client and is subject to and issued in accordance with the agreement between the client and GEM Planning Projects. GEM Planning Projects accepts no liability or responsibility of whatsoever nature in respect of any use of or reliance upon this report by any third party.



Geraldine Haigh  
GEM Planning Projects Pty Ltd  
Date: 25 August 2017 & 24 February 2018. Ref: 0075A SPD





## 1. INTRODUCTION

Proposal: Rezone land from RU1 Primary Production  
to  
SP1 Highway Service Centre

Property Details: Part Lot 11 DP 1029846,  
1179 Oxley Highway,  
Sancrox

Applicant: Scott PDI No. 6 Pty Ltd  
C/- GEM Planning Projects Pty Ltd  
P O Box 2068  
Port Macquarie

Owner: M M Hore

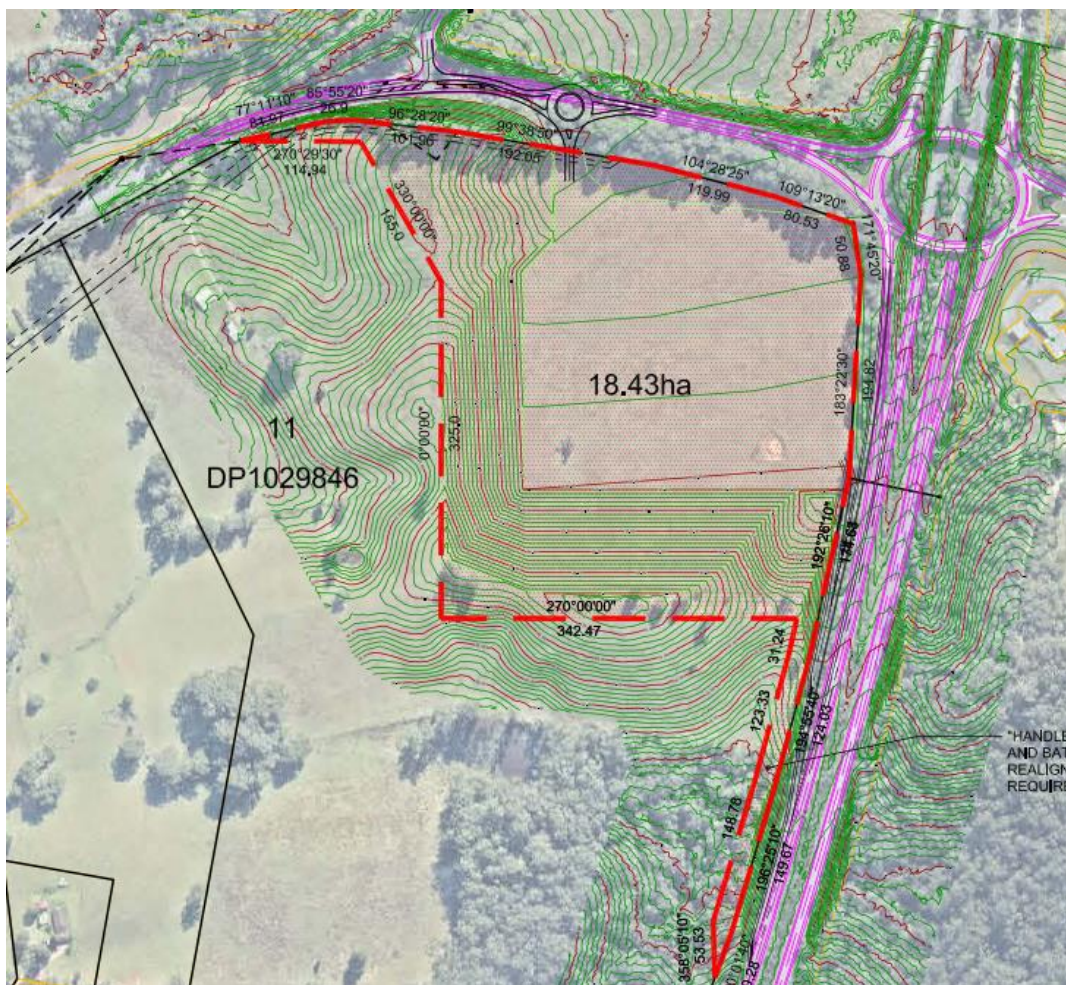


Figure 1 Land the subject of this Planning Proposal (Source Hopkins consultants)



## 2. PLANNING PROPOSAL

### 2.1 PART 1: Objectives or Intended Outcomes

To enable the development of land adjacent the Oxley Highway interchange with the Pacific Highway as a Highway Service Centre. The subject land is described as part Lot 11 DP 1029846, being 1179 Oxley Highway, Sancrox.

The intended outcome is to excise approximately 18.43ha of land from Lot 11 and amend Port Macquarie Hastings Local Environmental Plan 2011 to enable the use of the land as a Highway Service Centre and ancillary uses (herein after referred to as the Highway Service Centre). The proposal also includes the provision of access from the Pacific Highway and the Oxley Highway frontages.

The proposed local environmental plan amendment is consistent with the Port Macquarie Hastings Urban Growth Management Strategy and the Ministerial Section 117 Direction - *5.4 Commercial and Retail Development along the Pacific Highway*.

### 2.2 PART 2: Explanation of Provisions

The proposed outcome will be achieved by amendment to Port Macquarie Hastings Local Environmental Plan 2011 (PMHC LEP) by:

- Including land shown above, the subject of the planning proposal, in the Additional Permitted Uses Map;
- Insertion of wording into Schedule 1 to make permissible a Highway Service Centre and ancillary uses and
- Removal of the 40ha minimum lot size from the Minimum Lot Size mapping as it applies to the area the subject of the planning proposal.

The residual area of Lot 11 would remain within the RU1 Rural zone.



## 2.3 PART 3: Justification

### Section A: Need for the planning proposal

#### 2.3.1 Is the planning proposal a result of any strategic study or report?

The planning proposal is consistent with the North Coast Regional Plan 2036 and in Council's Urban Growth Management Strategy. The planning proposal is the result of a report to Council of 16 August 2017 and supporting resolution.

#### 2.3.2 Is the planning proposal the best means of achieving the objectives or intended outcomes?

A planning proposal is the only means of achieving the intended outcome to establish a Highway Service Centre.

The preferred means of amending the LEP is through the Additional Permitted Use provisions. The other mechanism would be to zone the area the subject of the planning proposal to a SP1 Special Activities zone or such other zone in which Highway Service Centres are permissible.

Intend outcome for the site is:

- Food and drink outlet with drive-through.
- Service station with restaurant and drive-through.
- 8 room motel.
- Truck type service facility.
- Truck wash.
- Trailer exchange area.
- Diesel canopy with fuel dispensers.
- 102 cars or motorcycle parking spaces.
- 5 x car and trailer (boat, caravan) parking spaces.
- 25 x semi-trailer (<19 metres) parking spaces.
- 70 parking spaces suitable for B-doubles.
- 10 B-double plus parking spaces at the tyre service area.

Access is proposed from both Pacific Highway and Oxley Highway.

Concept plans of the intended outcome (Highway Service Centre) is provided at **Appendix A**.



## Section B: Relationship to strategic planning framework

### 2.3.3 Is the planning proposal consistent with the objectives and actions of the applicable regional or sub-regional strategy?

The proposal is consistent with the objectives and actions of the North Coast Regional Plan 2036 (NCRP) and seeks to enhance opportunities for the Region by “Leveraging the Pacific Highway”. Direction 9 of the NCRP specifically seeks to “strengthen the regionally significant transport corridor”, which is further supported by Action 9.3 to locate Highway Service Centres in locations identified by the NSW Roads and Maritime Services under Table 1 of the S117 Directive 5.4.

### 2.3.4 Is the planning proposal consistent with a council’s local strategy or other local strategic plan?

The relevant Local Strategy is the Port Macquarie Urban Growth Management Strategy 2011 (UGMS) and Council’s exhibited draft Urban Growth Management Strategy 2017 - 2036. The subject land is mapped in the current UGMS as supporting Economic initiatives. The proposal is consistent with the UGMS as the Highway Service Centre represents a significant economic initiative.

The exhibited draft UGMS identifies the subject land as a Key Gateway Highway site.

### 2.3.5 Is the planning proposal consistent with applicable State Environmental Planning Policies

State Environmental Policies applicable to the Planning proposal are addressed at **Appendix B**.

### 2.3.6 Is the planning proposal consistent with applicable Ministerial Directions – Section 117 Directions

Of the current Section 117 Directions, *5.4 Commercial and Retail Development along the Pacific Highway, North Coast* is directly relevant to the proposal.

This direction applies to a planning proposal for land in vicinity of the Pacific Highway. Clause 6 of the direction states the establishment of highway service centres may be permitted at the localities listed in Table 1, provided that Roads and Maritime Services is satisfied that the Highway Service Centre can be safely and efficiently integrated into the Highway interchange at those locations.

*Table 1: Highway Service Centres that can proceed* – Port Macquarie: Oxley Highway interchange (both sides of the Pacific Highway).

The subject land is in vicinity of the Pacific Highway at the Oxley Highway interchange. After direct consultation with the Roads and Maritime Services, the proposed access concept for the



Highway Service Centre demonstrates that it can be safely and efficiently integrated into the Highway interchange.

The table at **Appendix C** addresses other relevant S117 Directions.



## Section C: Environmental, social and economic impact

### 2.3.7 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?

That part of Lot 11 subject to the planning proposal is generally clear of native vegetation. Pacific Highway and Oxley Highway Road reserve contains native vegetation which is subject to impacts relating to new access ramps and RMS road safety requirements.

Ecological assessment of the site works and the RMS Pacific Highway and Oxley Highway road reserve impacts have been completed and are provided at **Appendix D**.

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

Other Environmental effects to be considered include:

- Road traffic and highway access arrangements compatible with long term road infrastructure planning – **Appendix E**
- Acoustic impacts assessment – **Appendix F**
- Visual Impact – **Appendix G**
- Lighting – **Appendix H**
- On-site Sewage Management system - **Appendix I**
- Stormwater Management – **Appendix J**
- Geotechnical and SEPP 55 Contaminated Lands assessment – **Appendix K**
- Cultural Heritage Assessment – **Appendix L**

#### ***a) Road traffic and highway access arrangements***

The proposal will include an exit ramp from the Northbound Pacific Highway lanes and two way access from Oxley Highway via roundabout.

The existing Billabong Wildlife Park, fronting Billabong Drive, is located approximately 400m to the north of the subject land, across the Oxley Highway. Billabong Wildlife Park is a tourist attraction that utilises existing access onto the Oxley Highway at Billabong Drive. Early site investigations revealed the topography opposite the Billabong Drive intersection was not suitable for a roundabout treatment to access the Highway Service Centre site. Whilst having the access arrangements at the Billabong Drive intersection would enable a neat solution for connections to both north and south there is an embankment approximately 14 metres higher than the Oxley Highway road level at RL 20 opposite the Billabong Drive entry and regrading investigations have been unable to resolve suitable levels in this location.





After direct consultation with the Roads and Maritime Services, the proposed access concept by TTM Consultants demonstrates a roundabout 240m west of “The Donut” and 150m east of Billabong Drive can be safely and efficiently integrated into the Highway interchange.



Figure 2 Oxley Highway access (source TTM report App C)

The Pacific Highway exit ramp location has been discussed with RMS as per Figure 3 below.



Figure 3 Pacific Highway access (source TTM App C)



The TTM analysis of existing traffic volumes identifies Pacific Highway traffic northbound south of the off-ramp currently has a Friday peak at 12,566 with 11% commercials. AM peak hour is 1,010 vehicles per hour, and PM peak hour is 858 vehicles per hour. The Oxley Highway existing daily vehicle trips are approximately 15,000 vpd.

Advice from RMS is that a 10 year growth horizon is to be applied to base traffic loadings, with a growth rate of between 2.6% and 4% to be applied. TTM have used a projected linear growth rate of 3.3% per annum over the 10 year horizon.

Applying the RMS specified 33% increase, it is clear from the traffic analysis that enhancement work to the existing Highway Interchange “The Donut” will be warranted within the RMS’ 10 year analysis horizon, regardless of the proposed service centre development.

### ***b) Acoustic impact assessment***

An acoustic assessment has been prepared by Matrix Thornton Consulting Engineers and is provided at **Appendix F**. The report addresses potential noise emissions from the proposed Highway Service Centre utilising the traffic generation estimates from the TTM Traffic report.

Noise emission from vehicles using the centre are modelled and assessed against criteria determined from background noise monitoring. Potential residential receivers are identified as per Figure 4 below.

The analysis shows that noise is predicted to comply at all residential receivers potentially impacted by the site. The Traffic Report estimates that approximately 1700 vehicles will access the site per day. This has been broken down into numbers of light vehicles and heavy vehicles and by daytime and night-time.

The acoustic report applies a more conservative assumption of 1800 vehicles’ per day.

Noise sources considered in the report includes light vehicle noise from moving vehicle, as well as door slams and car starts. Heavy vehicles assumed sound power level for each vehicle is conservative and assumes a high proportion of the heavy vehicles would be refrigerated.

Apart from vehicles, the main potential source of noise emission from the site is from air-conditioning and refrigeration equipment. While this has not been designed, typical values were used.

The intrusiveness noise level is based on a worst-case 15 minute period. Therefore, the number of vehicles in the worst-case hour in the daytime period and night-time period have been used for the assessment.

Noise impact at the on-site motel assessed that noise emission would exceed the usual criteria for motels and identifies that appropriate noise levels within the motel rooms can be achieved using standard building materials and techniques with air-conditioning or mechanical ventilation required so that windows may remain closed.





As the proposal will not generate extra traffic on surrounding road network, traffic noise assessment is not required. (source: Matrix Thornton Consulting Engineers)



Figure 4 Residential receiver and noise logger locations

### c) Visual Impact

TRG architects have provided rendered 3D models of the proposal when viewed from:

- View 01 The existing highway interchange “donut” heading west on the Oxley Highway – Sheet 12
- View 02 The new roundabout and entry at Oxley Highway – Sheet 13
- View 03 The Oxley Highway – Sheet 14



Figure 5 Location of 3D model views

Refer to **Appendix G** for copies of the above plans.

### d) Lighting

The concept design for the proposed Highway Service Centre has been reviewed by registered Lighting Engineer, Mr Ron Nixon who has provided a specification for further detailed design to comply with all aspects of AS4282 “Control of the Obtrusive Effects of Outdoor Lighting” and also the public lighting standard AS/NZS1158 Series.

Refer **Appendix H**.

### e) On site Sewage Management

The site is not currently connected to reticulated sewerage service.

Sewage management options considered include:

- On-site treatment plant and purpose built disposal areas
- Construction of sewer mains to connect to the Sancrox Industrial Precinct system approximately 2.5km without contribution from PMHC or other land owners that would benefit (either immediately or in the future) from sewer main extension north to the Sancrox Industrial Precinct Sewer Pump Station.



A site feasibility assessment for On-site sewage management associated with the Highway Service Centre concept design has been prepared by HMC Environmental Consulting and is provided at **Appendix I**.

The assessment has taken into consideration:

- design wastewater flow, and water balance and nutrient load calculations,
- site and soil assessment to demonstrate that the site has sufficient land available for sewage collection, treatment and disposal to minimise the risk to public health and safety, and the environment;
- identification of suitable reserve land area is available for the disposal of treated effluent.
- Identification of the type of on-site sewage management appropriate for the site including effluent quality criteria and land application method
- Identification of the setbacks to sensitive environmental receptors, boundaries and other relevant site features.

The report concludes the site is considered suitable for on-site sewage management for the proposed development subject to; minimum secondary quality effluent treatment, land application via a sub-surface pressure compensating dripperline and the provision of a detailed design for a Commercial Sewage Management Facility at construction stage. (*source: HMC Environmental Consulting*).

#### ***f) Stormwater Management***

The intended outcome from the planning proposal is the type of land use which potentially generates pollutants in runoff. The concept development proposal would result in approximately 8.71 ha of the 18.43 ha site being largely impervious and a significant amount of bulk earthworks will be required to achieve the proposed final site levels.

The stormwater management strategy is designed to:

- Provide on site stormwater detention to ensure no increase in peak flow rates following development when compared to existing site conditions, and
- Remove pollutants from runoff to a sufficient extent to meet both Council and State government guidelines and adopt a stormwater treatment train approach that is consistent with current base practice WSUD.

A concept specific stormwater management plan has been prepared by *Hopkins consultants* and is provided at **Appendix J**.



#### ***g) Geotechnical SEPP 55 Contamination assessment***

Geotechnical field investigations and site history contamination assessment have been completed and report provided by *Regional Geotechnical Solutions* at **Appendix K**.

The site history is summarized and identifies that the site was mostly cleared of vegetation between 1956 and 1997, with some additional clearing between 1997 and 2009.

The subject area has been used for cattle grazing. Adjacent paddock to the west of subject area within Lot 11 has been used for horticultural purposes, primary beans and peas were grown.

The Pacific Highway and Oxley Highway interchange was constructed in the early 1990's; and a large vegetated spoil mound is present in the east of the site. A modified drainage line is present at the toe of the Pacific Highway embankment and it is possible that the spoil was generated from drainage improvement works in the Highway corridor.

Analysis of soil samples taken reveals:

- Concentrations of heavy metals were above detection, but were below adopted health investigation criteria for a Commercial / Industrial site;
- Concentrations of hydrocarbon contaminants were below detection;
- Concentrations of herbicide/pesticide contaminants were below detection; and
- Asbestos fibres were not detected in the soil samples submitted for analysis.

A service centre development is proposed for the site which is likely to involve significant site regrading works and the site is considered suitable for the proposed use. The site is considered suitable for the proposed Commercial/Industrial land use.

#### ***h) Cultural Heritage assessment***

A cultural heritage site inspection and report has been prepared by Birpai Local Aboriginal Land Council and is provided at **Appendix L**. The report identifies a long history of site disturbance and no finding of relics on the development site.



### 2.3.9 Has the planning proposal adequately addressed any social and economic effects?

#### **Social Benefits**

Local social benefits relate to provision of additional fuel competition in a locality known for above average fuel pricing as reported through regular campaigning from member-based organisations such as the NRMA and comparison reports of localities by the major metropolitan newspapers.

Community benefits as identified by Foresight Partners in their economic impact assessment are:

*The proposed highway service centre will enhance the choice and variety of service stations in the local area as well as provide a major new facility serving travelers and truck drivers using the Pacific Highway. The Pacific Highway – Oxley Highway interchange is currently served by the BP highway service centre and is well positioned to serve southbound Pacific Highway traffic, although access is somewhat indirect. The proposed development will provide a more comprehensive facility with direct access into the site for northbound traffic.*

*The range and scale of truck specific facilities such as truck wash, extensive trailer exchange, tyre/service centre and small motel are not currently provided by other highway service centres in the mid-north coast region, and this facility will support a truck hub for long and short haul truck drivers.*

The Foresight report goes on to demonstrate a major benefit of the proposed highway service centre is the potential contribution toward road safety.

*Driver fatigue management is a significant part of contemporary road safety, and the adequate provision of road and highway rest stops has been a major focus of both federal and state road authorities for lowering the road toll. The importance of these safety provisions is reflected by support from the NSW RMS, which has indicated a general support for the Port Macquarie Highway Service Centre and the role it can play along the Pacific Highway. The important role of highway service centres play in improving road safety and mitigating road fatigue is addressed in the 2014 Policy Review document*

*The report identified that operators consistently reported problems with the number, location and quality of rest facilities citing:*

*Inadequate sites can lead to fatigue or drivers breaching driving hour requirements.*

*Operators also identified that personal safety for drivers is a major disincentive to parking away from heavily used areas. Also, diversion off a driver's route (to an industrial area) for rest breaks is not desirable as it can add to the driving hours and*



*kilometres travelled and may even involve breaking down loads in order to access food services (within towns).*

*Drivers prefer to use existing stops that provide food and other facilities for socialising and may be unwilling to go to new areas off of established routes.*

*Long haul freight in Australia is borne mainly by articulated vehicles, representing 42% of the total 18.2 billion heavy vehicle kilometres travelled in Australia over a 12 month period ending June 2016*

*Driver fatigue management is critical for this kind of road travel. (source: Foresight Partners Section 4.5)*

### ***Economic Benefits***

In addition to the community benefits outlined above, the Economic impact assessment prepared by *Foresight Partners* addresses the proposals Need and Demand as well as Employment generation. Refer ***Appendix M***.

### ***Potential impacts on Billabong Wildlife Park***

Billabong Wildlife Park access to the Oxley Highway is from Billabong Drive approximately 400m to the west of the subject land. The proposed roundabout traffic solution designed by TTM identifies how a safer intersection treatment at Billabong Drive could be installed and how a new roundabout proposed 150m east of Billabong Drive would integrate with it.

The proposal demonstrates that access to Billabong Drive would not be detrimentally impacted.

The design concept illustrated by TTM would significantly improve the safety of the current Billabong Drive intersection.

In relation to other potential impacts on the Billabong Wildlife Park, the planning proposal area, and the intended outcome concept for the Highway Service Centre is such that it would not impact upon Billabong Wildlife Park visibility from the Oxley Highway or the Pacific Highway, nor would it impede tourist and visitor access to the Park.

Billabong Wildlife Park's status as a Gateway Site is not expected to alter as a result of this proposal and potentially will be exposed to additional visitation through north bound travellers exiting the Highway Service Centre onto the Oxley highway frontage.





## Section D: State and Commonwealth Interests

### 2.3.10 Is there adequate public infrastructure for the planning proposal?

The subject land has access to reticulated water supply, power and telecommunications services.

Highway access and traffic impact are addressed above and in the TTM report at **Appendix E**.

The site is not currently connected to reticulated sewerage service. On site sewage Management scheme is proposed as discussed above. Refer to **Appendix I**

### 2.3.11 What are the views of state and Commonwealth public authorities consulted in accordance with the Gateway determination?

This section is to be completed following consultation with the State and Commonwealth authorities should the Director General determine to proceed with the Planning Proposal and identifies which authorities are to be consulted with.



## 2.4 PART 4: Mapping

#### 2.4.1 The land subject to the planning proposal

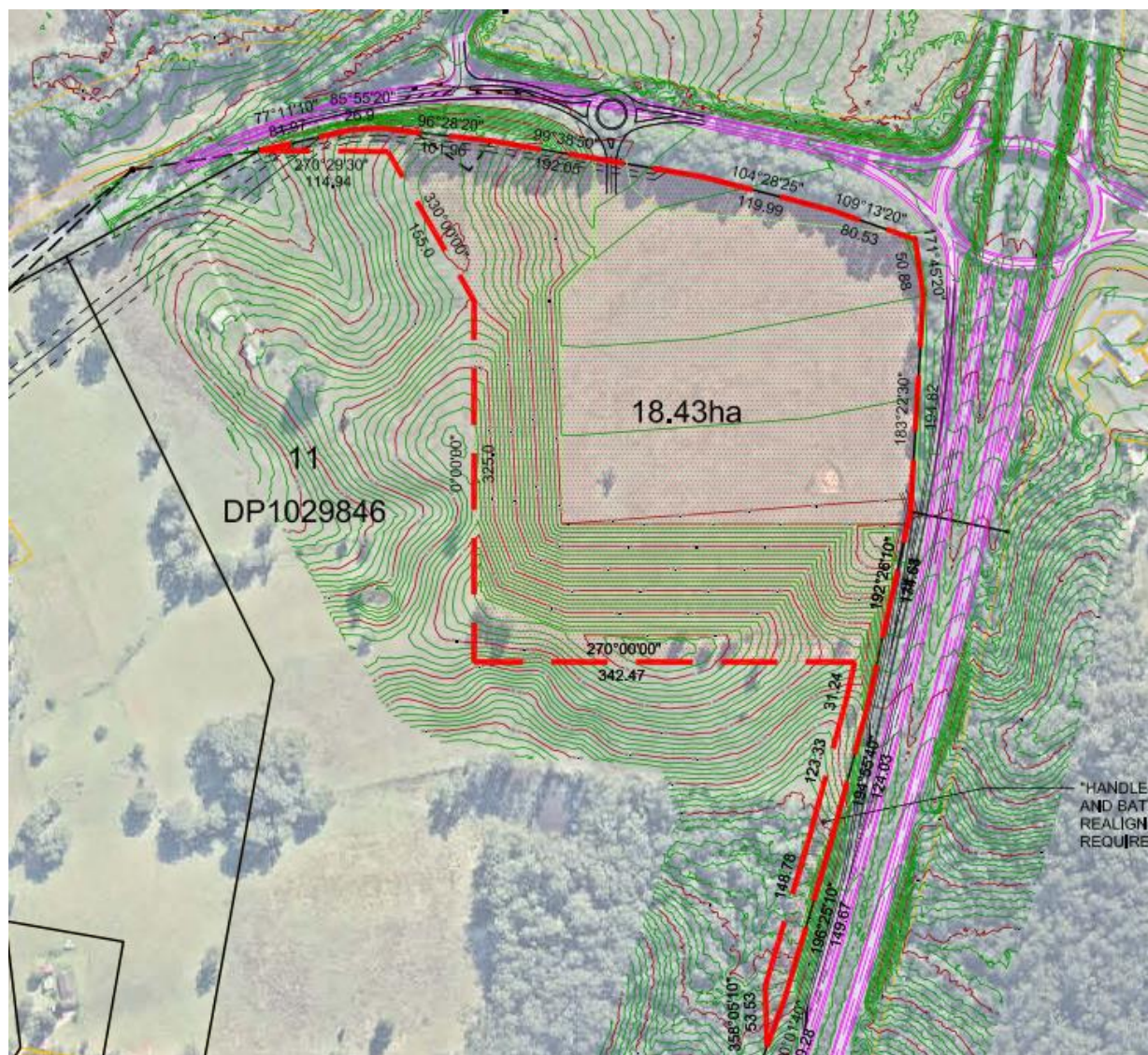


Figure 6 Land subject of planning proposal part Lot 11 DP 1029846



### 2.4.2 Current land use zone

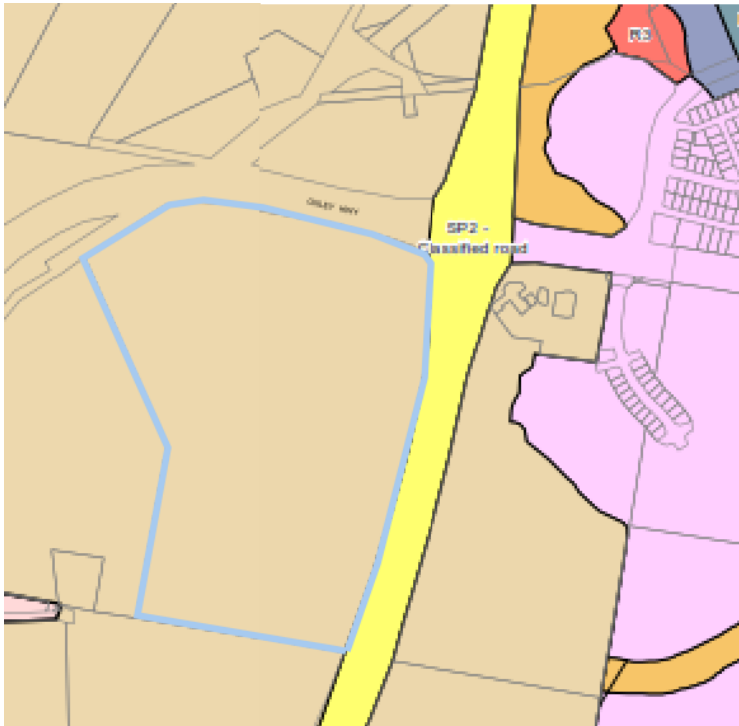


Figure 7 Current zone RU1 Primary Production

### 2.4.3 Current development standards

The mapped minimum lot size is 40ha which will be omitted over the area subject of the planning proposal to permit the master lot to be excised and provide for long term commercial lease/subdivision arrangements typical of Highway Service Centres with fast food outlets.

There are no existing provisions for Floor Space Ratio or Height of Buildings and this would continue consistent with that applied to the existing Highway Service Centre on the east side of the Pacific Highway.

### 2.4.4 Suggested alternative zone(s)

The planning proposal proposes not to include the site in the Additional Permitted Uses map and provisions of the Port Macquarie Hastings Local Environmental Plan. The RU1 zone is not proposed to be changed.



## 2.5 PART 5: Community Consultation

Community Consultation will be undertaken in accordance with Council's policy and will include referral to any agencies specified within the Gateway Determination.

## 2.6 Part 6: Project Timeline

The project is to be completed in accordance with the preliminary timeline below:

LEP Amendment Steps	Estimated Project Timing
Submit Planning Proposal to DP& E	March 2018
Receive Gateway Determination	March/April 2018
Preparation of materials for public exhibition & authority consultation	May & June 2018
Public exhibition of Planning Proposal & government authority consultation	July 2018
Review and consideration of submissions	August 2018
Public submission report and draft LEP amendment to Council for adoption	August 2018
Submission to the department to finalise the LEP	September 2018
Submit request for drafting of LEP to Parliamentary Counsel's Office ^	
Forward to the department for notification	

\* If required ^ If delegated



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## APPENDIX B – STATE ENVIRONMENTAL PLANNING POLICIES

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*State Environmental Planning Policy No 1—Development Standards*  
*State Environmental Planning Policy No 14—Coastal Wetlands*  
*State Environmental Planning Policy No 19—Bushland In Urban Areas*  
*State Environmental Planning Policy No 21—Caravan Parks*  
*State Environmental Planning Policy No 26—Littoral Rainforests*  
*State Environmental Planning Policy No 30—Intensive Agriculture*  
*State Environmental Planning Policy No 33—Hazardous And Offensive Development*  
*State Environmental Planning Policy No 36—Manufactured Home Estates*  
*State Environmental Planning Policy No 44—Koala Habitat Protection*  
*State Environmental Planning Policy No 47—Moore Park Showground*  
*State Environmental Planning Policy No 50—Canal Estate Development*  
*State Environmental Planning Policy No 52—Farm Dams And Other Works In Land And Water Management Plan Areas*  
***State Environmental Planning Policy No 55—Remediation Of Land***  
*State Environmental Planning Policy No 62—Sustainable Aquaculture*  
***State Environmental Planning Policy No 64—Advertising And Signage***  
*State Environmental Planning Policy No 65—Design Quality Of Residential Apartment Development*  
*State Environmental Planning Policy No 70—Affordable Housing (Revised Schemes)*  
*State Environmental Planning Policy No 71—Coastal Protection*  
*State Environmental Planning Policy (Affordable Rental Housing) 2009*  
*State Environmental Planning Policy (Building Sustainability Index: Basix) 2004*  
*State Environmental Planning Policy (Exempt And Complying Development Codes) 2008*  
*State Environmental Planning Policy (Housing For Seniors Or People With A Disability) 2004*  
***State Environmental Planning Policy (Infrastructure) 2007***  
*State Environmental Planning Policy (Integration And Repeals) 2016*  
*State Environmental Planning Policy (Kosciuszko National Park—Alpine Resorts) 2007*  
*State Environmental Planning Policy (Kurnell Peninsula) 1989*  
*State Environmental Planning Policy (Mining, Petroleum Production And Extractive Industries) 2007*  
*State Environmental Planning Policy (Miscellaneous Consent Provisions) 2007*  
*State Environmental Planning Policy (Penrith Lakes Scheme) 1989*  
***State Environmental Planning Policy (Rural Lands) 2008***  
***State Environmental Planning Policy (State And Regional Development) 2011***  
*State Environmental Planning Policy (State Significant Precincts) 2005*  
*State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011*  
*State Environmental Planning Policy (Sydney Region Growth Centres) 2006*  
*State Environmental Planning Policy (Three Ports) 2013*  
*State Environmental Planning Policy (Urban Renewal) 2010*  
*State Environmental Planning Policy (Western Sydney Employment Area) 2009*  
*State Environmental Planning Policy (Western Sydney Parklands) 2009*



**B1. State Environmental Planning Policy No. 55 – Remediation of Land**

Clause 6 of the *SEPP 55 – Remediation of Land* requires a planning authority to consider whether the land is contaminated and if the land is contaminated, to be satisfied that the land will be suitable for the proposed use or appropriately remediated.

Assessment of the previous use of the land and Stage 1 Assessment has been prepared. Refer **Appendix K**.

The proposed use is not one of those listed in the SEPP – residential, educational, recreational or child care purposes, or for the purposes of a hospital. The proposed use as highway service centre would be more closely categorised as commercial/industrial and the intended outcome is likely to result in substantial site regrading and construction of hard surfaces.

The report concludes that the site is suitable for the proposed use.

**B2. State Environmental Planning Policy 64- Advertising and Signage**

Clause 31 for the SEPP requires consultation with NSW Roads and Maritime Services (RMS) in the preparation of a draft local environmental plan. The subject land is within 250 metres of a classified road. Consultation with the RMS has commenced and will continue during the post gateway phase.

The intended outcome will include signage, including Pylon Signs and the Development Application will require the concurrence of the Roads & Maritime Services to signage.

**B3. State Environmental Planning Policy (Infrastructure) 2007**

The SEPP (Infrastructure) does not set specific referral or consultation requirements for preparation of a planning proposal/draft environmental planning instrument.

It does, however, identify provisions relating to traffic generating development adjacent to and having direct access to Highways.

Referral of the planning proposal to NSW Roads and Maritime Services for consultation will occur.



#### **B4. State Environmental Planning Policy (Rural Lands) 2008**

Clause 7 of the SEPP for Rural Lands is applicable and addressed as follows.

### **Part 2 Rural Planning Principles**

#### **7 Rural Planning Principles**

The Rural Planning Principles are as follows:

- (a) the promotion and protection of opportunities for current and potential productive and sustainable economic activities in rural areas,
- (b) recognition of the importance of rural lands and agriculture and the changing nature of agriculture and of trends, demands and issues in agriculture in the area, region or State,
- (c) recognition of the significance of rural land uses to the State and rural communities, including the social and economic benefits of rural land use and development,
- (d) in planning for rural lands, to balance the social, economic and environmental interests of the community,
- (e) the identification and protection of natural resources, having regard to maintaining biodiversity, the protection of native vegetation, the importance of water resources and avoiding constrained land,
- (f) the provision of opportunities for rural lifestyle, settlement and housing that contribute to the social and economic welfare of rural communities,
- (g) the consideration of impacts on services and infrastructure and appropriate location when providing for rural housing,
- (h) ensuring consistency with any applicable regional strategy of the Department of Planning or any applicable local strategy endorsed by the Director-General.

In considering the above Rural Planning Principles, principle (h) is most relevant to the subject Planning Proposal. The Planning Proposal is consistent with Council's local urban growth management strategy for *economic initiatives*.

#### **B5. State Environmental Planning Policy (State & Regional Development) 2011**

The SEPP (State & Regional Development) establishes the role of Joint Regional Planning Panels (JRPP) for determination of applications exceeding \$20 million capital investment value. The JRPP also have a role in the Review of Planning Proposals.

The intended outcome of the planning proposal is a Highway Service Centre which, once it proceeds to development application if it exceed \$20 million in CIV then a referral to the JRPP for determination would occur.



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## APPENDIX C – SECTION 117 DIRECTIONS

### COMPLIANCE AND JUSTIFICATIONS

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#### 1. Employment and Resources

##### **1.1 Business and Industrial Zones**

##### **1.2 Rural Zones**

##### 1.3 Mining, Petroleum Production and Extractive Industries

##### 1.4 Oyster Aquaculture

##### **1.5 Rural Lands**

#### 2. Environment and Heritage

##### 2.1 Environment Protection Zones

##### 2.2 Coastal Protection

##### **2.3 Heritage Conservation**

##### 2.4 Recreation Vehicle Areas

#### 3. Housing, Infrastructure and Urban Development

##### 3.1 Residential Zones

##### 3.2 Caravan Parks and Manufactured Home Estates

##### 3.3 Home Occupations

##### **3.4 Integrating Land Use and Transport**

##### 3.5 Development Near Licensed Aerodromes

##### 3.6 Shooting Ranges

#### 4. Hazard and Risk

##### **4.1 Acid Sulfate Soils**

##### 4.2 Mine Subsidence and Unstable Land

##### **4.3 Flood Prone Land**

##### **4.4 Planning for Bushfire Protection**

#### 5. Regional Planning

##### **5.1 Implementation of Regional Strategies**

##### 5.2 Sydney Drinking Water Catchments

##### 5.3 Farmland of State and Regional Significance on the NSW Far North Coast

##### **5.4 Commercial and Retail Development along the Pacific Highway, North Coast**

#### 6. Local Plan Making

##### **6.1 Approval and Referral Requirements**

##### 6.2 Reserving Land for Public Purposes

##### **6.3 Site Specific Provisions**



Table of Relevant 117 Directives		
Directive	Key requirement	Consistent or Justified
<b>1.1 Business &amp; Industrial Zones</b>  (1) The objectives of this direction are to: (a) encourage employment growth in suitable locations, (b) protect employment land in business and industrial zones, and (c) support the viability of identified strategic centres.	(3) This direction applies when a relevant planning authority prepares a planning proposal that will affect land within an existing or proposed business or industrial zone  (4) A planning proposal must: (a) give effect to the objectives of this direction, (b) retain the areas and locations of existing business and industrial zones, (c) not reduce the total potential floor space area for employment uses and related public services in business zones, (d) not reduce the total potential floor space area for industrial uses in industrial zones, and (e) ensure that proposed new employment areas are in accordance with a strategy that is approved by the Director-General of the Department of Planning. (including business or industrial zone boundary).	Consistent.  The proposal gives effect to the objectives of this direction and is consistent with the local urban growth management strategy as economic initiatives.
<b>1.2 Rural Zones</b>  The objective of this direction is to protect the agricultural production value of rural land.  A planning proposal must:	May be inconsistent if:  (a) justified by a strategy which:  (i) gives consideration to the objectives of this direction,	Justified  The subject land is identified in the North Coast 2036 Regional Plan as investigation area and with Council's local Urban Growth Management Strategy as economic initiative



<p>(a) not rezone land from a rural zone to a residential, business, industrial, village or tourist zone.</p> <p>(b) not contain provisions that will increase the permissible density of land within a rural zone (other than land within an existing town or village).</p>	<p>(ii) identifies the land which is the subject of the planning proposal (if the planning proposal relates to a particular site or sites), and</p> <p>(iii) is approved by the Director-General of the Department of Planning, or</p> <p>(b) justified by a study prepared in support of the planning proposal which gives consideration to the objectives of this direction, or</p> <p>(c) in accordance with the relevant Regional Strategy or Sub-Regional Strategy prepared by the Department of Planning which gives consideration to the objective of this direction, or</p> <p>(d) is of minor significance.</p>	<p>The inconsistency with the S117 is justified under item a) of the requirements.</p>
<p><b>1.5 Rural Lands</b></p> <p>The objectives of this direction are to:</p> <p>(a) protect the agricultural production value of rural land,</p> <p>(b) facilitate the orderly and economic development of rural lands for rural and related purposes.</p>	<p>A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Director-General of the Department of Planning (or an officer of the Department nominated by the Director-General) that the provisions of the planning proposal that are inconsistent are:</p> <p>(a) justified by a strategy which:</p> <p>i. gives consideration to the objectives of this direction,</p>	<p>Justified</p> <p>The subject land is identified in the North Coast 2036 Regional Plan as investigation area and with Council's local Urban Growth Management Strategy as economic initiative</p> <p>The inconsistency with the S117 is justified under item a).</p>





<p>A planning proposal to which clauses 3(a) or 3(b) apply must be consistent with the Rural Planning Principles listed in <i>State Environmental Planning Policy (Rural Lands) 2008</i>.</p>	<p>ii. identifies the land which is the subject of the planning proposal (if the planning proposal relates to a particular site or sites, and iii. is approved by the Director-General of the Department of Planning and is in force, or</p> <p>(b) is of minor significance.</p>	
<p><b>2.3 Heritage Conservation Objective</b></p> <p>The objective of this direction is to conserve items, areas, objects and places of environmental heritage significance and indigenous heritage significance.</p>	<p>A planning proposal must contain provisions that facilitate the conservation of:</p> <p>(a) items, places, buildings, works, relics, moveable objects or precincts of environmental heritage significance to an area, in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item, area, object or place, identified in a study of the environmental heritage of the area,</p> <p>(b) Aboriginal objects or Aboriginal places that are protected under the National Parks and Wildlife Act 1974, and</p> <p>(c) Aboriginal areas, Aboriginal objects, Aboriginal places or landscapes identified by an Aboriginal heritage survey prepared by or on behalf of an Aboriginal Land Council, Aboriginal body or public authority and provided to the relevant planning authority, which identifies the area, object, place or</p>	<p>Consistent</p> <p>The planning proposal does not alter the Heritage Conservation provisions of PMHC LEP 2011</p>



	<p>landscape as being of heritage significance to Aboriginal culture and people. Consistency</p> <p>(5) A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Director-General of the Department of Planning (or an officer of the Department nominated by the Director-General) that:</p> <p>(a) the environmental or indigenous heritage significance of the item, area, object or place is conserved by existing or draft environmental planning instruments, legislation, or regulations that apply to the land, or (b) the provisions of the planning proposal that are inconsistent are of minor significance.</p>	
<p><b>3.4 Integrating Land Use and Transport</b></p> <p>The objective of this direction is to ensure that urban structures, building forms, land use locations, development designs, subdivision and street layouts achieve the following planning objectives:</p> <p>(a) improving access to housing, jobs and services by walking, cycling and public transport, and</p> <p>(b) increasing the choice of available transport and reducing dependence on cars, and</p>	<p>(4) 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:</p> <p>(a) <i>Improving Transport Choice – Guidelines for planning and development</i> (DUAP 2001), and</p> <p>(b) <i>The Right Place for Business and Services – Planning Policy</i> (DUAP 2001).</p>	<p>Consistent with objective e) <i>providing for the efficient movement of freight.</i></p>



<p>(c) reducing travel demand including the number of trips generated by development and the distances travelled, especially by car, and</p> <p>(d) supporting the efficient and viable operation of public transport services, and</p> <p>(e) providing for the efficient movement of freight.</p>		
<p><b>4.1 Acid Sulphate Soils</b></p> <p>The objective of this direction is to avoid significant adverse environmental impacts from the use of land that has a probability of containing acid sulphate soils.</p>	<p>A relevant planning authority must not prepare a planning proposal that proposes an intensification of land uses on land identified as having a probability of containing acid sulphate soils on the Acid Sulphate Soils Planning Maps unless the relevant planning authority has considered an acid sulphate soils study assessing the appropriateness of the change of land use given the presence of acid sulphate soils.</p>	<p>Consistent</p> <p>Lot 11 DP 1029846 is partly mapped as subject to Acid Sulphate Soils. However, that part of the land, the subject of the planning proposal is not mapped.</p>
<p><b>4.3 Flood Prone Land</b></p> <p>The objectives of this direction are:</p> <p>(a) to ensure that development of flood prone land is consistent with the NSW Government's Flood Prone Land Policy and the principles of the <i>Floodplain Development Manual 2005</i>, and</p>	<p>A planning proposal may be inconsistent with this direction only if the relevant planning authority can satisfy the Director-General (or an officer of the Department nominated by the Director-General) that:</p> <p>(a) the planning proposal is in accordance with a floodplain risk management plan prepared in accordance with the principles and guidelines of the Floodplain Development Manual 2005, or</p>	<p>Consistent</p> <p>Lot 11 DP 1029846 is partly mapped as subject to flood prone land provisions. However, that part of the land, the subject of the planning proposal is not affected.</p>



<p>(b) to ensure that the provisions of an LEP on flood prone land is commensurate with flood hazard and includes consideration of the potential flood impacts both on and off the subject land.</p> <p>(4) A planning proposal must include provisions that give effect to and are consistent with the NSW Flood Prone Land Policy and the principles of the <i>Floodplain Development Manual 2005</i> (including the <i>Guideline on Development Controls on Low Flood Risk Areas</i>).</p> <p>(5) A planning proposal must not rezone land within the flood planning areas from Special Use, Special Purpose, Recreation, Rural or Environmental Protection Zones to a Residential, Business, Industrial, Special Use or Special Purpose Zone.</p>	<p>(b) the provisions of the planning proposal that are inconsistent are of minor significance.</p> <p><b>Note:</b> “flood planning area”, “flood planning level”, “flood prone land” and “floodway area” have the same meaning as in the <i>Floodplain Development Manual 2005</i>.</p>	
<p><b>4.4 Planning for Bushfire Protection</b></p> <p>The objectives of this direction are:</p>	<p>A planning proposal must:</p>	<p>Consistent</p>



<p>(a) to protect life, property and the environment from bush fire hazards, by discouraging the establishment of incompatible land uses in bush fire prone areas, and</p> <p>(b) to encourage sound management of bush fire prone areas.</p>	<p>(a) have regard to <i>Planning for Bushfire Protection 2006</i>,</p> <p>(b) introduce controls that avoid placing inappropriate developments in hazardous areas, and</p> <p>(c) ensure that bushfire hazard reduction is not prohibited within the APZ.</p>	<p>The planning proposal has regard to the PfBP 2006 guidelines. The development application includes the requisite bushfire hazard assessment.</p>
<p><b>5.1 Implementation of Regional Strategies</b></p> <p>The objective of this direction is to give legal effect to the vision, land use strategy, policies, outcomes and actions contained in regional strategies.</p> <p>Planning proposals must be consistent with a regional strategy released by the Minister for Planning.</p>	<p>A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Director-General of the Department of Planning (or an officer of the Department nominated by the Director-General), that the extent of inconsistency with the regional strategy:</p> <p>(a) is of minor significance, and</p> <p>(b) the planning proposal achieves the overall intent of the regional strategy and does not undermine the achievement of its vision, land use strategy, policies, outcomes or actions</p>	<p>Consistent</p> <p>The proposal is consistent with the North Coast 2036 Regional Plan, as discussed in the Planning proposal above.</p>
<p><b>5.4 Commercial and Retail Development along the Pacific Highway North Coast</b></p>	<p>This direction applies to a planning proposal for land in the vicinity of the Pacific Highway. Clause 6 of the direction states the establishment of highway service centres may be permitted at the localities listed in Table 1, provided that Roads and Maritime Services is satisfied that the highway service centre can be safely</p>	<p>Consistent</p> <p>The subject land is in vicinity of the Pacific Highway at the Oxley Highway interchange. After direct consultation with NSW Roads and Maritime Services, the proposed access concept and TTm Traffic report</p>





	<p>and efficiently integrated into the Highway interchange at those locations.</p> <p>Table 1: Highway service centres that can proceed – Port Macquarie: Oxley Highway interchange (both sides of the Pacific Highway).</p>	<p>for the Highway Service Centre demonstrates that it can be safely and efficiently integrated into the Highway interchange.</p>
<p><b>6.1 Approval and Referral Requirements</b></p> <p>Objective</p> <p>The objective of this direction is to ensure that LEP provisions encourage the efficient and appropriate assessment of development.</p>	<p>A planning proposal must:</p> <p>(a) minimise the inclusion of provisions that require the concurrence, consultation or referral of development applications to a Minister or public authority, and</p> <p>(b) not contain provisions requiring concurrence, consultation or referral of a Minister or public authority unless the relevant planning authority has obtained the approval of:</p> <p>(i) the appropriate Minister or public authority, and</p> <p>(ii) the Director-General of the Department of Planning (or an officer of the Department nominated by the Director-General), prior to undertaking community consultation in satisfaction of section 57 of the Act, and</p> <p>(c) not identify development as designated development unless the relevant planning authority:</p> <p>(i) can satisfy the Director-General of the Department of Planning (or an officer of the Department nominated by the Director-General)</p>	<p>Consistent</p> <p>The planning proposal does not include any site specific provisions that require the concurrence, consultation or referral of development applications to a Minister or public authority, other than those already required by existing Integrated Development provisions and State Environmental Planning Policies.</p>

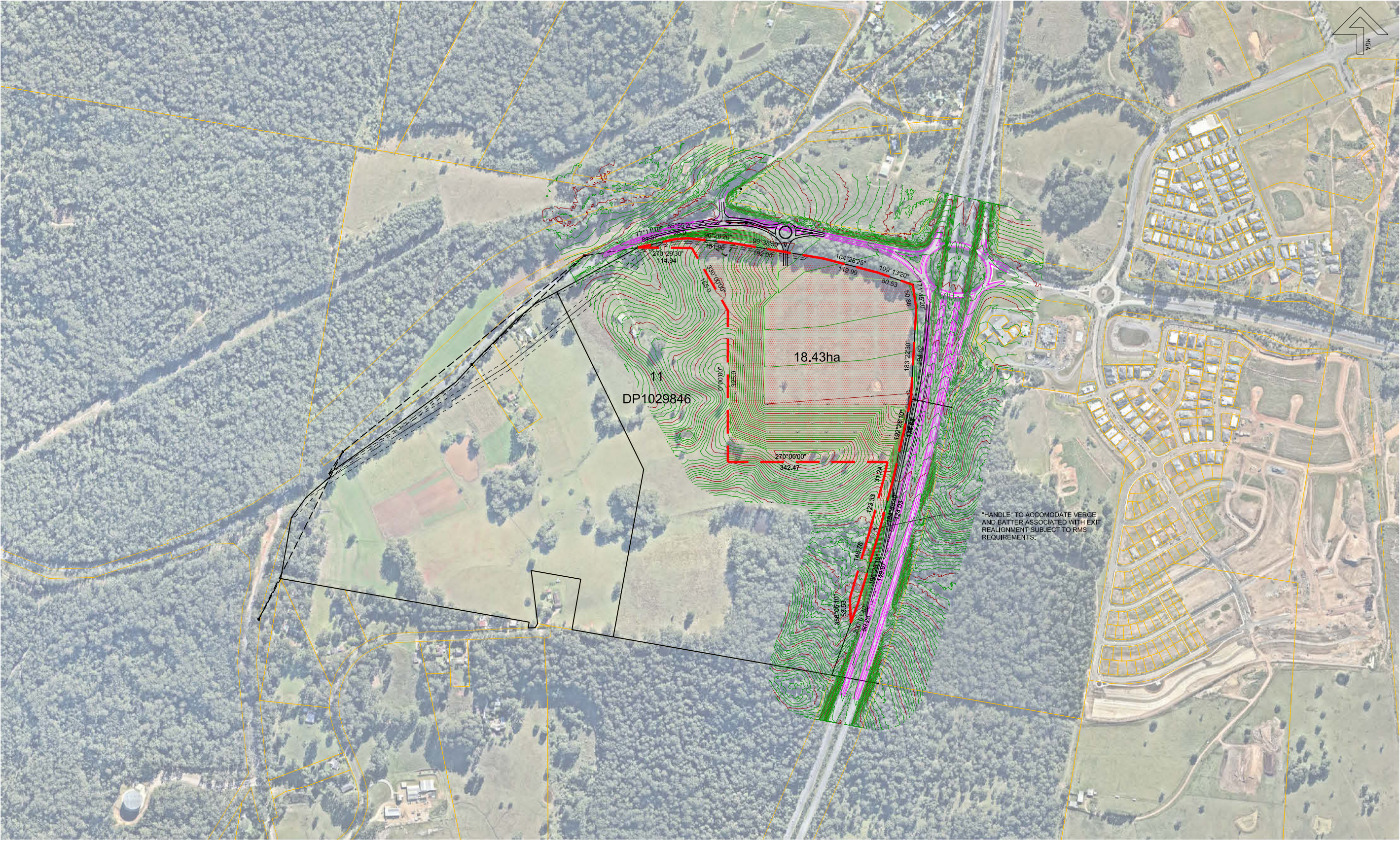


	<p>that the class of development is likely to have a significant impact on the environment, and</p> <p>(ii) has obtained the approval of the Director-General of the Department of Planning (or an officer of the Department nominated by the Director-General) prior to undertaking community consultation in satisfaction of section 57 of the Act.</p>	
<p><b>6.3 Site Specific Provisions</b></p> <p>The objective of this direction is to discourage unnecessarily restrictive site specific planning controls.</p>	<p>A planning proposal that will amend another environmental planning instrument in order to allow a particular development proposal to be carried out must either:</p> <p>(a) allow that land use to be carried out in the zone the land is sited</p> <p>(b) rezone the site to an existing zone already applying in the environmental planning instrument that allows that land use without imposing any development standards or requirements in addition to those already contained in that zone, or</p> <p>c) allow that land use on the relevant land without imposing any development standards or requirements in addition to those already contained in the principal environmental planning instrument being amended.</p> <p>A planning proposal must not contain or refer to drawings that show details of the development proposal.</p>	<p>Consistent</p> <p>The planning proposal seeks to include the proposed 18.43 ha development site under the Schedule 1 of the PMHLEP 2011 providing for Additional Permitted Use as a Highway Service Centre.</p>



## **Attachment 4 Site Plans**





BEARINGS, DISTANCES AND AREAS FOR  
PROPOSED LOT APPROXIMATE ONLY AND  
SUBJECT TO FINAL SURVEY.

0 25 50 100 150 200 250  
Full Size 1:4000 : Half Reduction 1:8000  
SCALE (m)

**DEVELOPMENT APPLICATION**  
**NOT FOR CONSTRUCTION**

Scott PDI  
PROPOSED HIGHWAY SERVICE CENTRE  
CNR PACIFIC AND OXLEY HIGHWAYS, SANCROX

**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

**HIGHWAY SERVICE CENTRE  
PLAN OF  
PART LOT 11 IN DP1029846 SUBJECT  
TO PROPOSED ADDITIONAL USE**

DRAWING NUMBER/REFERENCE		
DESIGNER	ORIGIN OF LEVELS	REV.
DB²	SSM-?????	A
SURVEYOR	HEIGHT	
-	RL??,???	
DRAFTING	DATUM	SHEET SIZE
DB²	AHD	A1
APPROVED	SCALE	
DB²	1:4000	





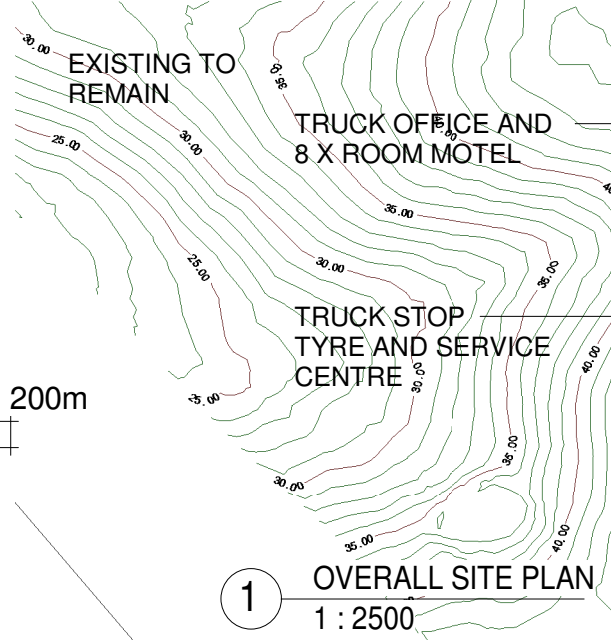


## **Attachment 5 Concept Plans and Photomontages**

PARKING SCHEDULE		
PARKING TYPE	TOTAL	
TOTAL CAR PARKING STAND ALONE DRIVE THRU	15x QUEING 3x WAITING 22x FRONT PARKING	41
	1x PWD	
DRIVE THRU A & B SERVICE CENTRE BUILDING	5x WAITING 19x QUEING	24
DRIVE THRU C SERVICE CENTRE BUILDING	2x WAITING 13x QUEING	15
SERVICE CENTRE BUILDING	61 + 12 + 16 2x PWD	91
SERVICE STATION (SERVICE CENTRE)	9 + 2 x AIR & WATER 1x PWD	12
TOTAL TRAILER PARKING (CAR + TRAILER)		6
TOTAL TRUCK PARKING		113
MOTEL & TRUCK WORKSHOP CAR PARK		16
TOTAL STAFF PARKING		24
GRAND TOTAL	342	

BUILDING AREA SCHEDULE	
BUILDING	AREA (m <sup>2</sup> )
SERVICE CENTRE	1560 m <sup>2</sup>
FOOD & DRINK OUTLET (STAND ALONE)	636 m <sup>2</sup>
8 MOTEL ROOM	275 m <sup>2</sup>
TRUCK STOP OFFICE & WORKSHOP	783 m <sup>2</sup>
TOTAL AREA	3254 m <sup>2</sup>

HARDSTAND AND LANDSCAPE AREA SCHEDULE	
TYPE	AREA (m <sup>2</sup> )
BUILDING AREA FOOT PRINT, ROADS & PAVING	72,190 m <sup>2</sup>
LANDSCAPE AREA & EXISTING NATURAL VEGETATION	112,110 m <sup>2</sup> (11.2 ha)
TOTAL DEVELOPMENT ALLOCATED AREA	184,300 m <sup>2</sup> (18.3 ha)



VISUAL SCALE 1:2000 @ A3

PRELIMINARY

AMENDMENTS			
AMD	DATE	AMENDMENT DETAILS	BY
1	19-01-18	SCHEMATIC	MW
2	30-01-18	SCHEMATIC	MW
3	31-01-18	SCHEMATIC DESIGN	MW
4	06-02-18	PRELIMINARY ISSUE TO CLIENT	MW
5	07-02-18	NEW SITE EXTENT & PROPOSED EASEMENT WIDENING	MW
6	08-02-18	ROUND ABOUT AND SITE ENTRY	MW
7	15-02-18	AMENDED SITE PLAN	MW
8	21-02-18	CONSULTANTS COORDINATION	MW
9	21-02-18	DA ISSUE	MW

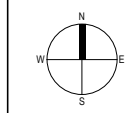


1 OVERALL SITE PLAN  
1 : 2500

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# PORT MACQUARIE SERVICE CENTRE

PACIFIC & OXLEY HIGHWAYS, PORT  
MACQUARIE, New South Wales



SCALE : As indicated @A3  
DATE : Feb 2018  
DRAWN : MW  
SHEET TITLE : OVERALL PROPOSED  
SITE PLAN  
PROJECT NUMBER : 415172

SHEET NUMBER : **DA003**

PORT MACQUARIE SERVICE CENTRE

REVISION

9





PRELIMINARY

1 SITE PLAN-PART 01  
1 : 850

AMENDMENTS

AMD	DATE	AMENDMENT DETAILS	BY
1	19-01-18	SCHEMATIC	MW
2	30-01-18	SCHEMATIC	MW
3	31-01-18	SCHEMATIC DESIGN	MW
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5	21-02-18	DA ISSUE	MW



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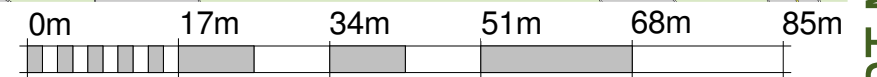
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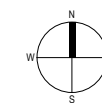
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VISUAL SCALE 1:850 @ A3



SCALE : 1 : 850 @A3

DATE : Feb 2018

DRAWN : MW

SHEET TITLE : SITE PLAN - PART 01

PROJECT NUMBER : 415172

SHEET NUMBER : DA004

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5

PORT MACQUARIE SERVICE CENTRE





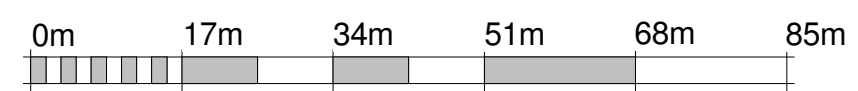
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2	31-01-18	SCHEMATIC DESIGN	MW
3	06-02-18	PRELIMINARY ISSUE TO CLIENT	MW
4	21-02-18	DA ISSUE	MW



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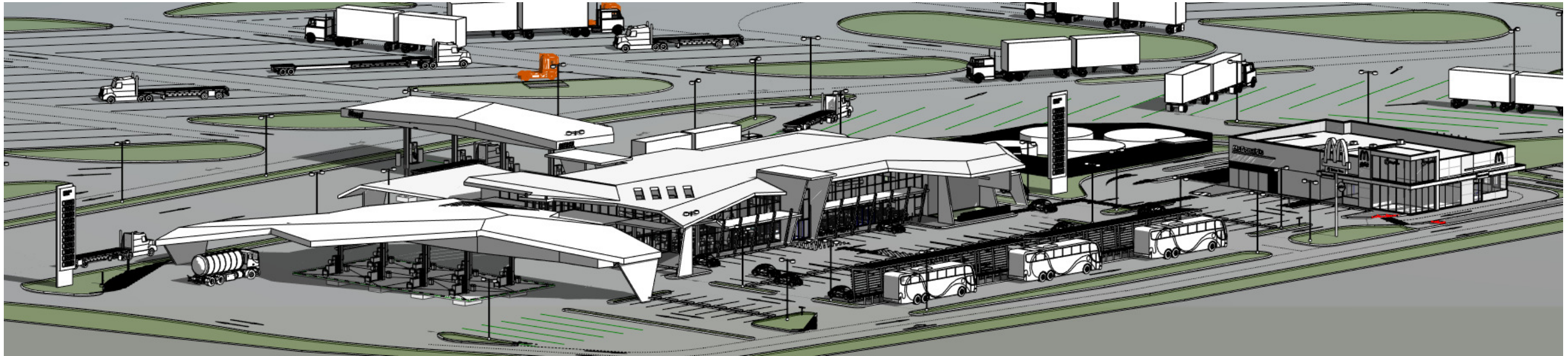


VISUAL SCALE 1:850 @ A3

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DATE : Feb 2018  
DRAWN : MW  
SHEET TITLE : SITE PLAN - PART 02  
  
PROJECT NUMBER : 415172  
**SHEET NUMBER : DA005**

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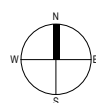
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SCALE : @A3  
DATE : 21.02.2018  
DRAWN : MW  
SHEET TITLE : OVERALL VIEW

PROJECT NUMBER : 415172

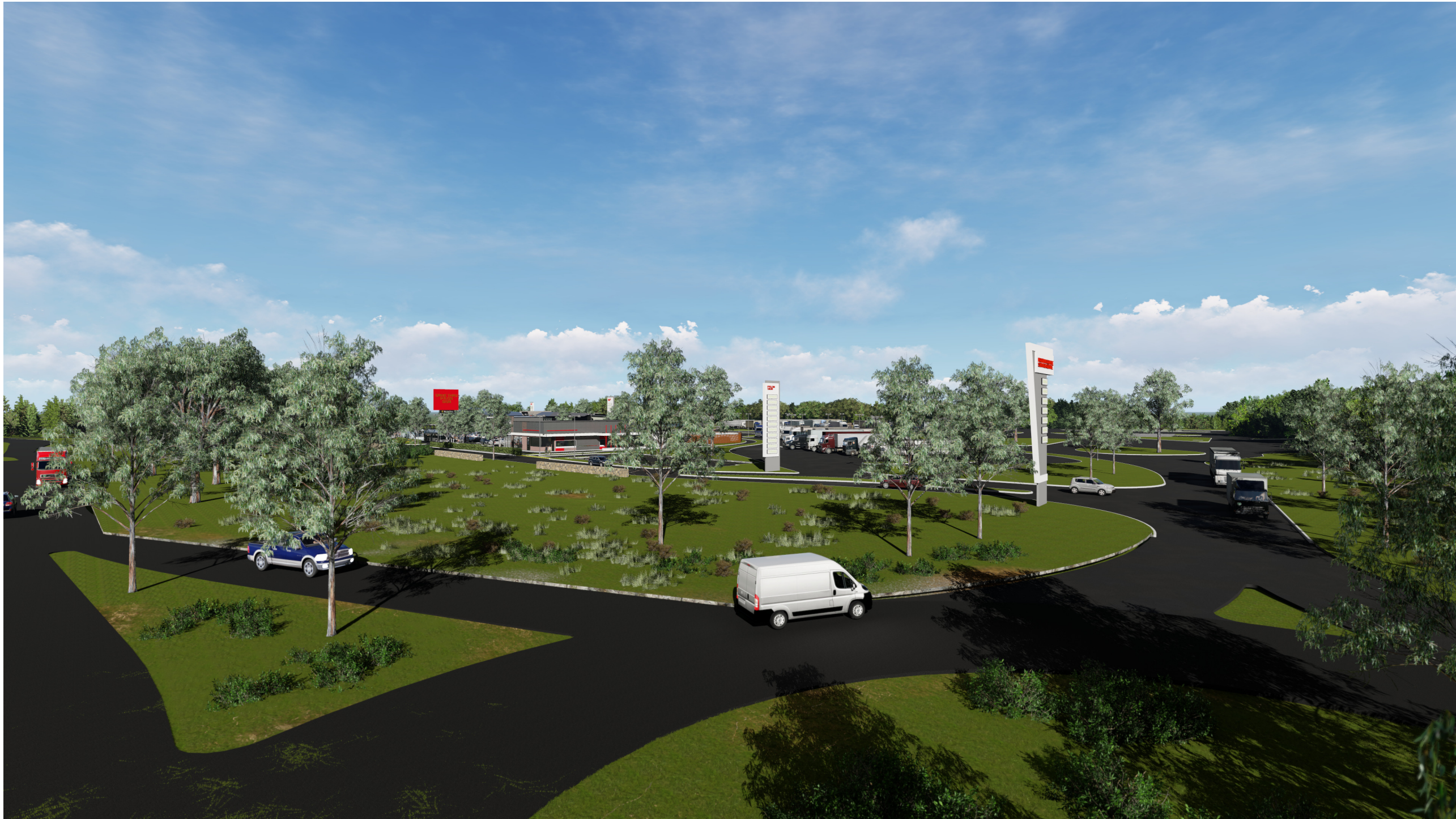
SHEET NUMBER : **DA011**

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2





VIEW 02 - OXLEY HIGHWAY NEW ROUND ABOUT & PROPOSED ENTRY TO SITE

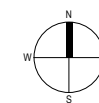
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SHEET TITLE : VIEW 02 - SITE 3D  
RENDER  
PROJECT NUMBER : 415172

SHEET NUMBER : **DA013**

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VIEW 03 - OXLEY HIGHWAY

PRELIMINARY

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AMD	DATE	AMENDMENT DETAILS	BY
1	21-02-18	DA ISSUE	MW



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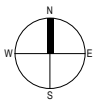
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SCALE : @A3  
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SHEET TITLE : VIEW 03 - SITE 3D  
RENDER

PROJECT NUMBER : 415172

SHEET NUMBER : DA014

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1





VIEW 01 - EXISTING PACIFIC HIGHWAY ROUND ABOUT

PRELIMINARY

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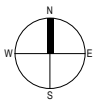
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SCALE : @A3  
DATE : Feb 2018  
DRAWN : MW  
SHEET TITLE : VIEW 01 - SITE 3D  
RENDER

PROJECT NUMBER : 415172

SHEET NUMBER : DA012

REVISION

1



## **Attachment 6 Biodiversity Development Assessment Report, April 2018**



**Biodiversity**  
AUSTRALIA

# **Biodiversity Development Assessment Report**

## **Project:**

Proposed Highway Service Centre on Part  
Lot 11 DP1029846, Oxley Highway, Sancrox

## **Client:**

Scott PDI

April 2018



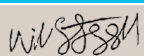
## Document Status

Version	Purpose	Author	Reviewed By	Approved By	Date
Rev 1	Draft	Will Steggall	Karl Robertson	Will Steggall	13/4/2018
Rev 2	Final	Will Steggall	Karl Robertson	Will Steggall	18/4/2018

## Document Control

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## Accredited Assessor Authorisation

Assessor Name	Accreditation number	Expiry date	Signature	Date
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## Executive Summary

The site was assessed in accordance with the requirements of the NSW *Biodiversity Conservation Act 2016*, *Biodiversity Conservation Regulation 2017*, and the *Biodiversity Assessment Method 2017*.

The development site is located on a 52ha rural property located on the Oxley Highway at Sancrox. The site has been cleared in the past and is now largely used for cattle grazing. Cleared pasture grassland occurs over most of the site and regrowth vegetation occurs within the Oxley Highway and Pacific Highway road reserve which fringes the north and east of the development site.

The development proposal is for a highway service centre and access points from both the Oxley Highway and Pacific Highway. The steep road batters surrounding the service centre site are also proposed to be levelled to allow access and improve safety for road users. The footprint for the development is 21ha.

The *Biodiversity Conservation Act 2016* and associated Regulation apply to the development proposal. The amount of native vegetation to be cleared exceeds the specified threshold level for triggering the application of the Biodiversity Assessment Method (BAM). A Biodiversity Development Assessment Report (BDAR) is therefore required to submit with the application. This development can be assessed using the small area development streamlined assessment module as detailed in Appendix 2 of the *Biodiversity Assessment Method 2017*.

A vegetation survey as per the BAM methodology was carried out in April 2017. Surveys to target candidate threatened flora and fauna species credit species were also undertaken.

Two vegetation communities occur on the development site which were assessed as a single Plant Community Type (PCT) and vegetation zone as per the requirements of the streamlined assessment module. Neither of these communities are listed as Endangered Ecological Communities.

No threatened flora species were detected during the survey. Five threatened fauna species were detected during the targeted surveys, comprising the Masked Owl, Grey-headed Flying Fox, East-coast Freetail Bat, Eastern Bentwing Bat and Little Bentwing Bat. Four of these are species credit species, however this is for breeding habitat only which was not identified on the development site. As such, no species credit offsets are required for the proposal.

The proposed development will require removal of approximately 3ha of native vegetation and associated habitat components. Other potential indirect impacts include, habitat fragmentation and weed invasion. The loss of vegetation will be offset through the purchase of biodiversity credits. The credit requirement for the proposal is detailed in Section 7 of the report. A range of mitigation measures will be implemented to reduce other impacts associated with the proposal. These are described in Section 5 of the report.

Consideration of Serious and Irreversibly Impacts (SAIL) is provided in Section 5 of the report. This has determined that there no potential SAIL species or ecological communities that will be impacted by the proposal. Further, the proposal will not have any effect on Areas of Outstanding Biodiversity Value.



## 1.0 Introduction

Biodiversity Australia Pty Ltd (Bio Aus) was requested to undertake a Biodiversity Development Assessment Report (BDAR) for the proposed vegetation clearing and development on Lot DP1029846, Sancrox. This assessment will form part of the rezoning and Development Application (DA) to be submitted to Port Macquarie-Hastings Council.

The survey and assessment was performed in accordance with the *Biodiversity Assessment Method 2017*, and the draft *Threatened Species Survey and Assessment – Guidelines for Developments and Activities* (DEC 2004). The assessment has also been undertaken in accordance with the Ecological Consultants Association of NSW – *Code of Ethics* (2002) available at [www.ecansw.org.au](http://www.ecansw.org.au).

### 1.1. Description of the Development Site

The development site is 21ha in area and is located on a rural property (Lot 11, DP 1029846) which is approximately 52ha in area. The location of the development site is shown in **Error! Reference source not found. 1**.

The site largely consists of exotic pasture grassland with scattered trees. Regrowth open forest within RMS road reserves is located along the northern and eastern boundaries (Photo 1 and Photo 2).

A small drainage line runs along the north-eastern corner of the northern RMS road reserve and a small natural farm dam of approximately 17m diameter exists in the east of the site.

The site is adjoined by other rural properties to the north, south-west and west, with the Oxley Highway forming the northern boundary and Pacific Highway forming the eastern boundary. Cowarra State forest is located 1km to the west.

### 1.2. Definitions Used in the Report

This report uses the following key definitions:

- **Development site:** Refers to the area that will be directly impacted by the proposed action which covers 21ha
- **Subject land:** The property on which the development will occur comprising Lot 11 DP 1029846. The property is 52ha in area

These definitions are in line with the BAM methodology, which provides further explanation of definitions and legal terms that may be used in this report.





Figure 1: Location of the site

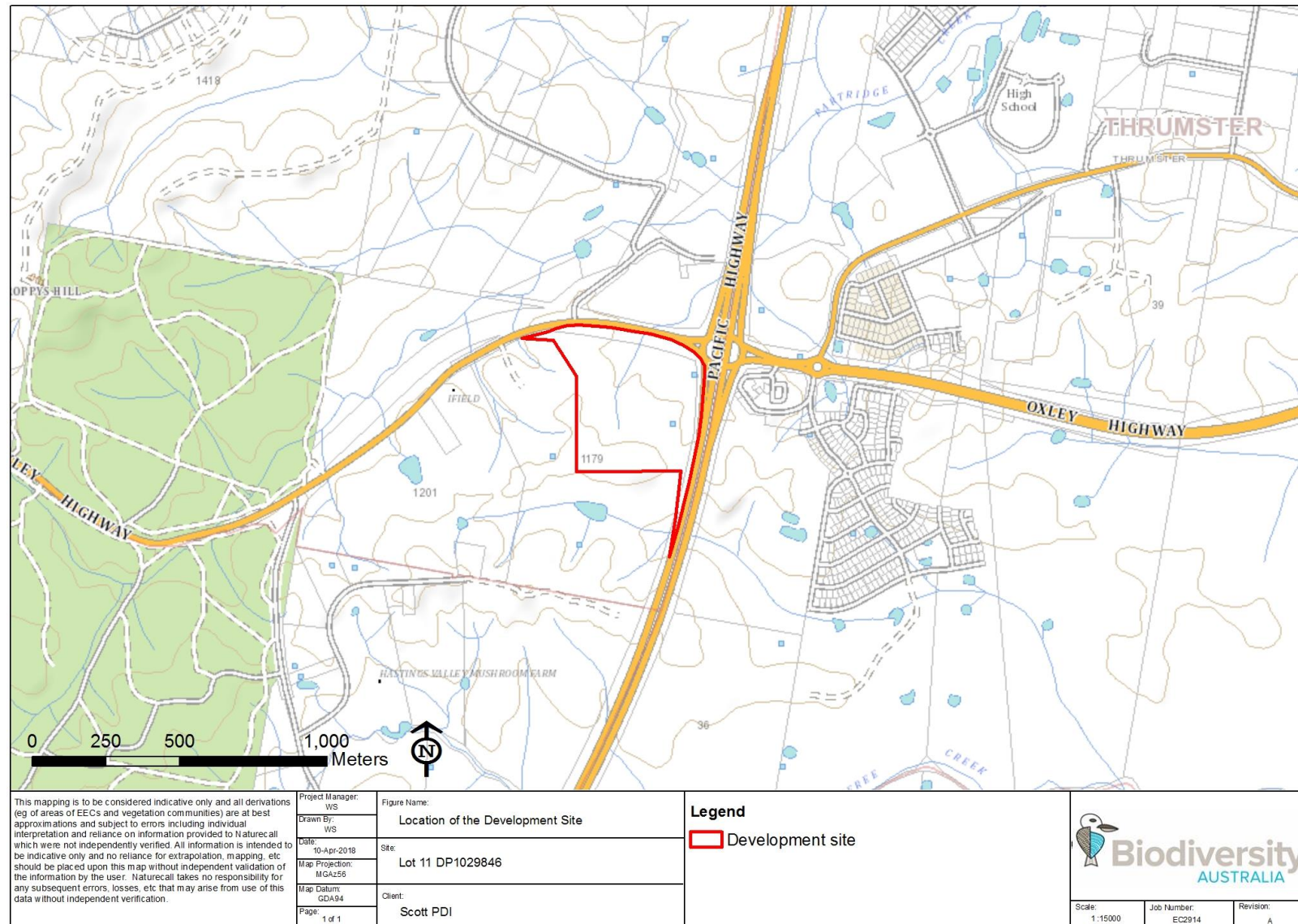






Photo 1: View from within the development site looking north



Photo 2: View of the northern RMS road reserve, taken from outside the site





## 1.3. Development Proposal

Scott PDI No. 6 Pty Ltd (the proponent) are proposing to develop a highway service centre on Lot 11 located on the corner of the Oxley Highway and Pacific Highway at Sancrox (Figure 1 and 2). The subject land is approximately 52ha and the proposed development site is approximately 21ha. This is inclusive of 3.29ha of RMS road reserve that runs along the northern and eastern property boundary, as earthworks and levelling of these steep road batters is required to allow access to the service centre and improve safety for road users. This will necessitate removal of open forest vegetation that has regrown since the construction of the Pacific Highway dual carriageway upgrade and interchange which was completed in 1990.

Biodiversity Australia (formerly Naturecall) has previously undertaken ecological surveys and assessments to assess the impact of the proposal on both Lot 11 and the RMS road reserves (Naturecall 2017, 2018). A new assessment is now however required to consider the total impact of the development footprint and apply the *Biodiversity Conservation Act 2016* (BC Act) and Regulation which came into effect from 25<sup>th</sup> February 2018.

The development requires consent under Part 4 of the *Planning and Assessment Act 1979* (P&A Act), hence the BC Act and Regulation applies. The proposed amount of native vegetation to be cleared exceeds the specified threshold level for triggering the application of the Biodiversity Assessment Method (BAM). A Biodiversity Development Assessment Report (BDAR) is therefore required to submit with the application. This development can be assessed using the small area development streamlined assessment module as detailed in Appendix 2 of the *Biodiversity Assessment Method 2017*.

The land proposed for clearing is not mapped on the Biodiversity Value Map as shown in Figure 3.

## 1.4. Structure of the Report

This report has been structured using guidance provided in Appendix 12 of the BAM. It is structured as follows:

- Section 1 provides background information for the assessment;
- Section 2 describes the landscape features of the development site;
- Section 3 describes the native vegetation features of the development site;
- Section 4 describes the threatened species and habitat features associated with the development site;
- Section 5 details avoidance and minimisation measures for the proposal; and
- Section 6 provides an impact summary and the number and type of credits required to offset impacts.



[illegible]



[illegible]



## 1.5.Information Sources

The following databases and Geographic Information System (GIS) layers were searched/obtained:

- Department of Environment and Energy Protected Matters Search Tool (DEE 2018);
- Office of Environment and Heritage BioNet Atlas;
- Office of Environment and Heritage NSW Native Vegetation Regulatory Map (OEH 2018);
- Office of Environment and Heritage Threatened Biodiversity Data Collection OEH 2018);
- Port Macquarie LGA Koala Habitat digital data layer (Biolink 2013);
- Port Macquarie LGA Vegetation Communities and EECs digital data layer (Biolink 2013); and
- Coastal Quaternary Geology – North Coast of NSW digital data layer (Troedson & Hashimoto 2008).



## 2.0 Landscape Features & Site Context

### 2.1.Site Context

#### 2.1.1.IBRA bioregions and Subregions

The site is located in the NSW North Coast Bioregion and the Macleay-Hastings subregion. The site is located within the Wauchope Foothills Mitchell Landscape.

#### 2.1.2. Native Vegetation Extent

A 1500m buffer was established around the development site (Figure 4). Analysis with GIS has determined that there is 29% native vegetation cover within the 1500m buffer.

#### 2.1.3. Cleared Areas

Cleared areas occur over a large percentage of the development site, including the entirety of the service centre footprint. The cleared land comprised pasture grassland that is currently grazed by cattle (Photo 3). This is non-native vegetation and does not require assessment under the BAM. The remaining areas in the road reserves surrounding Lot 11 comprise native regrowth vegetation.

Photo 3: Cleared land on the development site





## 2.2.Landscape Features

The following table shows the presence of landscape features on the site and provides details of these features if present. The topography of the site is shown in Figure 5.

Table 1: Landscape features

Feature	Present on site?	Description	Present on adjoining land?	Description
Rivers and Streams	No	-	Yes	<ul style="list-style-type: none"><li>A first order stream is located to the south of the development site. This flows east under the Highway and eventually meets Karikere Creek.</li></ul>
Important Local Wetlands	No	-	No	-
Connectivity Features	Yes	Vegetation within the RMS road reserves provide some connectivity, however this habitat is exposed and high risk habitat located adjacent to the highway.	Yes	Extensive forested areas occur on adjacent land to the south and west which provide connectivity for flora and fauna.
Areas of Geological Significance (eg karst, caves, crevices, cliffs)	No	-	No	-
Soil Hazard Features	No	-	No	-
Areas of Outstanding Biodiversity Value	No	-	No	-





Figure 4: Native vegetation extent

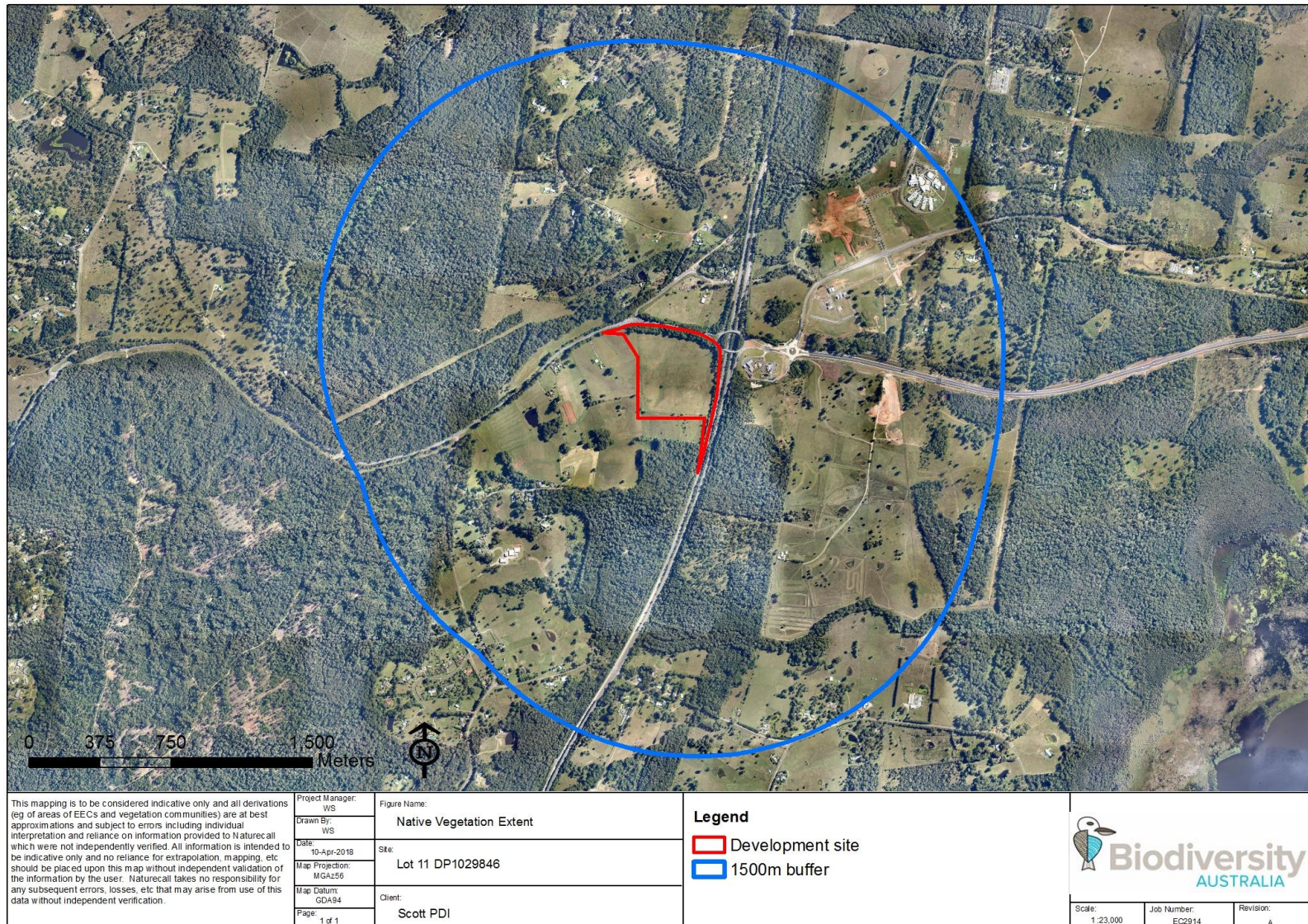
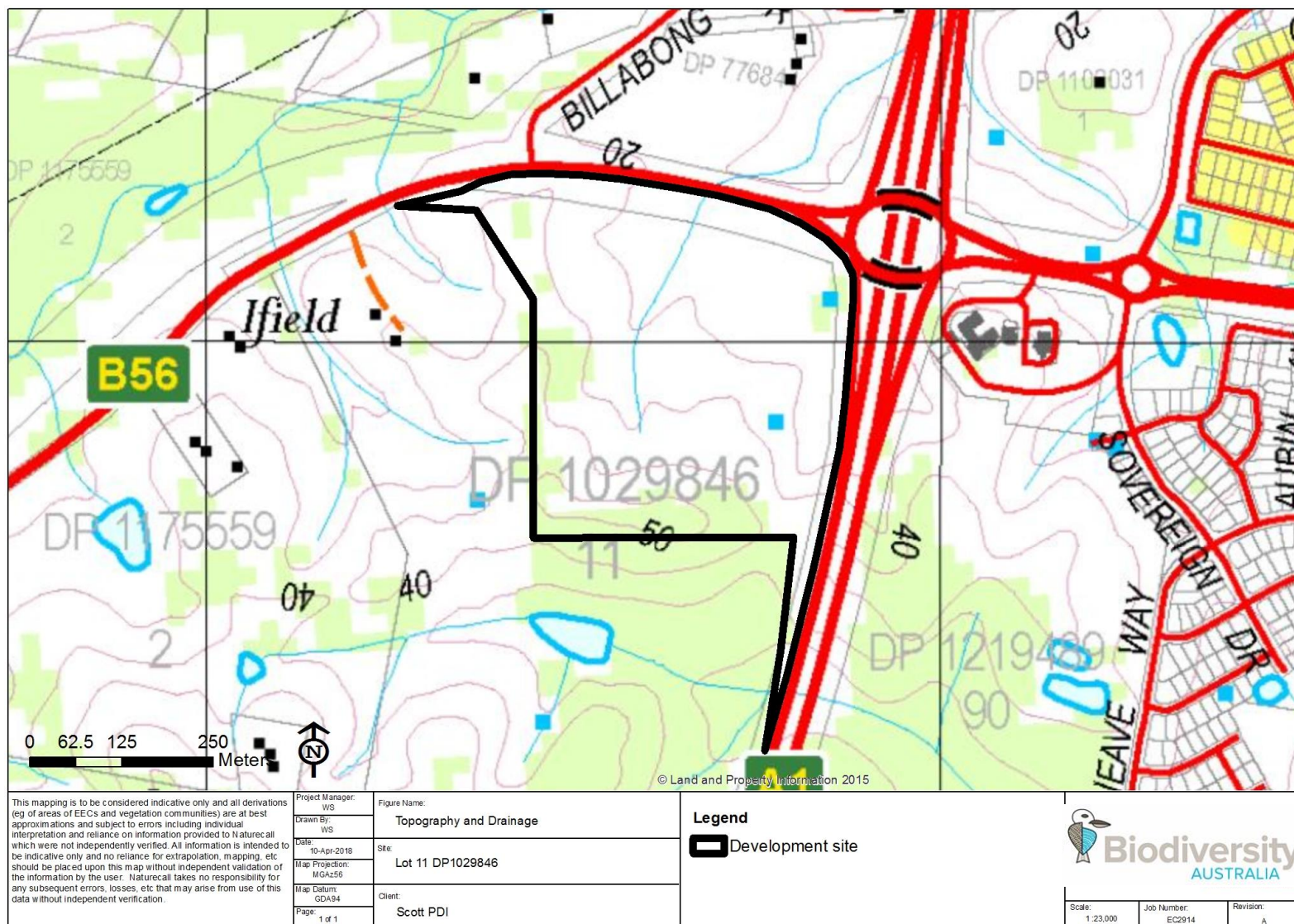






Figure 5: Topography and drainage





## 3.0 Native Vegetation

### 3.1. Survey Methods

#### 3.1.1. Vegetation Integrity Survey

Vegetation Integrity survey plots were undertaken on the development site as per the BAM methodology (OEH 2017). This consisted of a 20x20m plot in which floristic composition and structural attributes are collected, and 20x50m plot which collected ecosystem function attributes.

Two vegetation plots were undertaken over the site, which are both the development footprint (Figure 6). Location of the vegetation plots was selected based on existing vegetation mapping and analysis of satellite imagery, and aimed to sample a representative coverage of the site vegetation.

The following information was collected at each of the vegetation plots:

- Observer, location and date;
- Plot dimensions and orientation;
- Photographic record of vegetation;
- Vegetation Class and Plant Community Type (PCT);
- Physical features and disturbance history;
- Full flora list;
- Growth form, cover and abundance of each species;
- Exotic and High Threat Exotic (HTE) plant cover;
- Number of large trees;
- Recruitment;
- Presence of hollow-bearing trees;
- Length of logs; and
- Litter cover.

The field data collected was tallied and input into the BAM calculator to determine a vegetation integrity score for the vegetation zone.

#### 3.1.2. Vegetation Classification and Mapping

Vegetation communities were sampled by the vegetation plots described above and through walking random meander transects. Due to the limited extent of vegetation on the development site, this provided 100% coverage. The random meander transects also allowed for a more comprehensive flora inventory within the development site.

The vegetation communities were described from data collected during the vegetation plots and random meander transect studies. The vegetation classification is based on the NSW Plant Community Type (PCT) Classification and Local Government Area (LGA) wide vegetation community classification (Biolink 2013).

Flora species were identified to species or subspecies level and nomenclature conforms to that currently recognised by the Royal Botanic Gardens and follows Harden and PlantNET for changes since Harden.



## 3.2.Plant Community Types and Description

The following section provides a description of the PCTs within the development site that will be affected by the proposal. As described below, two PCTS were recorded in the development site.

The streamlined assessment module only requires identification of the dominant PCT on the development site. Given that Community 1 covers a larger area, it was chosen as the dominant PCT and was assigned a vegetation zone to cover both of the identified communities.

A map of the vegetation is provided in Figure 6.

### 3.2.1. Community 1

Table 2: Vegetation community 1 description

<b>Vegetation Community (NSW PCT)</b>	No. 1569 - Flooded Gum - Brush Box - Tallowwood mesic tall open forest on ranges of the lower North Coast
<b>Vegetation Class</b>	North Coast Wet Sclerophyll Forests
<b>Mapped PMHC Community</b>	No. 23: Blackbutt Shrubby Moist Forest/ No. 28 Grey Gum – Grey Ironbark Moist Forest
<b>Revised PMHC Community</b>	No 22: Flooded Gum Moist Riparian and Gully Forest
<b>EEC Status</b>	Not an EEC
<b>Key Species for ID</b>	Flooded Gum, Tallowwood
<b>Vegetation Zone</b>	1
<b>Number of Plots</b>	1
<b>Percent cleared</b>	Unknown
<b>Location and area</b>	Located in the north and east RMS road corridor adjoining the Pacific Highway and Oxley Highway. Covers an area of 1.9ha
<b>Description</b>	<p><b>a) Canopy:</b> <i>Structure and Species:</i> The canopy consists of an open to mid-dense layer of eucalypts 20-25m high. The dominant species are Flooded Gum (<i>Eucalyptus grandis</i>), Blackbutt (<i>Eucalyptus pilularis</i>) and Tallowwood (<i>Eucalyptus microcorys</i>) with lesser associates including Turpentine (<i>Syncarpia glomulifera</i>) and Brushbox (<i>Lophostemon confertus</i>).</p> <p><b>b) Understory:</b> <i>Structure and Species:</i> The understorey comprises a tree layer ranging from 8-12m in height. Dominant species comprise juvenile canopy species with lesser associates including Willow Bottlebrush (<i>Callistemon salignus</i>) and Red Ash (<i>Alphitonia excelsa</i>).</p> <p><b>c) Shrub Layer:</b> <i>Structure and Species:</i> Comprises an open layer of shrubs ranging from 1-4m in height. The dominant species recorded in this layer was Lantana* (<i>Lantana camara</i>)</p>





	<p>with other species including Cheese Tree (<i>Glochidion ferdinandi</i>), Scentless Rosewood (<i>Synoum glandulosum</i>), Tree Fern (<i>Cyathea cooperi</i>) and Coffee Bush (<i>Breynia oblongifolia</i>).</p> <p><b>d) Ground Layer:</b></p> <p><i>Structure and Species:</i> Groundcover is sparse to moderately dense depending on shrub/canopy cover. Height ranges from 0.1-0.7m. Species largely comprise Bordered Panic (<i>Entolasia marginata</i>), Spiny-headed Matrush (<i>Lomandra longifolia</i>) and Harsh Ground Fern (<i>Hypolepis muelleri</i>).</p> <p><b>e) Vines, scramblers, twiners:</b></p> <p>Occasional climbers are present in this community. These include Snake Vine (<i>Stephania japonica</i>), Monkey Rope (<i>Parsonsia straminea</i>) and Water Vine (<i>Cissus hypoglauca</i>).</p>
<b>Condition</b>	<p>This community comprises regrowth vegetation that has established since the highway construction. Weed cover is high and largely comprises Lantana thickets.</p>

Photo 4: Community 1 at Plot 2

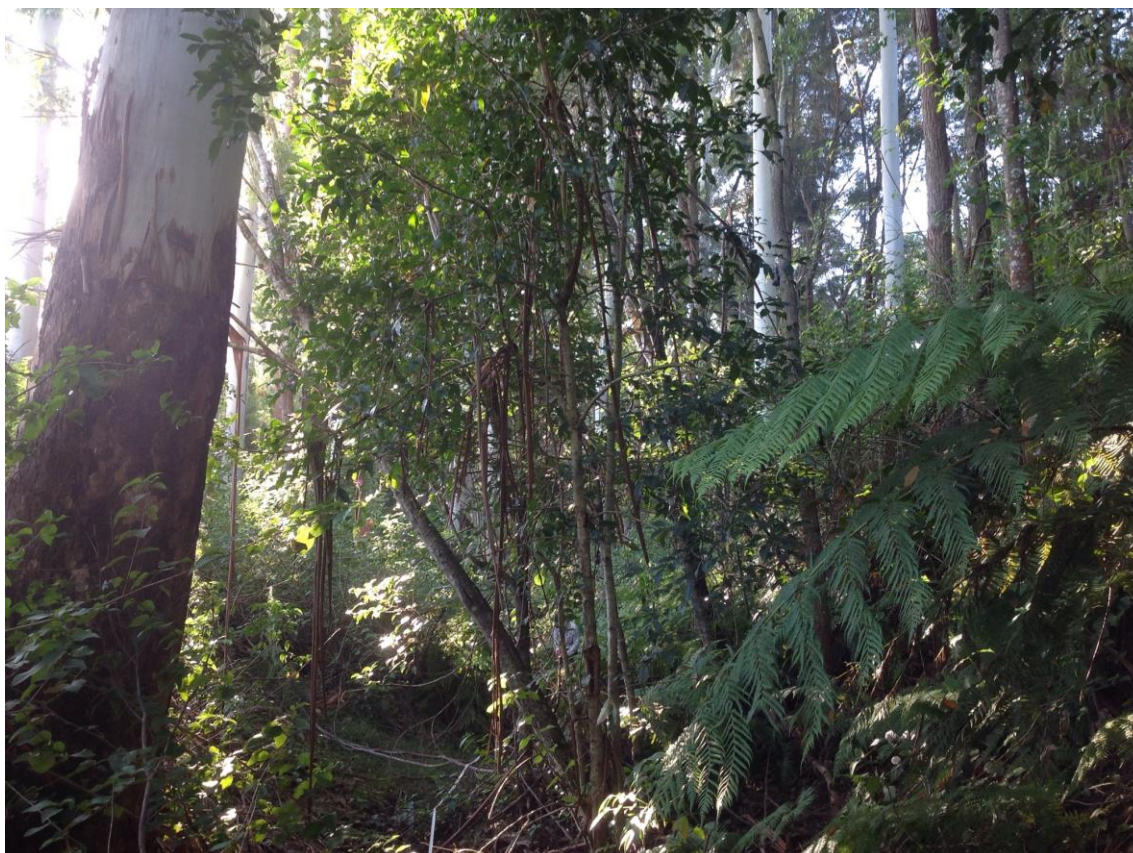




Photo 5: Community 1 looking north form Lot 11



### 3.2.2. Community 2

Table 3: Vegetation community 2 description

<b>Vegetation Community (NSW PCT)</b>	No. 695 - Blackbutt - Turpentine - Tallowwood shrubby open forest of the coastal foothills of the central NSW North Coast Bioregion
<b>Vegetation Class</b>	North Coast Wet Sclerophyll Forests
<b>Mapped PMHC Community</b>	No. 23: Blackbutt Shrubby Moist Forest/ No. 28 Grey Gum – Grey Ironbark Moist Forest
<b>Revised PMHC Community</b>	No. 23: Blackbutt Shrubby Moist Forest
<b>EEC Status</b>	Not an EEC
<b>Key Species for ID</b>	Blackbutt, Tallowwood, Forest Oak
<b>Vegetation Zone</b>	1
<b>Number of Plots</b>	1
<b>Percent cleared</b>	5%
<b>Location and area</b>	RMS Road Reserve in the north, located next to Oxley Highway. Also in the southeast. Covers an area of 1.1ha
<b>Description</b>	<p><b>a) Canopy:</b></p> <p><i>Structure and Species:</i> The canopy consists of an open to mid-dense layer of eucalypts 20-25m high. The dominant species are Blackbutt (<i>Eucalyptus pilularis</i>) and Tallowwood (<i>Eucalyptus microcorys</i>) with lesser associates including White Mahogany (<i>Eucalyptus acmenoides</i>) and Small-fruited Grey Gum (<i>Eucalyptus</i></p>





	<p><i>propinqua</i>).</p> <p><b>b) Understory:</b> <i>Structure and Species:</i> The understorey comprises a tree layer ranging from 8-15m in height. Species recorded in this layer were primarily juvenile canopy species along with occasional small trees including Sydney Golden Wattle (<i>Acacia longifolia</i>) and Forest Oak (<i>Allocasuarina torulosa</i>).</p> <p><b>c) Shrub Layer:</b> <i>Structure and Species:</i> Comprises an open layer of shrubs ranging from 1-3.5m in height. The dominant species recorded in this layer was Lantana* with other species including Tree Fern (<i>Cyathea cooperi</i>) and Coffee Bush.</p> <p><b>d) Ground Layer:</b> <i>Structure and Species:</i> Groundcover is moderately dense throughout. Height ranges from 0.1-0.7m. Species largely comprise Blady Grass (<i>Imperata cylindrica</i>), Spiny-headed Matrush and Bracken (<i>Pteridium esculentum</i>).</p> <p><b>e) Vines, scramblers, twiners:</b> Occasional climbers are present in this community. These include Appleberry (<i>Billardiera scandens</i>), Molucca Bramble (<i>Rubus moluccanus</i>) and <i>Desmodium rhytidophyllum</i>.</p>
<b>Condition</b>	This community comprises regrowth vegetation that has established since the highway construction. Weed cover is high and largely comprises Lantana thickets.

\* Denotes exotic species



Photo 6: Community 2 at survey plot 1



Photo 7: Community 2 looking southeast from Oxley Highway







## 3.3. Vegetation Integrity Assessment

### 3.3.1. Vegetation Zones and Integrity Scores

One vegetation zone has been mapped over the development footprint as required in the streamlined assessment module. The details of this zone is shown in the table below. This table also provides the vegetation integrity score for the zone which has been derived from the two BAM field plots undertaken. Figure 6 shows the location of the vegetation zone and PCTs.

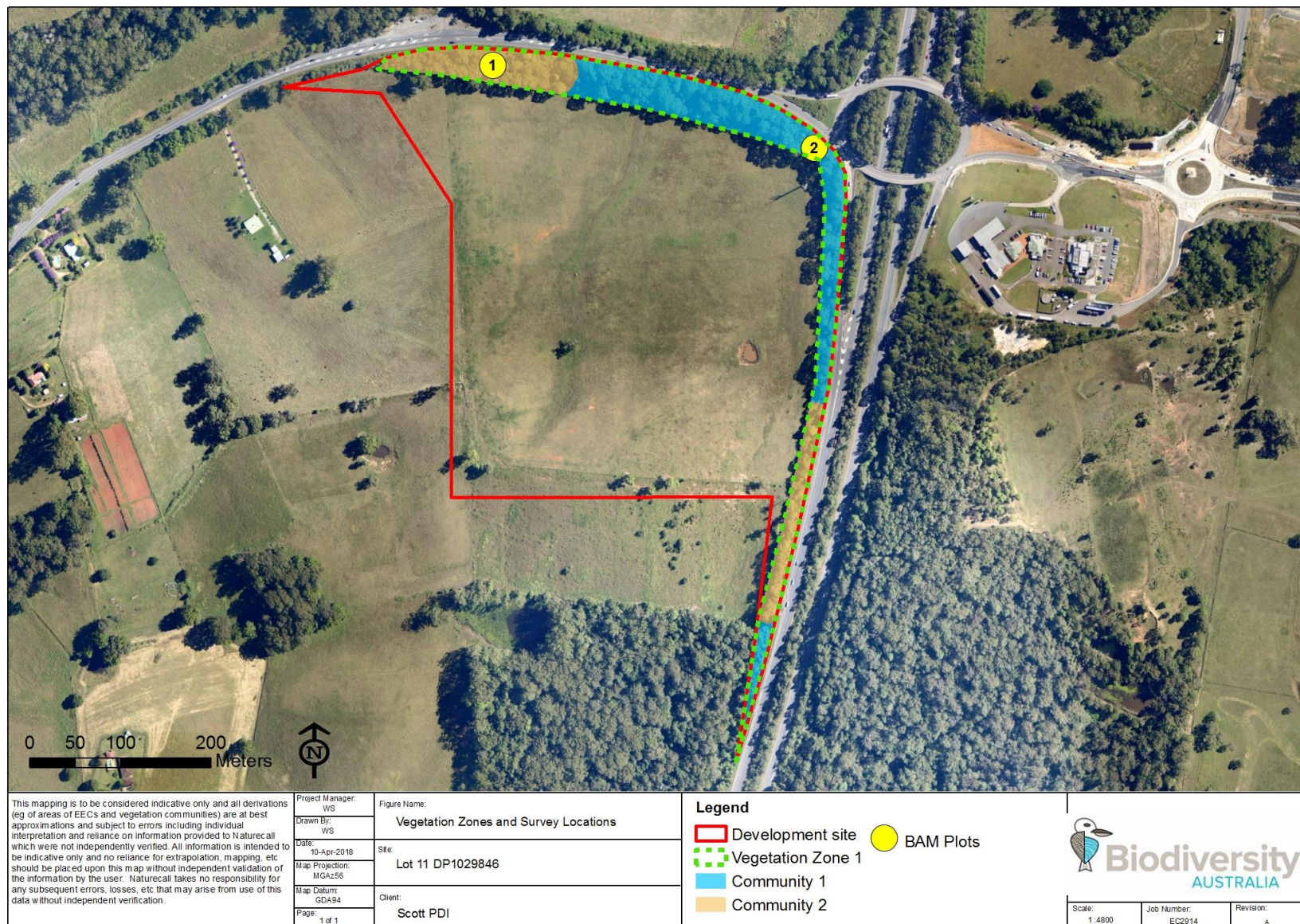


Table 4: Vegetation zone and integrity score

Vegetation Zone	Condition class	Community	Patch size category	Area Impacted	Vegetation Integrity Score			
					Composition	Structure	Function	Total
1	Moderate to good	Flooded Gum - Brush Box - Tallowwood mesic tall open forest on ranges of the lower North Coast	>100ha	3ha	61.3	36.2	66.1	52.8



Figure 6: Map of vegetation zone and survey locations





## 4.0 Threatened Species

### 4.1. Ecosystem Credit Species

Ecosystem credit species are threatened species which can be reliably predicted to occur by vegetation surrogates and landscape features. Targeted survey is not required for these species.

Some species which have specialised breeding requirements have dual credit classes to account for differences in foraging and breeding habitat. For example, Glossy Black Cockatoo foraging habitat can be reliably predicted through vegetation associations, however breeding habitat is specialised and requires hollow-bearing trees with hollows greater than 15cm diameter and greater than 5m above the ground (OEH Bionet 2018).

The BAM calculator produces a list of ecosystem credit species based on a number of attributes including Bioregion and subregion, patch size and the vegetation and habitat data collected in the field.

#### 4.1.1. List of Species Derived

The threatened species derived from the BAM calculator are presented in Table 5 below. These species have been predicted to occur based on the vegetation and habitat types present and are classed with ecosystem credits.

Table 5: Ecosystem credit species

Common Name	Scientific Name	Listing Status	
		BC Act	EPBC Act
Barking Owl (Foraging)	<i>Ninox connivens</i>	V	-
Eastern Bentwing-bat (Foraging)	<i>Miniopterus schreibersii oceanensis</i>	V	-
Eastern Freetail-bat	<i>Mormopterus norfolkensis</i>	V	-
Glossy Black-Cockatoo (Foraging)	<i>Calyptorhynchus lathami</i>	V	-
Grey-headed Flying-fox (Foraging)	<i>Pteropus poliocephalus</i>	V	V
Koala (Foraging)	<i>Phascolarctos cinereus</i>	V	V
Little Bentwing-bat (Foraging)	<i>Miniopterus australis</i>	V	-
Little Lorikeet	<i>Glossopsitta pusilla</i>	V	-
Masked Owl (Foraging)	<i>Tyto novaehollandiae</i>	V	-





Powerful Owl (Foraging)	<i>Ninox strenua</i>	V	-
Red-legged Pademelon	<i>Thylogale stigmatica</i>	V	-
Spotted-tailed Quoll	<i>Dasyurus maculatus</i>	V	E
Superb Fruit-Dove	<i>Ptilinopus superbus</i>	V	-
Varied Sittella	<i>Daphoenositta chrysoptera</i>	V	-
Yellow-bellied Sheath-tail-bat	<i>Saccolaimus flaviventris</i>	V	-

Listing Status Key: E – endangered; V – vulnerable; Dash – not listed.

## 4.2. Species Credit Species

Species credit species are threatened species or elements of their habitat that cannot be confidently predicted by vegetation surrogates and landscape features. Targeted survey is required for these species if the development site contains suitable habitat components and is within the predicted range of the species.

Candidate species credit species that have been derived from the BAM calculator are presented within Table 6 below. An assessment has been undertaken to determine if the habitat and geographic requirements are met within the development site, and if targeted survey is required. The table below also provides the survey timing for each species (from the OEH Threatened Species profile database) in which targeted surveys should be undertaken.



Table 6: List of candidate species credit species and survey requirements.

Common Name	Scientific Name	Listing Status		Habitat requirement met?	Geographic requirement met?	Candidate species for survey?	Survey timing
		BC Act	EPBC Act				
Fauna							
Glossy Black-Cockatoo (Breeding)	Calyptrorhynchus lathamii	V	-	Yes	Yes	Yes	Mar-Aug
Eastern Pygmy-possum	Cercartetus nanus	V	-	Yes	Yes, however sparse records in locality	Yes	Oct-Mar
Pale-headed Snake	Hoplocephalus bitorquatus	V	-	No – no suitable habitat	Yes, however not recorded in the LGA	No	-
Little Bentwing-bat (Breeding)	Miniopterus australis	V	-	Yes	Yes	Yes	Dec-Feb
Eastern Bentwing-bat (Breeding)	Miniopterus schreibersii oceanensis	V	-	Yes	Yes	Yes	Nov-Feb
Giant Barred Frog	Mixophyes iteratus	E	E	No – no suitable habitat	Yes	No	-
Southern Myotis	Myotis macropus	V	-	Partial – drainage lines and farm dam may offer marginal potential habitat	Yes	Yes	Nov-Mar
Barking Owl (Breeding)	Ninox connivens	V	-	Yes	Yes	Yes	May-Dec
Powerful Owl (Breeding)	Ninox strenua	V	-	Yes	Yes	Yes	May-Aug
Koala (Breeding)	Phascolarctos cinereus	V	V	Yes	Yes	Yes	Year round



Common Planigale	<i>Planigale maculata</i>	V	-	No – habitat considered to be unsuitable due to lack of dense undergrowth and disturbance history	Yes	No	-
Grey-headed Flying-fox (Breeding)	<i>Pteropus poliocephalus</i>	V	V	Yes	Yes	Yes	Oct-Dec
Masked Owl (Breeding)	<i>Tyto novaehollandiae</i>	V	-	Yes	Yes	Yes	May-Aug
<b>Flora</b>							
Trailing Woodruff	<i>Asperula asthenes</i>	V	V	No – no suitable habitat present	Yes	No	-
Guthrie's Grevillea	<i>Grevillea guthrieana</i>	E	E	No – no suitable habitat present	No	No	-
Slender Marsdenia	<i>Marsdenia longiloba</i>	E	V	Yes	Yes, however sparse records in LGA	<b>Yes</b>	Dec-Feb
Biconvex Paperbark	<i>Melaleuca biconvexa</i>	V	V	Yes	Yes	<b>Yes</b>	Year round
Milky Silkpod	<i>Parsonsia dorrigoensis</i>	V	E	Yes	Yes, however sparse records in LGA	<b>Yes</b>	Year round
Scant Pomaderris	<i>Pomaderris queenslandica</i>	E	-	Yes	Yes, however sparse records in LGA	<b>Yes</b>	Year round
Rainforest Cassia	<i>Senna acclinis</i>	E	-	Yes	Yes	<b>Yes</b>	Year round

Listing Status Key: E – endangered; V – vulnerable; Dash – not listed.



## 4.3. Targeted Survey Methods

A targeted survey was undertaken for the candidate species identified in Table 6. This was undertaken by a BAM Accredited Principal Ecologist and Ecologist under Bio Aus's scientific licence and animal research authority. A detailed description of the survey methods used is provided in the following sections.

### 4.3.1. Flora Survey

A targeted survey for the following threatened flora species was undertaken over the development site:

- Slender Marsdenia
- Biconvex Paperbark
- Milky Silkpod
- Scant Pomaderris
- Rainforest Cassia

The survey methodology consisted of parallel field traverses as per the *NSW Guide to Surveying Threatened Plants* (OEH 2016). The dense understorey, high weed cover and steep terrain present in places prevented thorough searches over some parts of the site, however the habitats most likely to support threatened flora were searched thoroughly.

These searches were carried out by two ecologists during three separate survey periods on the 29<sup>th</sup> November 2017, 22<sup>nd</sup> February 2018 and between 27<sup>th</sup> March and 4<sup>th</sup> April 2018.

Opportunistic searches for threatened flora species were also undertaken during the vegetation plot surveys and other activities on the site.

### 4.3.2. Fauna Survey

In consideration of the survey requirements of the candidate threatened fauna species (DEC 2004, DECC 2009), the following survey methods were utilised:

- Habitat evaluation
- Searches for secondary evidence e.g. scats and tracks
- Diurnal bird survey
- Passive Infra-Red (PIR) cameras
- Spotlighting and torch searches
- Microbat call recording and analysis
- Call playback and detection.

The main fauna survey period was undertaken between 27<sup>th</sup> March and 5<sup>th</sup> April. Fauna surveys for previous studies on the site were undertaken on 29<sup>th</sup> November 2017 and 22<sup>nd</sup> February 2018. A detailed description





of the methods is provided in the following sections.

#### **4.3.2.1. Habitat Evaluation**

This method was employed to assess the suitability of the development site habitats for the candidate threatened species.

Habitats on and adjacent to the development site were defined and assessed according to parameters such as:

- Structural and floristic characteristics of the vegetation e.g. understorey type and development, crown depth, groundcover density, etc.
- Degree and extent of disturbance e.g. fire, logging, weed invasion, modification to structure and diversity, etc.
- Presence of water in any form e.g. rivers, dams, creeks, drainage lines, soaks.
- Size and abundance of hollow-bearing trees and fallen timber.
- Availability of shelter e.g. rocks, logs, hollows, undergrowth.
- Wildlife corridors, refuges and proximate habitat types.
- Presence of mistletoe, nectar, gum, seed, sap, etc. sources.

#### **4.3.2.2. Secondary Evidence/Habitat Searches**

Physical habitat searches involved lifting up of any timber, rocks and debris, and inspection of dense vegetation and leaf litter for frogs and reptiles; binocular inspection of trees; searches for nests; and searches for scats, owl regurgitation pellets, tracks and scratches. Dedicated scat searches for Koala scats were undertaken under all primary browse trees within the development footprint in Lot 11 and in the RMS road reserves where access allowed.

A total of four hours was spent on habitat and secondary evidence searches.

#### **4.3.2.3. Diurnal Bird Survey**

This involved passive surveys (eg listening for bird calls) and active observation/binocular searches while walking around the entire site; and opportunistically during other activities. Bird surveys were undertaken primarily within two hours of dawn or dusk to coincide with periods of peak activity.

A total of six hours was spent on bird surveys over the course of three separate surveys.

#### **4.3.2.4. Passive Infrared Camera Stations**

Seven Stealthcam STC-G34 infra-red cameras were deployed on site for a period of 10 days.

Three were mounted on trees at a height of approximately four metres facing a hair tube on a platform to target arboreal species, specifically the Squirrel Glider and Eastern Pygmy Possum. The remaining four were placed on trees at approximately 0.5m facing a hair tube placed on the ground. The hair tubes were baited with a mixture of oats, peanut butter, honey, vanilla essence and apple.



The location of the PIR cameras is shown in Figure 7.

#### **4.3.2.5. Spotlight Survey**

Spotlighting was conducted for two hours per night over four nights. The procedure involved walking with a hand held 1100 lumen LED spotlight over the development site, targeting the trunks and branches of canopy trees and understorey, and periodically scanning the ground. Torch searches were conducted around the extent of the road reserve.

The target species for spotlighting were the Koala, Squirrel Glider, Grey-headed Flying Fox and Eastern Pygmy-possum.

#### **4.3.2.6. Microbat Call Detection and Analysis**

Microchiropteran bat call detection was undertaken using two Anabat Express units (Titley Scientific) set along the edges of the open forest of the road reserve (location shown in Figure 7). The units were left on site to record for ten nights.

The recordings were forwarded to Dr Anna McConville of Echo Ecology, a bat call identification consultant, for identification of the bat species.

#### **4.3.2.7. Call Playback Survey**

The Koala, Barking Owl, Powerful Owl and Masked Owl were the main target species for the call playback survey, and calls of these species were broadcast prior to and after spotlighting surveys. Recorded calls of the Squirrel Glider and Yellow-bellied Glider were also broadcast during the call playback survey.

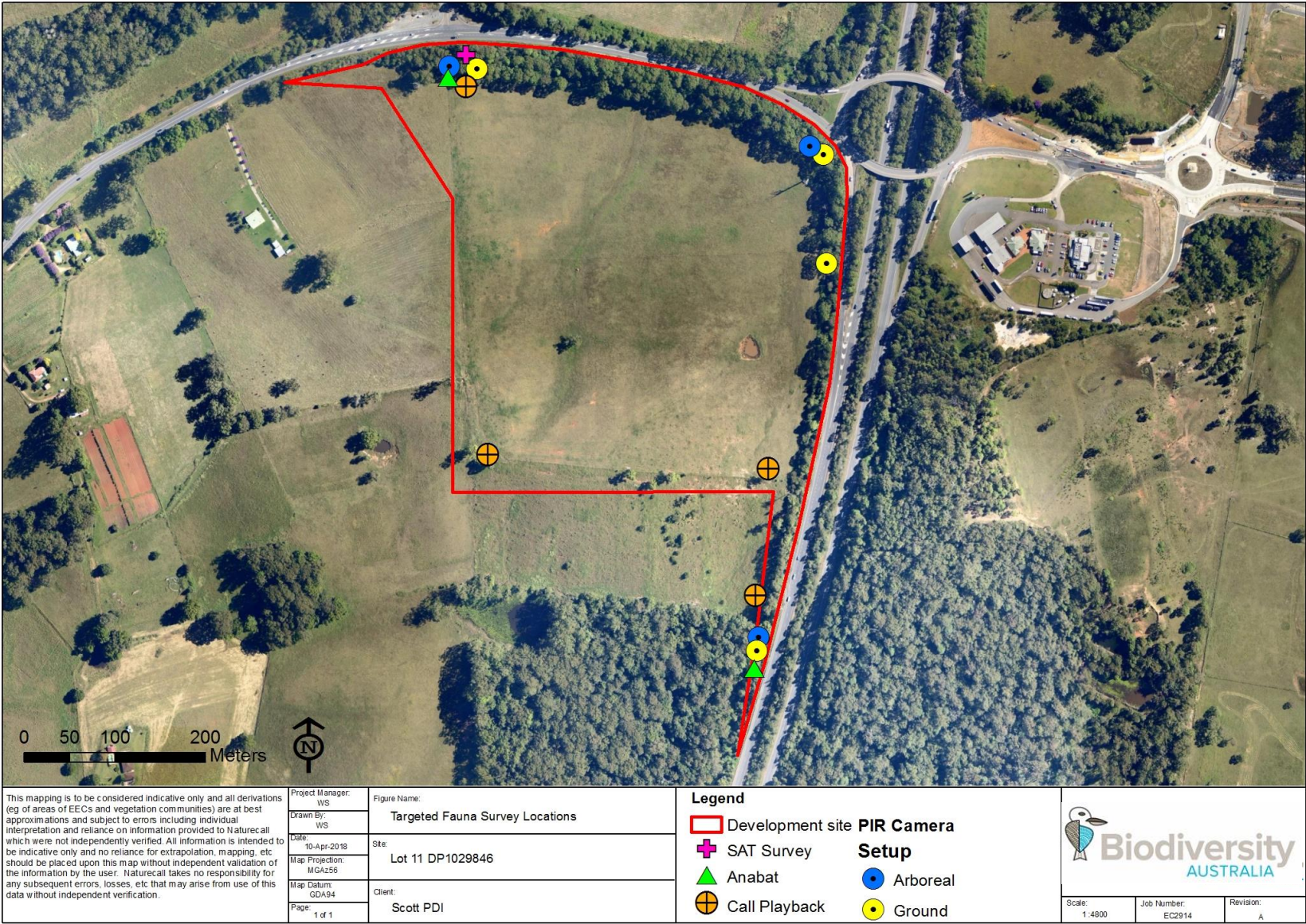
Calls were played through a portable MP3 player via a 55W PA system from multiple separate locations at a sound level approximating natural intensities for the target species. The general methodology involved an initial period of listening and spotlighting; followed by playback of the calls simulating a natural pattern.

Playback was utilised over four nights. The location of call playback surveys is shown in Figure 7.





Figure 7: Location of fauna surveys





### 4.3.3. Survey Timing and Limitations

#### 4.3.3.1. Fauna

Fauna detectability is limited by seasonal, behavioural or lifecycle characteristics of each species, and even by habitat variations (e.g. flowering periods), which can occur within a year, between years, decades, etc. (DEC 2004).

The fauna survey period fell in late summer which is a period of high activity for arboreal mammals, Microchiropteran bats, frogs and birds, (DEC 2004). Longitudinal and latitudinal migrants such as the Swift Parrot would not be present at this time of year. Rainfall preceding and during the survey increased the potential for frog detection for species known to breed at this time of year.

The survey timing coincided with the recommended survey period for all of the target fauna species except for the breeding season of the Powerful Owl and Masked Owl between May and August. The survey period is not considered to be a limitation on the detection of these species as foraging individuals are still likely to occur in the area outside of breeding season and there was no suitable breeding habitat detected on the development site.

To counter any limitations, qualitative and quantitative habitat evaluation was used as well as a standard ecological field survey to assess the site's significance to threatened species.

#### 4.3.3.2. Flora

The survey period fell within the recommended survey period for all of the target flora species. The warm conditions and rainfall is likely to have triggered flowering events for these species which would make them easily detectable if present.

### 4.3.4. Weather Conditions

The weather over the survey period was generally fine and sunny, however rainfall and storms also occurred as few days prior to the most recent survey period.

Minimum temperatures ranged from 14.7°C to 19.1°C with maximum temperatures ranging from 25.0°C to 27.7°C (BOM 2018 - nearest weather station at Port Macquarie airport).

Storms occurred on the 22-24<sup>th</sup> March (three days prior to the last survey period commenced) with a total of 256.4mm of rainfall recorded over the three days. Other key rainfall events occurred on 21<sup>st</sup> February 2018 (14.6mm recorded) and on the 23<sup>rd</sup> November 2017 (10.8mm recorded).

The moon phase over the survey period ranged from a waxing gibbous to waxing crescent with a full moon on the 31<sup>st</sup> March. No survey dates aligned with a new moon.





## 4.4.Targeted Survey Results

### 4.4.1.Fauna

#### 4.4.1.1. Habitat Features

The development site was found to be in a modified state as a result of historical clear-felling logging, along with more recent disturbances such as weed invasion and cattle grazing. Most of the vegetation assessed comprised regrowth that has grown since the Pacific Highway upgrade was completed in 1990.

A range of habitat features were recorded which are described in the following table.

Table 7: Summary of site habitat values

Habitat/ Attribute Type	Development site	Potential Values to Threatened Species Occurrence
Groundcover	Open groundcover of native grasses and herbs occurs in forest patches.	Forested areas containing native groundcover may provide cover for common species such as native and exotic rodents, frogs and reptiles.
Leaf litter	Forest patches contain some leaf litter, especially around canopy trees.	No significance for any threatened species.
Logs and debris	A few partially decayed fallen logs and stumps are present within the study site.	Only likely to provide habitat for common rodents and reptiles.
Hollows	Absent	Absence of hollows on site is a critical habitat limitation for hollow-obligate fauna species.
Nectar Sources	A mix of spring/summer flowering eucalypt species present on site which would provide a seasonal nectar source.	Small potential nectar source for the Grey-headed Flying Fox and Little Lorikeet.
Sap and gum sources	Pink Bloodwood is a rare occurrence within the site. This is a preferred sap source for the Squirrel Glider. Other eucalypt species on site are less preferred.	Vegetation in the study area contains a very minor potential sap resource for the threatened Squirrel Glider.
Primary preferred Koala browse trees	The site contains Tallowwood which is a preferred Koala food tree. These are most common in the east adjacent to the Pacific Highway.	Site contains a potential foraging resource for Koalas. Scat searches were undertaken within the site and no Koala scats were found.
Allocasuarinas	Site contains scattered Forest Oak trees which are preferred foraging species for the Glossy Black Cockatoo.	Site contains some foraging resources for Glossy Black-cockatoo. No evidence of feeding (chewed cones) was observed during the survey.



Habitat/ Attribute Type	Development site	Potential Values to Threatened Species Occurrence
Aquatic/wetland habitats	A small farm dam is present on the site (Photo 8)	Dam does not provide suitable habitat for any threatened species. Likely to be used by common frogs and waterfowl.
Fruiting species	Very few fruiting species occur on the site.	Lack of potential foraging resources for threatened frugivores such as Wompoo Fruit-dove, Rose-crowned Fruit-dove, Barred Cuckoo Shrike and the Grey Headed Flying Fox.
Caves, cliffs, overhangs, culverts, bridges	Absent aside from two concrete drain pipes which pass under the highways adjacent to the site.	Potential non-breeding roosts for obligate Microbats. Drains were inspected and no bats were recorded roosting.
Corridors	The site does not fall within a mapped corridor.	N/A
Habitat Linkages	<p>The road reserve vegetation within the subject site currently provides a narrow habitat linkage. This adjoins larger areas of forest on private land in the south.</p> <p>It also provides a tenuous linkage west along the Oxley Highway to Cowarra State Forest.</p> <p>These habitat linkages are however narrow and subject to edge effects, and other disturbances such as noise and light from the highway traffic. Fauna using these linkages would also be placed at heightened risk of road strike.</p>	<p>The vegetation within the site could potentially be used by a range of fauna species including small terrestrial species dependant on continuous cover and arboreal species such as the Koala and Squirrel Glider.</p> <p>Highly mobile species (e.g. birds and bats) would be able to move freely through the site.</p>
Key Habitat	The site is not mapped as Key Habitat by OEH.	N/A



Photo 8: Farm dam within the development site



#### 4.4.1.2. Observed/Detected Fauna

Across all surveys, a range of fauna species were detected over the site. Birds were the most common species detected (19), followed by mammals (16), a single reptile and single amphibian (Photos 9-12).

Five threatened fauna species were detected throughout the survey period which comprised the Masked Owl (*Tyto novaehollandiae*), East-coast Freetail Bat (*Mormopterus norfolkensis*), Eastern Bentwing Bat (*Miniopterus schreibersii oceanensis*) and Little Bentwing Bat (*Miniopterus australis*) which are listed as Vulnerable under the BC Act as well as the Grey-headed Flying Fox (*Pteropus poliocephalus*) which is listed as Vulnerable under the BC Act and EPBC Act.

The Masked Owl responded to the call playback broadcast and was also captured on a Passive Infrared Camera (Photo 9). There is not suitable breeding habitat on the development site for this or other owl species.

The Grey-headed Flying Fox was detected on several occasions during the spotlighting surveys. There is not suitable breeding habitat on the site for this species and the nearest known breeding camp is at Kooloonbung Creek in Port Macquarie.

The East-coast Freetail Bat, Eastern Bentwing Bat and the Little Bentwing Bat were detected via Microbat call recording units (Anabats).

Appendix 1 provides the total fauna list for the site and the method of detection. Appendix 4 provides a copy of the Microchiropteran bat analysis.





Photo 9: Masked Owl



Photo 10: Brush-tailed Possum







Photo 11: Fox



Photo 12: Red-necked Wallaby





#### 4.4.1.3. Species Credit Species

##### Species detected

The following table provides a list of the candidate species credits species subject to targeted survey. As shown in the table below, four species credit species were detected foraging over the development site.

Table 8: Species credit species (fauna) survey results

Common Name	Scientific Name	Targeted survey guidelines met?	Species detected?
Glossy Black-Cockatoo (Breeding)	<i>Calyptrorhynchus lathamii</i>	Yes	No
Eastern Pygmy-possum	<i>Cercartetus nanus</i>	Yes	No
Little Bentwing-bat (Breeding)	<i>Miniopterus australis</i>	Yes	Yes
Eastern Bentwing-bat (Breeding)	<i>Miniopterus schreibersii oceanensis</i>	Yes	Yes
Southern Myotis	<i>Myotis macropus</i>	Yes	No
Barking Owl (Breeding)	<i>Ninox connivens</i>	Yes	No
Powerful Owl (Breeding)	<i>Ninox strenua</i>	Yes	No
Koala (Breeding)	<i>Phascolarctos cinereus</i>	Yes	No
Grey-headed Flying Fox (Breeding)	<i>Pteropus poliocephalus</i>	Yes	Yes
Masked Owl (Breeding)	<i>Tyto novaehollandiae</i>	Yes	Yes



## Habitat components and credit requirement

The following table shows the species credit species detected on site and whether the suitable habitat components are present on site.

Table 9: Habitat components for species credit species recorded

Common Name	Credit Class	Biodiversity Risk Weighting	Habitat components (breeding)	Present on site?	Credits required?
Little Bentwing-bat ( <i>Miniopterus australis</i> )	Ecosystem /species (breeding)	3.00	Caves, tunnels, mines, culverts	None of these habitat components occur on site. Two concrete drain pipes occur, however these may only be used as non-breeding temporary roosts	No
Eastern Bentwing-bat ( <i>Miniopterus schreibersii oceanensis</i> )	Ecosystem /species (breeding)	3.00	Caves, tunnels, mines, culverts	As above	No
Grey-headed Flying Fox ( <i>Pteropus poliocephalus</i> )	Ecosystem /species (breeding)	2.00	Breeding camps	There are no breeding camps located within the development site.	No
Masked Owl ( <i>Tyto novaehollandiae</i> )	Ecosystem /species (breeding)	2.00	Tree hollows	No hollow-bearing trees are located within the development site, hence there is not potential breeding habitat present.	No

As shown in the above table, the habitat components required for the Masked Owl, Grey-headed Flying Fox and Microbats to breed are not present on the site. As such, credits for breeding habitat for this species are not required. The foraging habitat for these species will be offset through ecosystem credits.

### 4.4.2. Flora

As shown in Table 10 below, the targeted threatened flora surveys did not detect any threatened flora species over the development site. As such, there is no offset requirement for threatened flora species and they are not considered further.



Table 10: Species credits species (flora) survey results

Common Name	Scientific Name	Targeted survey guidelines met?	Species detected?
Slender Marsdenia	<i>Marsdenia longiloba</i>	Yes	No
Biconvex Paperbark	<i>Melaleuca biconvexa</i>	Yes	No
Milky Silkpod	<i>Parsonsia dorrigoensis</i>	Yes	No
Scant Pomaderris	<i>Pomaderris queenslandica</i>	Yes	No
Rainforest Cassia	<i>Senna acclinis</i>	Yes	No





## 5.0 Avoidance and Minimisation

### 5.1. Impact Avoidance

The proposed development will avoid areas of high quality vegetation and habitat on the subject land. This vegetation is located in the south of the land and comprises a 10ha patch of intact open forest. This forest contains a number of habitat features such as hollow-bearing trees and a first order stream. It forms part of a larger areas of forest which extends further south and has linkages to Cowarra State Forest to the west.

Sections of the vegetation in the RMS road reserves require removal to establish access to the new service centre and upgrade the Port Macquarie exit ramp. All other vegetation in the road reserves will be removed at the request of RMS to bring the steep road batters to the same level as the highway to improve safety and aesthetics for road users.

### 5.2. Measures to Minimise Impacts

The proposal would be subject to a number of mitigation measures and environmental controls to reduce the overall impact of the development on biodiversity and ensure potential offsite impacts are minimised.

#### 5.2.1. General Clearing Measures

The area to be cleared should be clearly marked prior to clearing in order to prevent inadvertent clearance beyond what is required and has been assessed.

Site induction is to specify that no clearing is to occur beyond the marked area, and vehicles are only to be parked in designated areas. Clearing and earthworks is to avoid damage to root zones of any retained trees and no materials or fill are to be placed under retained trees or within adjacent vegetation.

No further clearing is to be undertaken outside of that required for the earthworks and levelling of the steep road batters within the RMS road reserves surrounding the proposed highway service centre site.

#### 5.2.2. Pre-clearing Survey and Clearing Supervision

The following ameliorative measures should be carried during clearing works on site.

1. The clearing extent is to be inspected for Koalas and other fauna by a qualified ecologist immediately prior to commencement of any vegetation removal involving machinery and/or tree-felling. This is to occur each morning if clearing spans over multiple days/weeks.
2. If a Koala is present in an area subject to vegetation removal/modification, works must be suspended until the Koala moves along on its own volition. If the Koala is located in a position that a 50m buffer may be established, works may proceed outside this buffer.
3. The ecologist is to remain on site to supervise tree removal and dewatering of dams to retrieve any fauna detected during works, manage any fauna interactions and ensure Koalas do not enter the site during clearing works.



4. If any exotic aquatic species are captured during the dam dewatering (e.g. carp) they are to be euthanised on site by the ecologist. Any native aquatic species captured during the dam dewatering are to be released in suitable aquatic habitat nearby (e.g. Karikere Creek).

These provisions are in line with the guidelines stipulated within the NSW Government – Roads and Traffic Authority (now RMS), Biodiversity Guidelines 2011.

### 5.2.3. Donation of Foliage

The Koala Hospital and/or Billabong Wildlife Park are also to be contacted for interest in collecting the foliage and limbs of the fallen Tallowood.

Due to chemical changes in the leaves, foliage must be collected as soon as possible after felling, hence collectors must be contacted and arranged prior to felling.

### 5.2.4. Weed Control

Disturbance of the subject site's soils has potential to encourage weed invasion. Hence, it is recommended that:

- Disturbance of vegetation and soils on the site should be limited to the areas of the proposed work and should not extend into adjacent vegetation;
- All plant used for clearing and construction works is certified as weed free;
- Appropriate collection and disposal of all weed material removed via clearing;
- Any recent weed invasions within the development area should be removed, and
- Ongoing weed control in the development area.

### 5.2.5. External Lighting

External lighting must not result in light spillage on the retained vegetation to the south as it can deter arboreal fauna usage (especially Squirrel Gliders) or advantage predators.

### 5.2.6. Soil Erosion and Sedimentation Control

A number of mitigation measures to reduce the potential for erosion and sedimentation are proposed. The main measure will be placement of felled trees along contours/terraces to reduce the potential for erosion.

Other measures to be carried out consist of using silt fences and hay bales to reduce any sediment laden runoff reaching the creek in the west of the property. Following the earthworks, grass will be allowed to establish along the terraced areas. This, along with planting of fruit trees will significantly reduce the potential for erosion during the operational phase.

## 5.3. Mitigation Measure summary

The following table provides a summary of the mitigation measures and the timing and responsibility.



Table 11: Mitigation measure summary

Number	Mitigation measure	Timing	Responsibility
1	Clearing management	Prior to clearing	Clearing contractor/surveyor
2	Pre-clearing survey	Prior to clearing	Ecologist
2	Fauna spotter	During clearing	Ecologist
3	Donation of foliage	During clearing	Clearing contractor
4	Weed control	After clearing and earthworks	Bush regenerator
5	External lighting	During construction	Construction contractor
6	Erosion and sedimentation control	Prior to/during/after clearing and earthworks	Civil contractor

## 5.4.Impacts Unable to be Avoided

### 5.4.1. Vegetation and Habitat Removal

There will be some vegetation removal associated with the proposal. This is required to removal to establish access to the new service centre, upgrade the Port Macquarie exit ramp and level the steep highway batters. Vegetation removal is likely to be long-term and in line with the lifespan of the overall use of the service centre site. No further vegetation loss will be required through the operational phase of the development. Native vegetation loss associated with the proposal will total approximately 3ha. This loss will be offset through biodiversity credits.

The vegetation affected may provide foraging habitat for a number of fauna species. This includes nectar and prey habitat for birds, Microbats and flying foxes. No hollow-bearing trees will require removal.

### 5.4.2. Indirect Impacts

The following potential indirect impacts may be associated with the proposal:

- a) Injury/mortality during clearing:** No hollow-bearing trees occur on site, hence the risk of fauna mortality during clearing is low. Presence of an ecologist during all clearing activities will mitigate any risks of injury to fauna. In addition, a farm dams will also require draining. This dams may contain fish species, amphibians or turtles. It is recommended that dewatering activities are supervised by an ecologist.

Koalas are also at risk of injury if they are present on site at the time of clearing. An ecologist /fauna spotter must be present prior to and during clearing activities to search for Koalas and ensure they do not enter the site.

- b) Edge effects:** Most of the vegetation on site and in the study area is currently exposed to edge



effects due to current land use practices, historic clearing and the adjoining highways. The proposal is unlikely to lead to increased edge effects.

- c) Increased human presence:** The site is currently vacant and has very little human presence. Human presence will significantly increase over time both on site and in the area as the total development is completed. This has the potential to impact some fauna species that are not accustomed to human presence and other associated effects such as noise and lighting. Given that no habitat will be retained on the site, this has the greatest potential to impact sensitive fauna (e.g. via avoidance, behavioural changes etc.) in adjoining forested areas to the south.
- d) Erosion and sedimentation:** Standard mechanisms and controls should ensure the prevention of erosion and sedimentation during construction and post-development and such impacts do not extend beyond the development footprint.
- e) Noise and vibration:** : Fauna occurring in the study area are likely to be accustomed to existing noise levels given that the Oxley and Pacific Highways are located nearby. The construction phase is unlikely to significantly increase noise levels beyond that which already occurs in the study area and will be diurnal only.
- f) Road kill:** Access roads to the new service centre, and internal roads, are unlikely to increase the incidence of road kill as they will not bisect habitat (all vegetation in RMS road corridors will be removed) and will be low speed.
- g) Artificial Lighting:** Exterior lighting will be required for the service centre. This can have negative effects on native fauna if it is directed into adjacent vegetation. It is recommended that any exterior lighting proposed is not directed into adjoining vegetation to the south.
- h) Introduction of feral and domestic predators:** The proposal will not involve the introduction of any new species to the site which may prey on native wildlife.

## 5.5. Serious and Irreversible Impacts

Section 6.5 of the *Biodiversity Conservation Act 2016* requires developments to consider Serious and Irreversible Impacts on threatened species and ecological communities which meet the following criteria:

- are in a rapid rate of decline
- have a very small population size
- have a very limited geographic distribution
- are unlikely to respond to measures to improve habitat.

These criteria have been applied to all threatened species and ecological communities listed under the BC Act. Entities that meet the criteria under one or more principles are identified as 'potential' SAIL species/communities in the guidance document *Guide to assist decision-maker to determine a serious and irreversible impact* (OEH 2017).

Review of this document has determined that none of the species recorded on the development site are listed as potential SAIL species, and hence no assessment of SAIL is required.





## 6.0 Impact Summary

### 6.1.Ecosystem Credits

The following table details the credit requirement for the single vegetation zone that will be impacted by the development. The full credit report is provided in Appendix 3.

Table 12: Ecosystem credits required

Zone	PCT Name	Current Integrity Score	Future Integrity Score	Change in Integrity Score	Biodiversity Risk Rating	Credit Requirement
1	Flooded Gum - Brush Box - Tallowwood mesic tall open forest on ranges of the lower North Coast	52.8	0	-52.8	1.50	59

### 6.2.Species Credits

As previously discussed, there is not requirement for species credits as part of this proposal.



## 7.0 Conclusion

This report has assessed the impact of establishing a highway service centre on Lot 11 DP 1029846 Oxley Highway, Sancrox. This will require the removal of about 3ha of native vegetation within the development footprint.

The development requires consent under Part 4 of the Planning and Assessment Act. The amount of clearing required for the proposal has triggered the requirement for application of the Biodiversity Assessment Method and a Biodiversity Development Assessment Report. The proposal can be assessed using the small area development streamlined assessment module.

Two vegetation communities were identified in the development footprint and these were amalgamated into a single vegetation zone. The total area of native vegetation that will require removal is 3ha. This impact is recommended to be offset through purchase and retirement of appropriate ecosystem credits as described in this report.

No threatened flora species were detected on site and given the significant disturbance history, none are considered potential occurrences. None of the vegetation on the development site is listed as an Endangered Ecological Community.

The targeted fauna survey detected one threatened fauna species included within ecosystem credits (East-coast Freetail Bat) and four threatened fauna species requiring species credits for breeding habitat. Those requiring species credits comprised of the Masked Owl, Grey-headed Flying Fox, Eastern Bentwing Bat and Little Bentwing Bat. There is however no suitable breeding/roosting/nesting habitat on the site for these species and they would only use the site foraging as a small part of their range. As such, no species credits are required for the proposal.

The development has avoided the most significant areas of vegetation on the subject land which occur in the southwest. A number of mitigation measures are proposed to minimise the impact of the proposal on flora and fauna.

Direct impacts of the proposal will be limited to vegetation and habitat removal. Indirect impacts that may be associated with the proposal are considered to be minor and can be mitigated through the measures described in Section 5.2.

An assessment of Serious and Irreversible Impacts has found that there are no potential SAIL entities associated with the proposal. Further, the proposal will not have any effect on Areas of Outstanding Biodiversity Value.



## 8.0 References

- Biolink (2013a). Vegetation of the Port Macquarie-Hastings Local Government Area. Unpublished report to PMHC, Port Macquarie. Biolink Ecological Consultants, Uki, NSW.
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# Appendix 1: Fauna Species List

Group	Common Name	Species	Detection Method
Birds	Australian Magpie	<i>Cracticus tibicen</i>	Vis, HC
	Masked Owl	<i>Tyto novaehollandiae</i>	Cam, HC
	Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>	HC
	Brown Thornbill	<i>Acanthiza pusilla</i>	Vis, HC
	Eastern Yellow-robin	<i>Eopsaltria australis</i>	Vis, HC
	Grey Fantail	<i>Rhipidura albiscapa</i>	Vis
	Golden Whistler	<i>Pachycephala pectoralis</i>	HC
	Laughing Kookaburra	<i>Dacelo novaeguineae</i>	HC
	Lewin's Honeyeater	<i>Meliphaga lewinii</i>	HC
	Magpie Lark	<i>Grallina cyanoleuca</i>	Vis
	Rainbow Lorikeet	<i>Trichoglossus haematodus</i>	HC
	Sacred Kingfisher	<i>Todiramphus sanctus</i>	Vis
	Silvereye	<i>Zosterops lateralis</i>	Vis
	Southern Boobook	<i>Ninox novaeseelandiae</i>	Vis
	Superb Fairywren	<i>Malurus cyaneus</i>	Vis, HC
	Tawny Frogmouth	<i>Podargus strigoides</i>	Vis
	Torresian Crow	<i>Corvus orru</i>	Vis, HC
	Willy Wagtail	<i>Rhipidura leucophrys</i>	Vis, HC
	Yellow Thornbill	<i>Acanthiza nana</i>	Vis, HC
Mammals	Black Rat	<i>Rattus rattus</i>	Cam
	Chocolate Wattled Bat	<i>Chalinolobus morio</i>	Ana
	Common Brushtail Possum	<i>Trichosurus vulpecula</i>	Cam
	Common Ringtail Possum	<i>Pseudocheirus peregrinus</i>	Vis



Group	Common Name	Species	Detection Method
	<b>East-coast Freetail Bat</b>	<i>Mormopterus norfolkensis</i>	Ana
	<b>Eastern Bentwing Bat</b>	<i>Miniopterus schreibersii oceanensis</i>	Ana
	Eastern Forest Bat	<i>Vespadelus pumilus</i>	Ana
	Eastern Freetail Bat	<i>Mormopterus ridei</i>	Ana
	Eastern Grey Kangaroo	<i>Macropus giganteus</i>	Vis
	Eastern Horseshoe Bat	<i>Rhinolophus megaphyllus</i>	Ana
	Little Red Flying-fox	<i>Pteropus scapulatus</i>	Vis
	Gould's Wattled Bat	<i>Chalinolobus gouldii</i>	Ana
	<b>Grey-headed Flying Fox*</b>	<i>Pteropus poliocephalus</i>	Vis
	<b>Little Bentwing Bat</b>	<i>Miniopterus australis</i>	Ana
	Red-necked Wallaby	<i>Macropus rufogriseus</i>	Vis, Cam
	Red Fox	<i>Vulpes vulpes</i>	Cam
	White-striped Freetail Bat	<i>Austronomus australis</i>	Ana
<b>Reptiles</b>	Land Mullet	<i>Egernia major</i>	Cam
<b>Amphibians</b>	Eastern Sedge Frog	<i>Litoria fallax</i>	HC

Observation Key: Ana – Anabat; Cam – Camera; HC – heard alling; Vis – visual

Bold: Vulnerable under BC Act

\* Vulnerable under EPBC Act



## Appendix 2: Flora Species List

Common name	Scientific name	Native, Exotic, HTE
Canopy Trees		
Swamp Oak	<i>Casuarina glauca</i>	N
Pink Bloodwood	<i>Corymbia intermedia</i>	N
Flooded Gum	<i>Eucalyptus grandis</i>	N
Tallowwood	<i>Eucalyptus microcorys</i>	N
Blackbutt	<i>Eucalyptus pilularis</i>	N
Small-fruited Grey Gum	<i>Eucalyptus propinqua</i>	N
Red Mahogany	<i>Eucalyptus resinifera</i>	N
Swamp Mahogany	<i>Eucalyptus robusta</i>	N
Grey Ironbark	<i>Eucalyptus siderophloia</i>	N
White Mahogany	<i>Eucalyptus acmenoides</i>	N
Brush Box	<i>Lophostemon confertus</i>	N
Turpentine	<i>Syncarpia glomulifera</i>	N
Small Trees/Shrubs		
Hickory Wattle	<i>Acacia falcata</i>	N
Fringed Wattle	<i>Acacia fimbriata</i>	N
Sydney Golden Wattle	<i>Acacia longifolia</i>	N
Lilly Pilly	<i>Acmena smithii</i>	N
Forest Oak	<i>Allocasuarina torulosa</i>	N
Red Ash	<i>Alphitonia excelsa</i>	N
Coffee Bush	<i>Breynia oblongifolia</i>	N
Willow Bottlebrush	<i>Callistemon salignus</i>	N
Camphor Laurel	<i>Cinnamomum camphora</i>	HTE
Lolly Bush	<i>Clerodendrum floribundum</i>	N
Narrow-leaved Palm Lily	<i>Cordyline stricta</i>	N
Gorse Bitter Pea	<i>Daviesia ulicifolia</i>	N
Bolwarra	<i>Eupomatia laurina</i>	N
Sandpaper Fig	<i>Ficus coronata</i>	N
Cheese Tree	<i>Glochidion ferdinandi</i>	N
Guioa	<i>Guioa semiglauca</i>	N
Willow-leaved Hakea	<i>Hakea salicifolia</i>	N
Native Rosella	<i>Hibiscus heterophyllus</i>	N
Native Frangipani	<i>Hymenosporum flavum</i>	N
Lantana	<i>Lantana camara</i>	HTE
Lemon-scented Teatree	<i>Leptospermum petersonii</i>	N
Tantoon	<i>Leptospermum polygalifolium</i>	N
Prickly Beard-heath	<i>Leucopogon juniperinus</i>	N
Prickly-leaved Tea Tree	<i>Melaleuca styphelioides</i>	N
Brush Muttonwood	<i>Myrsine howittiana</i>	N



Large Mock Olive	<i>Notelaea longifolia</i>	N
Mickey Mouse Plant	<i>Ochna serrulata</i>	N
Geebung	<i>Persoonia sp.</i>	N
Sweet Pittosporum	<i>Pittosporum undulatum</i>	N
Elderberry Panax	<i>Polyscias sambucifolia</i>	N
Senna	<i>Senna pendula*</i>	HTE
Arsenic Bush	<i>Senna septemtrionalis</i>	E
Wild Tobacco	<i>Solanum mauritianum</i>	E
Scentless Rosewood	<i>Synoum glandulosum</i>	N
Cocos Palm	<i>Syagrus romanzoffianum</i>	E
Bootlace Bush	<i>Wikstroemia indica</i>	N
Sandfly Zieria	<i>Zieria smithii</i>	N
<b>Grasses</b>		
Whisky Grass	<i>Andropogon virginicus</i>	E
Quaking Grass	<i>Briza maxima</i>	E
Rhodes Grass	<i>Chloris gayana</i>	HTE
Bordered Panic	<i>Entolasia marginata</i>	N
Blady Grass	<i>Imperata cylindrica</i>	N
Australian Basket Grass	<i>Oplismenus aemulus</i>	N
Paspalum	<i>Paspalum dilatatum</i>	E
Broadleaf Paspalum	<i>Paspalum mandiocanum</i>	E
South African Pigeon Grass	<i>Setaria sphacelata</i>	E
Paramatta Grass	<i>Sporobolus africanus</i>	E
Kangaroo Grass	<i>Themeda triandra</i>	N
<b>Ferns</b>		
Maidenhair Fern	<i>Adiantum aethiopicum</i>	N
Rainbow Fern	<i>Calochlaena dubia</i>	N
Binung	<i>Christella dentata</i>	N
Lacy Treefern	<i>Cyathea cooperi</i>	N
Soft Tree-fern	<i>Dicksonia antarctica</i>	N
Rasp Fern	<i>Doodia aspera</i>	N
Harsh Ground Fern	<i>Hypolepis muelleri</i>	N
Common Bracken	<i>Pteridium esculentum</i>	N
<b>Groundcovers</b>		
Crofton Weed	<i>Ageratina adenophora</i>	E
Native Ginger	<i>Alpinia caerulea</i>	N
Tall Sedge	<i>Carex appressa</i>	N
Native Wandering Jew	<i>Commelina cyanea</i>	N
-	<i>Desmodium rhytidophyllum</i>	N
Blue Flax Lily	<i>Dianella caerulea</i>	N
False Dandelion	<i>Hypochaeris radicata</i>	E
Spiny-headed Mat-rush	<i>Lomandra longifolia</i>	N
Blackberry	<i>Rubus sp.</i>	E





Native Raspberry	<i>Rubus parvifolius</i>	N
Ivy-leaved Violet	<i>Viola hederacea</i>	N
<b>Vines and Scramblers</b>		
Moth Vine	<i>Araujia sericifera</i>	HTE
Appleberry	<i>Billardiera scandens</i>	N
Water Vine	<i>Cissus hypoglauca</i>	N
Wombat Berry	<i>Eustrephus latifolius</i>	N
Scrambling Lily	<i>Geitonoplesium cymosum</i>	N
-	<i>Glycine clandestina</i>	N
Trailing Guinea Flower	<i>Hibbertia dentata</i>	N
Milk Vine	<i>Marsdenia rostrata</i>	N
Sweet Morinda	<i>Morinda jasminoides</i>	N
Common Silkpod	<i>Parsonsia straminea</i>	N
Cork Passionflower	<i>Passiflora suberosa</i>	E
Molucca Bramble	<i>Rubus moluccanus</i>	N
Pearl Vine	<i>Sarcopetalum harveyanum</i>	N
Lawyer Vine	<i>Smilax australis</i>	N
Snake Vine	<i>Stephania japonica</i>	N
Key: N – native; E – exotic species; HTE – high threat exotic species		



## Appendix 3: Biodiversity Credit Report



## BAM Biodiversity Credit Report (Like for like)

---

### Proposal Details

Assessment Id

00010436/BAAS17107/18/00010437

Assessor Name

Will Steggall

Proponent Names

Proposal Name

Sancrox Highway Service Centre

Assessor Number

0

Report Created

10/04/2018

### Candidate Serious and Irreversible Impacts

No Data

No Data

### Additional Information for Approval

PCTs With Customized Benchmarks

No Changes

Predicted Threatened Species Not On Site



## BAM Biodiversity Credit Report (Like for like)

Name

**Thylogale stigmatica** / Red-legged Pademelon

**Ptilinopus superbus** / Superb Fruit-Dove

### Ecosystem Credit Summary

PCT	TEC	Area	Credits
1569-Flooded Gum - Brush Box - Tallowwood mesic tall open forest on ranges of the lower North Coast	Not a TEC	3.0	59.00

**Credit classes for 1569**

#### Like-for-like options

Any PCT in the below Class	And in any of below trading groups	Containing HBT	In the below IBRA subregions
North Coast Wet Sclerophyll Forests (including PCT's 487, 613, 661, 684, 686, 692, 693, 694, 695, 699, 747, 748, 752, 812, 1073, 1208, 1217, 1222, 1237, 1244, 1245, 1257, 1259, 1260, 1261, 1265, 1266, 1282, 1284, 1285, 1504, 1561, 1562, 1563, 1566, 1567, 1568, 1569, 1572, 1573, 1575, 1579, 1841, 1843, 1915 )	North Coast Wet Sclerophyll Forests - < 50% cleared group (including Tier 7 or higher).	Yes	Macleay Hastings, Carrai Plateau, Coffs Coast and Escarpment, Comboyne Plateau, Karuah Manning, Macleay Gorges, Mummel Escarpment and Upper Manning. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.





## BAM Biodiversity Credit Report (Like for like)

---

### Species Credit Summary

No Species Credit Data

## BAM Credit Summary Report

Assessment Id	Proposal Name	Report Created
00010436/BAAS17107/18/00010437	Sancrox Highway Service Centre	10/04/2018
Assessor Name	Assessor Number	
Will Steggall	0	

### Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	Vegetation integrity loss / gain	Area (ha)	Constant	Species sensitivity to gain class (for BRW)	Biodiversity risk weighting	Candidate SAI	Ecosystem credits
<b>Flooded Gum - Brush Box - Tallowwood mesic tall open forest on ranges of the lower North Coast</b>								
1	1569_Moderate_good	52.8	3.0	0.25	High Sensitivity to Potential Gain	1.50		59
							<b>Subtotal</b>	<b>59</b>
							<b>Total</b>	<b>59</b>

### Species credits for threatened species

Vegetation zone name	Habitat condition (HC)	Area (ha) / individual (HL)	Constant	Biodiversity risk weighting	Candidate SAI	Species credits
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## Appendix 4: Anabat Analysis Results





**ECHO**  
ECOLOGY AND  
SURVEYING

## **Bat Call Identification**

**Sancrox, NSW**

**Prepared for**  
Naturecall Environmental  
1/52 Newheath Drive  
Arundel, QLD 4214

**Job Reference BC\_NAT15 - April 2018**

This report has been prepared to document the analysis of digital ultrasonic bat echolocation calls received from a third party. The data was not collected by the author and as such no responsibility is taken for the quality of data collection or for the suitability of its subsequent use.

This report was authored by



**Dr Anna McConville**

PhD, B.Env.Sc.

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## **1.0 INTRODUCTION**

This report has been commissioned by Naturecall Environmental to analyse bat echolocation call data (Anabat, Titley Electronics) collected from Sancrox, NSW. Data was provided electronically to the author. This report documents the methods involved in analysing bat call data and the results obtained only.

## **2.0 METHODS**

The identification of bat echolocation calls recorded during surveys was undertaken using AnalookW (Chris Corben, Version 4.2n) software. The calls were recorded using Data Division Ratio 8. The identification of calls was undertaken with reference to Pennay et al. (2004) and through the comparison of recorded reference calls from north-eastern NSW. Reference calls were obtained from the NSW database and from the authors personal collection.

Each call sequence ('pass') was assigned to one of five categories, according to the confidence with which an identification could be made, being:

- Definite - Pass identified to species level and could not be confused with another species
- Probable - Pass identified to species level and there is a low chance of confusion with another species
- Possible - Pass identified to species level but short duration or poor quality of the pass increases the chance of confusion with another species
- Species group - Pass could not be identified to species level and could belong to one of two or more species. Occurs more frequently when passes are short or of poor quality
- Unknown - Either background 'noise' files or passes by bats which are too short and/or of poor quality to confidently identify.

Call sequences that were less than three pulses in length were not analysed and were assigned to 'Unknown' and only search phase calls were analysed. Furthermore, some species are difficult to differentiate using bat call analysis due to overlapping call frequencies and similar shape of plotted calls and in these cases calls were assigned to species groups.



The total number of passes (call sequences) per unit per night was tallied to give an index of activity.

It should be noted that the activity levels recorded at different sites may not be readily able to be compared. Activity levels should not be compared among species as different species have different detectability due to factors such as call loudness, foraging strategy and call identifying features. Activity comparisons among sites are dependent on many variables which need to be carefully controlled during data collection and statistically analysed. Influential variables include wind, rain, temperature, duration of recording, season, detector and microphone sensitivity, detector placement, weather protection devices etc.

Nomenclature follows the Australian Chiroptera taxonomic list described by Reardon et al. (2015).

## 2.1 Characteristics Used to Differentiate Species

*Miniopterus australis* was differentiated from *Vespadelus pumilus*, by characteristic frequency or the presence of a down-sweeping tail on pulses. Call sequences which had a majority of pulses containing an up-sweeping tail were assigned to *Vespadelus pumilus*.

*Chalinolobus morio* calls were differentiated from those of *Vespadelus* sp. by the presence of a down-sweeping tail on the majority of pulses. We do not confidently identify *Vespadelus troughtoni* from bat calls in this region as it overlaps in frequency with both *Vespadelus pumilus* and *Vespadelus vulturnus* and we find it difficult to distinguish based on call characteristics.

Calls from *Miniopterus orianae oceanensis* were differentiated from *Vespadelus* spp. by a combination of uneven consecutive pulses and the presence of down-sweeping tails.

Calls from *Mormopterus* spp. were differentiated by the presence of mainly flat pulses. *Mormopterus norfolkensis* was differentiated from *Mormopterus ridei* in long call sequences where pulses alternated, often with a downward sloping tail.

*Chalinolobus gouldii* was differentiated from other species by the presence of curved, alternating call pulses.

*Rhinolophus megaphyllus* and *Austronomus australis* were differentiated from other bat species on the basis of characteristic frequency.

*Phoniscus papuensis* (Golden-tipped Bat) has a very quiet call that is not often recorded on bat detectors.

### 3.0 RESULTS

A total of 2,132 call sequences were recorded, of which 539 call sequences were able to be analysed (ie were not 'noise' files or bat calls of short length). Of the bat calls, 394 call sequences (73 %) were able to be confidently identified (those classified as either definite or probable identifications) to species level (Table 3-1). Species recorded confidently within the site include:

- |   |                                   |
|---|-----------------------------------|
| • <i>Austronomus australis</i>          | (White-striped Free-tailed Bat)   |
| • <i>Chalinolobus gouldii</i>           | (Gould's Wattled Bat)             |
| • <i>Chalinolobus morio</i>             | (Chocolate Wattled Bat)           |
| • <i>Miniopterus australis</i>          | (Little Bent-winged Bat)          |
| • <i>Miniopterus orianae oceanensis</i> | (Eastern Bent-winged Bat)         |
| • <i>Mormopterus norfolkensis</i>       | (Eastern coastal Free-tailed Bat) |
| • <i>Mormopterus ridei</i>              | (Ride's Free-tailed Bat)          |
| • <i>Rhinolophus megaphyllus</i>        | (Eastern Horseshoe Bat)           |
| • <i>Vespadelus pumilus</i>             | (Eastern Forest Bat)              |

Additionally, the following bat species potentially occurred within the site, but could not be confidently identified (those calls classified as possible or as a species group):

- |                                 |                       |
|---------------------------------|-----------------------|
| • <i>Vespadelus darlingtoni</i> | (Large Forest Bat)    |
| • <i>Vespadelus regulus</i>     | (Southern Forest Bat) |
| • <i>Vespadelus troughtoni</i>  | (Eastern cave bat)    |
| • <i>Vespadelus vulturnus</i>   | (Little Forest Bat)   |

It should be noted that additional bat species may be present within the site but were not recorded by the detectors (or are difficult to identify by bat call) and habitat assessment should be used in conjunction with these results to determine the likelihood of occurrence of other bat species.

Table 3-1 below summarises the results of the bat call analysis.

**Table 3-1: Results of bat call analysis (number of passes per site per night)**

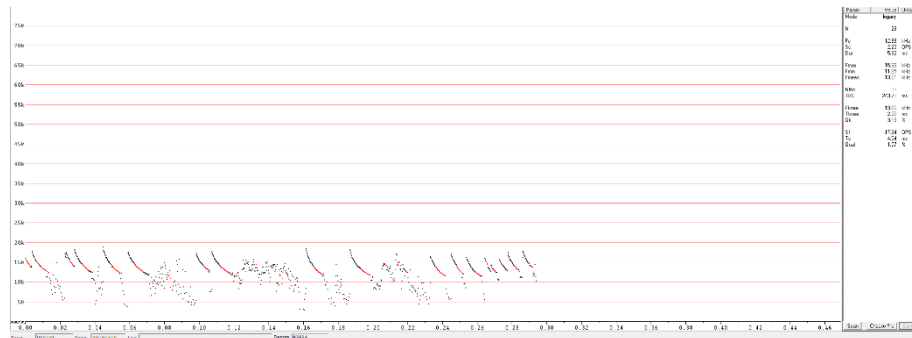
IDENTIFICATION	Unit 1 25/03/2018	Unit 1 5/04/2018	Unit 1 6/04/2018	Unit 1 7/04/2018	Unit 1 8/04/2018	Unit 1 9/04/2018
<b>DEFINITE</b>						
<i>Austronomus australis</i>	-	1	-	-	-	1
<i>Chalinolobus gouldii</i>	-	1	3	3	8	2
<i>Chalinolobus morio</i>	-	-	-	-	2	-
<i>Miniopterus australis</i>	-	65	33	87	42	22
<i>Mormopterus norfolkensis</i>	-	-	1	-	1	-
<i>Mormopterus ridei</i>	-	-	-	-	1	-
<i>Rhinolophus megaphyllus</i>	-	1	-	1	1	1
<i>Vespadelus pumilus</i>	-	1	2	8	3	1
<b>PROBABLE</b>						
<i>Chalinolobus gouldii</i>	-	1	6	2	20	1
<i>Miniopterus australis</i>	-	17	6	15	18	6
<i>Miniopterus orianae oceanensis</i>	-	1	-	1	1	-
<i>Vespadelus pumilus</i>	-	1	2	3	-	1
<b>SPECIES GROUPS</b>						
<i>Chalinolobus gouldii</i> / <i>Mormopterus norfolkensis</i> / <i>Mormopterus ridei</i>	-	3	4	1	-	-
<i>Chalinolobus gouldii</i> / <i>Mormopterus ridei</i>	-	1	4	5	7	-
<i>Chalinolobus morio</i> / <i>Vespadelus pumilus</i> / <i>Vespadelus vulturnus</i> / <i>Vespadelus troughtoni</i>	-	-	1	-	5	-
<i>Miniopterus australis</i> / <i>Vespadelus pumilus</i>	-	18	18	18	25	7
<i>Miniopterus orianae oceanensis</i> / <i>Vespadelus darlingtoni</i> / <i>Vespadelus regulus</i>	-	6	2	7	7	6

IDENTIFICATION	Unit 1 25/03/2018	Unit 1 5/04/2018	Unit 1 6/04/2018	Unit 1 7/04/2018	Unit 1 8/04/2018	Unit 1 9/04/2018
UNKNOWN						
'Noise' files	11	264	58	361	272	462
Unknown	-	43	22	43	43	14
<b>TOTAL</b>	<b>11</b>	<b>424</b>	<b>162</b>	<b>555</b>	<b>456</b>	<b>524</b>

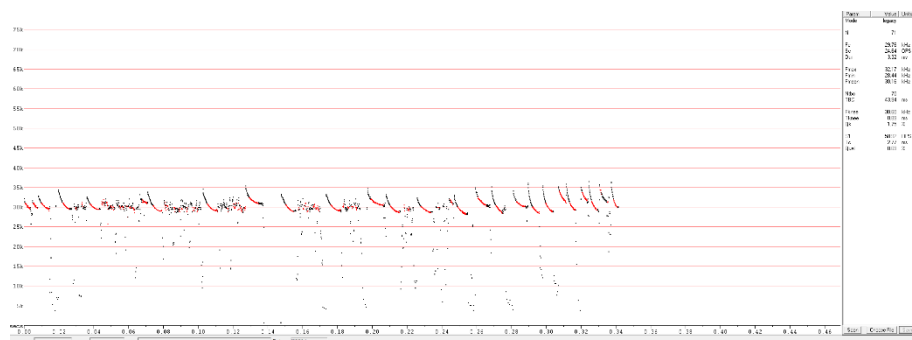


## 4.0 SAMPLE CALLS

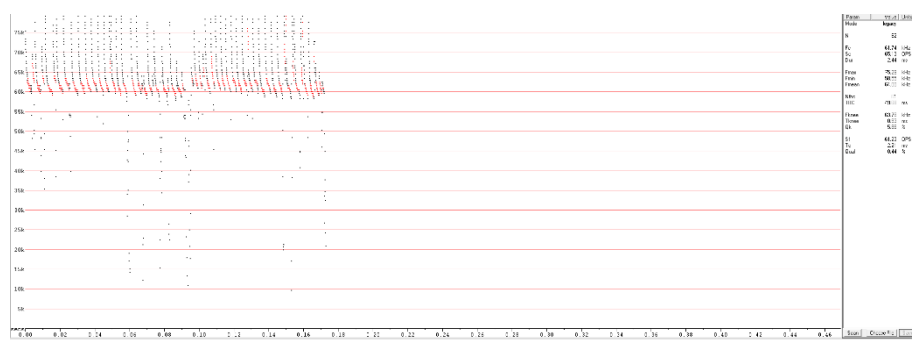
A sample of the calls actually identified from the site for each species is given below.



**Figure 4-1: *Austronomus australis* definite call**



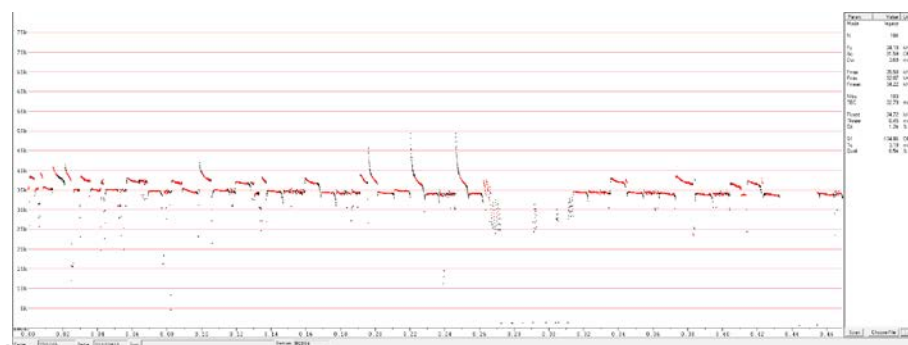
**Figure 4-2: *Chalinolobus gouldii* definite call**



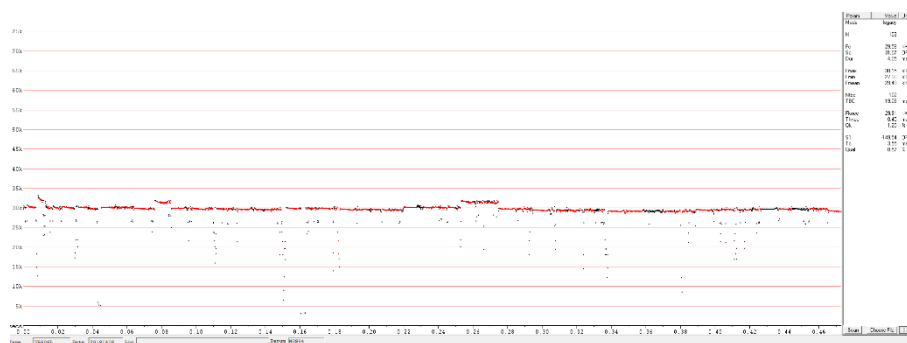
**Figure 4-3: *Miniopterus australis* definite call**



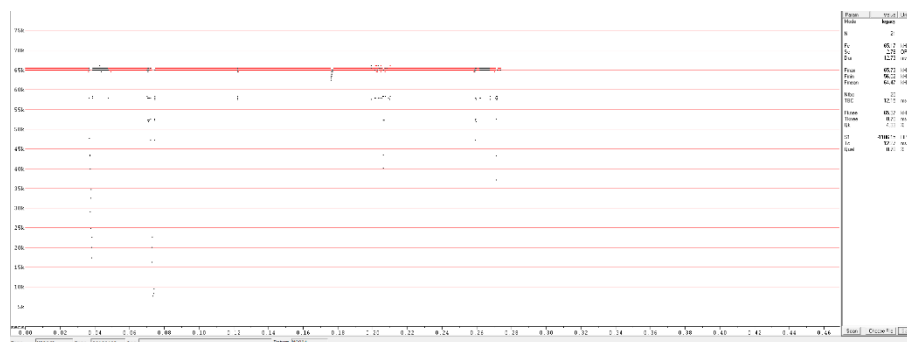
**Figure 4-4: *Miniopterus orianae oceanensis* probable call**



**Figure 4-5: *Mormopterus norfolkensis* definite call**



**Figure 4-6: *Mormopterus ridei* definite call**



**Figure 4-7: *Rhinolophus megaphyllus* definite call**



Figure 4-8: *Vespadelus pumilus* definite call

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## **Attachment 7 Traffic Impact Assessment**



# Traffic Impact Assessment

Proposed Highway Service Centre

Intersection Oxley Highway and Pacific Highway

1179 Oxley Highway, Sancrox

Corner Pacific and Oxley Highway



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# 1 Introduction and Scope

GEM planning Projects has applied for a Development Approval for a Highway Service Centre to be located on the south-western corner of the intersection of the Oxley Highway and Pacific Highway, at Sancrox in the Port Macquarie Hastings Local Government jurisdiction.

This report describes the traffic engineering and car parking aspects of the proposal, and the impacts of the traffic generation and redistribution on the nearby road network and intersections.

In preparing this report we have inspected the site and surrounding road network, instructed traffic counts, made vehicle queue observations, and consulted with Council and Roads and Maritime Services.



## 2 The Site

Figure 1 below shows the location of the subject land in the context of the local road network.



FIGURE 1 : SITE LOCALITY

The land is currently used for grazing. There are no relevant existing access arrangements. There is a single house on the land with a driveway well west of Billabong Drive.

## 3 Existing Traffic Facilities and Conditions

### 3.1 Road Network

Currently the interchange between Oxley Highway and Pacific Highway is managed by a large roundabout, locally referenced as the “Donut”. Single lane on-ramps and off-ramps connect the Pacific Highway with the Oxley Highway Donut. The Donut has single circulation lanes other than on the west to east segment where an additional circulation lane has been added.

All approaches are single lane except for the western approach which has a shared left and through lane as well as a shared through and right lane.

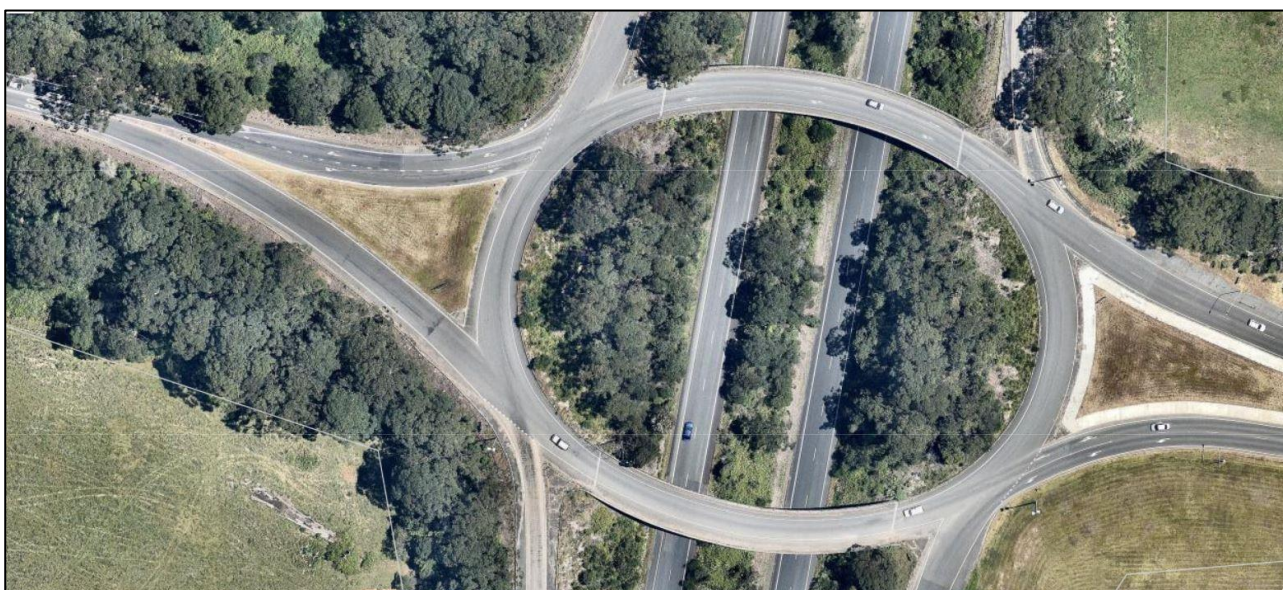


FIGURE 2 : THE “DONUT” ON OXLEY HIGHWAY

The Pacific Highway has a four lane divided carriageway with typical “freeway” conditions including sealed shoulders, limited access and 110kph speed limit.

Oxley Highway west of the Donut has a two-way/two-lane configuration with 90kph speed limit other than close to the Donut where the speed limit has been reduced to 60kph. East of the Donut the Oxley Highway has a four-lane divided carriageway.

The Oxley Highway intersection with Billabong Drive has auxiliary turn lanes with typical AustRoads geometry.

## 3.2 Existing Traffic Volumes and Intersection Performance

TTM Consulting (Vic) Pty Ltd commissioned traffic counts over a 9 day period from August 26<sup>th</sup> to September 4<sup>th</sup>, 2017. That period was not in school holiday time and no exceptional activities in the area were known. The counts on the Pacific Highway were undertaken using tubes, whereas the counts on the Donut were taken using cameras.

The weekday counts were reasonably consistent although the Thursday peak periods were a little higher than on other days. A copy of the counts is appended in Appendix A to this report. The Thursday counts are used as a basis for analysis of both current and future traffic conditions.

The SIDRA program has been used to analyse the existing and future intersection performance. The need (or otherwise) to calibrate SIDRA from the default value has been assessed on the basis of observation of vehicle queues on the western approach to the Donut in the AM peak period. In a 48 minute period from 7:45am to 8:43am on Thursday February 8<sup>th</sup>, 2018 the start time and clearing time of vehicle queues containing more than 5 cars were recorded.

There were 14 occasions when there was a queue of more than 5 vehicles in either of the western approach lanes, with total queued time of 115.5 seconds. 115.5 seconds is 4% of the total time of 48 minutes. SIDRA analysis using the default parameters in the program has indicated that the 95<sup>th</sup> percentile queue on the western approach to the Donut is 5 vehicles. We therefore see no reason to recalibrate the SIDRA program.

Advice from RMS is that a 10 year growth horizon is to be applied to base traffic loadings, with a growth rate of between 2.6% and 4% to be applied. We have used a projected linear growth rate of 3.3% per annum over 10 years in the following analysis.

Presented in the table below are SIDRA outputs for :-

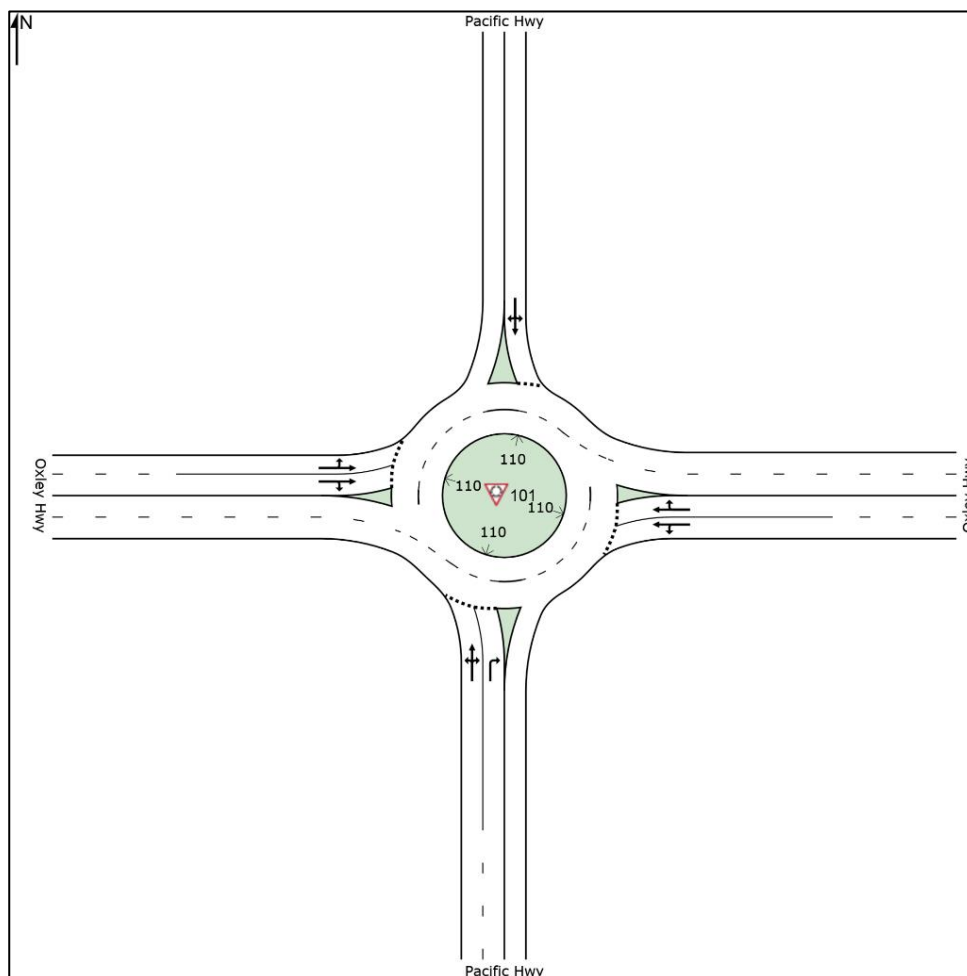
- Current traffic volumes and existing intersection conditions.
- Current traffic plus 33% and existing intersection conditions.
- Current traffic plus 33% with additional lanes on south and east approaches and the circulation path of the Donut re-marked to include 2 lanes all the way around.

AM Peak Hour Case	Degree of Saturation	Worst Approach	95 <sup>th</sup> Percentile Queue (metres)
Current Traffic Existing Roundabout	0.533	South	36
Current Traffic + 33%, Existing Roundabout	0.928	South	217
Current Traffic + 33% Additional Lanes to Roundabout	0.684	West	48

PM Peak Hour Case	Degree of Saturation	Worst Approach	95 <sup>th</sup> Percentile Queue (metres)
Current Traffic Existing Roundabout	0.912	East	147
Current Traffic + 33%, Existing Roundabout	1.146	East	1282
Current Traffic + 33% Additional Lanes to Roundabout	0.609	East	37



The expanded roundabout concept used in the analysis summarised above is as shown in the diagram below.



From the analysis above it is clear that at least some of the enhancement work to the Donut will be warranted within the RMS' analysis horizon, regardless of the proposed service centre development.

Pacific Highway traffic northbound south of the off-ramp currently has a Friday peak at 12,566 with 11% commercials. AM peak hour is 1,010 vehicles per hour, and PM peak hour is 858 vehicles per hour.

Allowing 33% increase gives :-

- Daily 16,754 vehicles per day
- AM Peak Hour 1,347 vehicles per hour
- PM Peak Hour 1,144 vehicles per hour

Those values will be used in the assessment.

Appendix A also contains the SIDRA analysis use to provide the data in tables above.



## 4 The Service Centre Proposal

Drawings by TRG depict the proposed service centre layout plan. In summary the proposal comprises :-

- Food and drink outlet with drive-through.
- Service station with restaurant and drive-through.
- 8 room motel.
- Truck type service facility.
- Truck wash.
- Trailer exchange area.
- Diesel canopy with fuel dispensers.
- 102 cars or motorcycle parking spaces.
- 5 x car and trailer (boat, caravan) parking spaces.
- 25 x semi-trailer (<19 metres) parking spaces.
- 70 parking spaces suitable for B-doubles.
- 10 B-double plus parking spaces at the tyre service area.

Access is proposed from both Pacific Highway and Oxley Highway.

A copy of the proposed site plan is attached in Appendix B to this report.

## 5 Traffic Generation at the Site

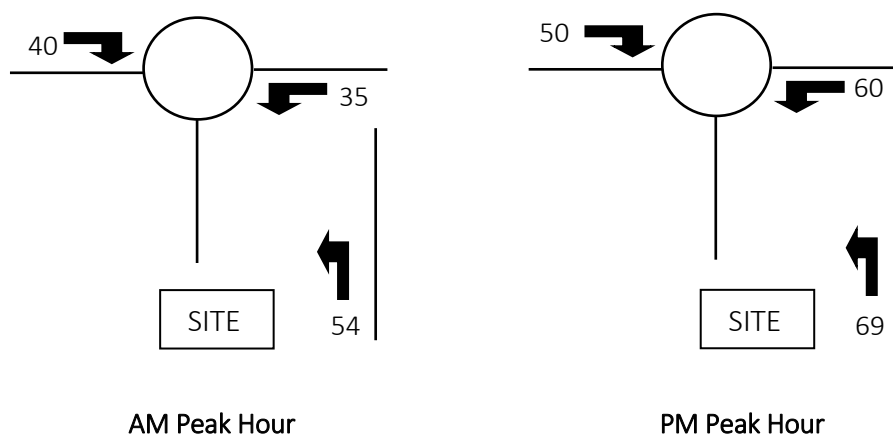
Service centres are likely to draw around up to 5% of passing traffic in an environment of reasonably high passing traffic volumes. We expect the characteristics of the traffic draw at the Oxley Highway to differ from that at the Pacific Highway in that :-

- Large trucks are in a much lower proportion to total traffic on the Oxley Highway in comparison with Pacific Highway.
- Oxley Highway has a function which is significantly directed to the commuter peak periods, whereas the Pacific Highway is more of an inter-regional route. Therefore we estimate that the passing traffic on the Oxley Highway may attend the service centre for convenience items rather than as a journey breaking stop.
- Commuters tend to purchase fuel in the afternoons rather than the mornings, and consequently we expect that the Oxley Highway draw will be higher in the PM than in the AM.

Our best estimate of traffic generation at the site is :-

- 5% of northbound traffic on the Pacific Highway will attend the site on a daily basis, with 4% of the northbound traffic attending in the AM peak hour and 6% attending in the PM peak hour.
- In the AM peak hour 5% of the westbound traffic on Oxley Highway will attend the site, and 3% of the eastbound traffic will attend the site.
- In the PM peak hour 6% of the westbound traffic will attend the site, and 6% of the eastbound traffic will attend the site.

Those estimates represented diagrammatically and based on existing base flows plus 33%, are :-



Total daily attendance is estimated at 1,700 vehicles.

No additional traffic from that which would be using the network without the service centre is likely to be generated consequent to the service centre being present, and all site generated vehicles leaving the site will continue to travel in the same direction as their arrival.

## 6 Pacific Highway Access Arrangements

The proposal for access from the Pacific Highway is to extend the existing off-ramp further south to allow sufficient deceleration distance for a left turn entry lane into the service centre site.

The proposed geometry is more or less the same as has recently been adopted and constructed for the service centre at the intersection of the Pacific Highway and Tweed Valley Way at Chinderah, and also “off-ramp off the off-ramp” at Taree.

The layout design makes provision for :-

- A “slow point” at entry to the site is needed to ensure appropriate vehicle speeds within the service centre internal roadways and parking areas.
- Traffic lane layout needs to provide a high level of protection against drivers having any opportunity to travel the wrong way down the Pacific Highway exit ramp.
- Because there will be a need for directional signage to indicate truck parking, truck service, diesel canopy and food and fuel there needs to be adequate space for such signage and also adequate time to make correct decisions about where to do.

A suitable layout plan for the area around the Pacific Highway entrance is provided in Drawing No. 9486303 and attached in Appendix C. Drawing No. 9486317 attached in Appendix C includes 26 metres B-double swept paths, generated by AutoTrack, to demonstrate the adequacy of the design.

The geometry features of the “off-ramp off the off-ramp” entrance are taken from AustRoads Guide to Road Design Part 4C : Interchanges, using 120kph design speed for Pacific Highway, 80kph design speed for the second gore area, and 60kph design speed for the site entrance.

## 7 Access at Oxley Highway

### 7.1 Access Options and Considerations

Possible options for access from Oxley Highway included :-

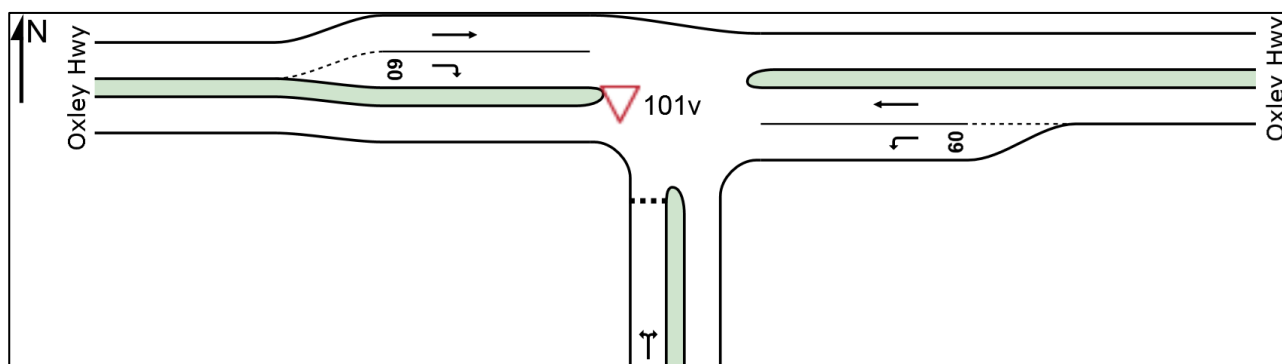
- Roundabout at the Billabong Drive intersection,
- Roundabout at a location about 150 metres east of Billabong Drive, possibly in conjunction with a realignment of Billabong Drive to form a cross junction at the roundabout, and
- T-Junction with auxiliary lanes at a similar location.

The location about 150 metres east of Billabong Drive best suits the site because that is approximately where the ground level inside the property is close to the level of the Oxley Highway pavement.

Having the access arrangements at the Billabong Drive intersection would enable a neat solution for connections to both north and south, except that there is an embankment approximately 14 metres high on the southern side. The top of the bank within the property is RL 34 whereas the Oxley Highway road level is RL 20 at Billabong Drive. The site topography is such that most of the facilities on the site will need to be placed at levels between about RL 14 and RL 18, particularly in the northern part of the site.

On the basis of the above the access at Billabong Drive was considered impractical and the concept was rejected.

A priority controlled T-junction was assessed in summary as set out below.



The projected Oxley Highway traffic volumes in the peak hours are such that the right turns out of the site into this form of intersection would not operate safely and satisfactorily under priority control.

A signal controlled option was also assessed and the topography and road reservation are such that this is a viable option.

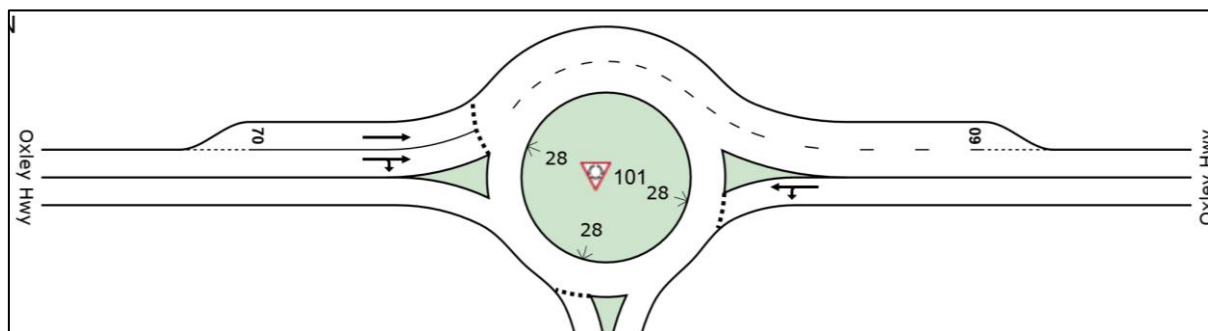
The viable options of roundabout and traffic signal controlled access at a point about 150 metres east of the Billabong Drive intersection are assessed in more detail in the ensuing sub-sections of this report.



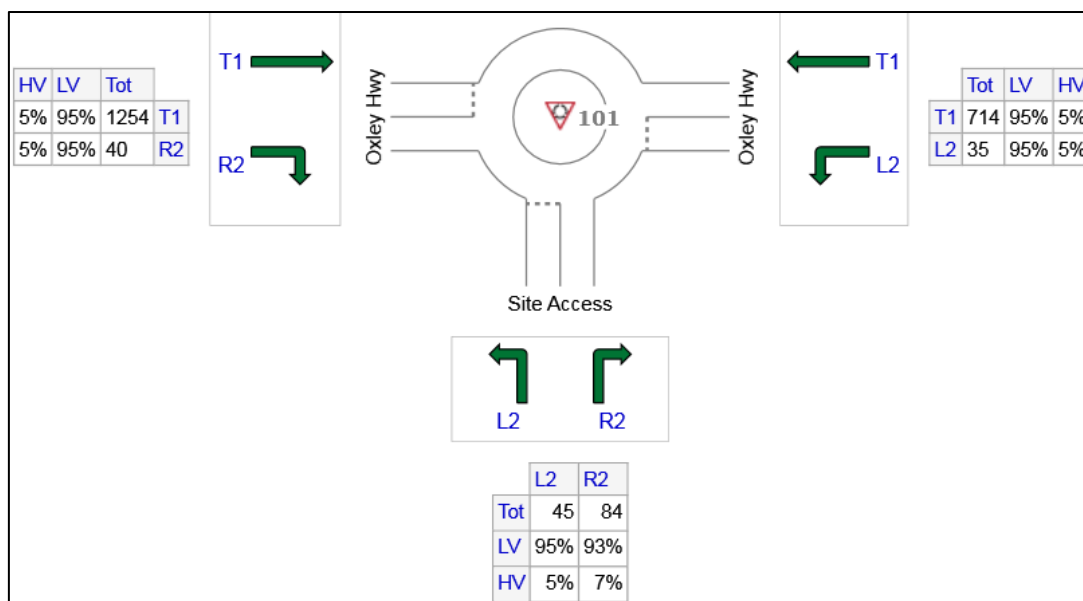
## 7.2 Roundabout Access Option

It is assumed that a roundabout controlled intersection for the access at Oxley Highway would need two approach lanes from the west (per the Donut) and a two lane segment on the northern side.

Applying the estimated 10 year horizon volumes to the roundabout with 28 metres diameter central circle leads to the following SIDRA analysis.



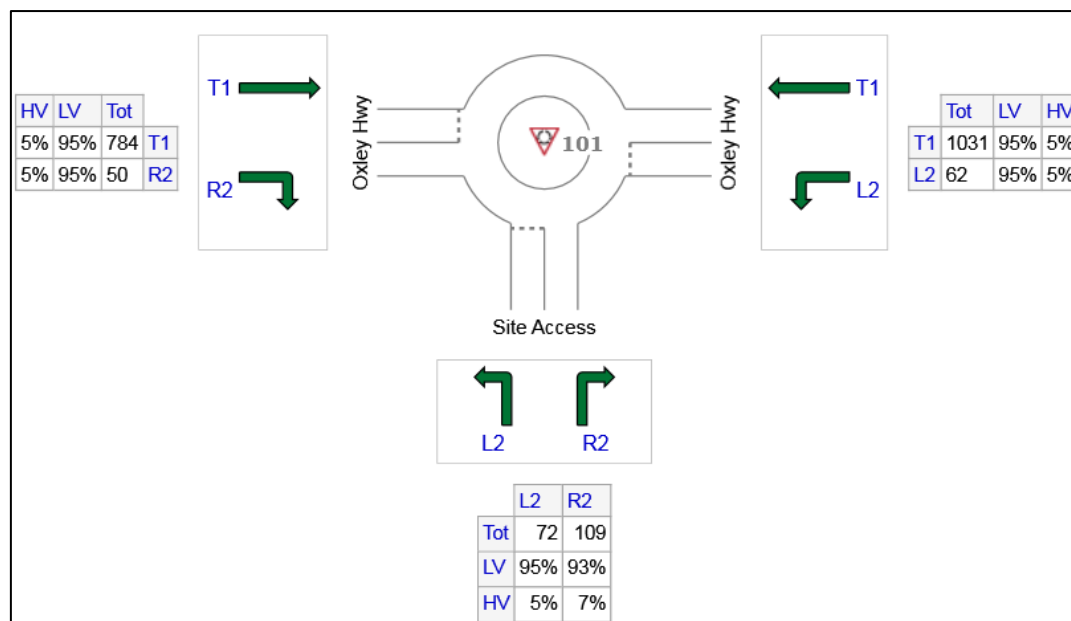
In the AM peak hour the design volumes are :-



And the intersection operation as predicted by SIDRA is :-

Lane Use and Performance													
	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total	HV						Veh	Dist				
	veh/h	%	veh/h	v/c	%	sec			m		m	%	%
South: Site Access													
Lane 1 <b>d</b>	136	6.3	711	0.191	100	12.2	LOS B	1.2	8.6	Full	500	0.0	0.0
Approach	136	6.3		0.191		12.2	LOS B	1.2	8.6				
East: Oxley Hwy													
Lane 1 <b>d</b>	788	5.0	1511	0.522	100	4.4	LOS A	4.9	35.7	Full	500	0.0	0.0
Approach	788	5.0		0.522		4.4	LOS A	4.9	35.7				
West: Oxley Hwy													
Lane 1	329	5.0	1119	0.294	45 <b>6</b>	4.8	LOS A	2.0	14.8	Short	70	0.0	NA
Lane 2 <b>d</b>	1033	5.0	1568	0.659	100	5.0	LOS A	7.9	57.9	Full	500	0.0	0.0
Approach	1362	5.0		0.659		5.0	LOS A	7.9	57.9				
Intersection	2286	5.1		0.659		5.2	LOS A	7.9	57.9				

In the PM peak hour the design volumes are :-



And the intersection operation as predicted by SIDRA is :-

Lane Use and Performance													
	Demand Total veh/h	Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Site Access													
Lane 1 <b>d</b>	191	6.2	481	0.396	100	18.7	LOS B	3.1	22.9	Full	500	0.0	0.0
Approach	191	6.2		0.396		18.7	LOS B	3.1	22.9				
East: Oxley Hwy													
Lane 1 <b>d</b>	1151	5.0	1549	0.743	100	4.2	LOS A	10.6	77.4	Full	500	0.0	0.0
Approach	1151	5.0		0.743		4.2	LOS A	10.6	77.4				
West: Oxley Hwy													
Lane 1	231	5.0	1146	0.202	48 <b>6</b>	4.3	LOS A	1.3	9.7	Short	70	0.0	NA
Lane 2 <b>d</b>	647	5.0	1550	0.417	100	4.6	LOS A	3.7	26.9	Full	500	0.0	0.0
Approach	878	5.0		0.417		4.5	LOS A	3.7	26.9				
Intersection	2219	5.1		0.743		5.6	LOS A	10.6	77.4				

In summary the proposed roundabout at the proposed location will operate well under the 10 year traffic growth horizon required by RMS. Key considerations are predicted queue lengths :-

- West Approach AM Peak Hour      58 metres
- West Approach PM Peak Hour      36 metres
- Eastern Approach AM Peak Hour    34 metres
- Eastern Approach PM Peak Hour    77 metres

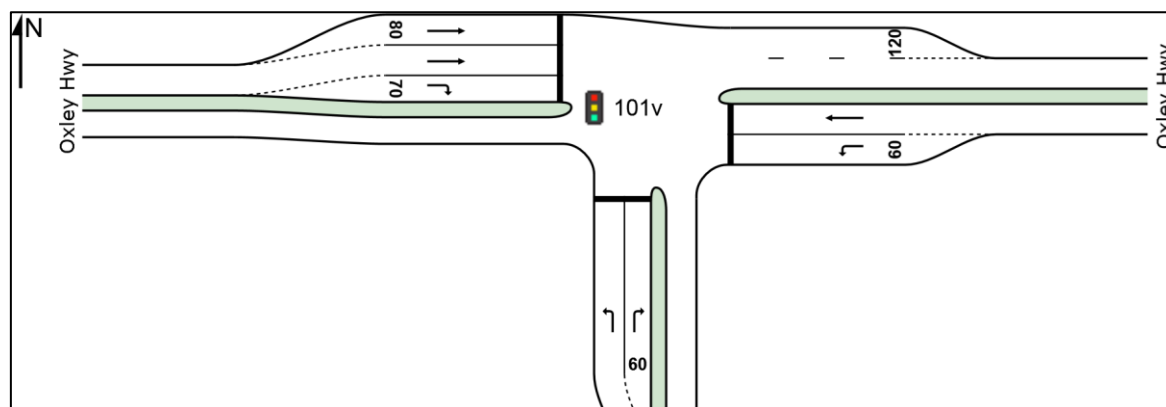
None of these queues approaches the length that might cause interactions with the intersections located on either side of the proposed roundabout location. The Donut intersection is about 270 metres to the east of the proposed roundabout and Billabong Drive is well over 100 metres west.

The Oxley Highway access arrangements under roundabout control are shown in Drawing No. 9846302 included in Appendix C.

## 7.3 Signal Controlled Access Option

The signal controlled option tested has two through lanes on the western approach, as with the roundabout access option and the Donut. It is assumed that the speed limit would be maintained at 60kph from the existing limit change just west of the Donut through to a point on the western approach to the Billabong Drive intersection.

The layout concept tested using SIDRA is :-



The SIDRA analysis for the AM peak hour is summarised in the Lane Summary Table below.

### LANE SUMMARY

Site: 101v [Oxley Highway Access AM - Signals]

Signals - Fixed Time Isolated Cycle Time = 100 seconds (User-Given Cycle Time)

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
	Total	HV						Veh	Dist m				
	veh/h	%											
South: Site Access													
Lane 1	47	5.0	186	0.255	100	52.2	LOS D	2.2	16.2	Full	500	0.0	0.0
Lane 2	88	7.0	179	0.495	100	53.9	LOS D	4.3	31.9	Short	60	0.0	NA
Approach	136	6.3		0.495		53.3	LOS D	4.3	31.9				
East: Oxley Hwy													
Lane 1	37	5.0	1450	0.025	100	8.2	LOS A	0.4	2.9	Short	60	0.0	NA
Lane 2	752	5.0	1527	0.492	100	4.1	LOS A	12.8	93.8	Full	500	0.0	0.0
Approach	788	5.0		0.492		4.3	LOS A	12.8	93.8				
West: Oxley Hwy													
Lane 1	520	5.0	1527	0.340	65.6	3.5	LOS A	7.4	54.3	Short	70	0.0	NA
Lane 2	800	5.0	1524.1	0.525	100	4.3	LOS A	14.3	104.1	Full	500	0.0	0.0
Lane 3	42	5.0	373	0.113	100	12.8	LOS B	0.8	5.8	Short	60	0.0	NA
Approach	1362	5.0		0.525		4.3	LOS A	14.3	104.1				
Intersection	2286	5.1		0.525		7.2	LOS A	14.3	104.1				



For the PM peak hour the lane summary is :-

## LANE SUMMARY



Site: 101v [Oxley Highway Access PM - Signals - Copy]

New Site

Signals - Fixed Time Isolated Cycle Time = 100 seconds (User-Given Cycle Time)

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist m				
South: Site Access													
Lane 1	76	5.0	167	0.453	100	54.6	LOS D	3.7	27.0	Full	500	0.0	0.0
Lane 2	115	7.0	161	0.713	100	57.7	LOS E	5.9	43.9	Short	60	0.0	NA
Approach	191	6.2		0.713		56.5	LOS E	5.9	43.9				
East: Oxley Hwy													
Lane 1	65	5.0	1468	0.044	100	8.0	LOS A	0.7	4.9	Short	60	0.0	NA
Lane 2	1085	5.0	1504	0.721	100	5.2	LOS A	24.5	179.0	Full	500	0.0	0.0
Approach	1151	5.0		0.721		5.4	LOS A	24.5	179.0				
West: Oxley Hwy													
Lane 1	324	5.0	1546	0.210	65	2.8	LOS A	3.9	28.4	Short	80	0.0	NA
Lane 2	501	5.0	1546	0.324	100	3.1	LOS A	6.7	49.3	Full	500	0.0	0.0
Lane 3	53	5.0	187	0.281	100	20.5	LOS C	1.5	11.0	Short	70	0.0	NA
Approach	878	5.0		0.324		4.0	LOS A	6.7	49.3				
Intersection	2219	5.1		0.721		9.2	LOS A	24.5	179.0				

In summary the access under signal control and with the layout concept as tested at the proposed location will operate well under the 10 year traffic growth horizon required by RMS. Key considerations are predicted queue lengths :-

- West Approach AM Peak Hour 104 metres
- West Approach PM Peak Hour 49 metres
- Eastern Approach AM Peak Hour 94 metres
- Eastern Approach PM Peak Hour 179 metres

Again none of these queues approaches the length that might cause interactions with the intersections located on either side of the proposed roundabout location. The Donut intersection is about 270 metres to the east of the proposed roundabout and Billabong Drive is well over 100 metres west.

## 7.4 Comparison of Viable Access Options

A comparison is made on the basis of the SIDRA outputs and assessment criteria, as follows :-

### Level of Service for Through Traffic

Under both options the through traffic on Oxley Highway is predicted to operate at Level of Service A in every relevant lane.

### Average Delay

Average delay for the through traffic is compared in the following table.

Period and Approach	Roundabout	Signal Control
AM Peak Hour Western Approach	5.0 seconds	4.0 seconds
AM Peak Hour Eastern Approach	4.4 seconds	4.1 seconds
PM Peak Hour Western Approach	4.2 seconds	3.0 seconds
PM Peak Hour Eastern Approach	4.5 seconds	5.2 seconds

There is little difference although the signal controlled option does provide slightly better delay related conditions for the through traffic.

### Queue Length

95<sup>th</sup> percentile queues for the through traffic is compared in the following table.

Period and Approach	Roundabout	Signal Control
AM Peak Hour Western Approach	58 metres	101 metres
AM Peak Hour Eastern Approach	36 metres	94 metres
PM Peak Hour Western Approach	27 metres	49 metres
PM Peak Hour Eastern Approach	77 metres	179 metres

The queueing outcomes clearly favour the roundabout option although the 95<sup>th</sup> percentile queue will almost clear in any one cycle.

## 7.5 Impact on Billabong Drive Intersection

Under the peak period estimated traffic volumes the right turn out into Oxley Highway will be difficult. If the site access is controlled by roundabout, minimal gaps in the westbound flow on Oxley Highway will be created. Under traffic signal control the platooning effect will be of more assistance to the operation of the Billabong Drive intersection.

## 8 Car Parking Per DCP

The DCP sets out car parking requirements for uses that are relevant to the proposal as set out in the following table.

Use	Proposal	Requirements	Spaces Required
Motel	8 rooms Assume 1 manager and 1 staff max.	1.1/unit + ½ employees	10
Food and Drink	3 x drive-through 165 seats total	1/3 seats 8 x queuing	79
Convenience Shop	155 sqm	1/30 sqm GLFA	6
Service Centre	1 no. Employees No workshop	3/work bay + 1/employee + 2 for customers	8
Truck Service	7 work bays for trucks 5 employees	1/work bay + 1/employee	12
<b>Total</b>			<b>115</b>

To make a direct comparison of the proposal with the requirements the truck service and motel components should be treated separately, due to the virtually separate locations.

In the service centre/food area the parking proposal is :-

- Staff only area 24 spaces
- In front of tandem fuel canopy 10 spaces
- In front of food entrance 93 spaces
- In front of stand-along food 23 spaces
- Queuing for drive-through 24 spaces minimum
- **Total 174 spaces minimum**

In the motel/truck service area there are 16 car spaces proposed, plus many truck parking spaces.

The motel and truck service staff parking requirements are met by the car spaces, and the truck parking exceeds the requirement significantly.

In summary the car and truck parking proposed easily exceeds any requirements of the DCP.

In addition to the car parking the proposal includes 6 parking spaces each 3.5 metres wide x 17 metres long, for car and trailer combinations near the tandem fuel canopy.

Those spaces are “drive-through” from either direction to avoid any need for reversing movements by customers on the site.

There is also a proposed bus parking area suitable for 3 buses, proximate to the food outlets. Buses could also use the trailer bays if necessary.

## 9 Loading and Service

The DCP requirement for loading bays of minimum dimension 3.5 metres wide x 6.0 metres long is easily met in the proposal.

Each of the two buildings has a loading bay proposed such that a standard service vehicle (MRV) can comfortably utilise the bay. Drawing no. 9486221 and Drawing No. 9486222 show the two loading bays.

Around the motel there is ample space for occasional loading and service to take place.

The space allowed for forecourt paving at the tandem fuel canopy is quite generous, allowing a 19 metres semi-trailer to service the remote fill points in almost any sensible location. The vehicle path diagram demonstrate a 19 metres semi-trailer going through the tandem fuel canopy area.



## 10 Truck Parking

Truck parking is proposed in several areas :-

- Downstream of the diesel canopy there are 10 spaces at 14 metres long x minimum 4.5 metres wide for single unit trucks.
- Downstream of the diesel canopy there are 10 spaces at 21 metres long x 4.9 metres wide for semi-trailers.
- In the trailer exchange and truck service area there are 67 spaces 5.6 metres wide x 26 metres long, suitable for trucks up to B-Double size. Some of those spaces may be used for trailer exchange.

In our view a footpath (with shelter and lighting) should be provided between the food area and the truck parking areas.

## 11 Truck Movement Design

Drawings Nos. 9486312-317 attached in Appendix C show AutoTrack generated vehicle paths for the adopted design vehicles. The adopted design vehicles are :-

- Entry, exit and through movements along the main link and in all of the areas south of the main link 26 metres B-Double per AustRoads 2013
- Through diesel canopy and to the exit to Oxley Highway 26 metres B-Double
- Through tandem fuel canopy and exit to Oxley Highway 12.5 metres HRV
- Through truck parking area downstream of diesel canopy 19 metres semi-trailer
- Coach parking 12.5 metres HRV

Clearly the design provides adequately for all of the appropriate vehicles.

## 12 Summary and Conclusions

The proposal provides an excellent design, responding to all relevant traffic engineering and parking provisions of the DCP.

Resolution of access arrangements at Oxley Highway with RMS and Council will be needed, with a Functional Layout design approval being an appropriate condition to a Development Approval.

Subject to the above there are no traffic engineering or related reasons for refusal of the sought Development Approval.

TTM Consulting (Vic) Pty Ltd



J. D. Higgs

# Appendix A



## Survey Details

TTM Reference: **17SYD0121**  
 Location: **Pacific Hwy NB Off Ramp & Oxley Hwy**  
 Suburb: **Port Macquarie**  
 Date: **Thursday, 31 August 2017**  
 Duration: **0600-1800**  
 Weather: **Fine**  
 Notes:

## Peak Hours

AM Peak Hour: 0745-0845  
 PM Peak Hour: 1515-1615

**ttm**

## Peak Hour Summary

0	0	↗	0	0	0
0	0	→	↙	↓	↘
0	0	↘	↖	↑	↗
39	511	0	135	149	
27	293	0	423	663	
			0	0	

## Image



## Survey Details

TTM Reference: **17SYD0121**

Location: **Pacific Hwy NB On Ramp & Oxley Hwy**

Suburb: **Port Macquarie**

Date: **Thursday, 31 August 2017**

Duration: **0600-1800**

Weather: **Fine**

Notes:

## Peak Hours

AM Peak Hour: 0745-0845

PM Peak Hour: 1515-1615

**ttm**

## Peak Hour Summary

65	77	↗	0	0	0
546	892	→	↖	↓	↘
0	0	↘			
			↖	0	0
↖	↑	↗	←	0	0
0	144	559	↖	0	0
0	133	352			

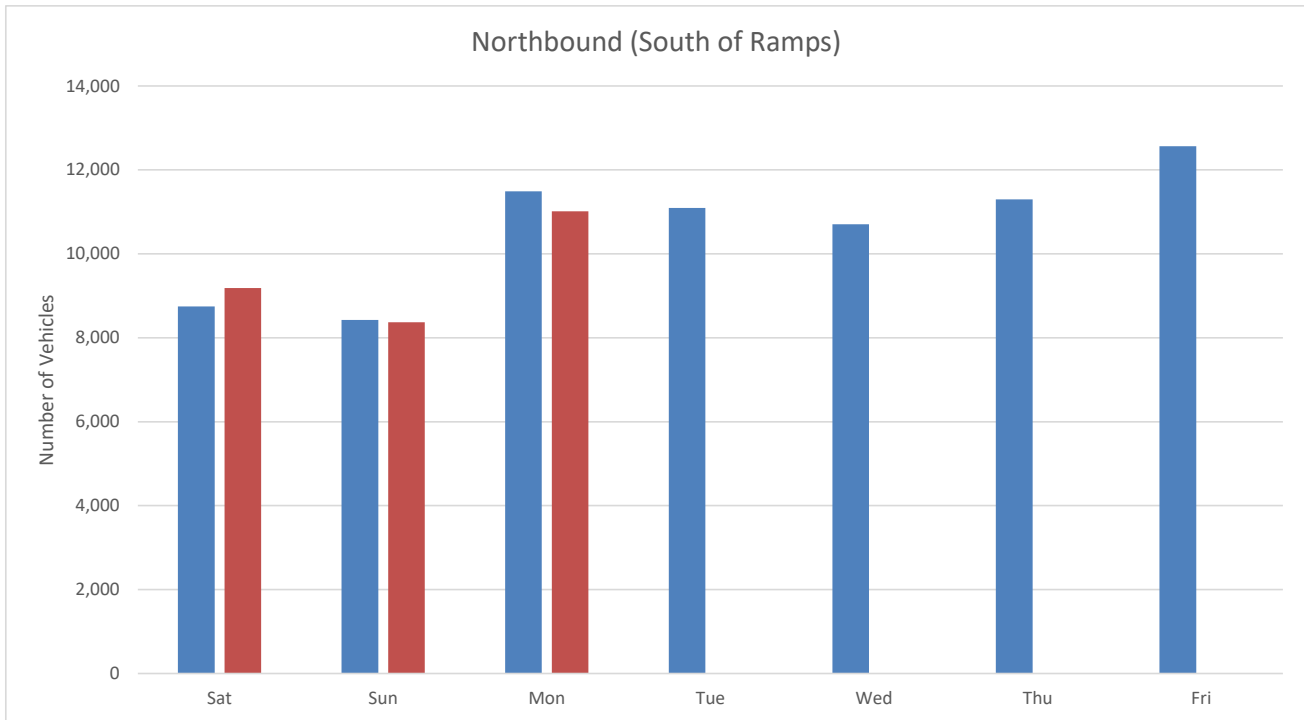
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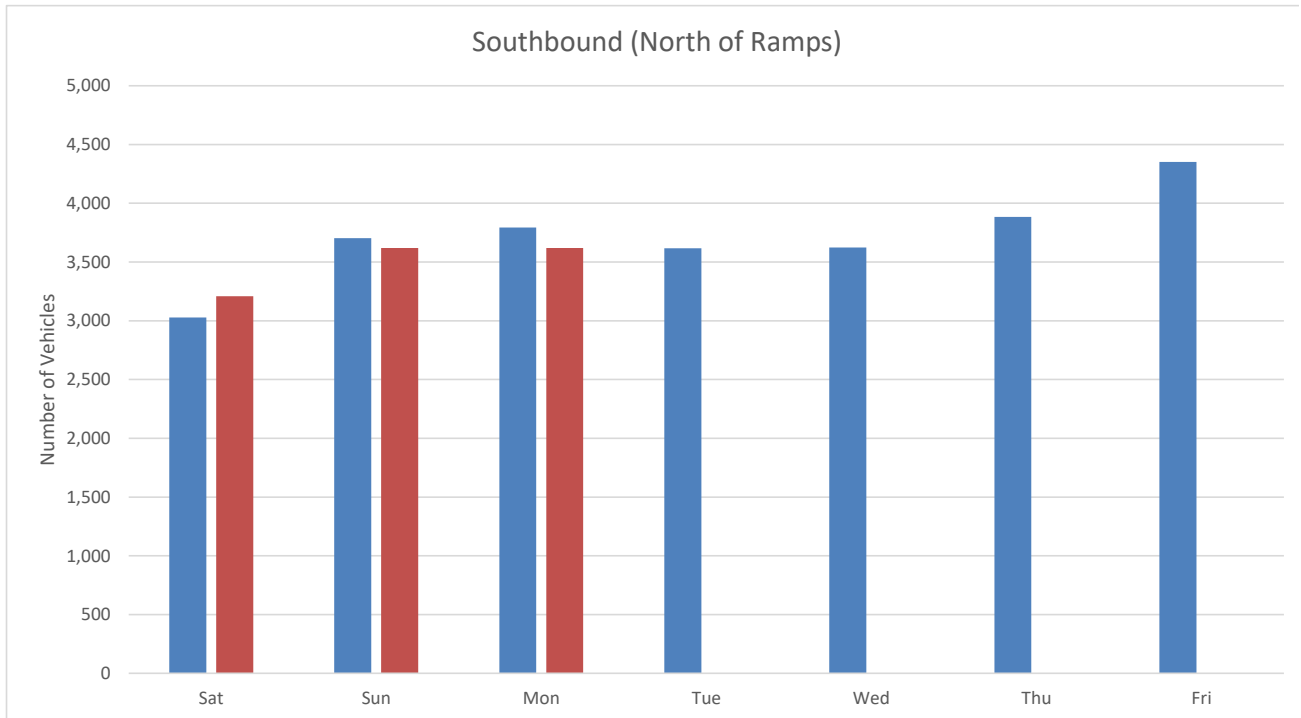
17SYD0121

Pacific Hwy, at Oxley Hwy Ramps

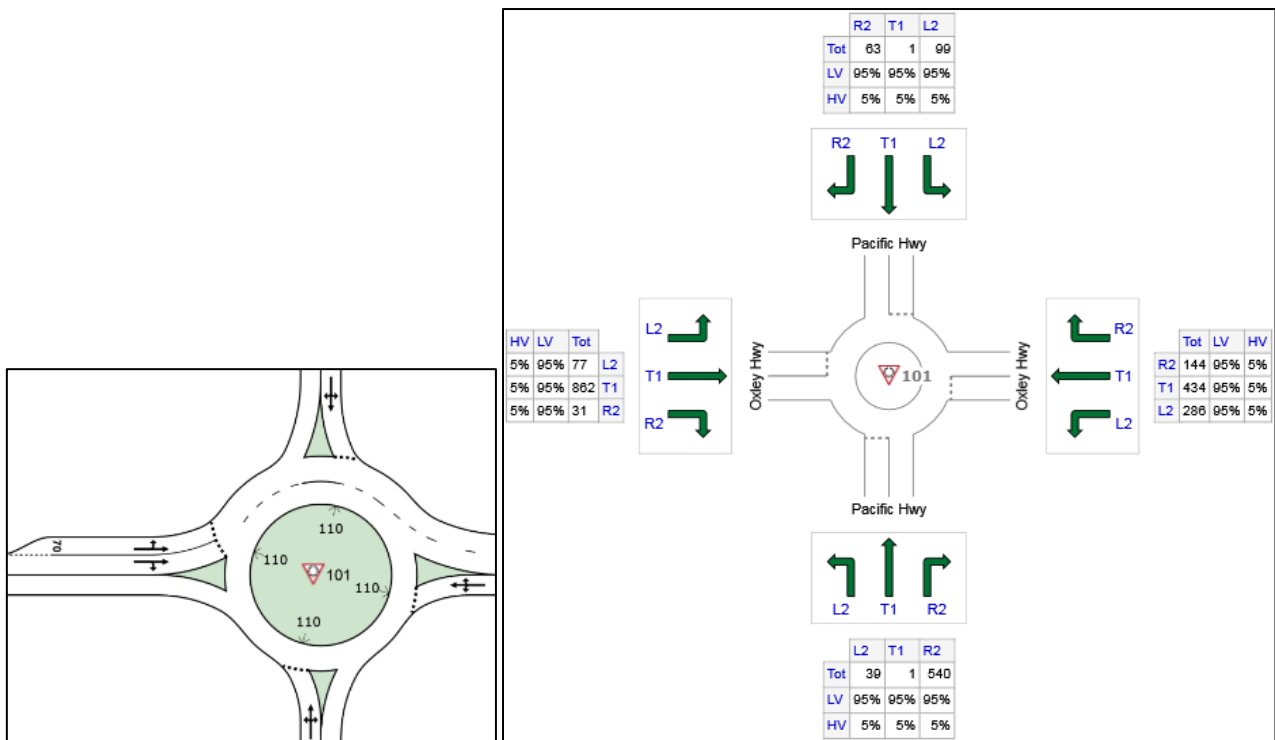
**Northbound (South of Ramps)**



**Southbound (North of Ramps)**



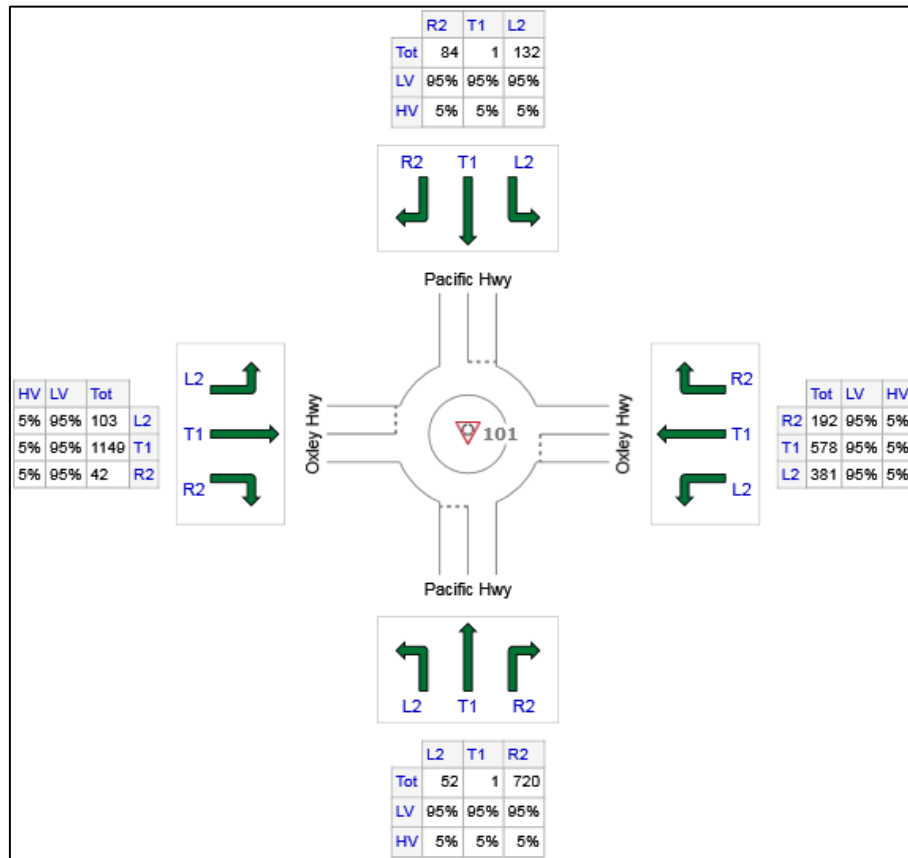
## EXISTING AM PEAK HOUR CONDITIONS AND VOLUMES



### Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total	HV	veh/h	v/c	%	sec		Veh	Dist		m	%	%
South: Pacific Hwy													
Lane 1 <span style="color: red;">d</span>	611	5.0	1162	0.525	100	13.1	LOS B	5.0	36.4	Full	500	0.0	0.0
Approach	611	5.0		0.525		13.1	LOS B	5.0	36.4				
East: Oxley Hwy													
Lane 1 <span style="color: red;">d</span>	909	5.0	1707	0.533	100	3.8	LOS A	5.0	36.4	Full	500	0.0	0.0
Approach	909	5.0		0.533		3.8	LOS A	5.0	36.4				
North: Pacific Hwy													
Lane 1 <span style="color: red;">d</span>	172	5.0	662	0.259	100	9.1	LOS A	1.5	11.0	Full	500	0.0	0.0
Approach	172	5.0		0.259		9.1	LOS A	1.5	11.0				
West: Oxley Hwy													
Lane 1 <span style="color: red;">d</span>	621	5.0	1352	0.459	100	5.3	LOS A	4.9	35.5	Short	70	0.0	NA
Lane 2	400	5.0	872	0.459	100	7.6	LOS A	4.1	29.8	Full	500	0.0	0.0
Approach	1021	5.0		0.459		6.2	LOS A	4.9	35.5				
Intersection	2713	5.0		0.533		7.1	LOS A	5.0	36.4				

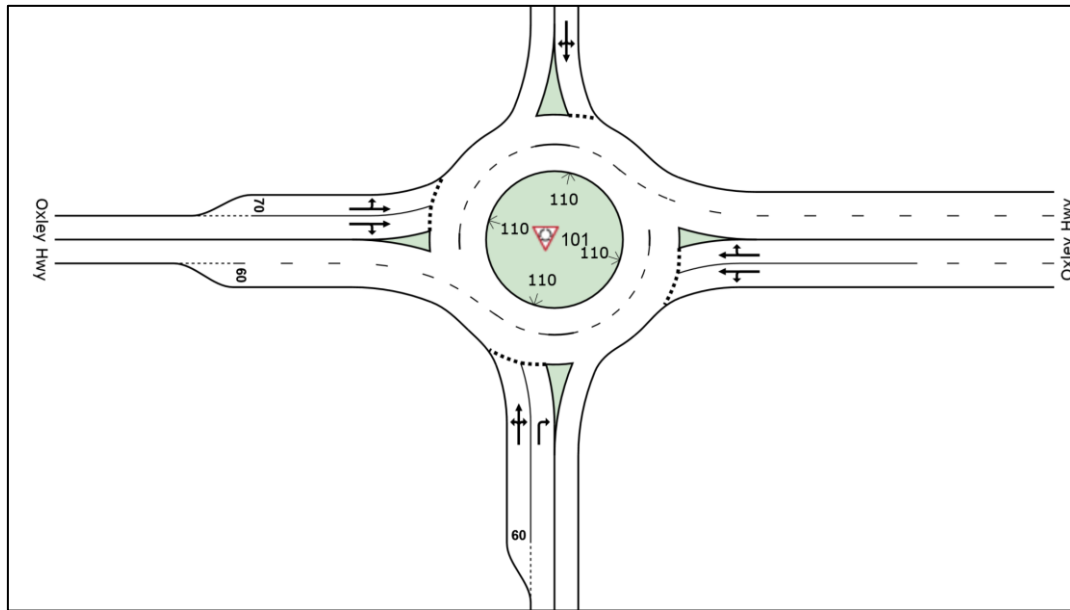
## EXISTING AM PEAK HOUR VOLUMES + 33%



Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist m				
South: Pacific Hwy													
Lane 1 <span>d</span>	814	5.0	877	0.928	100	47.1	LOS D	29.8	217.2	Full	500	0.0	0.0
Approach	814	5.0		0.928		47.1	LOS D	29.8	217.2				
East: Oxley Hwy													
Lane 1 <span>d</span>	1212	5.0	1656	0.732	100	4.3	LOS A	9.6	70.0	Full	500	0.0	0.0
Approach	1212	5.0		0.732		4.3	LOS A	9.6	70.0				
North: Pacific Hwy													
Lane 1 <span>d</span>	228	5.0	464	0.493	100	17.4	LOS B	3.7	26.8	Full	500	0.0	0.0
Approach	228	5.0		0.493		17.4	LOS B	3.7	26.8				
West: Oxley Hwy													
Lane 1 <span>d</span>	842	5.0	979	0.860	100	29.8	LOS C	24.3	177.1	Short	70	0.0	NA
Lane 2	520	5.0	605	0.860	100	37.1	LOS D	17.5	128.0	Full	500	0.0	0.0
Approach	1362	5.0		0.860		32.6	LOS C	24.3	177.1				
Intersection	3616	5.0		0.928		25.4	LOS C	29.8	217.2				



## Donut AM Existing Vols + 33% + EXTRA LANES



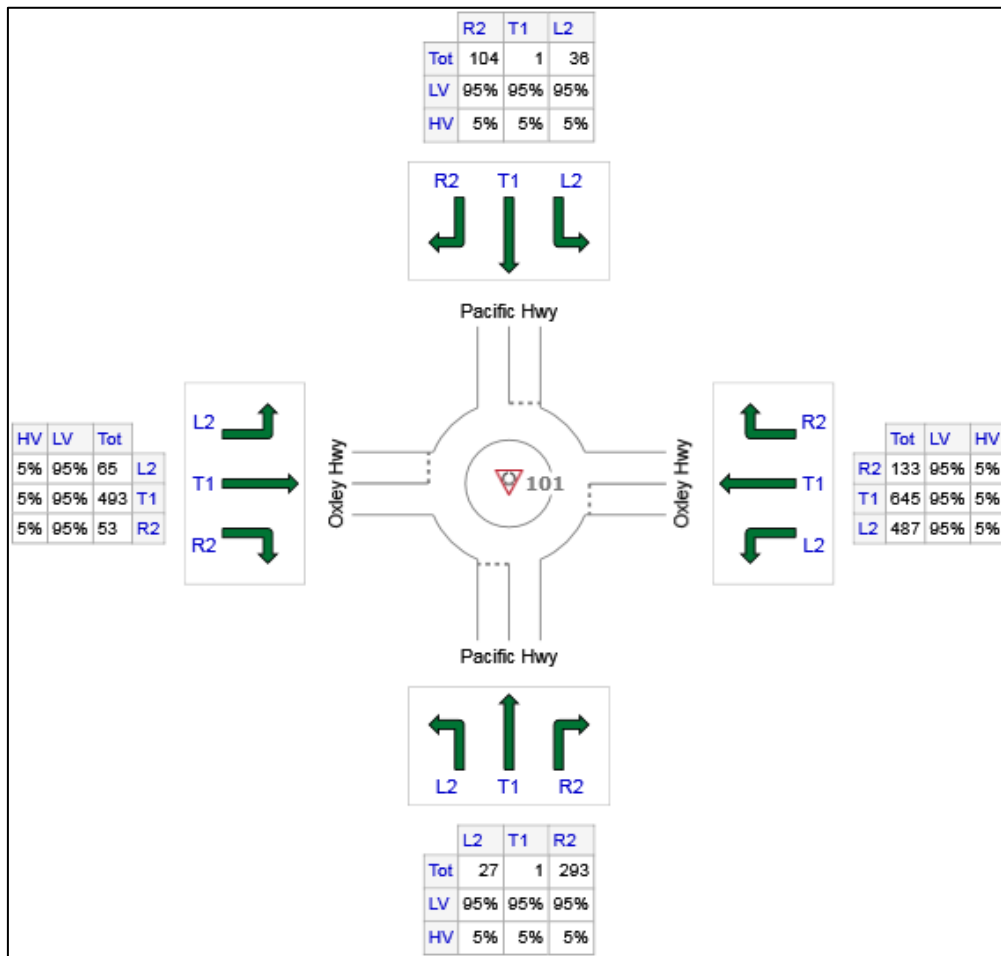
## LANE SUMMARY



Site: 101 [Donut AM Existing Vols + 33% + EXTRA LANES]

Lane Use and Performance													
	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total	HV						Veh	Dist				
	veh/h	%	veh/h	v/c	%	sec			m		m	%	%
South: Pacific Hwy													
Lane 1 <span style="color: red;">d</span>	476	5.0	1061	0.448	100	13.0	LOS B	3.8	27.4	Short	60	0.0	NA
Lane 2	338	5.0	754	0.448	100	15.7	LOS B	3.4	24.7	Full	500	0.0	0.0
Approach	814	5.0		0.448		14.1	LOS B	3.8	27.4				
East: Oxley Hwy													
Lane 1	402	5.0	1331	0.302	63 <span style="color: red;">6</span>	2.4	LOS A	1.8	13.0	Full	500	0.0	0.0
Lane 2 <span style="color: red;">d</span>	809	5.0	1690	0.479	100	4.4	LOS A	3.6	26.4	Full	500	0.0	0.0
Approach	1212	5.0		0.479		3.8	LOS A	3.6	26.4				
North: Pacific Hwy													
Lane 1 <span style="color: red;">d</span>	228	5.0	569	0.401	100	12.3	LOS B	2.6	18.8	Full	500	0.0	0.0
Approach	228	5.0		0.401		12.3	LOS B	2.6	18.8				
West: Oxley Hwy													
Lane 1 <span style="color: red;">d</span>	807	5.0	1119	0.721	100	7.4	LOS A	7.5	54.9	Short	70	0.0	NA
Lane 2	555	5.0	770	0.721	100	10.2	LOS B	6.5	47.7	Full	500	0.0	0.0
Approach	1362	5.0		0.721		8.5	LOS A	7.5	54.9				
Intersection	3616	5.0		0.721		8.4	LOS A	7.5	54.9				

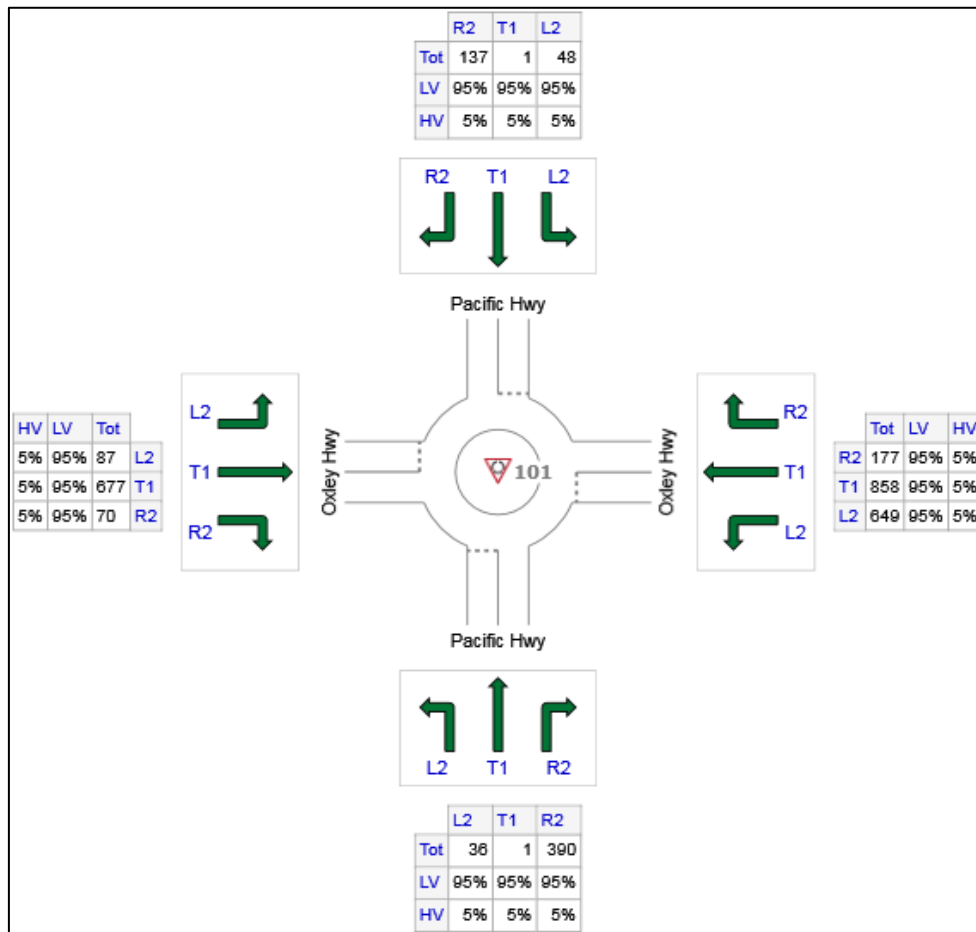
## PM PEAK HOUR EXISTING VOLUMES AND CONDITIONS



### Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Back of Queue Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Pacific Hwy													
Lane 1 <span style="color: red;">d</span>	338	5.0	621	0.544	100	17.5	LOS B	5.3	38.9	Full	500	0.0	0.0
Approach	338	5.0		0.544		17.5	LOS B	5.3	38.9				
East: Oxley Hwy													
Lane 1 <span style="color: red;">d</span>	1332	5.0	1460	0.912	100	6.9	LOS A	20.3	147.9	Full	500	0.0	0.0
Approach	1332	5.0		0.912		6.9	LOS A	20.3	147.9				
North: Pacific Hwy													
Lane 1 <span style="color: red;">d</span>	148	5.0	981	0.151	100	9.4	LOS A	0.7	5.2	Full	500	0.0	0.0
Approach	148	5.0		0.151		9.4	LOS A	0.7	5.2				
West: Oxley Hwy													
Lane 1 <span style="color: red;">d</span>	365	5.0	1358	0.268	100	3.6	LOS A	1.9	13.7	Short	70	0.0	NA
Lane 2	279	5.0	1038	0.268	100	5.6	LOS A	1.7	12.3	Full	500	0.0	0.0
Approach	643	5.0		0.268		4.5	LOS A	1.9	13.7				
Intersection	2461	5.0		0.912		7.9	LOS A	20.3	147.9				

## Donut PM Existing Vols + 33%



Lane Use and Performance													
	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Pacific Hwy													
Lane 1 d	449	5.0	562	0.800	100	41.8	LOS D	14.8	108.0	Full	500	0.0	0.0
Approach	449	5.0		0.800		41.8	LOS D	14.8	108.0				
East: Oxley Hwy													
Lane 1 d	1773	5.0	1546	1.146	100	140.0	LOS F	175.7	1282.8	Full	500	0.0	54.0
Approach	1773	5.0		1.146		140.0	LOS F	175.7	1282.8				
North: Pacific Hwy													
Lane 1 d	196	5.0	639	0.307	100	17.9	LOS B	2.9	21.1	Full	500	0.0	0.0
Approach	196	5.0		0.307		17.9	LOS B	2.9	21.1				
West: Oxley Hwy													
Lane 1 d	503	5.0	1223	0.411	100	4.5	LOS A	3.3	24.4	Short	70	0.0	NA
Lane 2	375	5.0	913	0.411	100	6.7	LOS A	2.9	21.5	Full	500	0.0	0.0
Approach	878	5.0		0.411		5.4	LOS A	3.3	24.4				
Intersection	3296	5.0		1.146		83.5	LOS F	175.7	1282.8				

Donut PM Existing Vols + 33% + EXTRA LANES

Lane Use and Performance													
	Demand Flows		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
	Total veh/h	HV %						Veh	Dist m				
South: Pacific Hwy													
Lane 1 <span>d</span>	268	5.0	622	0.431	100	19.6	LOS B	4.3	31.6	Short	60	0.0	NA
Lane 2	181	5.0	421	0.431	100	25.1	LOS C	3.6	26.6	Full	500	0.0	0.0
Approach	449	5.0		0.431		21.8	LOS C	4.3	31.6				
East: Oxley Hwy													
Lane 1	683	5.0	1280	0.534	79 <span>s</span>	3.1	LOS A	3.9	28.2	Full	500	0.0	0.0
Lane 2 <span>d</span>	1089	5.0	1615	0.675	100	4.5	LOS A	6.2	45.1	Full	500	0.0	0.0
Approach	1773	5.0		0.675		4.0	LOS A	6.2	45.1				
North: Pacific Hwy													
Lane 1 <span>d</span>	196	5.0	899	0.218	100	9.9	LOS A	1.0	7.6	Full	500	0.0	0.0
Approach	196	5.0		0.218		9.9	LOS A	1.0	7.6				
West: Oxley Hwy													
Lane 1 <span>d</span>	505	5.0	1328	0.381	100	3.6	LOS A	2.4	17.7	Short	70	0.0	NA
Lane 2	373	5.0	979	0.381	100	5.7	LOS A	2.2	16.1	Full	500	0.0	0.0
Approach	878	5.0		0.381		4.5	LOS A	2.4	17.7				
Intersection	3296	5.0		0.675		6.9	LOS A	6.2	45.1				

# Appendix B



PARKING SCHEDULE		
PARKING TYPE	TOTAL	
TOTAL CAR PARKING STAND ALONE DRIVE THRU	15x QUEING 3x WAITING 22x FRONT PARKING  1x PWD	41
DRIVE THRU A & B SERVICE CENTRE BUILDING	5x WAITING 19x QUEING	24
DRIVE THRU C SERVICE CENTRE BUILDING	2x WAITING 13x QUEING	15
SERVICE CENTRE BUILDING	61 + 12 + 16 2x PWD	91
SERVICE STATION (SERVICE CENTRE)	9 + 2 x AIR & WATER 1x PWD	12
TOTAL TRAILER PARKING (CAR + TRAILER)		6
TOTAL TRUCK PARKING		113
MOTEL & TRUCK WORKSHOP CAR PARK		16
TOTAL STAFF PARKING		24
<b>GRAND TOTAL</b>	<b>342</b>	

HARDSTAND AND LANDSCAPE AREA SCHEDULE	
TYPE	AREA (m <sup>2</sup> )
BUILDING AREA FOOT PRINT, ROADS & PAVING	72,190 m <sup>2</sup>
LANDSCAPE AREA & EXISTING NATURAL VEGETATION	112,110 m <sup>2</sup> (11.2 ha)
TOTAL DEVELOPMENT ALLOCATED AREA	184,300 m <sup>2</sup> (18.3 ha)



VISUAL SCALE 1:2000 @ A3

AMENDMENTS			
AMD	DATE	AMENDMENT DETAILS	BY
1	19-01-18	SCHEMATIC	MW
2	30-01-18	SCHEMATIC	MW
3	31-01-18	SCHEMATIC DESIGN	MW
4	06-02-18	PRELIMINARY ISSUE TO CLIENT	MW
5	07-02-18	NEW SITE EXTENT & PROPOSED EASEMENT WIDENING	MW
6	08-02-18	ROUND ABOUT AND SITE ENTRY	MW
7	15-02-18	AMENDED SITE PLAN	MW
8	21-02-18	CONSULTANTS COORDINATION	MW
9	21-02-18	DA ISSUE	MW



BRISBANE

1 OVERALL SITE PLAN  
1 : 2500

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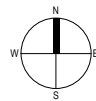
15 KURILPA STREET,  
WEST END,  
QUEENSLAND,  
4101 AUSTRALIA

P: +61 7 3392 2200  
F: +61 7 3392 2300  
E: [trg-qld@trg-aus.com](mailto:trg-qld@trg-aus.com)  
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**PORT MACQUARIE  
SERVICE CENTRE**  
PACIFIC & OXLEY HIGHWAYS, PORT  
MACQUARIE, New South Wales



SCALE : As indicated @A3  
DATE : Feb 2018  
DRAWN : MW  
SHEET TITLE : OVERALL PROPOSED  
SITE PLAN

PROJECT NUMBER : 415172

**SHEET NUMBER : DA003**

REVISION

9


21/02/2018 7:35:55 PM

# Appendix C





A	JH	16/02/18	Initial Issue
Issue/Appd	Date	Comments	



Acoustics Data Traffic Waste

**TTM Consulting (Vic) Pty Ltd**

Suite 9, 70 - 80 Wellington Street  
Collingwood VIC 3066  
P : (03) 9419 0911  
E : email@ttmconsulting.com.au  
W : www.ttmgroup.com.au

**PORT MACQUARIE SERVICE CENTRE  
PACIFIC AND OXLEY HIGHWAYS  
SANCROX**

**CONCEPT LAYOUT PLAN  
OXLEY HIGHWAY PRECINCT  
ROUNDABOUT ACCESS OPTION**

Scale

0 5 10 15 20 25  
1:1,500 @ A3

Drawing No : 9486302

Sheet No : 1 Issue : A





A	JH	16/02/18	Initial Issue
Issue	Appd	Date	Comments



Acoustics Data Traffic Waste

TTM Consulting (Vic) Pty Ltd

Suite 9, 70 - 80 Wellington Street

Collingwood VIC 3066

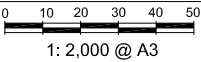
P : (03) 9419 0911

E : email@ttmconsulting.com.au

W : www.ttmgroup.com.au

PORT MACQUARIE SERVICE CENTRE  
PACIFIC AND OXLEY HIGHWAYS  
SANCROX  
CONCEPT LAYOUT PLAN  
PACIFIC HIGHWAY PRECINCT

Scale



1: 2,000 @ A3

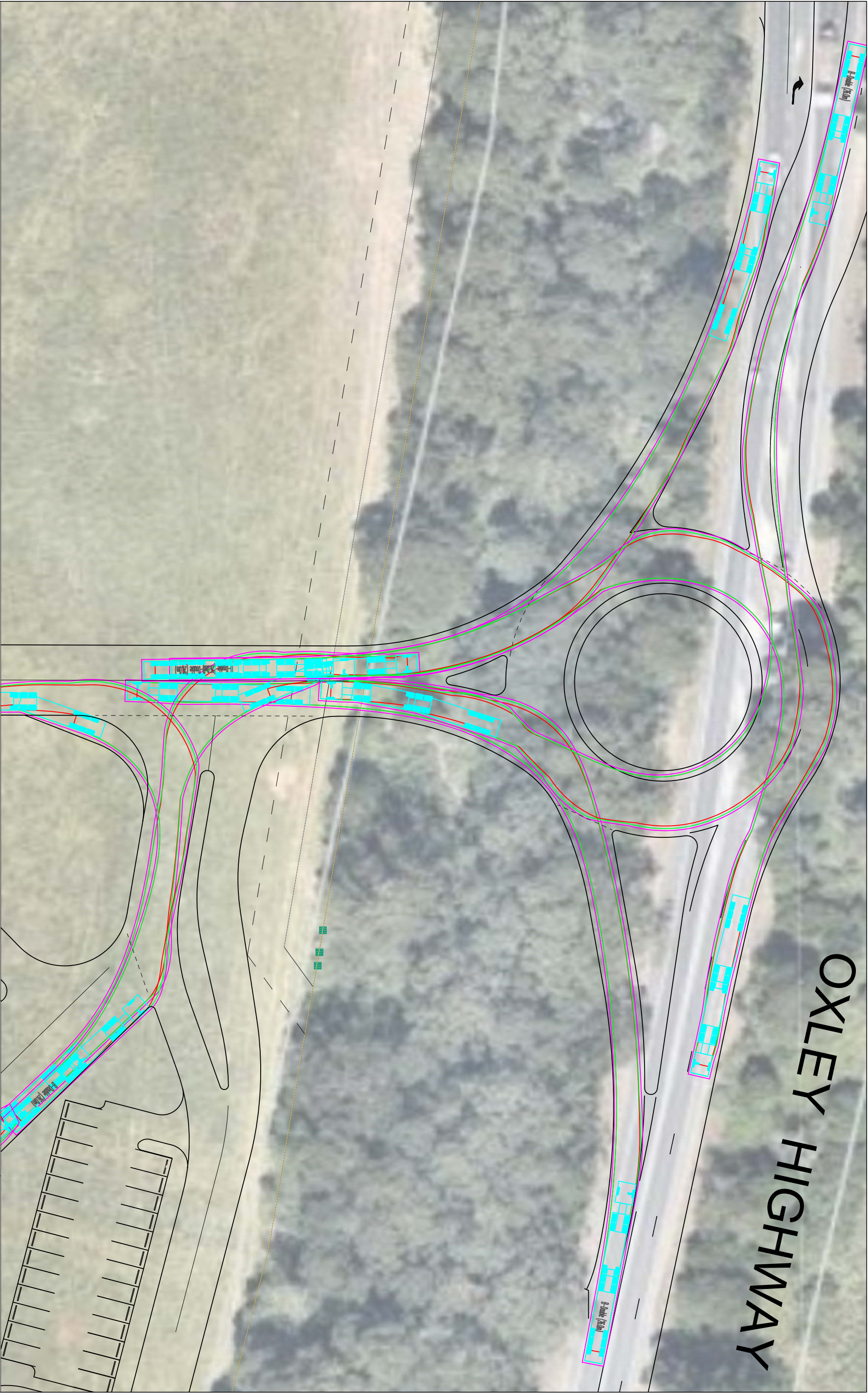
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Sheet No :

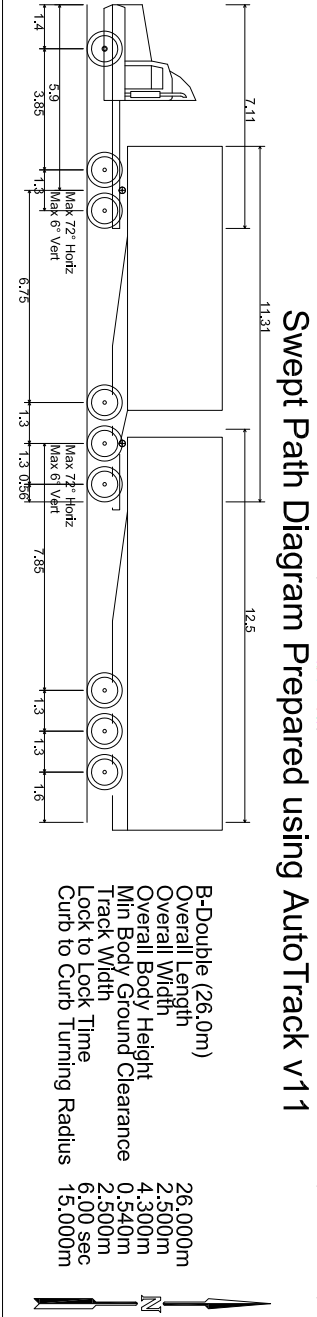
1


Issue : A






A	JH	16/02/18	Initial Issue
Issue/Appd	Date	Comments	





Acoustics Data Traffic Waste  
**TTM Consulting (Vic) Pty Ltd**  
Suite 9, 70 - 80 Wellington Street  
Collingwood VIC 3066  
P : (03) 9419 0911  
E : email@ttmconsulting.com.au  
W : www.ttmgroup.com.au

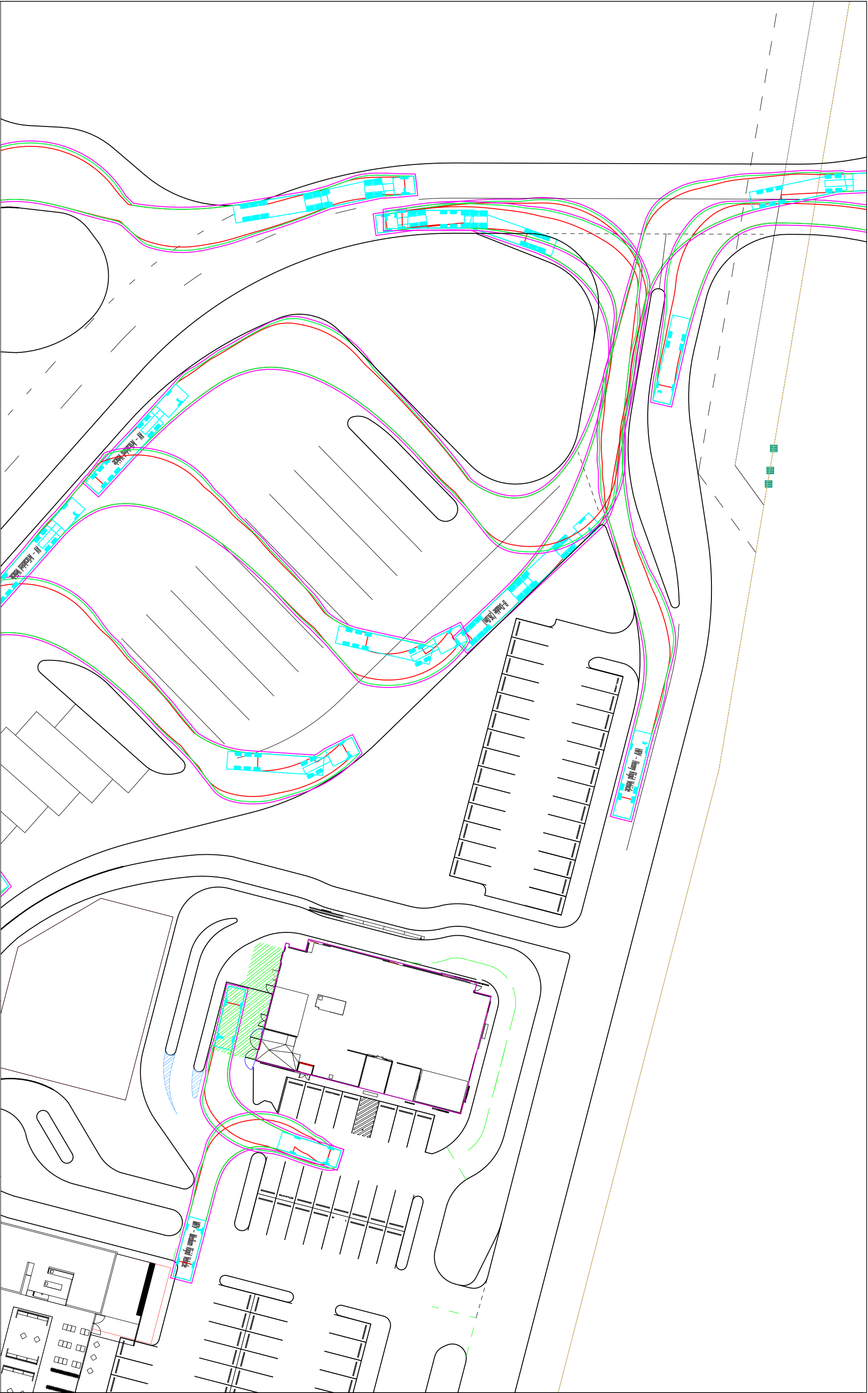
**PORT MACQUARIE SERVICE CENTRE  
PACIFIC AND OXLEY HIGHWAYS  
CONCEPT LAYOUT PLAN  
OXLEY HIGHWAY PRECINCT  
26m B-DOUBLE PATHS SHOWN**

Scale  1:500 @ A3


Drawing No : 9486312

Sheet No : 1 Issue : A





A	JH	16/02/18
Issue/Appd	Date	Initial Issue
Comments		

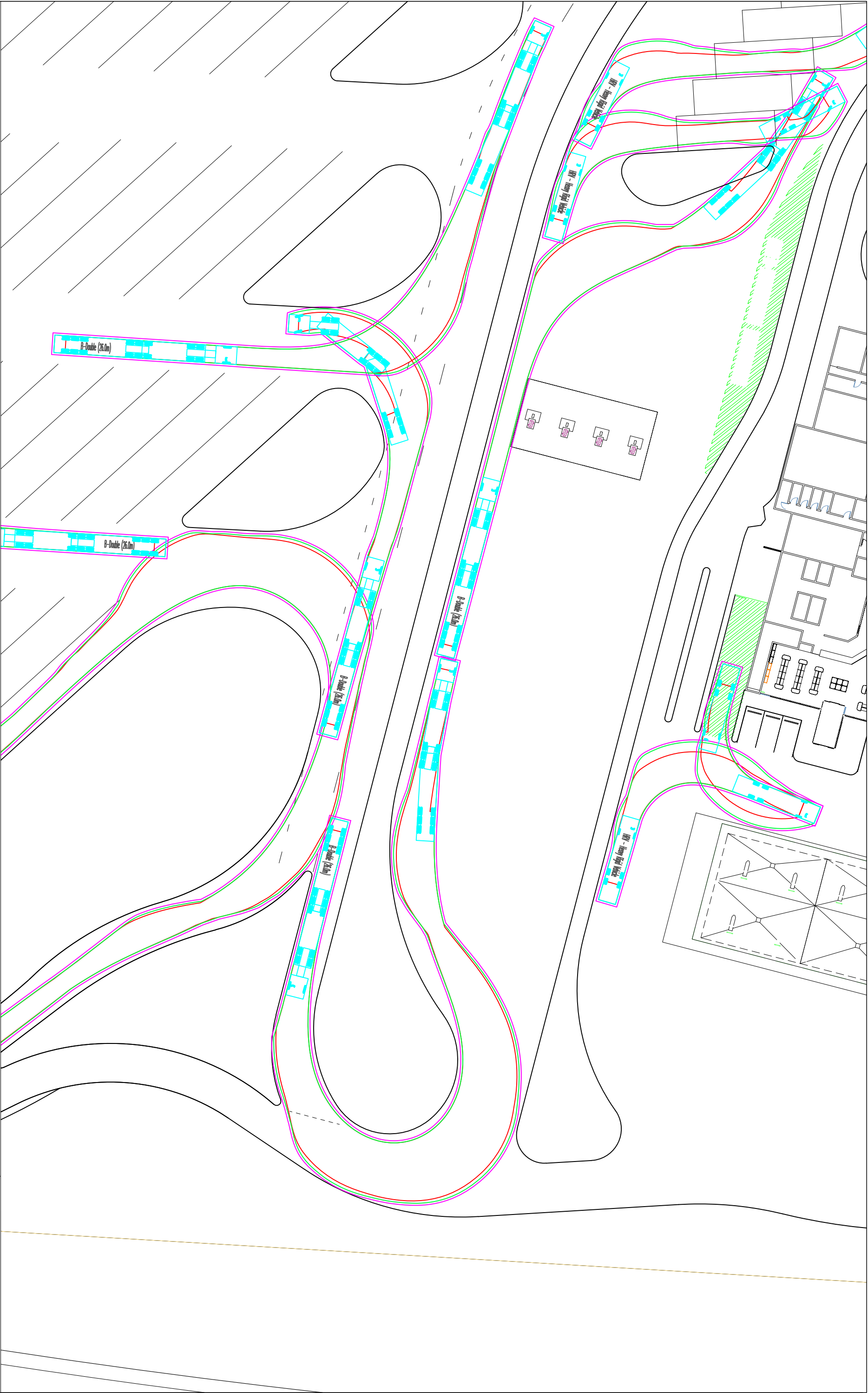


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**TTM Consulting (Vic) Pty Ltd**  
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**PORT MACQUARIE SERVICE CENTRE  
PACIFIC AND OXLEY HIGHWAYS  
CONCEPT LAYOUT PLAN  
OXLEY HIGHWAY PRECINCT  
VARIOUS TRUCK PATHS SHOWN**

Scale  
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Drawing No : 9486313  
Sheet No : 1 Issue : A



Wheel path

Vehicle Overhang

Vehicle Overhang + 300mm Clearance

A

JH

16/02/18

Initial Issue

Issue/Appd

Date

Comments

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Scale

Drawing No : 9486314

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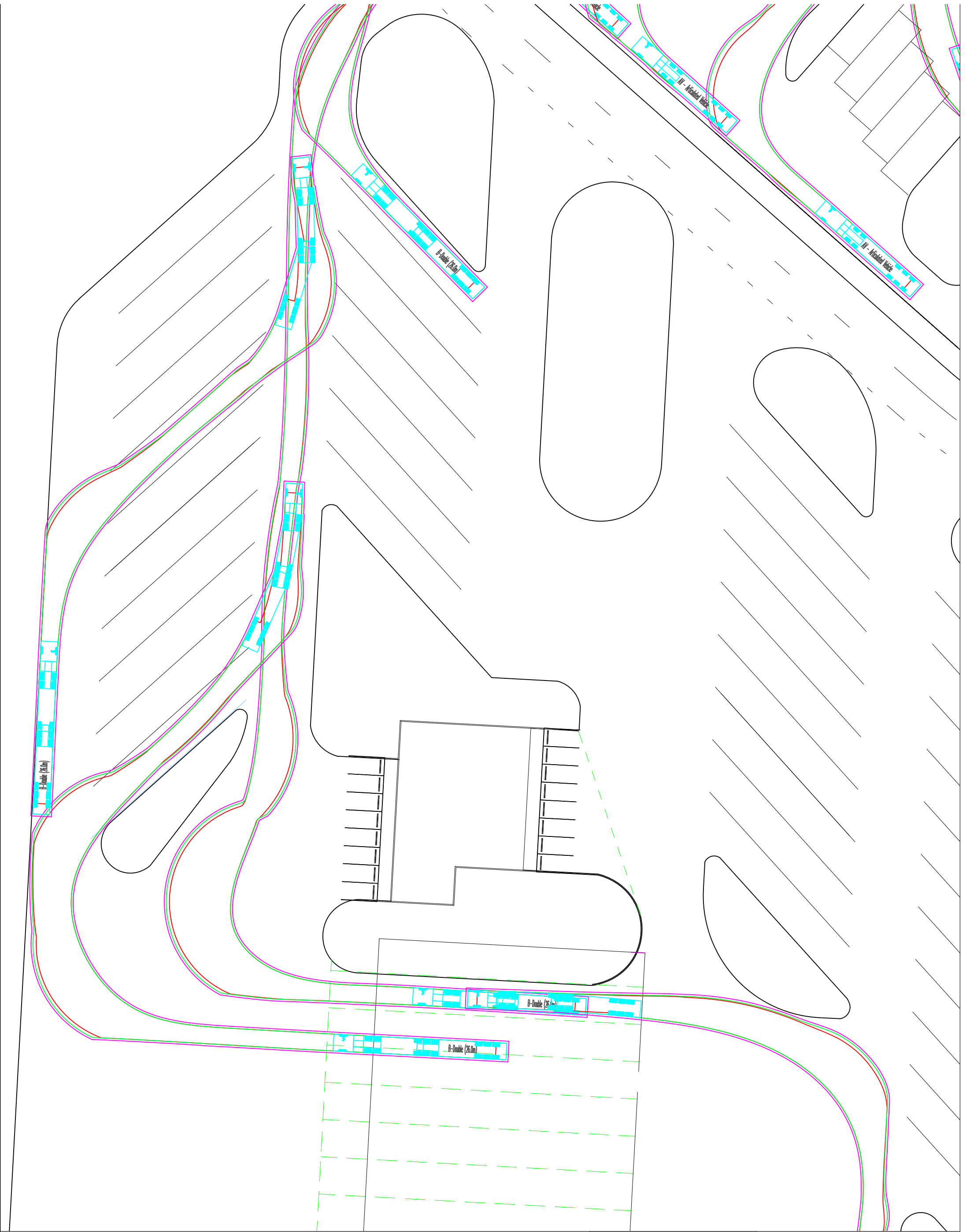
PORT MACQUARIE SERVICE CENTRE

PACIFIC AND OXLEY HIGHWAYS

CONCEPT LAYOUT PLAN

OXLEY HIGHWAY PRECINCT

VARIOUS TRUCK PATHS SHOWN



- Wheel path
- Vehicle Overhang
- Vehicle Overhang + 300mm Clearance

A	JH	16/02/18	Initial Issue
Issue	Appd	Date	Comments

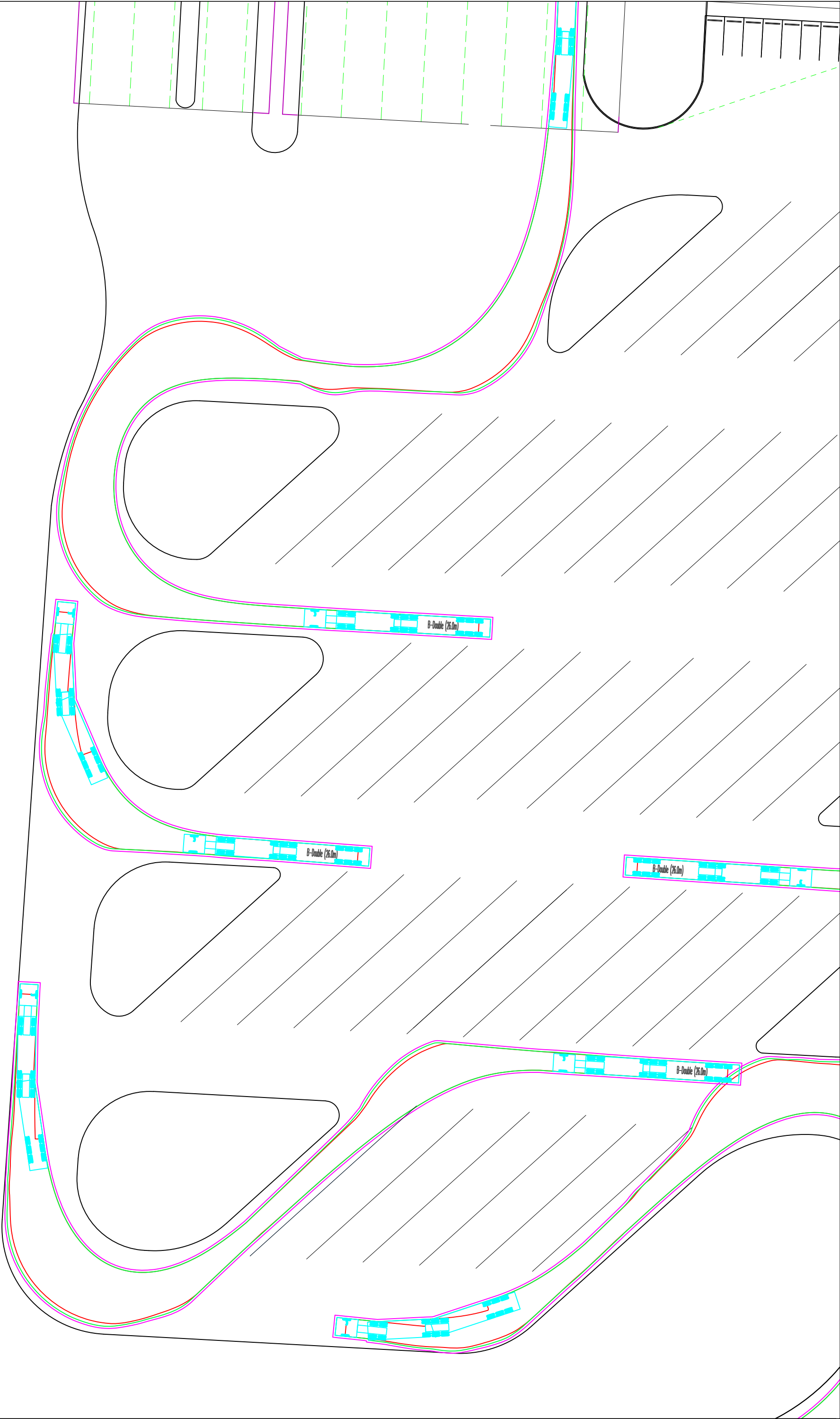


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VARIOUS TRUCK PATHS SHOWN

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Drawing No :	9486315
Sheet No :	1
Issue :	A





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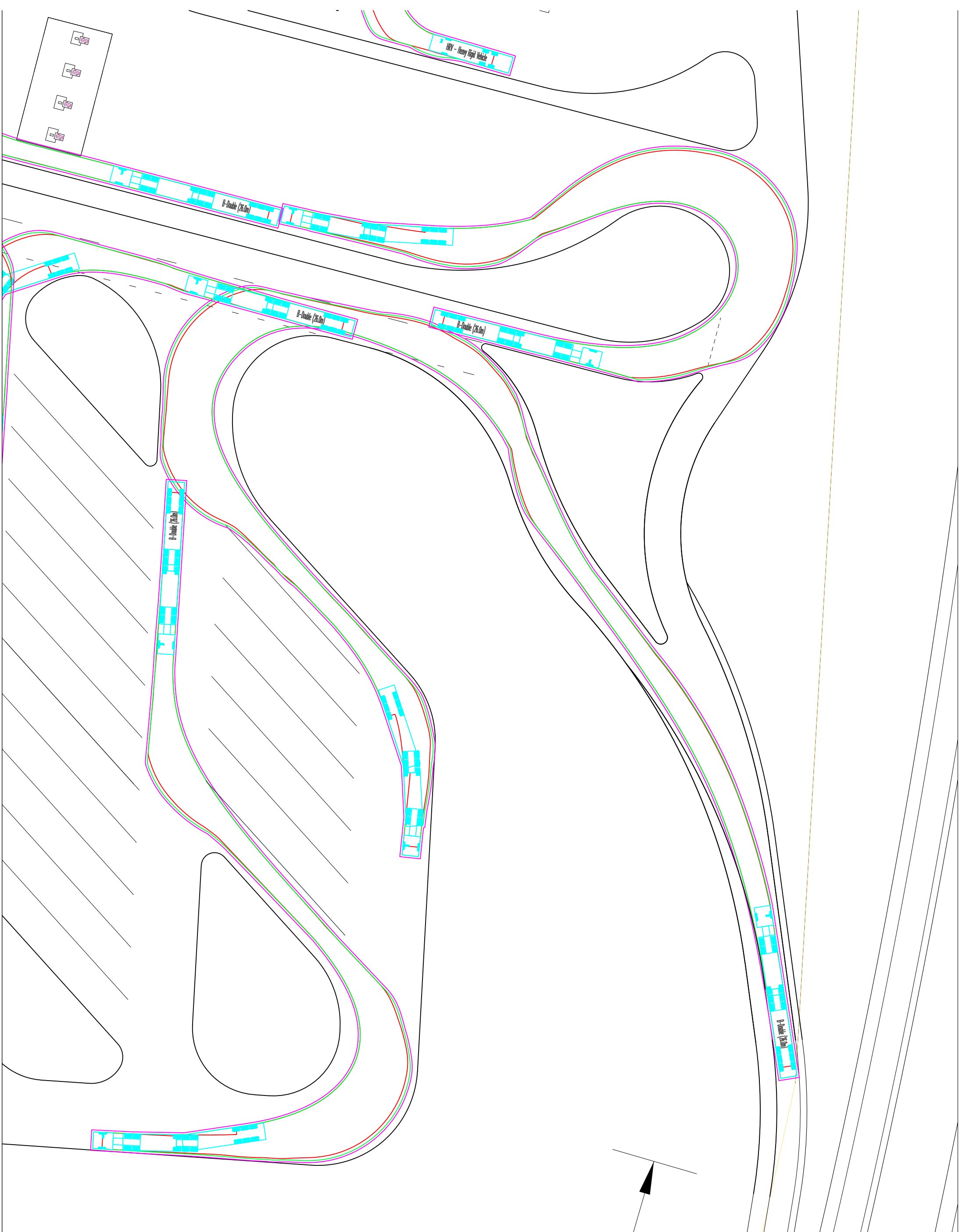
**PORT MACQUARIE SERVICE CENTRE  
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CONCEPT LAYOUT PLAN  
OXLEY HIGHWAY PRECINCT  
VARIOUS TRUCK PATHS SHOWN**

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Drawing No : 9486316

Sheet No : 1 Issue : A



- Wheel path
- Vehicle Overhang
- Vehicle Overhang + 300mm Clearance

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OXLEY HIGHWAY PRECINCT  
VARIOUS TRUCK PATHS SHOWN

Scale 0 5 10  
1:500 @ A3

Drawing No : 9486315  
Sheet No : 1 Issue : A



## **Attachment 8 Acoustic Assessment**

# Acoustic Assessment for DA Highway Service Centre

Report Number: M17758.01

Client: Scott PDI No. 6 Pty Ltd

Site: Intersection of the Oxley Highway and Pacific Highway,  
Port Macquarie

Prepared by: Philip Thornton BE (UNSW) CPEng  
Acoustic Consultant  
Matrix Thornton Consulting Engineers  
22 February 2018

**Summary:** Noise emission from vehicles using the proposed Highway Service Centre is predicted to comply with trigger levels at the nearest residential receivers.

At the proposed on-site motel, noise emission is predicted to exceed the usual criteria for motels. Appropriate noise levels within the motel rooms can be achieved using standard building materials and techniques. Air-conditioning of mechanical ventilation will be required so that windows may remain closed.

As the proposal will not generate extra traffic on surrounding road network, traffic noise assessment is not required.

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# 1 INTRODUCTION

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This report will form part of a development consent for a Highway Service Centre to be located on the south-western corner of the intersection of the Oxley Highway and Pacific Highway, at Sancrox in the Port Macquarie Hastings Local Government jurisdiction.

Aspects covered include:

- setting appropriate limits for noise emission from all aspects of the development, including noise from mechanical services and vehicles using the centre;
- assessing noise from operations;
- an assessment of noise due to traffic generated in surrounding streets.

The report follows recommendations of the following documents:

- the New South Wales *Noise Policy for Industry* (NPfI);
- the New South Wales *Road Noise Policy* (RNP).

# 2 PURPOSE OF THE REPORT

---

As there are several uses of the development, each of which will have its own specific acoustic goals, each use will be treated individually in this report. Procedures will include:

- Measure the existing background noise levels near the site.
- Obtain noise data of the expected noise related activities.
- Setting the appropriate limits for noise emission from all aspects of the development, including:
  - noise from mechanical services and
  - noise from vehicles using the site;
- Setting appropriate noise limits for noise into the motel at the development.
- An assessment of noise due to traffic generated in surrounding streets.
- Determine acceptable noise criteria.
- Analyse noise level data and assess levels of noise impacts at the nearest affected residences.
- Suggested method of noise mitigation required, if any, to achieve desired noise levels.
- Prepare a report on these findings acceptable to Council.

# 3 DESCRIPTION OF THE DEVELOPMENT

---

The proposal comprises:

- Food and drink outlet with drive-through.
- Service station with restaurant and drive-through.
- Eight room motel.
- Truck type service facility.
- Truck wash.
- Trailer exchange area.
- Diesel canopy with fuel dispensers.
- 102 cars or motorcycle parking spaces.
- car and trailer (boat, caravan) parking spaces.
- 25 x semi-trailer (<19 metres) parking spaces.

- 70 parking spaces suitable for B-doubles.
- 10 B-double plus parking spaces at the tyre service area.

Access is proposed from both Pacific Highway and Oxley Highway.

The site layout is shown in Figure 3-1. A view in context with noise sensitive receivers is shown in the next section in Figure 3-2.

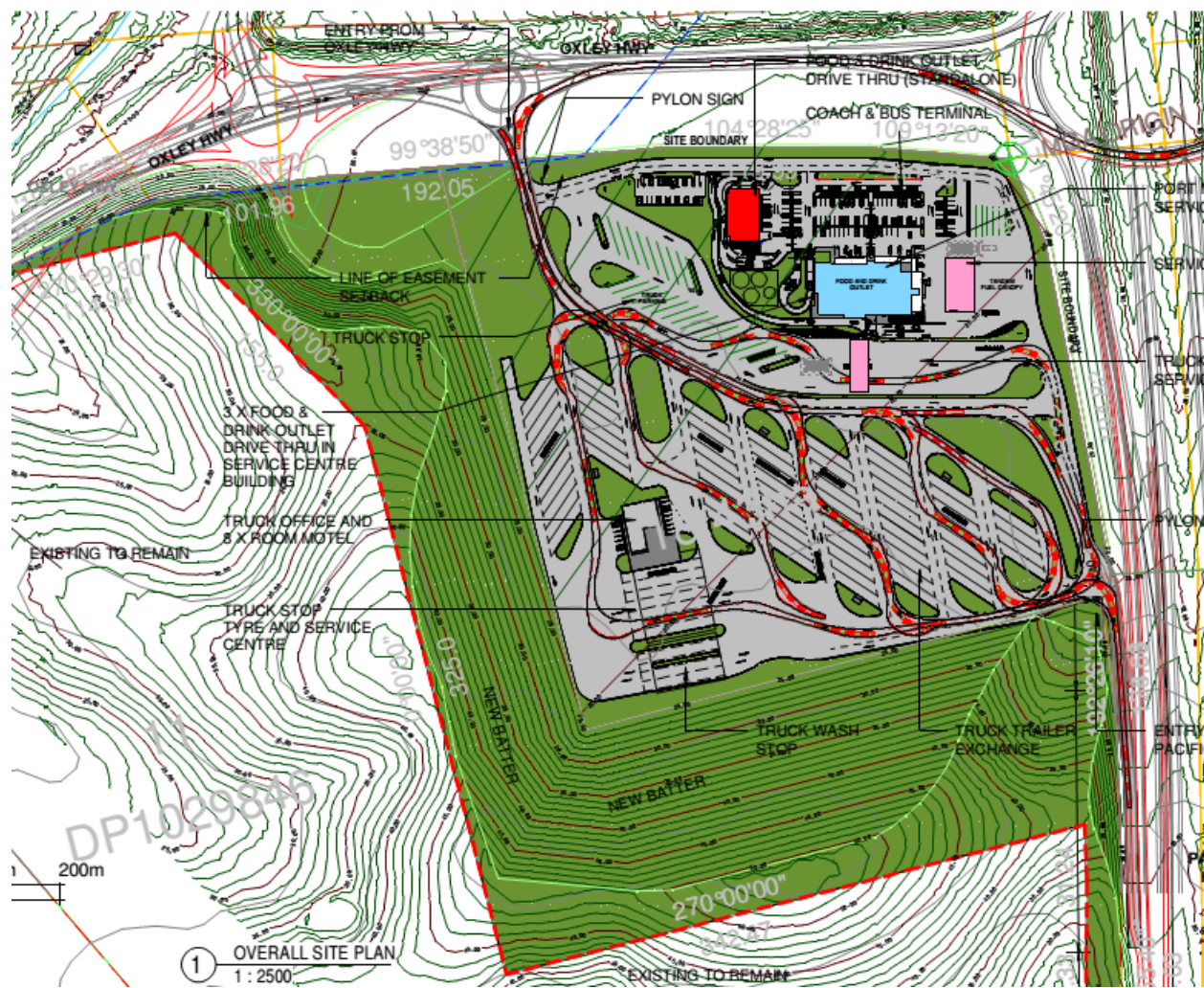


Figure 3-1 Site Layout

### 3.1 NOISE-SENSITIVE RECEIVERS

The proposal potentially impacts noise-sensitive receivers surrounding the site. It is a large site and there are receivers on all sides as shown in Figure 3-2. Representative residential receivers are marked by numerals, and non-residential sensitive receivers with letters. They are listed in Table 3-1. Receivers distant from the site, namely Receivers 6 to 10, will be used to assess traffic noise on the local road network.

Receiver	Address
1	1203 Pacific Hwy
2	1201 Pacific Hwy
3	1179 Pacific Hwy
4	101 Birralelee Drive
5	2 Yarralumla Parade (new development not seen on aerial image)
6	14 Sovereign Drive (new development not seen on aerial image)
8	54 Billabong Drive
7	23 Billabong Drive
9	Motel on Site

**Table 3-1 Noise-Sensitive Receivers**



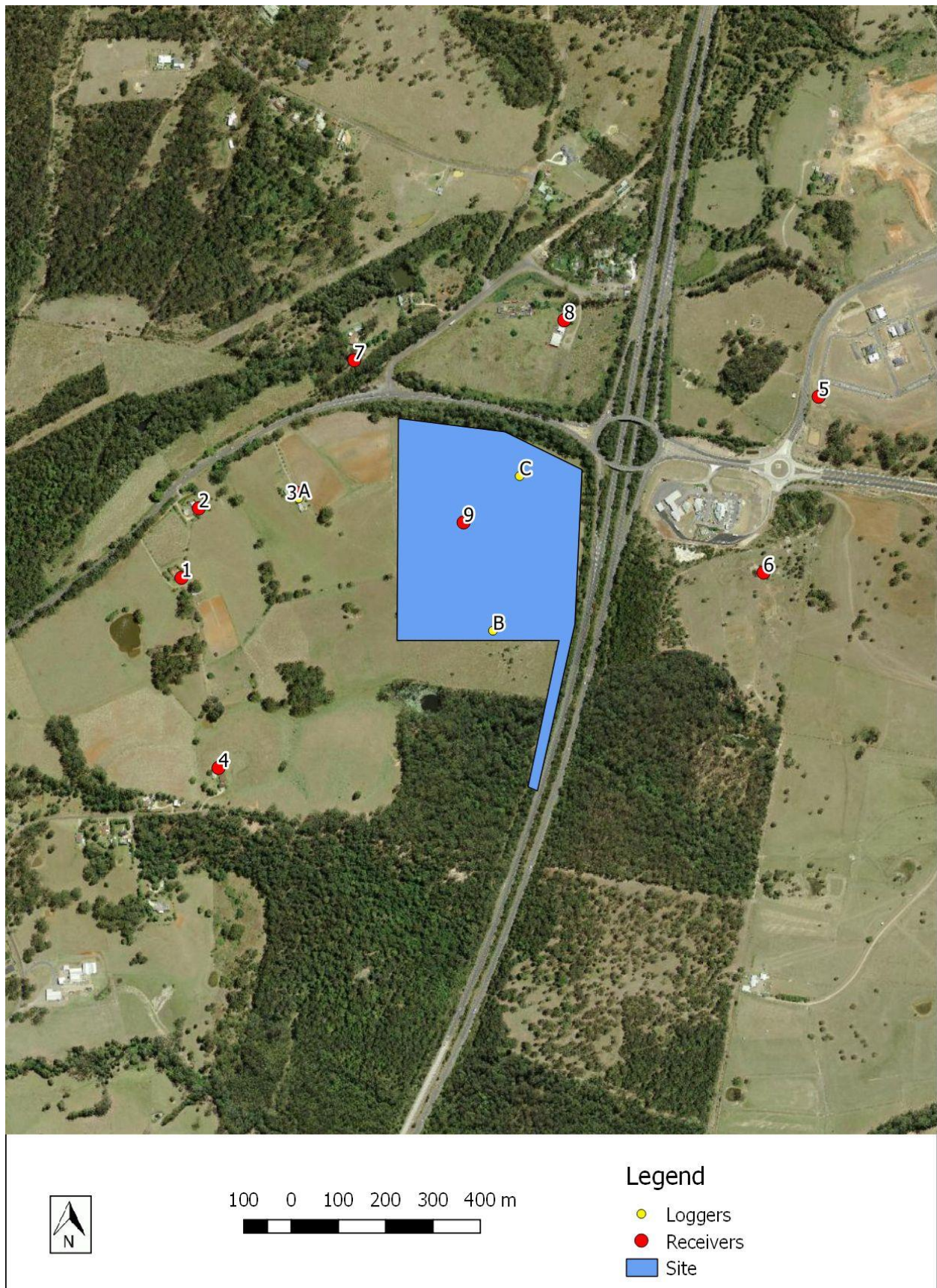


Figure 3-2 Receiver and Noise Logger Locations



## 4 PLANNING NOISE LEVELS

---

### 4.1 OVERVIEW

Due to the many different occupancies at the proposal, and the varied nature of the surrounding neighbourhood, several New South Wales planning guidelines and Australian Codes will be necessary for a complete assessment. Most of the codes depend on a measurement of the existing noise environment in the area, including the background noise and the existing traffic noise levels at residential premises. This section describes the measurement of the existing noise levels and how they will be applied in the assessment.

### 4.2 RATING BACKGROUND LEVEL

The Rating background level, RBL, is the overall single-figure background level representing each assessment period (day/evening/night). The INP states that *where the rating background level is found to be less than 30 dB(A), then it is set to 30 dB(A)*. In the absence of noise monitoring, the minimum RBL can be adopted for assessment purposes.

Two noise loggers were used to measure the ambient background level. Location A was also used to measure the traffic noise from Lake Street.

#### 4.2.1 Instrumentation

An ARL brand, model EL-316, Type 1 environmental noise logger was used to measure the background noise level. A Lutron sound level calibrator, model SC-941, was used as a reference sound source immediately before and after measurements were taken. All instruments are in current calibration from a NATA registered laboratory. A noise logger measures the noise levels over a 15-minute sampling period and then determines  $L_{A1}$  through to  $L_{A99}$ ,  $L_{Amax}$  and  $L_{Aeq}$ . Both instruments are integrating sound level meters which are able to process a continuous, variable, intermittent or impulsive signal to give a single integrated level or  $L_{Aeq}$  for the sampling period. This equipment complies with AS 1259 ‘Acoustics-Sound level meters’, Part 2 “Integrating-Averaging” and the testing procedure with AS 2659 “Guide to the use of sound measuring equipment”.

#### 4.2.2 Measurement Procedure

Logging locations A, B and C are shown in Figure 3-2.

Measurement conditions:

- Noise readings were recorded over 15 minute periods under ideal conditions to determine the existing background and ambient noise levels.
- Periods of rain were excluded from the data.
- Two periods were logged as noted in the table.

#### 4.2.3 Summary of Measured Noise Levels

The background noise measurements tabulated in Table 4-1 were recorded using the noise logger over a seven-day period and are classified as long-term recordings. They were recorded under conditions that are considered reliable and typical for the receptor area. The full graphical results are in the Appendix B.

Location	Measurement Period	LAeq			RBL		
		Day	Evening	Night	Day	Evening	Night
Logger A	20/12/2017-30/12/2017	65	62	58	52	47	39
Logger B	24/1/2018-31/1/2018	57	59	55	52	46	41
Logger C	24/1/2018-31/1/2018	58	58	53	53	49	42

**Table 4-1 Measured Background A-weighted sound pressure levels**

Note: Daytime is defined as 7.00am to 6.00pm, Monday to Saturday; 8.00am to 6.00pm Sunday and Public Holidays.  
 Evening is defined as 6.00pm to 10.00pm, Monday to Saturday and Public Holidays.  
 Night is defined as 10.00pm to 7.00am, Monday to Saturday; 10.00pm to 8.00am Sunday and Public Holidays.

### 4.3 NOISE POLICY FOR INDUSTRY

Assessment criteria are discussed in the New South Wales noise Policy for Industry (NPfI). The NPfI gives a procedure for setting “trigger” noise levels. If noise is above a trigger level, mitigation or management needs to be considered.

The policy discusses “intrusiveness” and “amenity” levels which are a set based on the existing noise environment, and the type of residential area. The project specific trigger levels become the most stringent of the two.

#### 4.3.1 Intrusiveness Noise Level

For assessing intrusiveness, the background noise level ( $L_{A90}$ ) is measured and the Rating Background Level (RBL) determined. The intrusiveness of an industrial noise source may generally be considered acceptable if the equivalent continuous noise level ( $L_{Aeq}$ ) of the source (measured over a 15-minute period) does not exceed the background noise level (RBL) by more than 5dBA.

The intrusiveness criterion does not apply to Receiver 9, Motel on site. It will be assessed by the amenity criterion.

#### 4.3.2 Amenity Noise Level

The amenity assessment is based on noise criteria specific to land use and associated activities. The criteria relate only to industrial-type noise and do not include transportation noise.

The amenity noise level aims to limit continuing increases in noise levels which may occur if the intrusiveness level alone is applied to successive development within an area.

The recommended amenity noise level represents the objective for total industrial noise at a receiver location. The project amenity noise level represents the objective for noise from a single industrial development at a receiver location.

To prevent increases in industrial noise due to the cumulative effect of several developments, the project amenity noise level for each new source of industrial noise is set at 5dBA below the recommended amenity noise level.

For high-traffic areas the amenity becomes the  $L_{Aeq,period(traffic)}$  minus 15dBA. – this is applicable in this case for Evening and Night time.

Amenity noise levels are not used directly as regulatory limits. They are used in combination with the project intrusiveness noise level to assess the potential impact of noise, assess mitigation options and determine achievable noise requirements.

The amenity noise levels for surrounding receivers is given in

Table 4-2.

Table 4-2      Amenity Noise Levels

Receiver	Noise Amenity Area	Time of Day <sup>1</sup>	Recommended Amenity Noise Level  $L_{Aeq}$ dBA	Existing Traffic Noise $L_{Aeq,period}$ dBA	High Traffic Noise Amenity Criterion
Residence	Rural	Day	55	65	52
		Evening	45	62	47
		Night	40	58	53
Commercial	All	When in use	65		

Note:      Daytime is defined as 7.00am to 6.00pm, Monday to Saturday; 8.00am to 6.00pm Sunday and Public Holidays.  
              Evening is defined as 6.00pm to 10.00pm, Monday to Saturday and Public Holidays.  
              Night is defined as 10.00pm to 7.00am, Monday to Saturday; 10.00pm to 8.00am Sunday and Public Holidays.

### 4.3.3 Project Noise Trigger Levels

The amenity and intrusiveness noise levels and resulting project trigger levels applicable to sources of continuous operational noise associated with the project are shown in Table 4-3.

In developing project specific trigger noise levels, the levels for each receiver have been applied based on their relation to the most appropriate of the three noise loggers.

Receivers	Criterion		Day	Evening	Night
<b>Logger A</b>  <b>Receivers 1, 2, 3 and 7</b>	Intrusiveness Criterion	RBL	52	47	39
		Intrusiveness Criterion	57	52	44
	Amenity Criterion	Recommended Amenity	55	45	40
		Recommended Amenity minus 5dBA	50	40	35
		Traffic Noise Level	65	62	58
		High Traffic Noise Amenity Criterion	50	47	53
		Project Amenity Criterion, 15 minute	53	50	56
	<b>Project Trigger Level, LAeq,15min</b>		<b>52</b>	<b>47</b>	<b>44</b>
<b>Logger B</b>  <b>Receivers 5, 6 and 8</b>	Intrusiveness Criterion	RBL	52	46	41
		Intrusiveness Criterion	57	51	46
	Amenity Criterion	Recommended Amenity	55	45	40
		Recommended Amenity minus 5dBA	50	40	35
		Traffic Noise Level	57	59	55
		High Traffic Noise Amenity Criterion	N/A	44	50
		Project Amenity Criterion, 15 minute	53	47	53
	<b>Project Trigger Level, LAeq,15min</b>		<b>53</b>	<b>46</b>	<b>46</b>
<b>Logger C</b>  <b>Receivers 4</b>	Intrusiveness Criterion	RBL	53	49	42
		Intrusiveness Criterion	58	54	47
	Amenity Criterion	Recommended Amenity	55	45	40
		Recommended Amenity minus 5dBA	50	40	35
		Traffic Noise Level	58	58	53
		High Traffic Noise Amenity Criterion	N/A	43	38
		Project Amenity Criterion, 15 minute	53	46	41
	<b>Project Trigger Level, LAeq,15min</b>		<b>53</b>	<b>46</b>	<b>41</b>

Table 4-3 Project Trigger Levels

At commercial receivers, the LAeq,15min project amenity noise level is 63dBA.

At the on-site motel, Receiver 9, the recommended amenity criterion is 5 dBA higher than the recommended criterion for residences.

#### 4.3.4 Maximum Noise Level Events

Activity that may occur during the night time period (10 PM to 7 AM) should be assessed in terms of the potential to cause sleep disturbance.

The following initial *screening* noise levels are recommended by the NPfI:

LAeq,15min 40dBA or the prevailing RBL + 5dB, whichever is the greater; and/or



$L_{AFmax}$  52dBA or the prevailing RBL + 15dB, whichever is the greater.

In this case the screening levels are

- $L_{Aeq,15min}$  44dBA (based on RBL of 39dBA at Logger A); and/or
- $L_{AFmax}$  54dBA.

Where the screening noise levels cannot be met, a detailed maximum noise level event assessment should be undertaken. It may also be appropriate to consider other guidelines including the NSW Road Noise Policy (RNP) which contains additional guidance relating to potential sleep disturbance impacts.

Based on currently available research results, the RNP concludes that:

- “Maximum internal noise levels below 50 dBA to 55 dBA are unlikely to cause awakening reactions.”
- “One or two noise events per night, with maximum internal noise levels of 65 dBA to 70 dBA, are not likely to affect health and wellbeing significantly.”

These are internal noise levels, and for noise assessment it is usual to work with external noise levels which are much easier to predict and measure for compliance. Noise reduction by a facade with open windows is typically 10 dBA. Therefore we can say that an external level of 60 dBA to 65 dBA is unlikely to lead to an awakening reaction at the Receiver location

## 5 NOISE MODELLING

---

### 5.1 PROCEDURE

Noise modelling was done based on the traffic is given in the report Traffic Impact Assessment prepared by TTM (the Traffic Report). As the acoustic assessment requires further detail then contained in the Traffic Report, some details were provided by TTM in separate correspondence, attached as Appendix C.

Modelling was done using a SoundPLAN acoustic modelling software. The modelling algorithm used ISO 9613. The algorithm includes a component that simulates meteorological conditions which enhance noise propagation.

Topography of the area including and surrounding the proposal was provided. The earthworks required for the proposal result in significant noise shield in to the nearest residences.

### 5.2 NUMBER OF VEHICLES

The Traffic Report estimates that approximately 1700 vehicles will access the site per day. This has been broken down into numbers of light vehicles and heavy vehicles and by daytime and night-time. The breakdown is based on correspondence from TTM shown in Appendix C. The initial assumption in the appendix is that there would be 1800 vehicles per day, hence the results based on this breakdown are slightly more conservative than the final numbers given in the Traffic Report (1700 per day).

The intrusiveness noise level is based on a worst-case 15 minute period. Therefore the number of vehicles in the worst-case hour in the daytime period and night-time period have been used for the assessment. The number of vehicles calculated for each period is shown in Table 5-1.

For modelling heavy vehicles, it was assumed that half would pass through the fuel area, and half would pass through the parking lot and motel area at the rear of the site.

Period			Total Vehicles	Light Vehicles	Heavy Vehicles
Full Day			1800	1650	150
Daytime and Evening	7am-10pm		1580	1450	130
	<b>PM Peak Hour</b>		<b>179</b>	<b>164</b>	<b>15</b>
Night Time	10pm-7am		220	200	20
	<b>Peak Hour</b>		<b>33</b>	<b>30</b>	<b>3</b>

**Table 5-1 Vehicle Numbers Accessing Site**

## 5.3 SOURCE NOISE LEVELS

### 5.3.1 Vehicles

The source noise levels are based on previous measurements of vehicle noise, and available published data.

For light vehicles, the assumed sound power level for each vehicle is  $L_{A_{\text{eq}},15\text{min}}$  78 dBA. This level includes noise from the moving vehicle, as well as door slams and car starts.

For heavy vehicles, the assumed sound power level for each vehicle is  $L_{A_{\text{eq}},15\text{min}}$  108 dBA. This is conservative in that it assumes a high proportion of the heavy vehicles would be refrigerated.

### 5.3.2 Mechanical Services

Apart from vehicles, the main potential source of noise emission from the site is from air-conditioning and refrigeration equipment. While this has not been designed, typical values were used. For each building and air conditioning external unit with a sound power level of  $L_{Aw}$  90dBA was assumed. For the largest building, a refrigeration condenser with a sound power level of 90 dBA was assumed.

## 5.4 PREDICTED NOISE LEVELS

The predicted noise levels are shown Table 5-2. The highest noise generation occurs during the PM Peak hour. While this would normally occur prior to 6 PM, the predicted level is shown compared to the daytime and evening trigger noise levels. While the predicted noise levels at residences comply with the evening trigger levels, evening noise levels will generally be lower than shown.

The night-time noise predictions also comply with the night time trigger level at residences.

The low noise levels at residences are in part due to the noise shield in provided by the design of the site.

The predicted noise level at Receiver 9, on-site motel, exceeds the level. This is discussed further in Section 5.5.

Daytime noise contours shown in Figure 5-1, and night time noise contours shown in Figure 5-2.

Receiver	Daytime/Evening			Night Time		
	Day/Evening Predicted level	Trigger Level	Complies	Night	Trigger Level	Complies
1	33	47	Yes	27	44	Yes
2	33	47	Yes	28	44	Yes
3	39	47	Yes	32	44	Yes
4	33	46	Yes	27	46	Yes
5	37	46	Yes	31	46	Yes
6	36	46	Yes	30	46	Yes
7	42	47	Yes	36	44	Yes
8	41	46	Yes	33	46	Yes
9	60	48	No	53	43	No

Table 5-2 Predicted Noise Levels

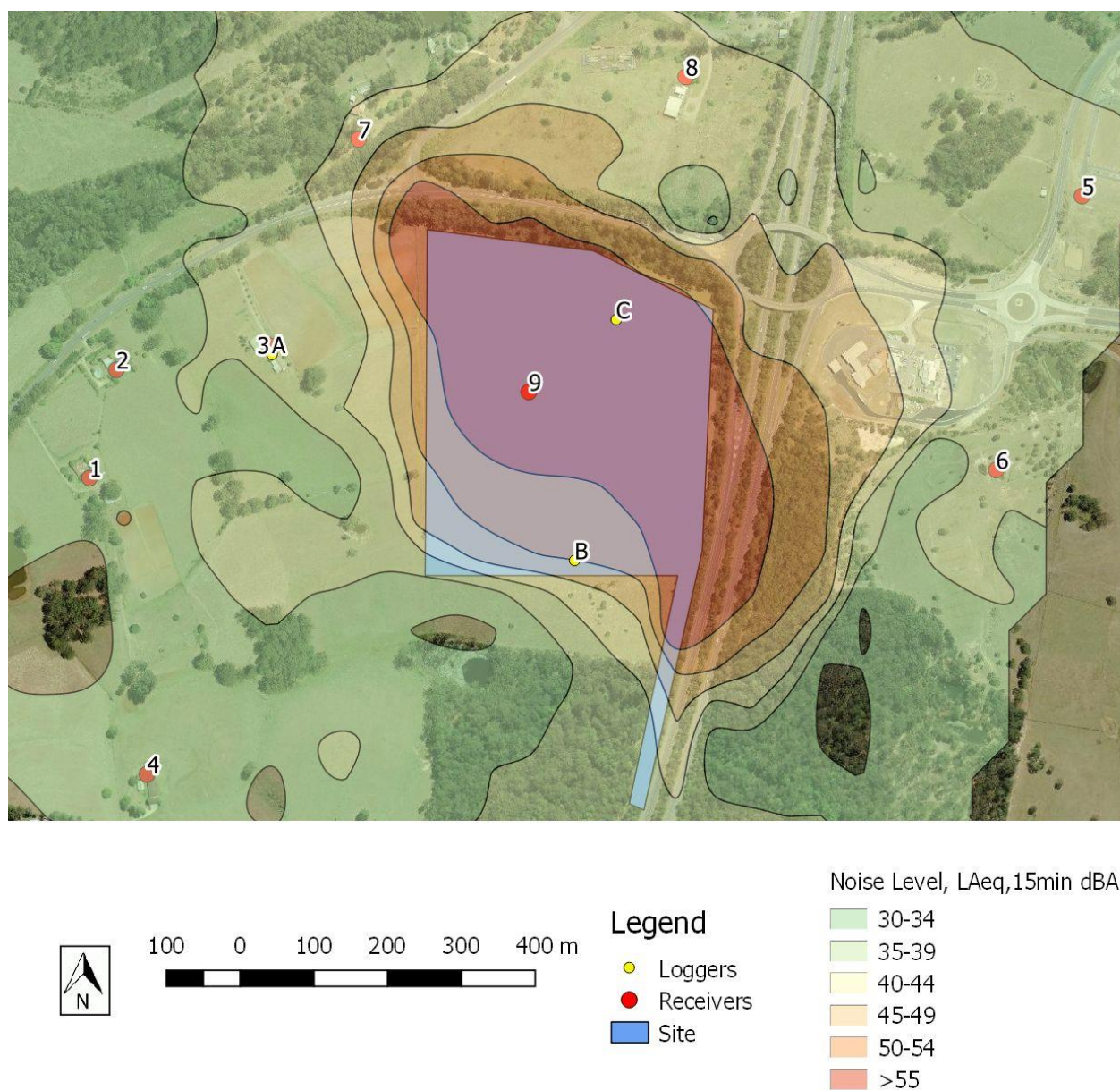


Figure 5-1 Daytime Noise Contour



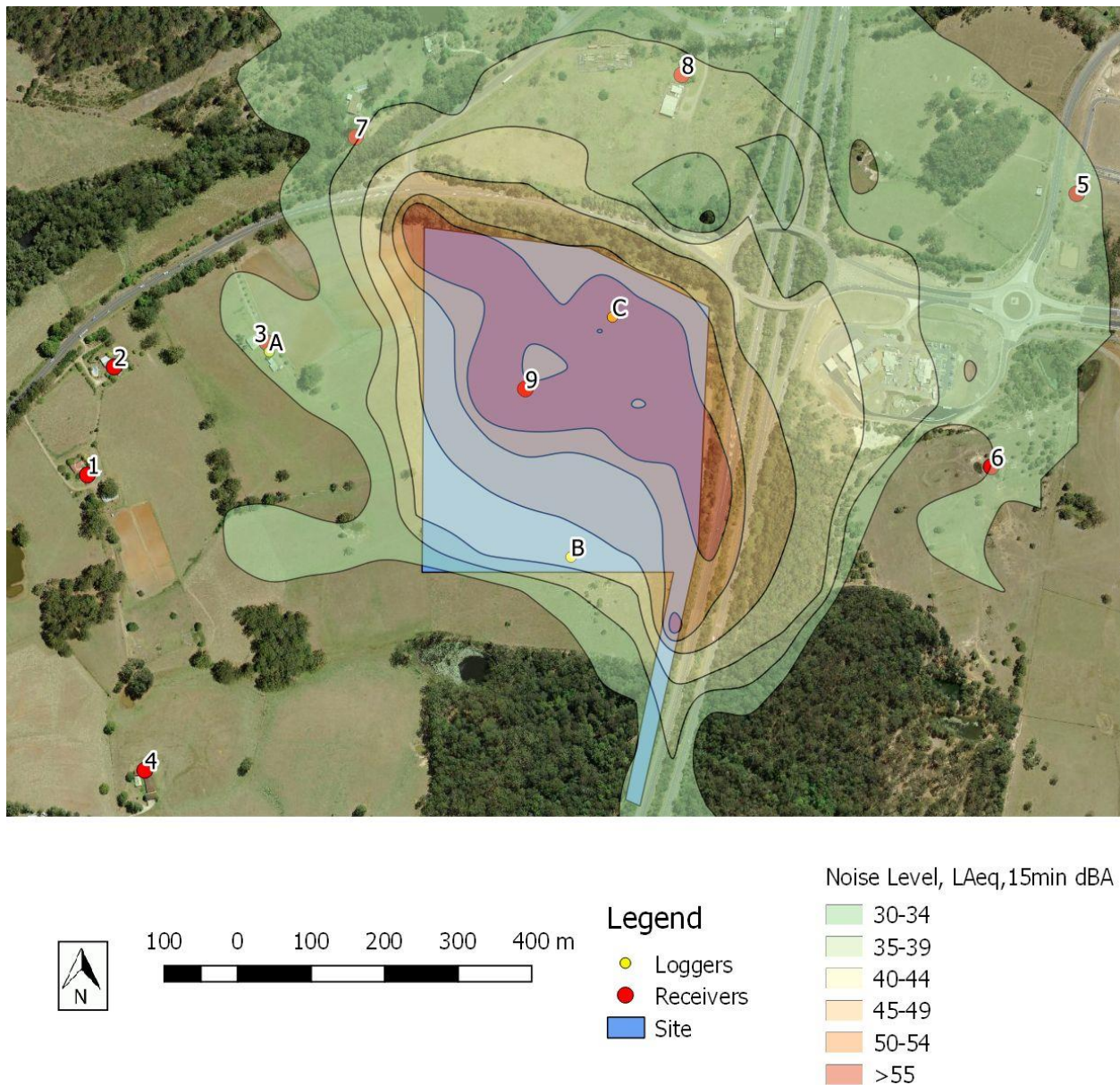


Figure 5-2 Night Time Noise Contour

## 5.5 ONSITE MOTEL

Noise levels are predicted to exceed the night time trigger level at the on-site motel. This is not unexpected, and as the motel is part of the development, and built specifically to service the development, there is no reason to propose mitigations on noise generation to reduce noise impact on the motel.

Instead it is appropriate to design the motel so that internal noise levels are at an appropriate level.

Australian Standard 2107, 'Recommended Design Sound Levels and Reverberation Times for Building Interiors', recommends levels of 35 to 40 dBA for hotel rooms near a major roads. The predicted level at the motel is 60 dBA. Noise looking at Location be indicates traffic noise levels up to 60 dBA at the motel. Therefore, it is recommended that the facade elements of the motel be chosen so that a noise reduction of 30 dBA is achieved.



As a minimum, we recommend:

- windows of minimum 6 mm laminated glass;
- doors with  $R_w$  30 and acoustic seals on the sides, top and threshold;
- walls of masonry, or stud walls with minimum 90 mm thickness incorporating acoustic installation.

While the minimum acoustic installation facade elements can be achieved using standard building techniques, the recommended level will be exceeded inside rooms if windows are open. Therefore we recommend that the motel rooms be designed so that windows can be kept closed if desired. This requires incorporation of mechanical ventilation or air-conditioning.

The details of the facade elements should be verified at detailed design stage.

## 5.6 MAXIMUM NOISE LEVELS AND SLEEP DISTURBANCE

Short term noise levels from engine starts or use of reversing beepers can give rise to sleep disturbance. Using a typical sound power level of  $L_{Amax}$  114dBA, the levels shown in Table 5-3 have been predicted at receivers. At all surrounding residential receivers, the predicted level is below the trigger level, and no further analysis is required.

The predicted level at receiver 9, the on-site motel, is above the trigger level. If the motel incorporates the recommendations of Section 5.5, the internal levels will be below  $L_{Amax}$  40dBA in the motel rooms. At this level the noise is not expected to cause sleep disturbance.

Receiver	$L_{Amax}$ Levels dBA		
	Day/Evening Predicted level	Trigger Level	Complies
1	39	54	Yes
2	40	54	Yes
3	43	54	Yes
4	38	54	Yes
5	42	54	Yes
6	42	54	Yes
7	47	54	Yes
8	42	54	Yes
9	67	54	No

Table 5-3 Maximum Noise Levels

## 6 TRAFFIC NOISE ASSESSMENT

The development is not expected to generate extra traffic on the surrounding road network. Therefore an assessment and analysis of traffic noise due to the development is not required.

## 7 CERTIFICATION FOR NOISE IMPACT STATEMENT

---

**Acoustic Certification:** Provided the site layout and the plant and equipment remain essentially as described in this assessment, and traffic volumes are as stated in this assessment, the noise associated with the operation of the service centre at the corner of Oxley and Pacific Highway, Sancrox, will be within the levels specified in the NSW Noise Policy for Industry at the nearest adjoining residential neighbours and other sensitive noise receivers. Based on the information obtained from on-site noise measurements and noise modelling, the development is not expected to be a source of “offensive noise” as defined by the protection of the Environment Operations Act 1997.

## 8 CONCLUSION

---

Noise emission from the proposed service centre at the corner of the Pacific Highway and Oxley Highway was analysed and assessed. Noise emission from vehicles using the centre was modelled and assessed against criteria determined from background noise monitoring.

The analysis showed that noise is predicted to comply at all residential receivers potentially impacted by the site.

Noise impact at the on-site motel was discussed. While noise emission would exceed the usual criteria for motels, appropriate noise levels within the motel rooms can be achieved using standard building materials and techniques. Air-conditioning of mechanical ventilation will be required so that windows may remain closed.

As the proposal will not generate extra traffic on surrounding road network, traffic noise assessment is not required.

*P. Thornton*



Philip Thornton BE(UNSW) MIE (Aust)  
Acoustic Consultant  
Chartered Professional Engineer  
February 22, 2018

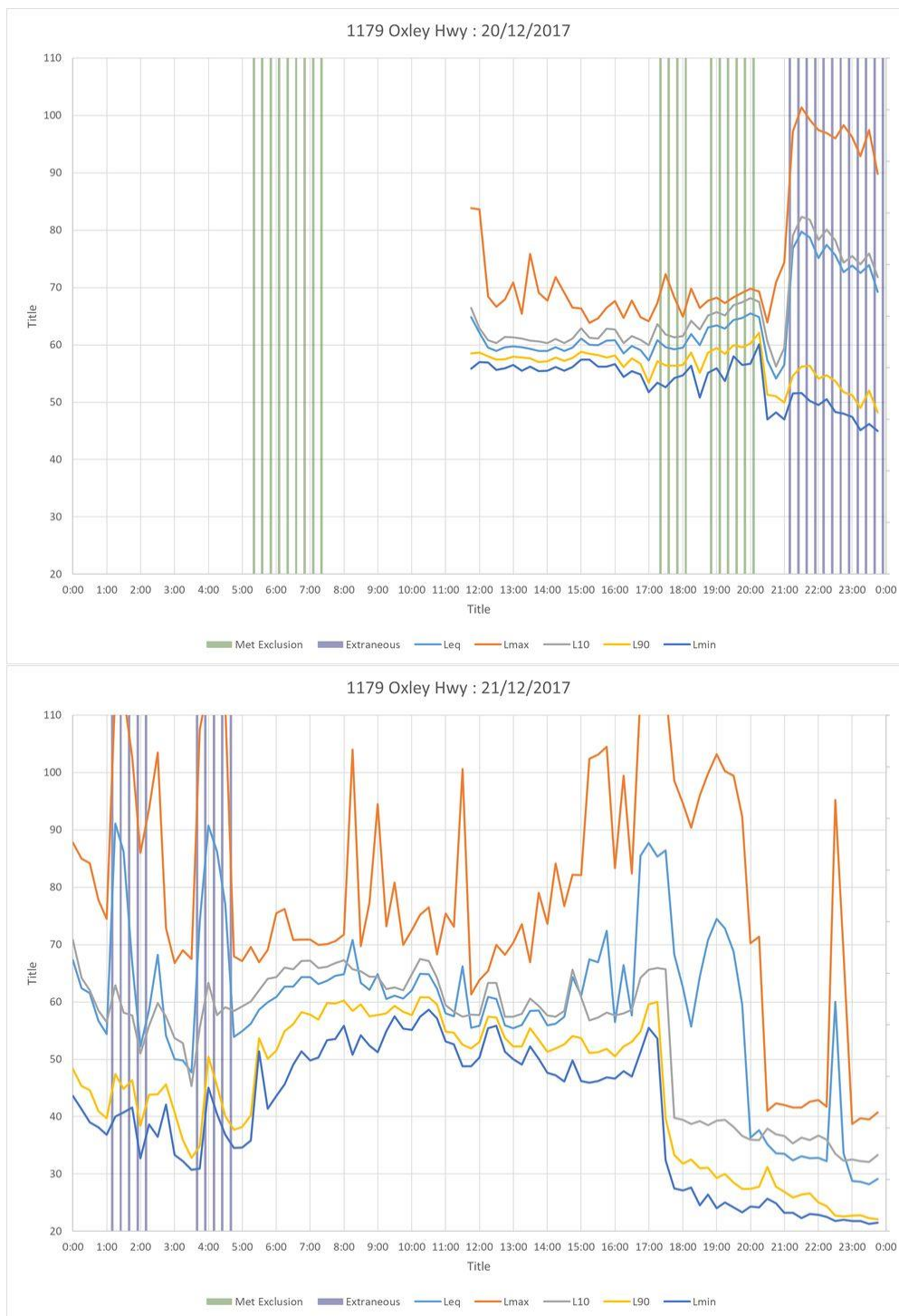
## APPENDIX A: GLOSSARY OF ACOUSTIC TERMS

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### Assessment

Period	The period in a day over which assessments are made.
dB(A)	Unit of sound level in A-weighted decibels. The A-weighting approximates the sensitivity of the human ear by filtering these frequencies. The dB(A) measurement is considered representative of average human hearing.
$L_{Aeq}$	The A-weighted equivalent continuous sound pressure level, used to quantify the average noise level over a time period.
$L_{A10}$	The A-weighted sound pressure level exceeded for 10% of the measurement period. It is usually used as the descriptor for intrusive noise level.
$L_{A90}$	The A-weighted sound pressure level exceeded for 90% of the measurement period. It is usually used as the descriptor for background noise level.
$L_{Aeq15min}$	Refers to the A-weighted energy averaged equivalent noise level over a 15 minute time period.
$L_{Cpeak}$	The highest instantaneous C-weighted sound pressure level over the measurement period. It is usually used for high impulsive noise.
$L_{Amax}$	The maximum A-weighted sound pressure level for the measurement period.
Loudness	A 3dB(A) change in sound pressure level is just noticeable or perceptible to the average human ear; a 5dB(A) increase is quite noticeable and a 10dB(A) increase is typically perceived as a doubling in loudness.
RBL	The overall single figure background level representing the assessment period over the whole monitoring period. For the short term method of assessment, the RBL is the measured $L_{A90, 15min}$ value, or where a number of measurements have been made, the lowest $L_{A90, 15min}$ value.

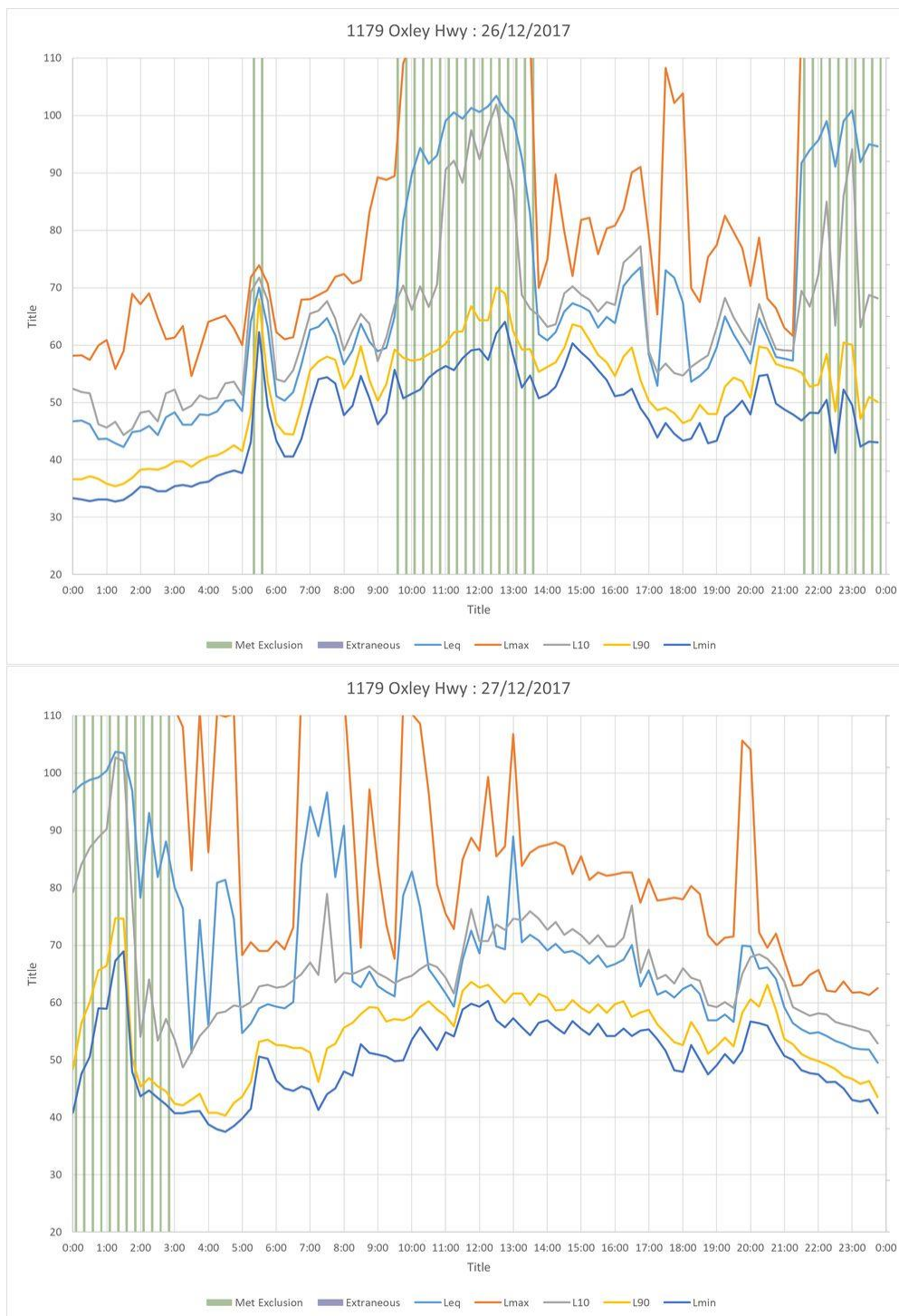
## APPENDIX B: NOISE LOGGER CHARTS





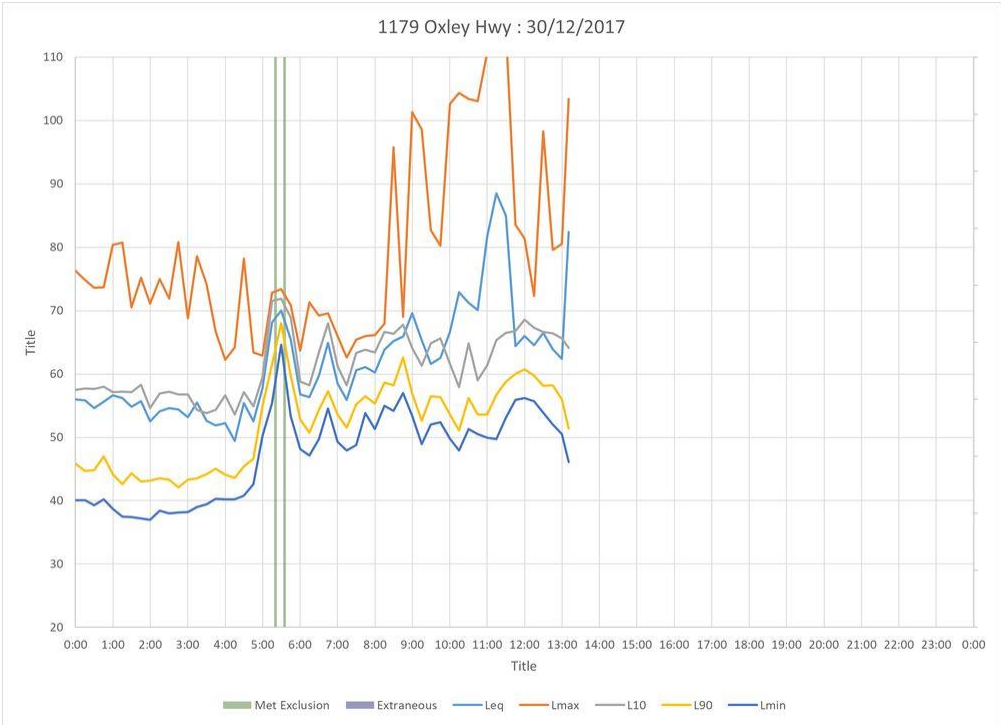




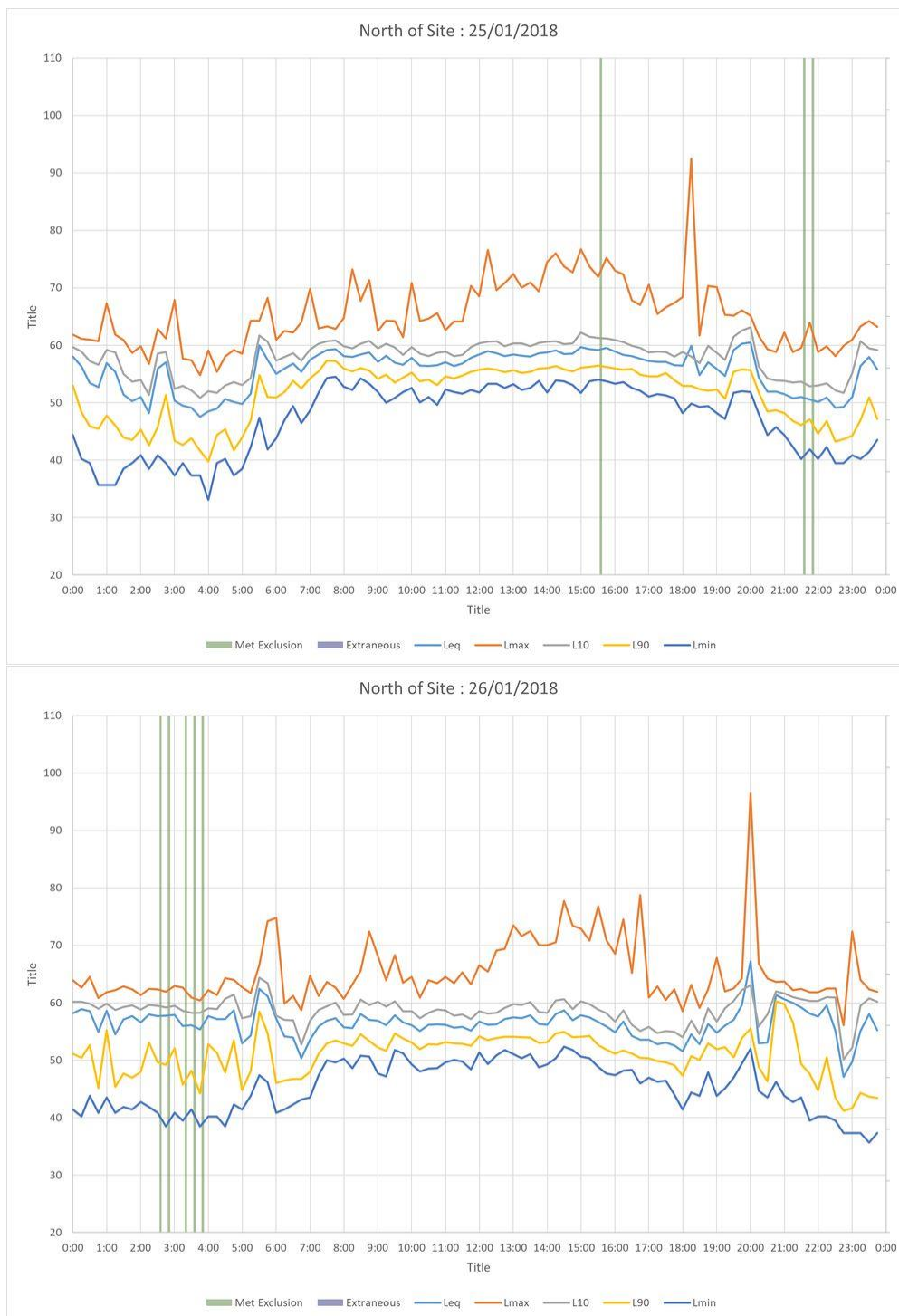


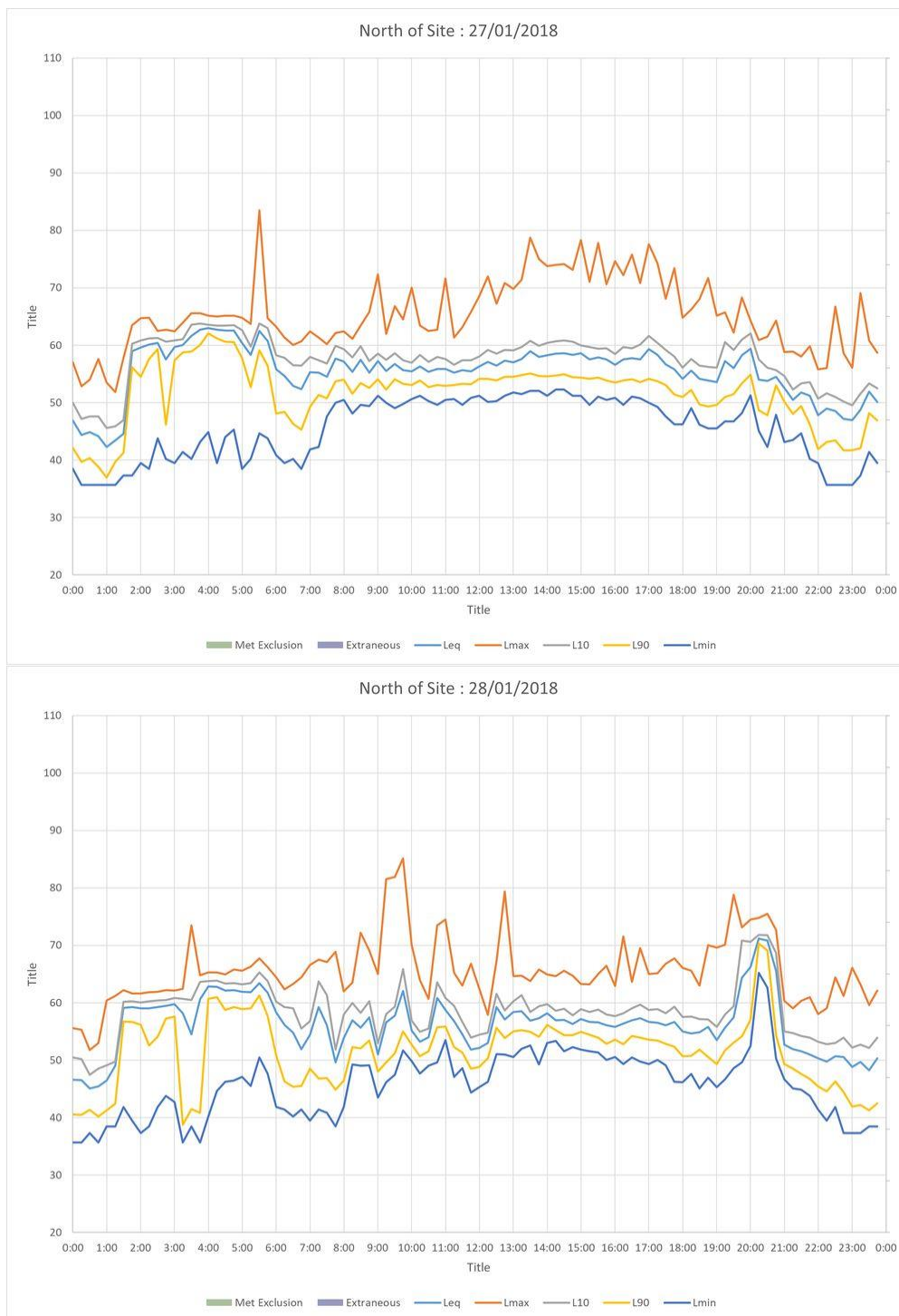




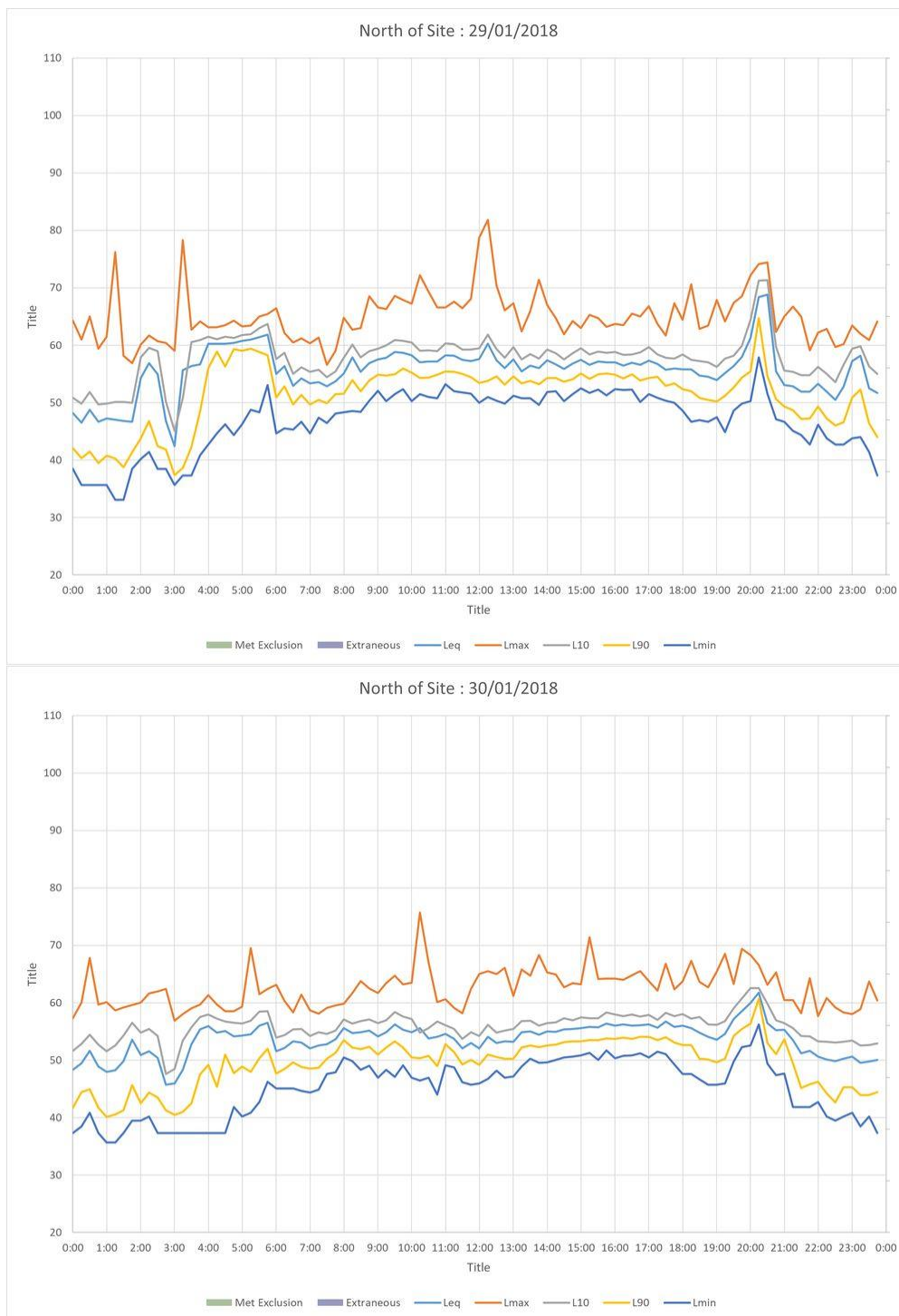


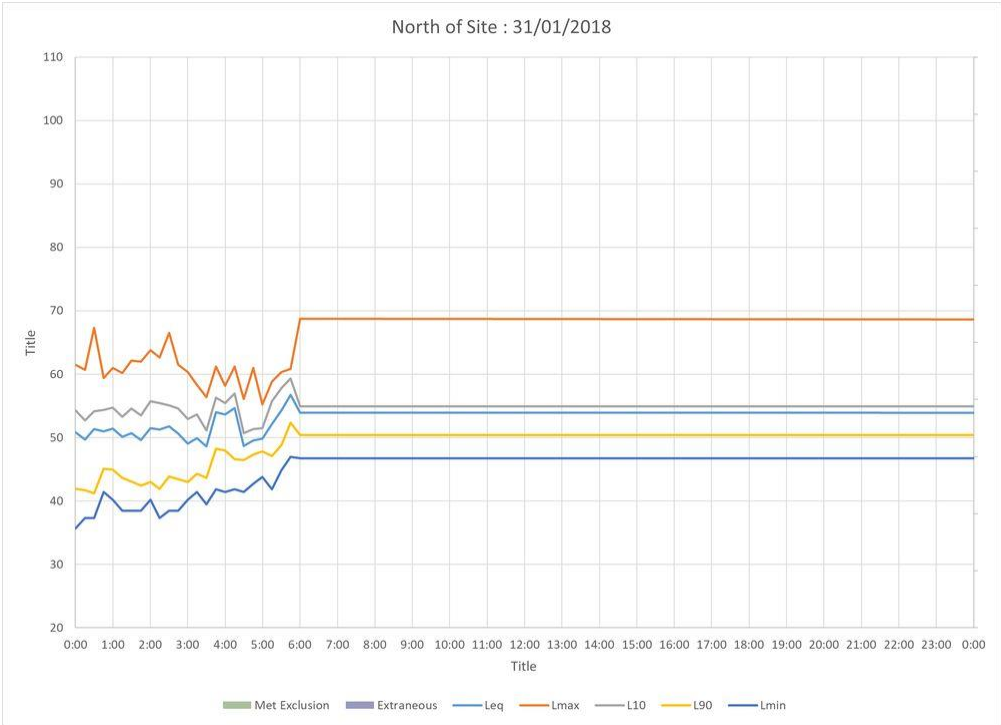


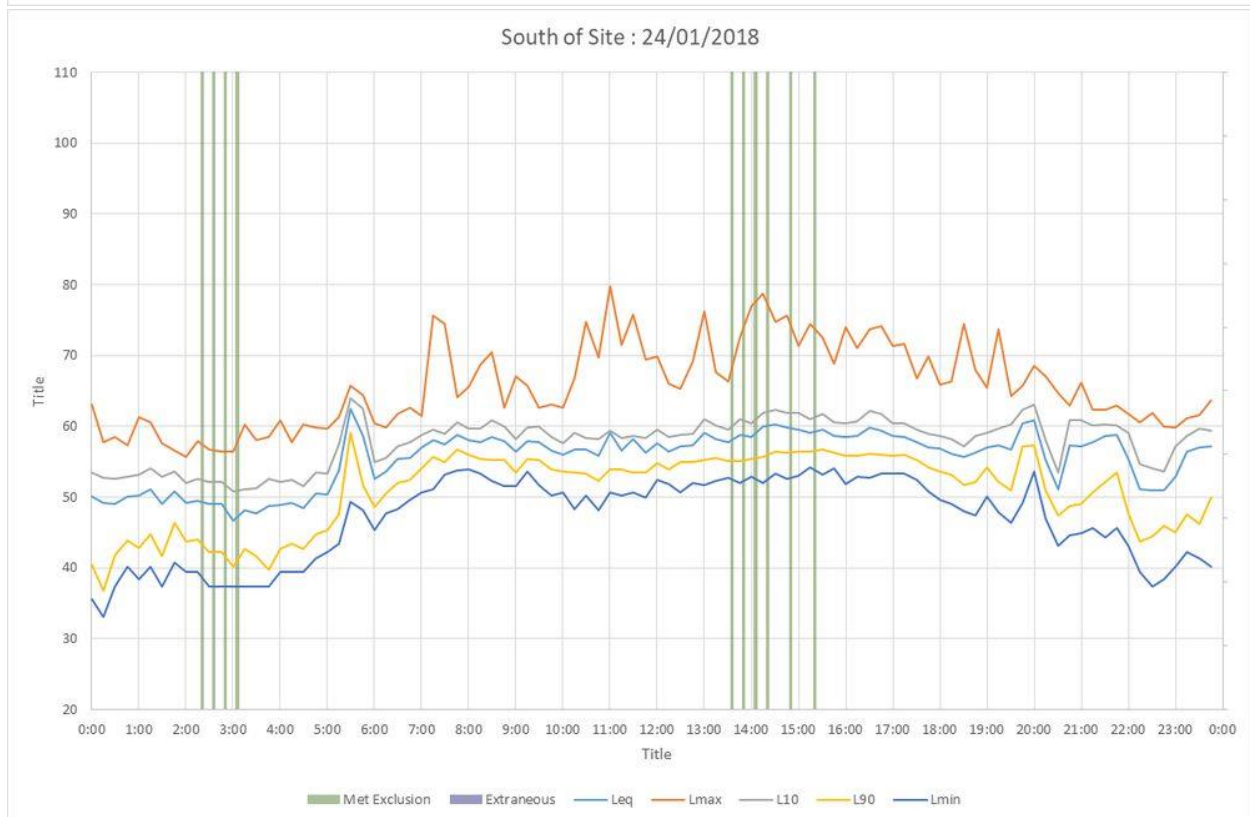
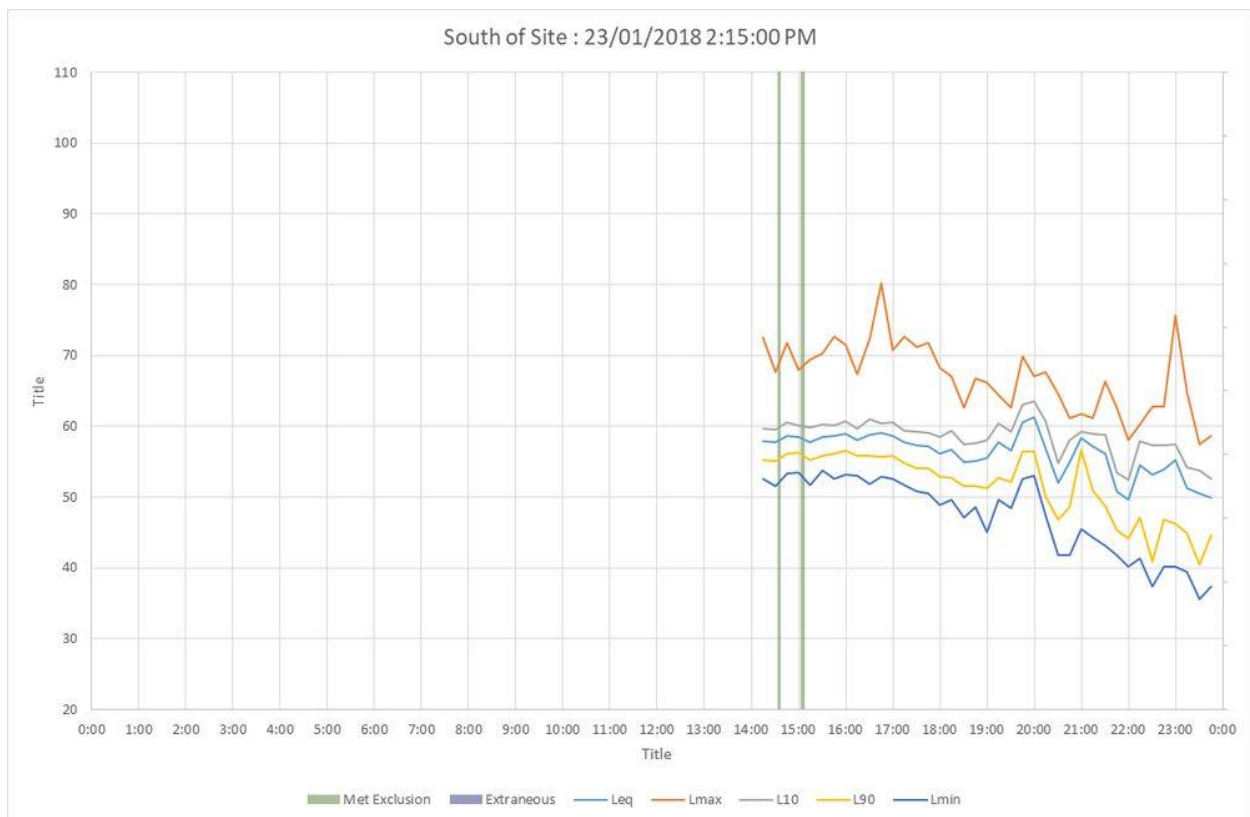


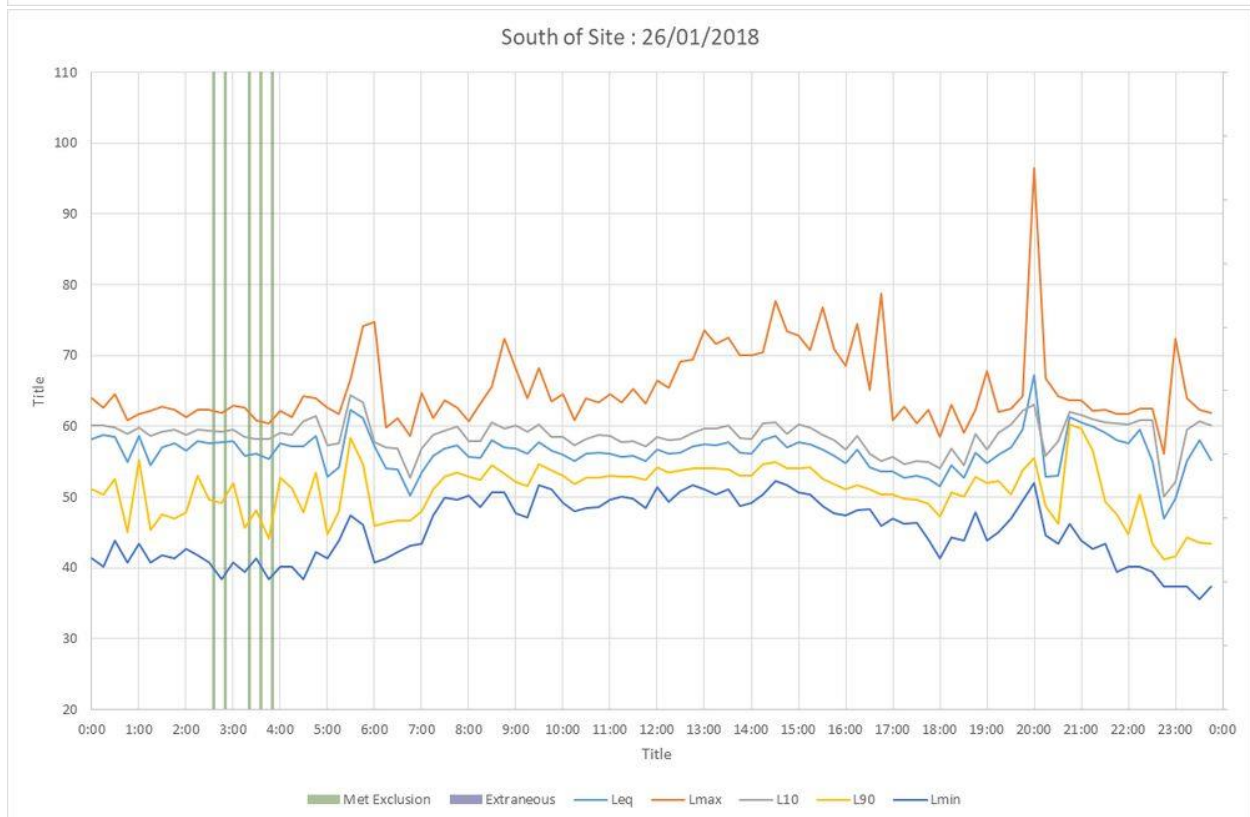
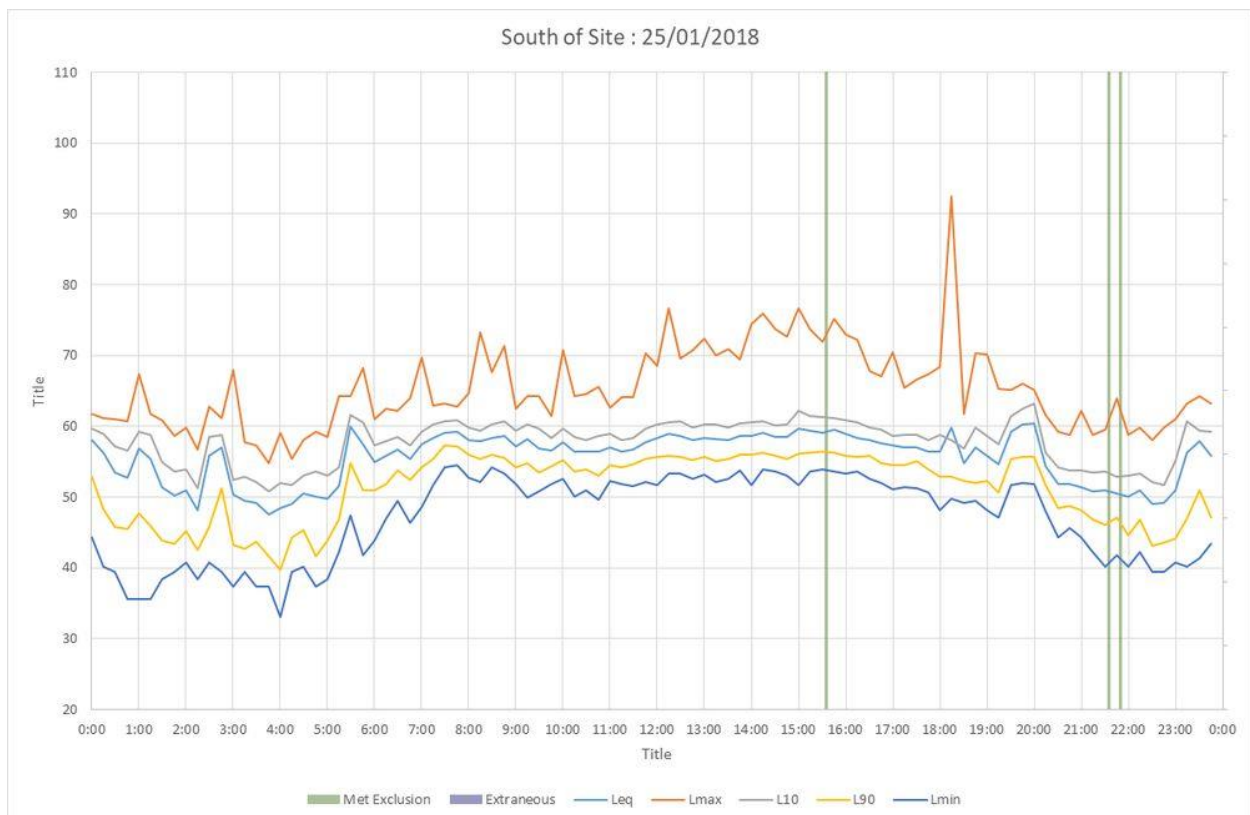




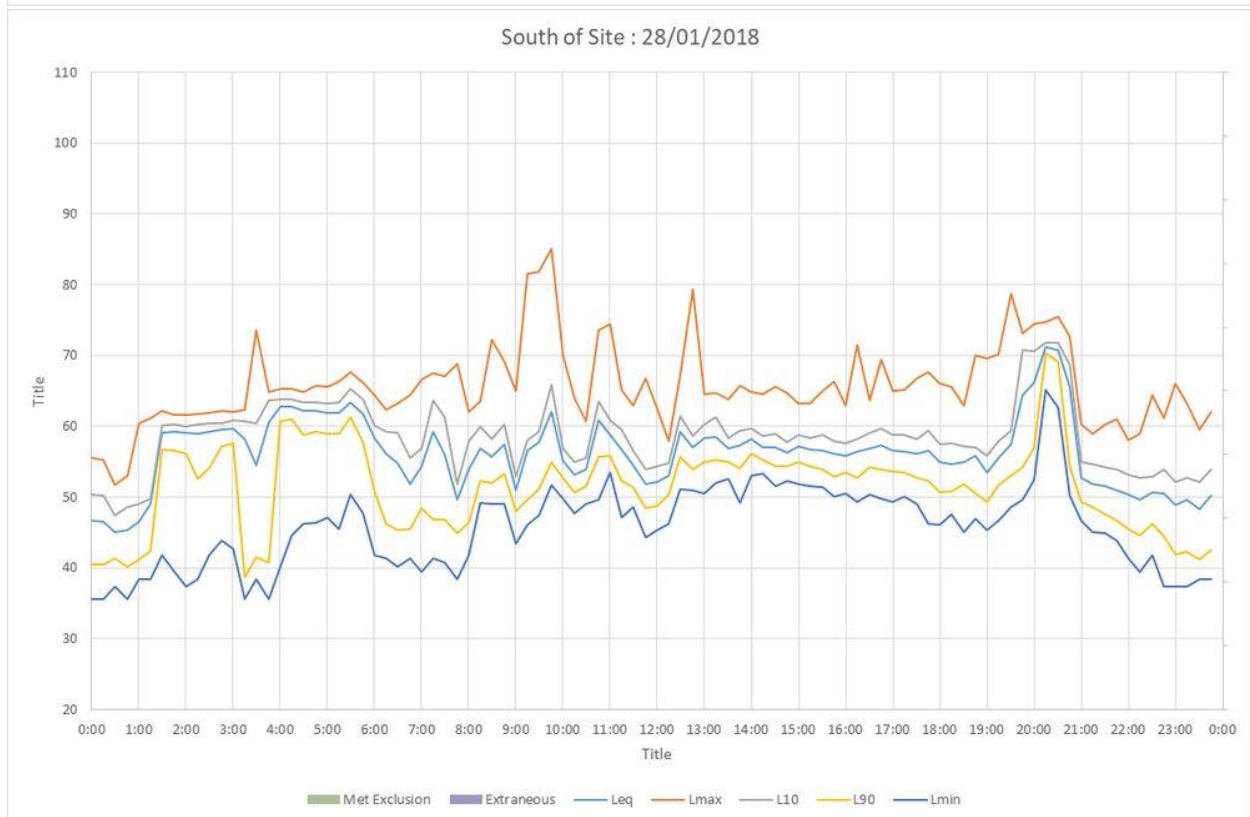
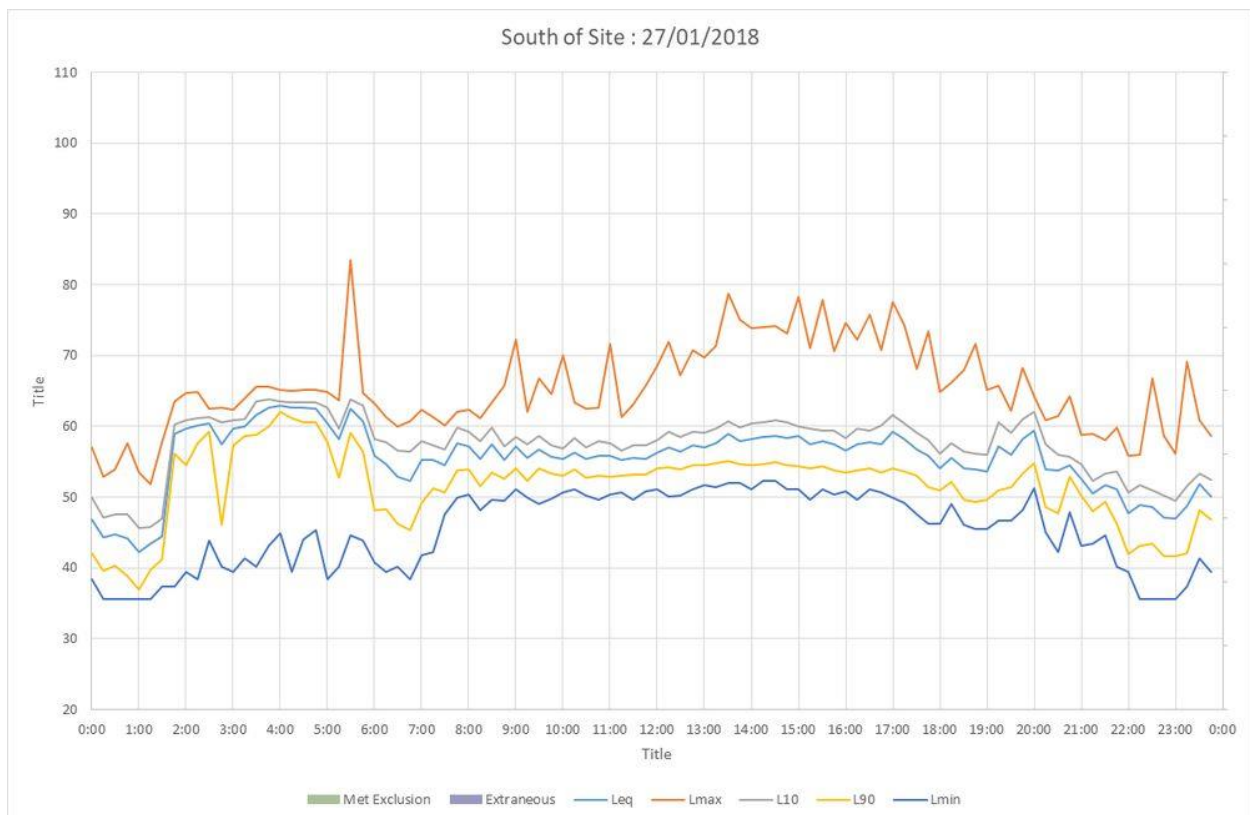


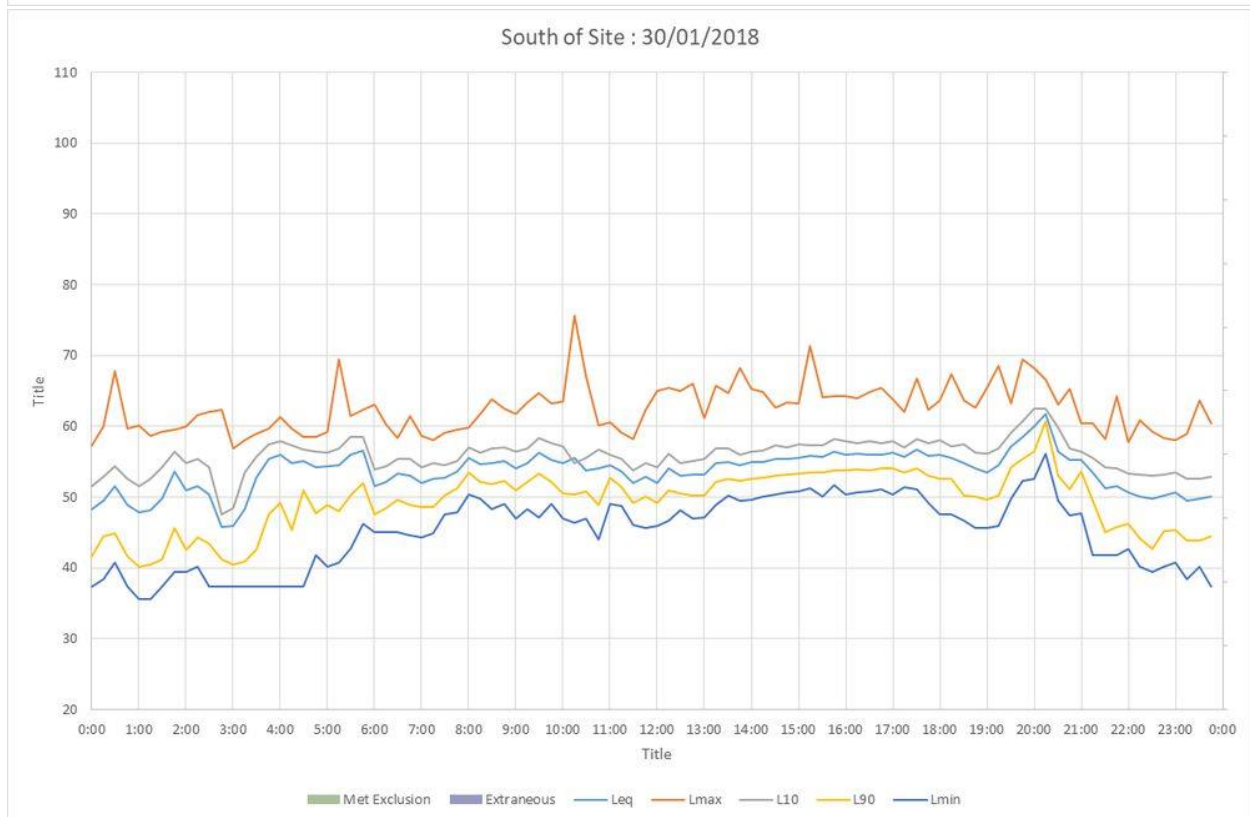
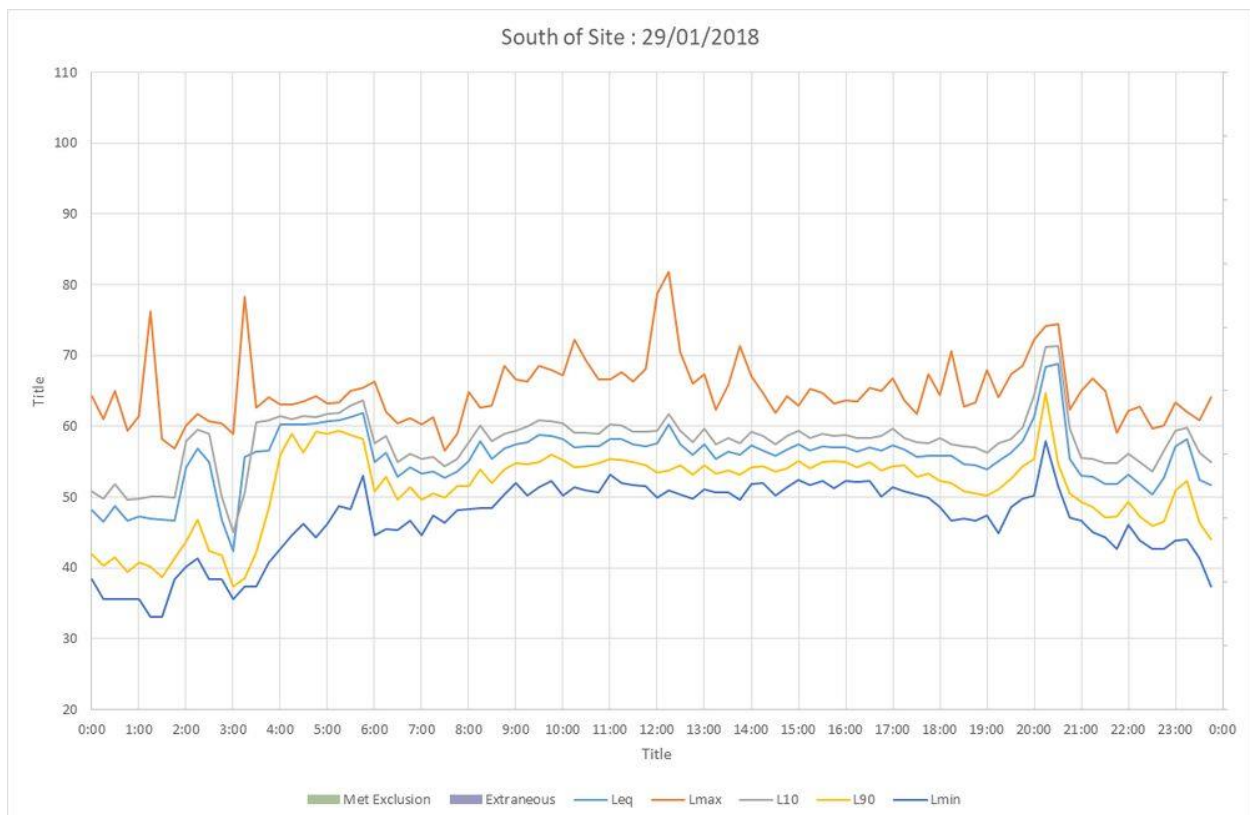


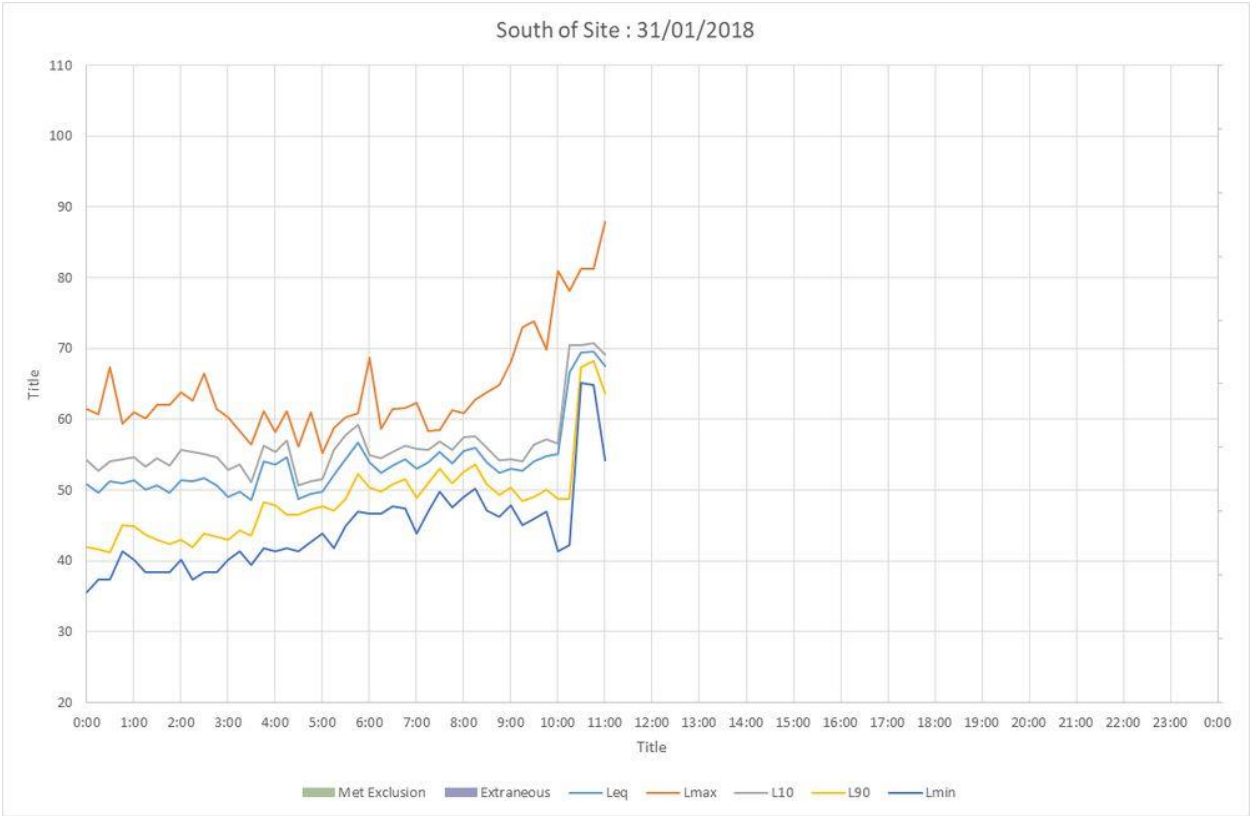












## APPENDIX C: VEHICLE VOLUMES ACCESSING SITE

---



15 February, 2018

Graeme Jones  
Kokomo Property Group

Dear Graeme

Of the estimated 1,800 vehicles per day that will attend the site I estimate that 150 will be trucks.

The estimate is based on 5% draw from both highways, that is :-

- Oxley Highway      20,000 vpd x 5%      = 1,000 vpd attending  
                                 5% trucks = 50
- Pacific Highway    16,750 vpd x 5%      = 850 vpd attending  
                                 10% trucks = 100 (say)

From 10:00pm-7:00am the traffic at the site is likely to total around 12.5% of the total daily volume on Pacific Highway, and around 10% on Oxley Highway.

Therefore in the 10:00pm-7:00am time slot we estimate that around 20 trucks will enter the site.

Given the location in relation to large parts of Greater Sydney we would expect that about half of the trucks attending the site from Pacific Highway (say 50 trucks) will park on the site. We suggest allowing 20% of the trucks attending from Oxley Highway to park on the site (say 10 trucks).

Cars attending in the 10:00pm-7:00am time periods are estimated at 200, with 9say) 25% parking for up to one hour.

The estimates above are based on the RMS 10 year planning horizon which includes 33% growth from current traffic volumes.

The proposed motel has only 8 rooms so we consider that significant.

Please call with any further queries.

Yours faithfully,  
**TTM Consulting (Vic) Pty Ltd**

A handwritten signature in black ink, appearing to read 'J. D. Higgs'.

**J. D. Higgs**

Cc      Peter Scott  
         George Jenner

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ABN 71 123 813 865



## **Attachment 9 Preliminary Lighting Assessment**

Graeme Jones  
Development Manager  
Scott PDI  
PO Box 520  
Runaway Bay QLD 4216

25<sup>th</sup> February 2018

Dear Graeme,

Re: Proposed Service Centre Pacific and Oxley Highways Port Macquarie - Overview of Site Lighting and the Control of the Obtrusive Effects of Outdoor Lighting (AS4282):

Refer to Project 415172 Sheets DA001 to DA043 Dated 21/02/2018.

Light Harmony has reviewed development application drawings and offers the following preliminary evaluation for a future comprehensive Lighting Assessment Report.

- (1) All site lighting must be designed by a qualified lighting engineer with extensive experience in spill lighting minimisation and glare control.
- (2) The lighting engineer must also have comprehensive experience in Public Lighting and the Australian Standard Series AS/NZS1158 - all parts.
- (3) The basis for environmental lighting compliance must be Australian Standard AS4282 for Obtrusive Lighting Control.
- (4) The basis for general exterior lighting of public pathways, carparks, parking areas and truck stands must be AS/NZS1158.3.1.
- (5) All exterior lighting hardware or luminaires including pole top and wall and building mounted lighting must be of the luminaire type classed as CIE Type C or full cut-off. That is, all light leaving the luminaire is directed below the horizontal and the luminaire is classed as dark sided.
- (6) All wall, building and pole top lights must be supplied with a fixed pole or surface attachment bracket which prevents the lights being incorrectly aimed. All the light emitting surfaces must be mounted horizontal to the ground level, except for the pylon signage.
- (7) The pylon signage must rely on luminance and colour contrast rather than excessively high intensity and illuminance. Although the current issue of AS4282 excludes pylon signage, future drafts will include signage and, therefore, care must be taken with the design of all pylon signage.
- (8) Existing residential dwellings and proposed residential areas must be considered as requiring AS4282 Curfew compliance which assumes that the operation will be granted a twenty-four-hour licence to operate.
- (9) Strobing or cycling of any site lighting shall be considered inappropriate for this site to avoid problems for both residential dwellings and the associated major roadway system.

This standard was developed to prevent, quote Scope 1.1: “potentially adverse effects of outdoor lighting on nearby residents (e.g. of dwellings such as houses, hotels, hospital), uses of adjacent roads (e.g. vehicle drivers, pedestrians, cyclist) and transport signalling systems (e.g. air, marine, rail and on astronomical observations”.

Section 1.4.12 defines: quote: “Relevant Boundary as any boundary of a residential property over which it is physically possible for spill light from the subject lighting installation to pass and directly impact upon either.”

The whole intent of AS4282 was to minimise and control the impact of a lighting installation outside the subject site.

With the employment of a suitably qualified lighting professional and with judicious and professional illumination design the Port Macquarie Service Centre will comply with all aspects of AS4282 “Control of the Obtrusive Effects of Outdoor Lighting” and also the public lighting standard AS/NZS1158 Series.

Ron Nixon

A handwritten signature in black ink, appearing to read 'R. Nixon', with a long horizontal stroke underneath.

Lighting Engineer – Registered Lighting Practitioner

M.I.E.S. – RLP      IES626

## **Attachment 10 Onsite Sewage Management – Site Feasibility Assessment**



# Onsite Sewage Management - Site Feasibility Assessment Proposed Highway Service Centre

***Location:***

Part Lot 11 DP 1029846  
1179 Oxley Highway  
Thrumster NSW

---

***Prepared for:***

Scott PDI Pty Ltd

---

***Report No:***

HMC2018.013 OSSM

**February 2018**



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abn 60 108 085 614

**RE: Part Lot 11 DP 1029846 1179 Oxley Highway Thrumster**

HMC Environmental Consulting Pty Ltd is pleased to present our report for On-site Sewage Management Design for the abovementioned site.

We trust this report meets with your requirements. If you require further information please contact HMC Environmental Consulting directly on the numbers provided.

Yours sincerely



Helen Tunks  
(B.Env.Sc.)

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<b>Tweed Heads NSW 2485</b>		
<b>Title:</b>	On-site Sewage Management Assessment	
<b>Job No:</b>	2018.013 OSSM	
<b>Client:</b>	Scott PDI Pty Ltd	

<b>Document Record:</b>				
<b>Version</b>	<b>Date</b>	<b>Prepared by</b>	<b>Checked by</b>	<b>Approved for issue by</b>
Draft	21 Feb 2018	HT	MT	HT
Final	23 Feb 2018	HT	MT	HT

<b>Issue Register</b>				
<b>Distribution List</b>	<b>Date Issued</b>	<b>Version</b>	<b>Method of Transmission</b>	<b>Number of Copies</b>
G Jones	21 Feb 2018	Draft	Email	1 x pdf
G Jones P Scott D Scott G Haigh	23 Feb 2018	Final	Email	1 x pdf

## **Limitations**

The information within this document is and shall remain the property of HMC Environmental Consulting Pty Ltd.

This document was prepared for the sole use of client and the regulatory agencies that are directly involved in this project, the only intended beneficiaries of our work. No other party should rely on the information contained herein without the prior written consent of HMC Environmental Pty Ltd and client. The report and conclusions are based on the information obtained at the time of the assessment. Your report is based on the assumption that the site conditions as revealed through selective point sampling are indicative of actual conditions throughout an area. This assumption cannot be substantiated until project implementation has commenced and therefore your report recommendations can only be regarded as preliminary.

Because a report is based on conditions which existed at the time of the subsurface exploration, decisions should not be based on a report whose adequacy may have been affected by time, natural processes and the activities of man. Changes to the subsurface, site or adjacent site conditions may occur subsequent to the investigation described herein, through natural processes or through the intentional or accidental addition of contaminants, and these conditions may change with space and time.

The findings of this report are based on the objectives and scope of work outlined within. HMC performed the services in a manner consistent with the normal level of care and expertise exercised by members of the environment assessment profession. No warranties or guarantees, expressed or implied, are made. Subject to the scope of work, HMC's assessment is limited strictly to identifying typical environmental conditions associated with the subject property, and does not include evaluation of any other issues. This report does not comment on any regulatory obligations based on the findings, for which a legal opinion should be sought. This report relates only to the objectives and scope of the work stated, and does not relate to any other works undertaken for the Client. All conclusions regarding the property area are the professional opinions of the HMC personnel involved with the project, subject to the qualifications made above. While normal assessments of data reliability have been made by HMC, HMC assume no responsibility or liability for errors in any data obtained from regulatory agencies, or information from sources outside HMC's control, or developments resulting from situations outside the scope of this project.

## EXECUTIVE SUMMARY

<b>Development Proposal</b>	Highway Service Centre, Tyre & Service Centre, Truckers Motel and Truck Wash
<b>Purpose of Report</b>	To demonstrate site capability for the sustainable operation of a Commercial Sewage Management Facility (CMSF). Design details necessary to support an application to install or construct will be provided by separate report and remain subject to development approval.
<b>Conclusion</b>	The site is considered suitable for on-site sewage management for the proposed development subject to minimum secondary quality effluent treatment, land application via sub-surface pressure compensating dripperline, and the provision of a detailed design for a Commercial Sewage Management Facility at construction stage.
<b>Location</b>	Part Lot 11 DP 1029846, 1179 Oxley Highway, Thrumster
<b>Site Area</b>	18.4 hectares
<b>Local Government Area:</b>	Port Macquarie - Hastings Council
<b>Water Supply Sources</b>	Reticulated mains supply - potable water, interior use. Recycled water - truck wash Recycled stormwater/roof catchment water – non-potable, exterior use.
<b>Design Wastewater Flow EP</b>	40kL/day with peak loading variability expected. 200EP @150L/EP (ablutions & sanitary) Sewer/water ET can be calculated from Schedule 2 of the Council's Development Contribution Assessment Policy based on floor areas.
<b>Design Irrigation Load</b>	Maximum 3mm/day
<b>Land Application Area &amp; Method</b>	Recommended minimum 1.3 ha – see Primary Land Application Area on natural soil Pressure compensation, non-drain, anti-siphon dripperline recommended @ maximum 1m lateral spacing.
<b>Reserve LAA</b>	>100% . 2.0 ha available on 1:4 batter surrounding filled platform. Minimum 8000m2 to be under lawn grasses OR If groundcover landscaping, 8000m2 dripperline to be pre-installed @100mm depth and ready for contingency use.
<b>Setback Distances</b>	100m to surface water 40m to drainage/stormwater lines
<b>Recommended Vegetation/Crop</b>	Primary LAA: existing pasture grass to be retained and oversown as necessary. Reserve LAA: lawn grasses or groundcover, low stature leafy plants/clumping grasses.
<b>Appropriate Regulatory Authority</b>	Approval under Section 68 of the Local Government Act 1993 is required to be obtained from Port Macquarie -Hastings Council for the installation and operation of the sewage management facility. An Environmental Protection Licence is not required. Not a Scheduled Activity under the <i>Protection of Environment Operations Act 1997</i> (< 2500EP or <750kL/day)
<b>Wastewater Classification</b>	Medium- High Strength Influent (DEC, 2004)
<b>Site Limitations</b>	Low permeability soil
<b>Treated Effluent Quality</b>	The proposed sewage treatment plant is to be selected to adequately manage the average and peak flows described and treat effluent to secondary standard with nutrient reduction and disinfection, and to produce effluent suitable for sub-surface drip irrigation. Following concept approval, full design specifications and validated performance data are to be provided for the selected plant prior to installation.
<b>Wet Weather Storage</b>	Minimum 120kL required
<b>Operation and Maintenance</b>	A Recycled Water Management Plan would be submitted following concept approval and at time of installation/construction approval. An operations and maintenance manual is to be included as an on-site tool for staff and service contractors.

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## **1 INTRODUCTION**

Scott PDI Pty Ltd (the client) is proposing a boundary adjustment and highway service centre with four associated food retail outlets, truck exchange public amenities, trucker office and an 8 room motel, a tyre and service centre and truck wash.

The client proposes to provide an on-site sewage management system for the development, as an alternative to connecting to the municipal sewerage scheme at a distance of approximately 3.8km from the site. The site is zoned RU1 and a rezoning is not proposed.

HMC Environmental Consulting Pty Ltd (HMC) has been commissioned by the client to provide a site feasibility assessment for on-site sewage management. This report provides a site and soil assessment, water balance and nutrient modelling, and information on suitable effluent treatment and land application methods, to demonstrate the merits of the on-site management proposal in accordance with Council's On-site Sewage Management Code 17 (2007) and On-site Sewage Management Technical Installation Guidelines (2005).

## **2 OBJECTIVE**

The objective of this report is to provide a site capability assessment for the land application of treated effluent within the subject site. This report is not intended to provide detailed system design appropriate for construction and installation approval.

The report will provide the following in accordance with the Port Macquarie-Hastings Council requirements for wastewater consultant reports:

- design wastewater flow, and water balance and nutrient load calculations,
- site and soil assessment to demonstrate that the site has sufficient land available for sewage collection, treatment and disposal to minimise the risk to public health and safety, and the environment;
- identification of suitable reserve land area is available for the disposal of treated effluent.
- Identification of the type of on-site sewage management appropriate for the site including effluent quality criteria and land application method
- Identification of the setbacks to sensitive environmental receptors, boundaries and other relevant site features.

## **3 RELEVANT LEGISLATION & GUIDELINES**

### **3.1 Legislation**

- Local Government Act 1993
- Local Government (General) Regulation 2005
- Protection Of The Environment Operations Act 1997

### **3.2 Guidelines**

- Port Macquarie-Hastings Council On-site Sewage Management Code 17 for domestic premises (2007)
- Port Macquarie – Hastings Council On-site Sewage Management Technical Installation Guidelines (2005).
- Australian Standard AS/NZS 1547:2012
- NSW Plumbing Code of Australia
- Interim NSW Guidelines for Management of Private Recycled Water Schemes (2008)

- ANZECC Guidelines For Fresh and Marine Water Quality (2000)
- EPA Environmental Guidelines: Use & Disposal of Biosolids Products (1997)
- Australian Guidelines for Water Recycling; Managing Health and Environmental Risk Impact Assessment (EHPC, 2006)
- Environmental Guidelines – Use of Effluent for Irrigation by the Department of Environment and Conservation (DEC, 2004).
- National Water Quality Management Strategy (ARMCANZ, ANZECC, 1998)

## 4 PROPOSED DEVELOPMENT

### 4.1 Project Description

Proposal	Highway Service Centre and Subdivision (boundary alteration)
Location	The development site is bounded by the Pacific Highway to the east and the Oxley highway to the north. The site is located on the south-western outskirts of Port Macquarie township and approximately 5km south of the Hastings River.
Property Description	Proposed subdivision of a 18.4 ha parcel to be created from Lot 11 DP 1029846
Client	Scott PDI Pty Ltd
Local Government Area:	Port Macquarie-Hastings Council
Relevant Guidelines	AS/NZS 1547: 2012
Design Average Wastewater Flow Allowance	40kL/day
Water Supply	Mains Water Supply available

### 4.2 Site Description

The subject development site of 18.4 hectares is to be excised from a large parent lot used predominantly for open farming land and grazing. The subject property is located at the south-western intersection of the Oxley and Pacific Highways, Thrumster. The development site is located in the north-eastern corner of the larger parent lot. The north and eastern boundaries border the formed highway embankments. The adjacent land uses on the properties to the south and west are predominantly open farming land/pasture.

The development site is generally fan shaped, bounded by the elevated ridges along the south and western boundaries and drains generally to the north-east corner. Drainage lines are located along the base of the embankments supporting the elevated highway pavements, and drain towards a stormwater pipe under the Oxley Highway at the north-east corner of the site.

Two small farm dams were located on the property and were holding water at the time of the inspection. These dams would be removed for the proposed development A level building platform is to be formed through cut and fill, and the creation of long sloping batters of 1:4 grade along the part of the southern and western boundaries.

Approximately 1.3 hectares of gently sloping land is to remain undisturbed in the north western corner, achieving buffers of 10m to the water supply easement located inside the northern boundary. A minimum of 40m setback to downslope open drainage lines is achieved. The location of the development site within the mid North Coast region of NSW is provided in Appendix 1.

## 5 SITE ASSESSMENT

Should conditions vary from those described during any stage of installation HMC is to be notified to ensure the recommendations of this report remain valid or alternative recommendations be made.

The following information relates to the general development site but more specifically to the nominated Land Application Areas (LAAs) for the on-site sewage management proposal.

### 5.1 Site Information

<b>Inspected by</b>	Helen Tunks of HMC Environmental Consulting
<b>Date of Inspection</b>	Monday 22 <sup>nd</sup> January 2018
<b>Site Conditions</b>	Warm, dry. Nil Rainfall previous 6 days. Below average rainfall month preceding according to BOM Stn 60139 Port Macquarie Airport AWS
<b>Summary of Site Constraints</b>	Low permeability of soil. Gentle to moderately sloping land. Medium volume, temperate rainfall.
<b>Soil Investigations</b>	<ul style="list-style-type: none"> <li>Regional Geotechnical Solutions, November 2017 - 4 boreholes, 14 testpits - borelogs</li> <li>HMC Environmental Consulting, January 2018- –7 test pits, soil profile investigation, soil chemical and physical analysis by Environmental Analysis Laboratory x 9 samples</li> </ul> <p>See Section 6 for soil profile and assessment information, and Appendices 7-9 for soil investigation results.</p>
<b>Environmentally Sensitive Receptors &amp; Adjacent Land Uses:</b>	Surface water drainage systems discharging to oyster leases/aquaculture area within Hastings River.
<b>Climate</b>	<p>The local climate is temperate, with moderate volume rainfall.</p> <ul style="list-style-type: none"> <li>Average annual median monthly rainfall = 1406mm (1998 - 2018)</li> <li>Average Pan Evaporation Annual = 0-1000 range (1975-2005)</li> </ul> <p>Climate data source: BOM Stn: 60139 Port Macquarie Airport (AWS)</p>
<b>Lot Size</b>	18.4 ha
<b>Available Land Application Area (LAA)</b>	<p>Primary 1.3 ha – natural soil – existing 15-25% slope. See contour plan.</p> <p>Reserve 2.0 ha – formed batter 1:4 slope</p>
<b>Slope</b>	<p>Maximum 25%</p> <p>Where slopes exceed 20%, run-off controls and slope mitigation will be provided in the form of contour planting of the trees, mulching and provision of biofilters at the two low points within the LAA.</p>
<b>Exposure &amp; Aspect</b>	<p>Exposed to wind and sun, minimal shading.</p> <p>Predominantly north and eastern aspect.</p>
<b>Boulders/Floaters/Rock Outcrops</b>	Nil observed during site inspection or noted in borelogs.
<b>Geology</b>	(Pzl) Expected Schist, phyllite, greywacke, slate
<b>Soil Landscape</b>	Thrumster (th) Residual Landscape. Undulating to rolling rises and low hills, on mafic metasediments and sediments. Relief 10 – 50 m, elevation 10 – 60 m,

	slopes 3 – 10%. Tall open forests and rainforests, extensively cleared. Soils. Very deep, well drained Red Ferrosols (Krasnozems), with imperfectly drained Mottled Brown Kurosols (Lateritic and Brown Podzolic Soils) on lower slopes. Land & Soil Attributes. Deep soils, low wet bearing strength, localised stoniness, localised seasonal waterlogging, strong acidity, high soil fertility, productive arable land. (Morand 1:10000
<b>Flooding Potential</b>	Nil
<b>Site Drainage/topography</b>	Moderately sloping land allow sheetflow of incident rainfall Predominantly clay loam subsoils, imperfectly drained.
<b>Surface Condition</b>	Existing 100% pasture grass coverage to be retained within Primary LAA
<b>Erosion/mass movement</b>	None observed in proposed LAA
<b>Depth to Water Table</b>	>4m – see borelogs in Appendix 7
<b>Distance to Surface Water</b>	>40m to open lined stormwater drains >100m to permanent surface water
<b>Distance to Bore</b>	The nearest registered groundwater bore (GW12642) is approximately 700m SW of the site.
<b>pH</b>	Soil investigation recorded pH range of 5.0-5.5
<b>Permeability Testing</b>	Indicative 0.06-0.5 m/day based on in situ sub-soil texture and structure. See Appendix 7 for Borelogs.

## 5.2 **Water Quality Monitoring**

At the time of the site inspection, surface water on the site was present in two small farm dams. These dams are to be removed during the proposed site works.

Baseline water quality data from the dams is not considered relevant given the location and size of the dams, and the proposed site works.

Following commencement of the effluent land application, it is recommended that ongoing water quality monitoring be carried out on the site. The monitoring is to measure the quality of any groundwater intercepted <6m depth, and any receiving surface water body present, against local baseline and ambient conditions, in line with the scheduling provided under the Environmental Guidelines (DEC, 1994).

The locations will be determined by final site drainage configuration, and the monitoring program included in the Effluent Irrigation Management Plan.

## 6 **SOIL INVESTIGATION**

### 6.1 **HMC Soil Investigation – January 2018**

Six test pits were mechanically excavated to generally 1 - 1.2m depth across the potentially available land application area within the undisturbed development site for the purpose of soil profile investigation. The testpit locations and bore logs relevant to the proposed effluent irrigation areas are contained within Appendix 5 and Appendix 6, respectively.

The bore logs generally recorded Clay Loams (Soil Category 4) to strongly structured Medium Clay up to 1.2m depth across the upper and lower locations within the southern and western facing slopes. The soil profile in



the upper slope of the south-eastern corner presented a heavier texture soil, generally medium clay with weaker structure.

Nine (9) samples were forwarded to the Environmental Analysis Laboratory (EAL) at Southern Cross University, Lismore and subjected to the septic disposal assessment including:

- Laboratory bulk density; pH ; Conductivity; Sodidity (ES); Exchangeable cations; ECEC; and Phosphorus Sorption Capacity

The laboratory results and a summary using Hazelton & Murphy (2007) and DECC (2004). are provided in Appendix 8.

The soils within the proposed land application presented generally within the moderate range of all parameters with no absolute constraints or major limitations recorded. The soils have high percentages of exchangeable magnesium, and are therefore likely to benefit from the addition of calcium in the form of lime and gypsum.

**Table 1 Summary of Soil Investigation Results –TP 15-21**

Parameter	Result Range	Desired Criteria	Recommended Action/Amelioration
<b>Texture/ Soil Category AS/NZS1547: 2012</b>	Clay Loam – Medium Clay	Soil Category 3-5	Gypsum & organic matter applied during formation of batter. Recommended guide 0.5kg/m <sup>2</sup>
<b>Emerson Aggregate Test (Dispersibility)</b>	Class 3-6	Class 3 - 8	Not a limitation to effluent irrigation
<b>pH</b>	3.9-4.4	<b>Soil pH</b> 6–7.5 -for optimum plant growth	Not a limitation to effluent irrigation. Recommend broadscale liming during forming of batters to maximise soil fertility. Recommended guide 0.5kg/m <sup>2</sup>
<b>Cations – 0-400mm : Concentration cmol(+)/kg and % CEC</b>			More relevant to plant performance
- <b>Sodium</b>	0.09-0.29 1.1-3.4%	0.3-0.7 0-1%CEC	Low Low
- <b>Calcium</b>	0.18-4.21 1.1-52.5%	5-10 65-80%	Low Low
- <b>Potassium</b>	0.04-0.57 0.4-8.3	0.3-0.7 1-5	Low - Moderate Low - Moderate
- <b>Magnesium</b>	1.91-3.31 17.7-39.9	1-3 10-15	Moderate High
<b>Cation Ratio Ca:Mg</b>	0.05-1.21		Calcium is low.
<b>Effective cation exchange capacity ECEC cmol (+)/kg,</b>	5.3-24	>15 average	Gypsum & organic matter applied during formation of batter. Recommended guide 0.5kg/m <sup>2</sup>
Exchangeable Sodium %	1.1% -3.5%	<5% ESP (0–40 cm) 0–5% to ESP (40-100cm)	Moderate. Minimises structural degradation & water logging. No amelioration required.
P sorption kg/ha/m	>8,449-33,961	>10,000	Moderate to High Effectively immobilises excess P/ No amelioration required.
Indicative hydraulic	0.24mm/h –		<20 mm/h: excess run-off, water

conductivity (Ksat mm/h) 0-1000mm	21mm/h	0-100 cm: 20–80	logging , poor infiltration Dripperline to remain @ 100mm depth in biologically active zone.
Soil Conductivity (salinity) ECe (dS/m)	0.143 -0.452	<2	Low . No amelioration required

## 6.2 Geotechnical Regional Solutions – November 2017

A geotechnical investigation of the development site was carried out by GRS in November 2017 (Report No. 744) comprising 4 boreholes and 14 testpits to generally 4m depth across the site.

The borelogs representative of the south west section and western section of the site considered suitable for effluent land application area are provided in Appendix 7. The borelogs present information on the soil profile at depths below 1m. Groundwater was not encountered within 4m depth.

## 6.3 Proposed Soil Profile within Batter

The Geotech report has recommended the construction of the filled building platform and long 1:4 slopes of the batter along the southern and western site boundaries using the native soils of the site.

The appropriate construction of the batters using minimal compaction will enable the use of them as a portion of the total available effluent land application area (LAA) on the site. It is recommended to restrict the available LAA to a mid-slope area, 10m downslope from the top of the batter and 20m upslope from the toe of the batter. It is considered that the 20m setback to the toe of the batter will enable vegetation to be densely planted to provide hydraulic and nutrient uptake downslope of the LAA.

Given the nature and scheduling of the proposed site planting and landscaping, it is recommended that 4000m<sup>2</sup> of pressure compensated, non-drain, anti-siphon dripperline be pre-installed at 100mm depth during construction of the batter and prior to landscaping, for immediate use during contingencies.

# 7 PROJECTED INFLUENT QUALITY

## 7.1 Characterisation of the Untreated Wastewater

The principal constituents in wastewater treatment, and the reason for concern, are listed in Crites & Tchobanoglous (1998) as summarised below:

- Total suspended solids - sludge deposits and anaerobic conditions
- Biodegradable organics – depletion of natural oxygen resources and the development of septic conditions
- Dissolved inorganics (total dissolved solids) - inorganic constituents added by usage, recycling and reuse.
- Heavy metals – added by usage, many also classified as priority pollutants.
- Nutrients – excessive growth of undesirable aquatic life, eutrophication, nitrate contamination of water.
- Pathogens – communicable diseases
- Priority organic pollutants (refractory organics eg carcinogens)

The expected wastewater flow and load from the Highway Service Centre is to be generated by the operations of the four retail food tenancies, trucker public amenities and the 8 room trucker's motel. All sanitary amenities are to be connected to the commercial sewage treatment plant.

The operation of the truck wash is expected to use an industry typical standalone water recycling system with nil discharge of truck wash water into the commercial STP. The details of the truck wash recycled water system will be provided following concept approval, and prior to installation and construction of the development. The selected truck wash water recycling system will have validated performance data from industry case studies to demonstrate capability of standalone wash water recycling.

The tyre and service centre is to be provided with appropriate pre-treatment of wastewater via oil/water separation and grit removal, prior to discharge to the stormwater retention system on the site. Nil discharge of significant trade waste volumes from the tyre and service centre to the commercial STP would be expected.

## 7.2 Case Study: Plainlands Service Centre, Warrego Highway, Qld

To characterise the untreated effluent flow and load generated by the Highway Service Centre, information was obtained from the Plainlands Service Centre, a similar highway service centre that pumps out all wastewater to Bundamba Sewage Treatment Plant. The Plainlands Service Centre, is located an hour west of Brisbane on the on the Warrego Highway, between Brisbane and Toowoomba. This travel centre has leased tenancies by Caltex, Hungry Jacks, KFC, Subway and Coffee Club.

The effluent quality results from a sampling run carried out on the tanker contents was provided by the Trade Waste Coordinator – Source Control, Queensland Urban Utilities and are summarised in Table 2.

The results may not be solely representative of the Service Centre wastewater but have been obtained using data filtering from the tanker run sheet and are considered useful to characterise the expected wastewater from the proposed service centre.

**Table 2 Tanker Results – Bundamba STP – Plainlands Service Centre Wastewater Pump-Out**

Sample Date	Volumes (L)	pH	Conductivity (mg/L)	SS (mg/L)	BOD (mg/L)	Nitrite+ Nitrate as N (mg/L)	N- Kjeldahl (mg/L)	Total Nitrogen (mg/L)	Total Phosphorus (mg/L)	Total O&G (mg/L)
31/08/2012	20000	7.7	2500	4100	89	<0.02	200	200	18	
10/09/2012	22000	7.0	2200	470	1100	0.043	210	210	24	
13/11/2012	22000	6.9	1900	250	650	0.061	160	160	21	
3/12/2012	20000	6.8	1900	170	920	<0.02	150	150	20	
8/01/2013	20000	6.4	1800	47	740	0.064	160	160	19	
2/04/2013	20000	6.8	1900	550	710	<0.02	160	160	23	180
24/09/2013	20000	6.4	2200	740	1900	<0.02	190	190	33	470
27/09/2013	20000	6.6	2300	1600	1300	0.042	150	150	23	220

As a comparison, Crites & Tchobanoglous (1998) provides typical data on the composition of untreated domestic wastewater as shown in Table 3, representing low strength effluent.

**Table 3 Typical Composition of Untreated Domestic Wastewater**

Contaminant	Concentration		
	Unit	Range	Typical
Total Dissolved Solids (TDS)	mg/L	280-850	700
Total Suspended Solids (TSS)	mg/L	100-350	210
BOD <sub>5</sub>	mg/L	110-400	210
Total N	mg/L	20-85	35
Organic N	mg/L	8-35	13
Ammonia	mg/L	12-50	22
Nitrites+Nitrates	mg/L	0	0
Total P	mg/L	4-15	7
Oil & Grease	mg/L	50-150	90
Total coliform	no./100mL	10 <sup>6</sup> -10 <sup>9</sup>	10 <sup>7</sup> -10 <sup>8</sup>
Fecal coliform	no./100mL	10 <sup>3</sup> -10 <sup>7</sup>	10 <sup>4</sup> -10 <sup>5</sup>

The Environmental Guidelines (DEC, 2004) describes the effluent classifications, and a summary is produced below in Table 4. The strength of untreated effluent to be produced from the proposed Highway Service Centre is Medium-High, based on the results of the industry comparison case study described below.

**Table 4 Classification of Influent for Environmental Management (Adapted from Table 3.2, DEC, 2004)**

Constituent	Effluent Strength (Average Concentration mg/L)		
	LOW	MEDIUM	HIGH
Total Nitrogen	<50	50-100	>100
Total Phosphorus	<10	10-20	>20
BOD <sub>5</sub>	<40	40-1500	>1500
TDS*	<600	600-1000	>1000-2500
(EC)*	<0.93 dS/m	(0.93-1.55)	(>1.55- 3.87)
Grease and Oil	-	-	>1500
Metals and Pesticides	-	-	> 5 x ANZECC and ARMCANZ (2000) long term water quality triggers

\*According to Section 3.7 of the Environmental Guidelines (DEC, 2004), the term Total Dissolved Solids (TDS) is commonly used to express the combined concentration of salts in mg/L. TDS may be estimated by multiplying the Electrical Conductivity (EC) by an empirical factor ranging from 550-900. Conversely, the EC in dS/m can be calculated by multiplying TDS by 0.00155.

## 8 PROJECTED TREATED WASTEWATER QUALITY

Based on the expected Medium – High influent strength and the proposed land application method of sub-surface drip irrigation, the recommended effluent quality criteria and the associated impacts on operation, are presented and discussed in Table 5.

It is recommended that the proposed Sewage Treatment Plant (STP) consistently achieve the effluent quality criteria as summarised in Table 6.

The details of the sewage treatment process will be provided following approval and prior to installation of the commercial sewage treatment plant. The selected STP will have validated performance data from industry case studies to demonstrate capability of achieving the effluent quality criteria.

**Table 5 Proposed Treated Wastewater Quality Criteria & Impacts**

Constituent	Concentration	Impacts of Concern/Restrictive Considerations (Sourced from: ANZECC, ARMCANZ, 1998; DEC, 2004)
pH	6.5-8.5	Pre-treatment of acidic effluent recommended prior to irrigation.
Total Nitrogen (TN)	<=25 mg/L	Nitrogen is beneficial to plant growth and need not be removed from effluent where it can be effectively used. Modelling is provided demonstrating required land application area based on harvest via regular mowing and removal of trimmings.
Total Phosphorus (TP)	<10 mg/L	Soil sorption capacity and vegetation uptake are the major P removal mechanisms. Modelling is provided demonstrating long term capacity for the site.
Total Suspended Solids (non-filterable residue):	<30mg/L	The solids in suspension in effluent that are removable by laboratory filtering, usually by a filter of nominal pore size of about 1.2 micrometers.
Biological Oxygen Demand 5 Day (BOD <sub>5</sub> )	<20 mg/L	Depletion of oxygen within soil and soil micro-organisms, limiting biological activity.
Dissolved Oxygen (DO)	>2mg/L	Limited land application rate and resting periods required to permit re-aeration and prevent anaerobic conditions.
Disinfection Criteria	<10 cfu/100mL	Final disinfection required. This disinfection process will enable the installation option of covered surface drip irrigation under mulch.
Total Dissolved Solids (TDS) or Salinity	<600 mg/L	Combined concentration of dissolved mineral salts in effluent. Increased salinity causes increase in the osmotic pressure of the soil solution, reducing the availability of water plants and potentially retards growth. Irrigation management and soil loading required to achieve balanced soil moisture content to prevent accumulation of salts in the main root zone.
Electrical Conductivity (EC)	<1.3 mg/L (Low Salinity)	
Sodium Adsorption Ratio (SAR)	<10	
Oil and Grease	<2mg/L	Pre-treatment required via commercial oil & grease separators at each food tenancy and a primary baffle tank. Can block irrigation systems and soil pores. The nature of the oil/grease product will affect decomposition rates, as well as soil and



		climatic conditions.
<b>Metals/Pesticides/Herbicides*</b>	EPA 1997 provides maximum topsoil concentrations.	Metals eg Lead (Pb), Cadmium (Cd), copper (Cu), chromium (CrIII, CrIV), persistent organic chemicals (eg. Dieldrin, DDT, 2,4-D) can be harmful to plants and grazing animals. Not expected in wastewater from food preparation and public sanitary facilities.

**Table 6 Projected STP Effluent Quality Criteria**

Constituent	Concentration
Total Suspended Solids (non-filterable residue)	≤ 30mg/L
Turbidity	<5NTU
Biological Oxygen Demand 5 Day(BOD <sub>5</sub> )	≤ 20 mg/L
Disinfection Criteria	<10 cfu/100mL
pH	6.5-8.5
Dissolved Oxygen (DO)	>2mg/L
Total Nitrogen (TN)	≤ 25 mg/L
Total Phosphorus (TP)	≤ 7 mg/L
Chlorine (residual disinfection)	0.2-2.0mg/L

## 9 PROJECTED WASTEWATER FLOW

Various references were sourced to enable a calculation of the estimated daily wastewater volume likely to be generated by the proposed service centre and truckers' motel and amenities in order to then assess site feasibility.

The food preparation processes, general cleaning and sanitary facilities are the end users of the potable water supply within the development and will generate most of the wastewater volume. The number of diner seats and motel rooms are known, and the number and type of tenancies is known. The customer numbers are only able to be estimated at this planning stage, and can be linked with fuel sale projections, if known.

### 9.1 Estimation of Wastewater Flow

#### 9.1.1 Case Study: BP and Caltex Highway Service Centres, Chinderah NSW

Two existing highway service centre are located on the Pacific Highway at Chinderah in the far north coast of NSW. Chinderah BP HSC has been in operation since 2007.

Water usage figures are available for the BP Chinderah (Table 7), and a comparison of the centres is provided below in Table 8 to justify using this information.

**Table 7 Comparison of Proposed Highway Service Centre with Chinderah BP & Caltex**

Feature	Existing BP Chinderah	Existing Caltex Chinderah	Proposed Highway Service Centre	Potential Increase
<b>Enclosed Building Space</b>	Approx. 1400m <sup>2</sup>	1408m <sup>2</sup>	1560m <sup>2</sup>	Approx. 10%
<b>No. of seats for casual dining</b>	104 inside 32 outside	Maximum 160*	Approximately 260	Approx. 60%
<b>No. of</b>	BP fuel & retail	Caltex fuel & retail	Fuel	Generally equivalent

<b>Tenancies/Type</b>	Wild Bean Cafe KFC McDonalds	Coffee Club Hungry Jacks McDonalds Subway	4 Food Tenancies (inc. stand alone Food Tenancy) Truckers Motel (8 rooms) Truckers Office	+ additional 2700L/day for Truckers Motel/Office (guests x 16 ; staff x 6)
<b>No. of Car Parks</b>	64 x car 12 x truck <u>4 x breakdown</u> <u>Total 80</u>	95 x car 24 x staff 25 x truck <u>5 x bus/van</u> <u>Total 149</u>	103 x car 24 x staff 6 x trailer 95 x truck 3 x truck amenities Total 228	Approx. 50%
<b>Fuel Sales</b>	Estimated 50ML/year*	Projected 40 ML/year*	UNKNOWN	UNKNOWN

\*Source: P. Novak, Impexon Retail Projects Ltd.

**Table 8 Water Usage & Wastewater Flow Volumes – Chinderah BP & Caltex**

Date	Period	Water Usage/Year	Average Water Usage/Day	Estimation of customers served (fuel + food)	Average Water Usage/customer
BP 2010/2011	12 Months	4.6 ML	12.6kL/day	7000/week*	21L/customer/day
BP 2011/2012	12 Months	5.3 ML	14.5kL/day		
BP May 2012/May 2013	12 Months	17.7 ML	48.5kL/day		
BP May 2013/Nov 2013	6 Months	3.3ML	18kL/day		
BP Estimate May 2013/May 2014	12 Months (include 100% increase for Dec + Jan)	7.7ML	21.1kL/day		
Estimate Caltex Chinderah (+18%)	2016-2017	9.1 ML	24.9kL/day PEAK	8260/week	Peak 1900 retail customers/day @ 21L/day
Actual Caltex Chinderah	2016-2017	TBA	Peak 40kL/day* Regular 25kL/day*		
Proposed HSC Thrumster	Assume:60% incr Peak 1900 retail/fuel customers/day @ 21L/p/day Assume: Regular 1145 retail/ fuel customers/day @ 21L/p/day Assume 100% occupancy of Truckers' Motel: 16 guests/day @ 150L/p/day ESTIMATED TOTAL PEAK 42.4kL/day ESTIMATED REGULAR 26.4kL/day				

\*Personal communication with BP Manager

\*Personal communication with Truewater Manager (STP service contractor), subject to pending data to be provided.

### 9.1.2 Typical Wastewater Flow Rates - Summary of Literature Research

- Crites & Tchobanoglous (1998) provide a typical flow of 23 L/customer within a range of 11-30L/customer is stated as typical wastewater flow rate for a Short Order restaurant.
- Table H1 of AS1547:2012 provides 25L/customer/day as an informative guide for tea rooms with restroom facilities and restaurants (lunch), and 30L/diner/day for restaurants (dinner).
- Asquith et al (2005) provide the typical flow characteristics of medium size wastewater systems based on numerous audits, and stated the typical daily load from a Highway Service Centre is 40 – 150kL/day.
- A breakdown is provided by the Miami-Dade Environmental Protection Code 2011. A minimum 35 gallon/132.5L per seat is required for planning approvals assessments of fast food restaurants in Miami Florida.
- The American Waste Water Association Research Foundation (Dziegielwski et al., 2000) carried out audits of 85-87 restaurants and produced useful data:
  - Average daily water use per building area= 1.1 (gallons/sf) 46.4L/m<sup>2</sup>
  - Average daily water use per customer = 12.8 gallons/customer
  - Average daily water use per meal 16.1L/meal
  - Average number of seats 200
- VanSchenkohf (2011) aimed to develop benchmarks for water usage and costs for casual dining restaurants with a study that audited 300 casual dining restaurants and interviewed proprietors to produce useful modelling factors. The study concluded:
  - 1,766 gallons (6.7kL) of water were used each day per restaurant,
  - 12.79 gallons (48.6L) per day for each seat,
  - 68 gallons (258L) per employee, and
  - 0.73 gallons per interior square foot (31L/m<sup>2</sup>).

### 9.1.3 Tenancy Information – Summary of Literature Research

Interviews with the tenancy representative at Chinderah BP were carried out however no water usage breakdown was available on existing tenancies within similar centres:

- McDonalds - no information available to date
- Red Rooster – no information available to date
- Coffee Club
  - estimate of 400-700 customers/day
  - food preparation carried out on site but not all
  - table service to customer
  - typically greasetrap of 2000 or 5000L depending on monthly or quarterly service
- Subway
  - estimate of 1000 customers/day
  - 100L hot water system
  - typically greasetrap serviced every 26 weeks
  - minimal fats, oil, grease
- Caltex
  - estimate of 1000 customers/day - fuel and shop
  - instant hot water – underbench only
  - pre-made food only
  - typically no greasetrap

## 9.2 Projected Wastewater Design Flow

Based on the Chinderah case study and the literature research using water usage rates per meals/seating, a daily water usage of 40kL/day is expected to be generated by the proposed service centre. The loading is expected to have a high variability, dependent on seasonal, weekly and daily peaks.

Peaking factors for are unknown at this stage but are expected to result in a variable actual daily flow of up to 100%.

It is considered appropriate to size the proposed sewage treatment plant (STP) for 64kL/day with flow balancing include in the design to manage the peak flows. The projected wastewater flows are summarised in Table 9.

**Table 9 Projected Wastewater Flow Volumes - Proposed Highway Service Centre**

Existing Caltex Highway Service Centre, Chinderah	Expected Increased Loading Factor (%)	Design Regular Wastewater Flow	Design Peak Flow (+60%)
PEAK 40 kL/day REGULAR 25kL/day	Assume: 60%	40kL/day	64kL/day

## 10 PROPOSED METHOD OF LAND APPLICATION OF TREATED EFFLUENT

To minimise the risk to public health and the environment, and to enable long term security of operation and maintenance, it is recommended that the land application method of the treated wastewater from the Commercial Sewage Treatment Plant be sub-surface drip irrigation @ 100-150mm depth in the soil.

To use as a guide to the appropriate effluent quality on the subject site, the Environmental Guidelines (DEC, 2004), NSW Health Advisory Note No. 4 (2008) and the Australian Guidelines for Water Recycling (2006) provide the water quality objectives recommended for various methods of land application of effluent. These are summarised in Tables 10-12 below.

**Table 10 Guidelines for the spray application of municipal effluent.**

Type of reuse	Level of treatment	Effluent quality	Effluent Monitoring	Controls
<b>Urban (non-potable)</b>				
Municipal with uncontrolled public access Irrigation open spaces, parks, sportsgrounds, dust suppression, construction sites	Tertiary and Pathogen reduction	pH 6.5 to 8.5 ≤ NTU9 1 mg/L Cl <sub>2</sub> residual10 or equivalent level of pathogen reduction 10cfu/100mL	pH weekly BOD weekly Turbidity continuous Disinfection systems daily  Thermotolerant coliforms weekly	Application rates limited to protect groundwater quality. . Salinity should be considered for irrigation.
Municipal with controlled public access	Secondary and Pathogen	Thermotolerant coliforms <1,000 cfu/100 mL	pH monthly SS monthly Thermotolerant coliforms	Irrigation during times of no public access.

Irrigation open spaces, parks, sportsgrounds, dust suppression, construction sites, mines	reduction		weekly Disinfection systems daily	Application rates limited to protect groundwater quality. Salinity should be considered for irrigation. Withholding period nominally 4 hours or until irrigated area is dry.
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**Table 11 Effluent Quality Criteria from NSW Health Advisory Note 4 – May 2008**

Land Application System	Waste Material and Waste Management Facility	Treatment Stand Performance Requirement
Sub-soil (>300 mm depth) <ul style="list-style-type: none"> <li>trenches</li> <li>beds</li> <li>mounds</li> <li>off-site transfer</li> <li>deep drippers</li> </ul>	Sewage or Greywater Management <ul style="list-style-type: none"> <li>septic tank</li> <li>collection well</li> <li>greywater tank</li> <li>CED pre-treatment tank</li> <li>biolytic filter</li> <li>greywater diversion (no treatment)</li> <li>sewage ejection unit (no treatment)</li> </ul>	Primary treatment to separate solids from liquids. No performance standard
Irrigation <ul style="list-style-type: none"> <li>sub-surface (300 mm to 100 mm)</li> <li>surface and spray irrigation (&lt;100 mm to above GL)</li> </ul>	Sewage or Greywater Management <ul style="list-style-type: none"> <li>aerated wastewater treatment system</li> <li>domestic greywater treatment system</li> <li>aerobic sand filter</li> <li>biological filter</li> </ul> (which incorporate an active disinfection process)	A secondary treated disinfected effluent to the following standard is required: <ul style="list-style-type: none"> <li>BOD &lt;20</li> <li>TSS &lt;30</li> <li>T. coli &lt;30</li> </ul>
Indoor <ul style="list-style-type: none"> <li>toilet flushing</li> <li>washing machine</li> </ul>	Greywater Management only (Sewage may be considered in the future) <ul style="list-style-type: none"> <li>domestic greywater treatment system</li> </ul>	A secondary treated disinfected effluent to the following standard is required: <ul style="list-style-type: none"> <li>BOD &lt;10</li> <li>TSS &lt;10</li> <li>T. coli &lt;10</li> </ul>

**Table 12 Water Quality Objectives – Municipal Spray Irrigation (AGWR,2006)**

Type of reuse	Level of treatment	Effluent quality	Controls -
Municipal with restricted access and application	Secondary with disinfection	BOD<20mg/L SS<30mg/L Residual disinfection E.coli<100cfu/100mL	Restrict public access during irrigation and one of the following application controls: <ul style="list-style-type: none"> <li>No access until dry (4 hours)</li> <li>Minimum 25m -30m to public access point</li> <li>Spray drift control e.g., low throw or directional sprinklers, vegetation screening</li> </ul>



## 11 LAND APPLICATION AREA SIZING

In accordance with the “Environmental Guidelines- Use of Effluent by Irrigation” (DEC, 2004), modelling has been carried out with daily and monthly water balances to determine the effluent land application sizing area (LAA) based on:

- Effluent flow rate and quality
- Proposed sub-surface drip irrigation system @ 150mm depth
- Climate (Alstonville Pan Evaporation data (40 years); Port Macquarie rainfall data – 70<sup>th</sup> percentile;
- Landform, soil physical and chemical properties.
- Total Nitrogen (TN) loading, with N loss via plant uptake and seepage below the topsoil zones.
- Total Phosphorus (TP) loading, with P loss via plant uptake and soil adsorption.
- Hydraulic loading, with water loss via plant evapo-transpiration and percolation.

### 11.1 Nutrient Mass Balance Calculation

In consideration of nutrients such as nitrogen and phosphorus, a mass balance was used to estimate the application rate and long term management of the irrigation scheme based on soil and effluent characteristics, and the expected average regular wastewater flow of 40k/day.

In determination of effluent land application area (LAA) sizing in regards to nutrients the following data was used in the nutrient cycle land application model, and the calculations are included in Appendix 4.

**Table 13 Summary of TN Production Treated Effluent – Discharge Effluent Concentration**

Design Treated Effluent Discharge Volume	Target Concentration In Discharged Effluent	TN Produced Per Year in Treated Effluent	Recommended Nutrient Envelope	Sizing of Management
40kL/day	25 mg/L	1 kg TN/day 365kg TN/year	12121 m2	

**Table 14 Summary of TP Production Treated Effluent – Discharge Effluent Concentration**

Design Treated Effluent Discharge Volume	Target Concentration In Discharged Effluent	TP Produced Per Year in Treated Effluent	Recommended Nutrient Envelope (50 year life)	Sizing of Management
40kL/day	7 mg/L	0.28 kg TP/day 102.2 kg TP year	4433m2	

### 11.2 Hydraulic Load and Wet Weather Storage Requirements

The “Environmental Guidelines- Use of Effluent by Irrigation” (DEC, 2004), stated that land application area requirements for the irrigation of low strength effluent is determined based on the 50<sup>th</sup> percentile storage requirements.

To remain conservative, the land application area was calculated using the design wastewater design flow allowance of 40kL/day, the monthly water balance modelling using 70<sup>th</sup> percentile monthly rainfall data. The land application area sizing (see Appendix 4) did not demonstrate a need for any wet weather storage.

The cumulative peak effluent depth in the 70<sup>th</sup> percentile monthly modelling demonstrated that zero overtopping occurs if using 1.3ha of land application area.

### 11.3 **Organic Loading**

In accordance with the Environmental Guidelines (DEC 2004), an average organic loading rate of 1500kg/ha/month can be assumed as the maximum organic loading for most soils in a sustainable irrigation scheme.

Using the proposed secondary effluent with a BOD<sub>5</sub> concentration of 20mg/L, and an average irrigation rate of 40kl/day, the average maximum daily organic loading rate is calculated to be 24.4kg/month. Using the average organic loading rate of 1500kg/ha/month as a target, it is concluded that the proposed 1.3 hectare of land application area is not limited by the organic loading.

### 11.4 **LAA Sizing Inputs**

<b>Models Used: Monthly Water Balance: AS1547:1994 (PMH Council OSSF Code 17)</b>	
<b>Nutrient Loading: Richmond Tweed On-Site Regional Strategy (Alderson, 1999 &amp; LCC, 2007)</b>	
Climate Data	<b>Port Macquarie Airport – 1996-2018</b> Bureau of Meteorology Weather Station 70 <sup>th</sup> percentile – Rainfall – LAA sizing & wet weather storage
Design Daily Wastewater Flow	40,000L/day
Nitrogen (TN)	1kg/day, 365kg/year
(TN) System Nutrient	Secondary effluent 25mg/L 20% denitrification taking place in disposal field.
Vegetation Removal (TN)	Kikuyu up to 520kg/ha/year (NSW Agriculture 1997) Conservative rate of (240 kg/ha/year) adopted in modelling.
Phosphorus (TP)	Secondary effluent 7mg/L x 40kL/day = 0.28kgP/day x 50 years - = 5110kg total
Vegetation Removal (TP)	30 kg/ha/year 8mg/m <sup>2</sup> /day (Myers et al 1994)
Phosphorus Adsorption	1328 mg/kg based on lowest P-sorption result for upper sub-soil Bulk density 1400kg/m <sup>3</sup> (1.4g/cm <sup>3</sup> ) Depth of soil assumed 0. 5m 9289kg/ha/year/1m Assume 50 year life of land application area (modelled time for P accumulation ). At 1.3ha, phosphorous longevity is 118 years.
Effective Captured Rain In LAA	75% assumed. 15- 25% slope expected to maximise shedding of incident rainfall
Long Term Acceptance Rate (LTAR)	6 mm/day
Design Irrigation Rate (DIR)	3.1mm/day
Wet Weather Storage	Nil expected based on monthly water balance @70 <sup>th</sup> percentile. Recommend 3 days storage/120KL provided as contingency during extreme rainfall events

**Table 15 Summary of Land Application Area Sizing**

DESIGN LAND APPLICATION AREA SIZING	EFFLUENT QUALITY ASSUMPTIONS	MODELLING CALCULATION ASSUMPTIONS
Hydraulic Load      13000m <sup>2</sup> Total Nitrogen        12167m <sup>2</sup> Total Phosphorus    118 year life  Limited by Hydraulic Load Reserve LAA of 20000m <sup>2</sup> available (4000m <sup>2</sup> with dripperlines pre-installed) .	Secondary treated effluent with final disinfection delivered via pressure compensated non-drain, anti-siphon dripperline directly to root zone 100-150mm below ground surface within nominated LAA <ul style="list-style-type: none"> <li>• 20mg/L BOD5</li> <li>• 30mg/L SS</li> <li>• &lt;10 cfu/100mL</li> <li>• TN &lt;25mg/L; TP &lt;7mg/L</li> </ul>	Q= 40kL/day LTAR 6mm/day DIR 3.1 mm/day 70 <sup>th</sup> percentile daily rainfall Minimum 120kL wet weather storage, typically available as 3 x 45kL tanks, to be determined by supplier.

## 12 COMMERCIAL SEWAGE TREATMENT FACILITY

It is proposed to install and operate a modular commercial Sewage Treatment Plant (STP) as part of the overall Commercial Sewage Management Facility (CSMF). The STP would be capable of achieving the nominated effluent quality criteria detailed, and variable quality and quantity flows in Table 16.

The STP will utilise various system controls and retention/treatment methods to allow for the accumulation of wastewater which will contribute to producing a more consistent influent to the treatment facility. The STP will incorporate multiple treatment barriers including:

- Secondary treatment
- Ultrafiltration
- Ozonation
- Chlorination

The design wastewater flow for the proposed project has been calculated at 40kL/day, with peak daily loading of estimated 64kL/day associated with daily or seasonal variation. Pre-treatment of trade waste, flow balancing and surge control are essential components for long term security of STP performance. See the Site plan in Appendix 3 for the proposed location of Sewage Treatment Plant compound and wet weather storage of 120kL.

Design and construction details of the Commercial Sewage Treatment Facility, effluent treatment processes and land application methods will be provided separately following conceptual approval. Validated performance data is required to demonstrate capability of consistently achieving the effluent quality criteria.

The proposed sewage treatment plant is to be selected to adequately manage the average and peak flows described and treat to secondary standard with nutrient removal to meet TN 25mg/L, TP 7mg/L, with disinfection, and to produce effluent suitable for sub-surface drip irrigation.

The detailed design is to be provided for the Commercial Sewage Management Facility following concept development approval, and is not within the scope of this report.

The detailed design is to be provided at the time of construction and installation approval would include the following information as a minimum, in accordance with the requirements of Section 13.0 of Council's Code 17 On-site Sewage Management for Domestic Systems:

- Appropriate system selection process providing information on the advantages and disadvantages and limitation of various alternatives.
- Hazard identification, exposure risk assessment
- Plans and section drawings of the Commercial Sewage Management Facility and land application area.
- LAA site plan to include contours, setback to surface drainage and any vegetation to be retained.
- Inlet and outlet arrangements, major chambers and components of the CMS,.
- Treatment process and schematic flow diagram
- Flow and Load assessment based on detailed design of the proposed service centre
- Calculations of peak and average flow
- Flow balancing requirements
- Irrigation hydraulic design including specifications of all components and operational efficiency.
- Wet weather storage, alarms & monitoring
- Plant maintenance & operation
- Power supply requirements – pumps, solenoid valves and expected 3 phase supply required to STP
- Trade Waste Agreements with individual tenancies/users of the STP regarding pre-treatment and servicing – food, retail, truck motel, office, wash, tyre & mechanical
- Power supply requirements
- Truck wash water recycling process and oil/grit collection
- Tyre/mechanical trade waste pre-treatment in the form of coalescing plate oil/water separator and grit removal.

### 12.1 **Recycled Water Management Plan**

At construction and installation approval stage, it is recommended that a Recycled Water Management Plan is also prepared with the submission of detailed design following development approval. The RWMP is not within the scope of this Site Feasibility report.

The Recycled Water Management Plan will include the necessary operational and maintenance processes of the STP manufacturer and treatment, and the drainage connections. The processes within the appropriate washwater recycling system and servicing for the stand alone truck wash, and the tyre/mechanical trade waste pre-treatment and servicing should be included in the RWMP.

A customised hydraulic design for the operation of the effluent treatment, wet weather storage and irrigation system will form part of the Recycled Water Management Plan. The RWMP would form the operations and maintenance manual as an on-site tool. The Recycled Water Management Plan should address at a minimum:

- |   |  |
|---|--|
| 1. Hazard Identification & Risk Assessment -  | Source of Recycled Water -<br>Intended Use<br>Routes of Exposure<br>Critical Control Points  |
| 2. Operational Procedures & Process Control - | Operational Procedures – effluent treatment, irrigation, Storage.<br>Operational Monitoring - daily, weekly checklists<br>Operational Corrections<br>Security Measure & Access Control |
| 3. Verification of Recycled Water Quality:    | Recycled Water Quality Monitoring – quarterly testing<br>Environmental Monitoring – soil, groundwater, surface water<br>Reporting, Documents and Records<br>Evaluation & Review        |



### 13 PREPARATION OF LAND APPLICATION AREAS

The nominated effluent land application areas comprise a primary LAA of 1.3 ha on natural soil, and a remaining 2.0ha reserve LAA on the formed batters of 1:4 slope.

The following recommendations are specifically for a sub-surface dripper line land application system. This report does not preclude the construction and installation of alternative land application methods within the nominated LAA. Alternative methods such as trenches or mounds would not be expected to require a larger area than sub-surface drip irrigation.

<b>INSTALLATION OF DRIPPERLINE PRIMARY LAA 1.3 ha</b>  <b>Detailed hydraulic design required prior to installation.</b>	<ul style="list-style-type: none"> <li>• The dripperline is to be ripped into the existing soil a depth of approximately 100-150mm below the existing grassed surface of the primary Land Application area of 1.3ha, subject to a detailed irrigation design.</li> <li>• An example of an appropriate product is Netafim UniBioline CNL XR 16mm lilac dripperline - heavy wall, pressure compensating, anti siphon &amp; non leakage, chemical free resistance to root intrusion</li> </ul>
<b>Maintenance &amp; Management of Grass Clippings</b>	<ul style="list-style-type: none"> <li>• Further top dressing of the LAA may be required, especially for the first 6-12 months due to settling of the soil. To maximise exposure to sun and wind, adjacent shrubs and trees are to be lopped regularly.</li> <li>• The pasture grass is to be cut regularly and the clippings removed off site on an alternate basis. Turf cover is to be maintained so as to provide a dense and vigorously growing protective cover to the soil.</li> <li>• Flush valves required.</li> <li>• Warning signs required</li> </ul>
<b>Surface Water Controls</b>	<ul style="list-style-type: none"> <li>• An intercept bund/drain with a mounded edge is to be installed upslope to divert surface water run-on around the Primary and Reserve LAAs in areas with potential overland flow.</li> <li>• A grassed shallow bund is to be installed, mid slope and down slope of the land application area to minimise the slope run length and to minimise the overland surface water flow.</li> <li>• The irrigation system is to be constructed so that there is no pooling or run-off of the effluent within or from the surface of the land-application area.</li> </ul>
<b>INSTALLATION OF DRIPPERLINE Available Reserve LAA 2.0 ha</b>  <b>Detailed hydraulic design required prior to installation.</b>	<ul style="list-style-type: none"> <li>• To provide immediate contingency, it is recommended that a minimum of 4000m<sup>2</sup> of dripperline is pre-installed within the nominated reserve LAA during construction of the batters.</li> <li>• The batters within the reserve LAA areas asnoted on the Site Plan, is to undergo minimum compaction and the upper 500mm is to be no heavier than a clay loam. The native soils of the site to a depth of 1m have been determined as suitable.</li> </ul>

## 14 CONCLUSION AND RECOMMENDATIONS

Based on the information presented in this report, the capacity of the proposed development site to sustainably manage the wastewater generated by the proposed development has been adequately demonstrated by a site and soil assessment, calculation of the projected wastewater flow volumes and quality.

It is therefore considered that the recommendations listed below and detailed in this report, are sufficient to minimise the environmental impact from the proposed development concept to an acceptable risk level, subject to the provision of detailed design at construction and installation approval stage.

Alternative effluent treatment and land application methods may be possible for the proposed development on the subject site, including interior and exterior reuse, installation of waterless composting toilets, sub-surface flow wetlands, sand mounds and sub-soil trenches. The suitability of the alternative effluent treatment would be assessed via the Section 68 application process. The alternative effluent land application methods would not be expected to require a larger land application area than nominated in this report. Maximising effluent quality to enable on-site reuse would reduce the land application required.

It is therefore considered that the proposed development site is suitable for the management of on-site sewage generated by the proposed development provided the strategy includes the following minimum recommendations:

1. Install a modular, minimum secondary quality Commercial Sewage Treatment Facility, capable of treating the minimum design peak wastewater flow of 64kL/day and a minimum average peak flow of 40kL/day. Detailed design to be provided at installation and construction approval stage. The CSTF is to have the capacity to expand in order to ensure long term operational security of the proposed development.
2. The CSTF is to be capable of treating the expected variables in wastewater flow and concentration due to peaking factors, and to consistently achieve the following effluent quality criteria:

Constituent	Concentration
Total Suspended Solids (non-filterable residue)	≤ 30mg/L
Turbidity	<5NTU
Biological Oxygen Demand 5 Day(BOD <sub>5</sub> )	≤ 20 mg/L
Disinfection Criteria	<10 cfu/100mL
pH	6.5-8.5
Dissolved Oxygen (DO)	>2mg/L
Total Nitrogen (TN)	≤ 25 mg/L
Total Phosphorus (TP)	≤ 7 mg/L
Chlorine (residual disinfection)	0.2-2.0mg/L

3. Install a minimum of 1.7 hectares of pressure-compensating sub-surface dripperline at the time of construction and installation approval. 4000m<sup>2</sup> of this allocation is to be provided on the formed batter, a minimum of 20m upslope of the toe. The remaining 1.3ha is to be installed into the existing grassed pasture.

Including the nominated initial installation of 1.7 ha, a total of 3.3 hectares of available effluent land application is to remain preserved on the development site for effluent disposal in the long term, as nominated on the Site Plan in Appendix 3.

4. The truck wash is to be operated as a standalone recycled water system with no discharges of washwater to the Commercial Sewage Treatment Facility.
5. The tyre and service centre is to provide satisfactory pre-treatment of wastewater in terms of oil/water separation and grit removal, prior to discharging to the on-site stormwater treatment. No discharge of trade waste from the tyre and service centre is to enter the Commercial Sewage Treatment Facility.
6. A Recycled Water Management Plan is to be prepared and submitted at the time of installation and construction approval, and is not within the scope of this report.
7. It is recommended that influent monitoring via flow meter and laboratory analysis be carried out to obtain representative loading information to assist the operation of the sewage treatment plant in regards to contaminant and hydraulic loads, and surge control. The monitoring and review is to commence during initial establishment phase and continue on a regular and representative basis through the operational stages, and remain subject to review.

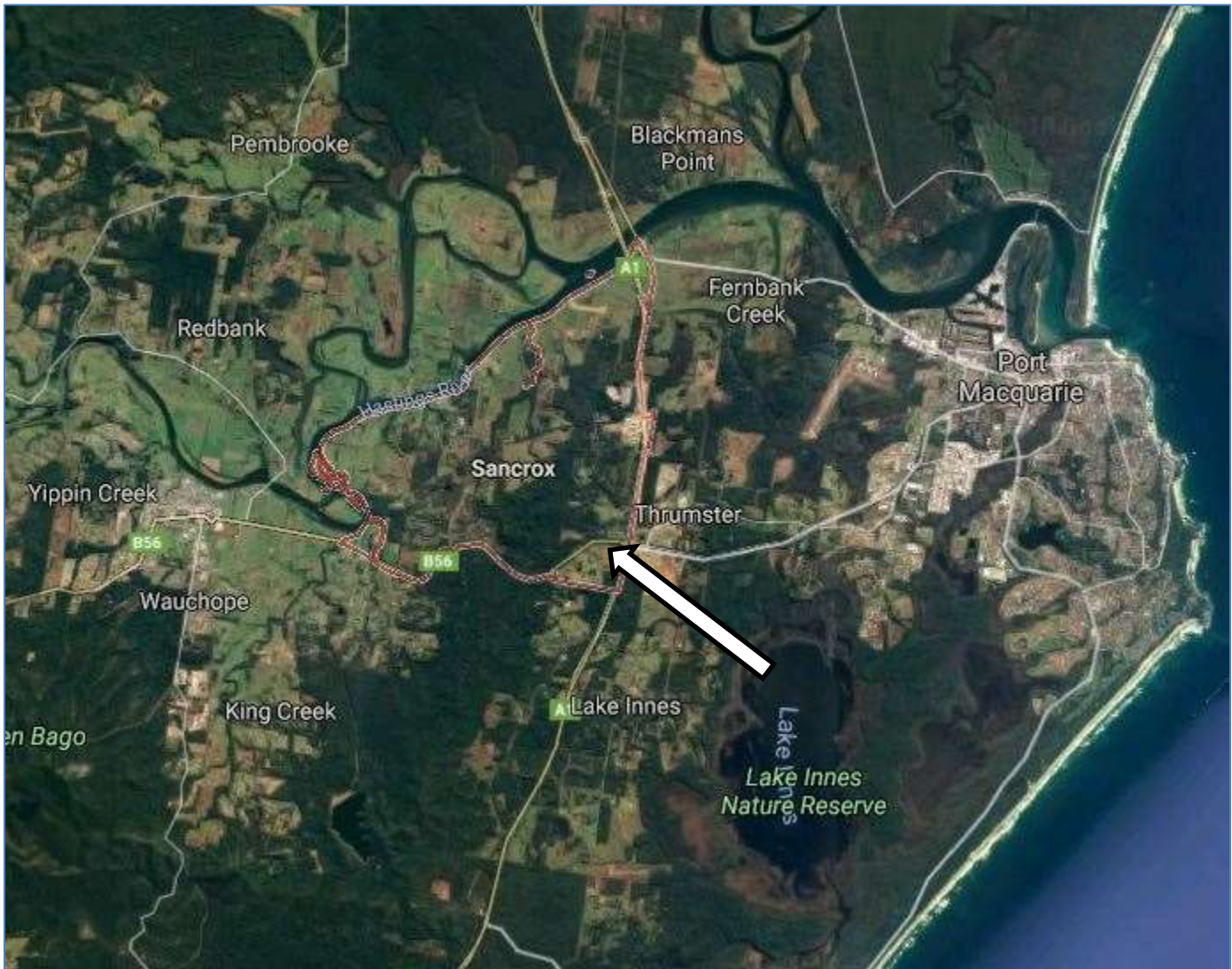
## 15 REFERENCES

References/legislation utilised in the preparation of report:

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## 16 APPENDICES

### APPENDIX 1 Site Location

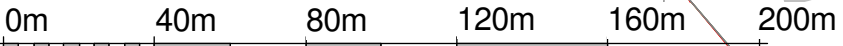


***APPENDIX 2    Proposed Site Plan***

SEE FOLLOWING PAGE



BUILDING AREA SCHEDULE	
BUILDING	AREA (m <sup>2</sup> )
SERVICE CENTRE	1560 m <sup>2</sup>
FOOD & DRINK OUTLET ( STAND ALONE )	420 m <sup>2</sup>
8 MOTEL ROOM	275 m <sup>2</sup>
TRUCK STOP OFFICE & WORKSHOP	495 m <sup>2</sup>
TOTAL AREA	2750 m <sup>2</sup>



VISUAL SCALE 1:2000 @ A3  
**PRELIMINARY**

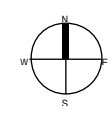
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1	19-01-18	SCHEMATIC	MW
2	30-01-18	SCHEMATIC	MW
3	31-01-18	SCHEMATIC DESIGN	MW
4	06-02-18	PRELIMINARY ISSUE TO CLIENT	MW
5	07-02-18	NEW SITE EXTENT & PROPOSED EASEMENT WIDENING	MW
6	08-02-18	ROUND ABOUT AND SITE ENTRY	MW



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SERVICE CENTRE**  
PACIFIC & OXLEY HIGHWAYS, PORT  
MACQUARIE, New South Wales



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DATE : Jan 2018  
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SHEET TITLE : OVERALL PROPOSED  
SITE PLAN

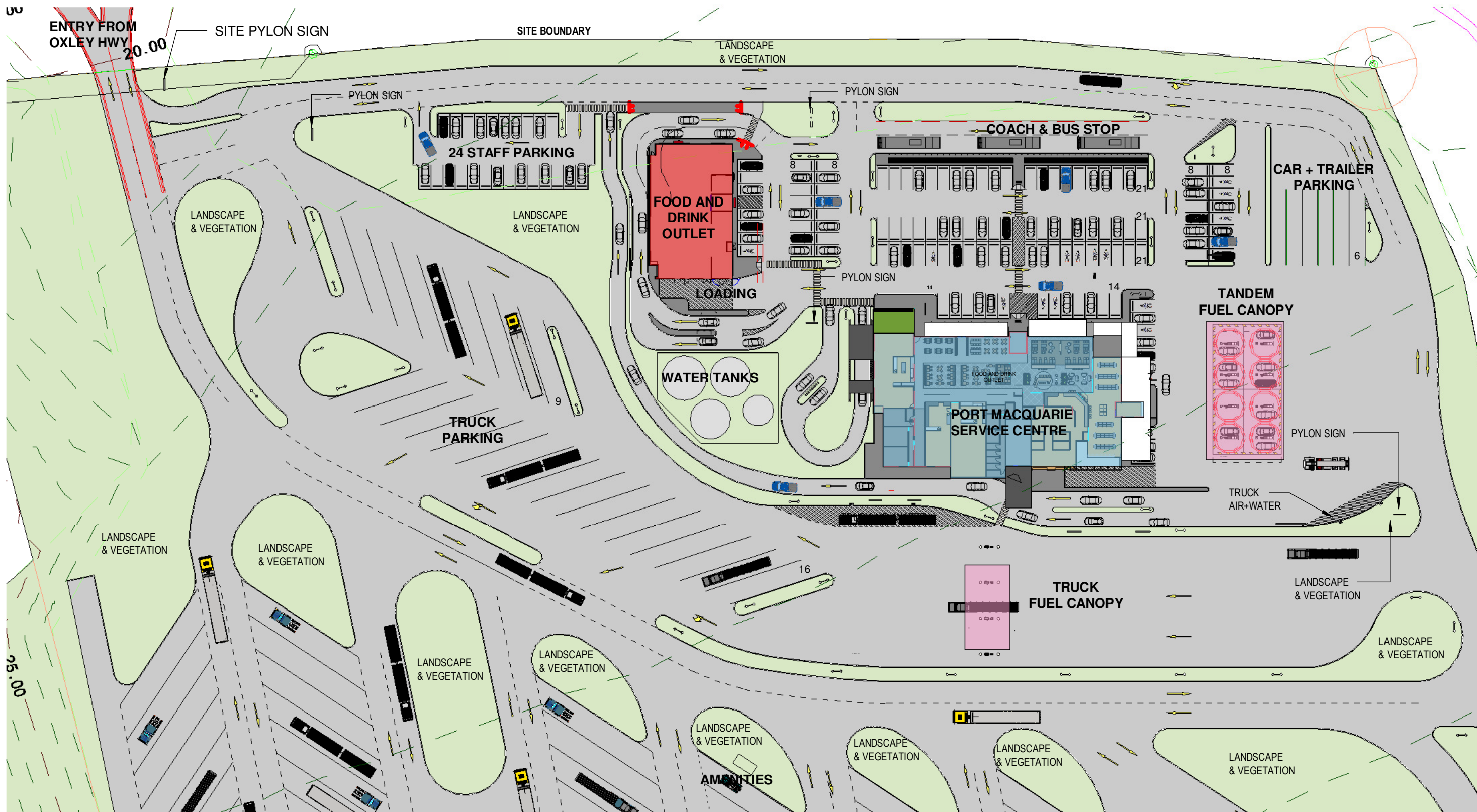
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**PORT MACQUARIE SERVICE CENTRE**

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**6**





PRELIMINARY

1 SITE PLAN-PART 01  
1 : 850

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3	31-01-18	SCHEMATIC DESIGN	MW
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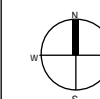
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PACIFIC & OXLEY HIGHWAYS, PORT  
MACQUARIE, New South Wales

0m 17m 34m 51m 68m 85m

VISUAL SCALE 1:850 @ A3



SCALE : 1 : 850 @A3

DATE : Jan 2018

DRAWN : MW

SHEET TITLE : SITE PLAN - PART 01

PROJECT NUMBER : 415172

SHEET NUMBER : **A004**

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PORT MACQUARIE SERVICE CENTRE

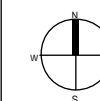




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VISUAL SCALE 1:850 @ A3



SCALE : 1 : 850 @A3

DATE : Jan 2018

DRAWN : MW

SHEET TITLE : SITE PLAN - PART 02

PROJECT NUMBER : 415172

SHEET NUMBER : A005

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#### AMENDMENTS

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PACIFIC & OXLEY HIGHWAYS, PORT  
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PORT MACQUARIE SERVICE CENTRE

**APPENDIX 3    *Site Plan – Proposed On-site Sewage Management Conceptual Layout***

SEE	FOLLOWING	PAGE
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***APPENDIX 4    Modelling – Monthly Water Balance & Nutrient Balance***

SEE FOLLOWING PAGE

AS1547:1994 MONTHLY WATER BALANCE  
WEATHER STATION: Port Macquarie Airport Site No.  
NSW 1988-2018  
EVAPORATION DATA: NSW Centre for Horticulture, Alstonville NSW (40 years)

LAND APPLICATION AREA (LAA)

Client: Jones  
Location: Port Macquarie HSC  
Assumptions: 150 works 40kL/day 70th Percentile Rainfall  
Water Supply: Reticulated  
Water Saving: AAA

TABLE A1: SIZE OF AREA PER MONTH

(1)		(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Month	Days in Month (n)	Pan Evaporation E	Evapo-transpiration ET (ET = 0.75E)	Rainfall R Decile 7	Retained rainfall RR (Rr = 0.75R)	Long-Term Acceptance Rate (LTAR) per month	Disposal rate per month (3) - (5) + (6)	Treated Effluent applied per month	Size of area  (8)/(7)
		mm	mm	mm	mm	mm	mm	L	sq.m
Jan.	31	5.7	133	176	132	186	187	1240000	6648
Feb.	28	5	105	60	45	168	228	1120000	4912
Mar.	31	4.3	100	210	158	186	128	1240000	9652
Apr.	30	3.5	79	153	115	180	144	1200000	8333
May	31	2.7	63	190	143	186	106	1240000	11668
Jun.	30	2.4	54	172	129	180	105	1200000	11429
Jul.	31	2.7	63	76	57	186	192	1240000	6466
Aug.	31	3.5	81	55	41	186	226	1240000	5484
Sept.	30	4.4	99	67	50	180	229	1200000	5246
Oct.	31	5	116	74	56	186	247	1240000	5025
Nov.	30	5.4	122	185	139	180	163	1200000	7373
Dec.	31	5.9	137	130	98	186	226	1240000	5495
AVERAGE:									7311

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Daily		1971-2011 Mean Daily Evaporation		
days	effluent	LTAR	DIR	E
31	40000	6	3.1	5.7
28	40000	6	3.1	5
31	40000	6	3.1	4.3
30	40000	6	3.1	3.5
31	40000	6	3.1	2.7
30	40000	6	3.1	2.4
31	40000	6	3.1	2.7
31	40000	6	3.1	3.5
30	40000	6	3.1	4.4
31	40000	6	3.1	5
30	40000	6	3.1	5.4
31	40000	6	3.1	5.9

RESULT

Max 125mm depth of effluent in top soil of 150mm for 2 months/year

LTAR 5L/m2/day

DIR 3.1 L/m2/day

TABLE A2: DEPTH OF STORED EFFLUENT

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Month	First trial area LAA	Application rate	Disposal rate /month		Increase in depth of stored effluent	Depth of effluent for month	Increase in depth of effluent	Computed depth of effluent
	sq.m	(8)/(2) mm	mm	mm	(3) - (4) mm	(5)/n mm	(X - 1) mm	+ (6) mm = month (X)
Dec.	13000							0
Jan.	13000	95	187	-91	-304	0	-304	0
Feb.	13000	86	228	-142	-473	0	-473	0
Mar.	13000	95	128	-33	-110	0	-110	0
Apr.	13000	92	144	-52	-172	0	-172	0
May	13000	95	106	-11	-36	0	-36	0
Jun.	13000	92	105	-13	-42	0	-42	0
Jul.	13000	95	192	-96	-321	0	-321	0
Aug.	13000	95	226	-131	-436	0	-436	0
Sept.	13000	92	229	-136	-455	0	-455	0
Oct.	13000	95	247	-151	-505	0	-505	0
Nov.	13000	92	163	-70	-235	0	-235	0
Dec.	13000	95	226	-130	-434	0	-434	0

176 60 210 153 190 172 76 55 67 74 185 130  
282.2 290.2 268.8 288 246.5 281.9 108.4 183.4 130.4 131.8 265.2 179

1 mL 1 L/m2

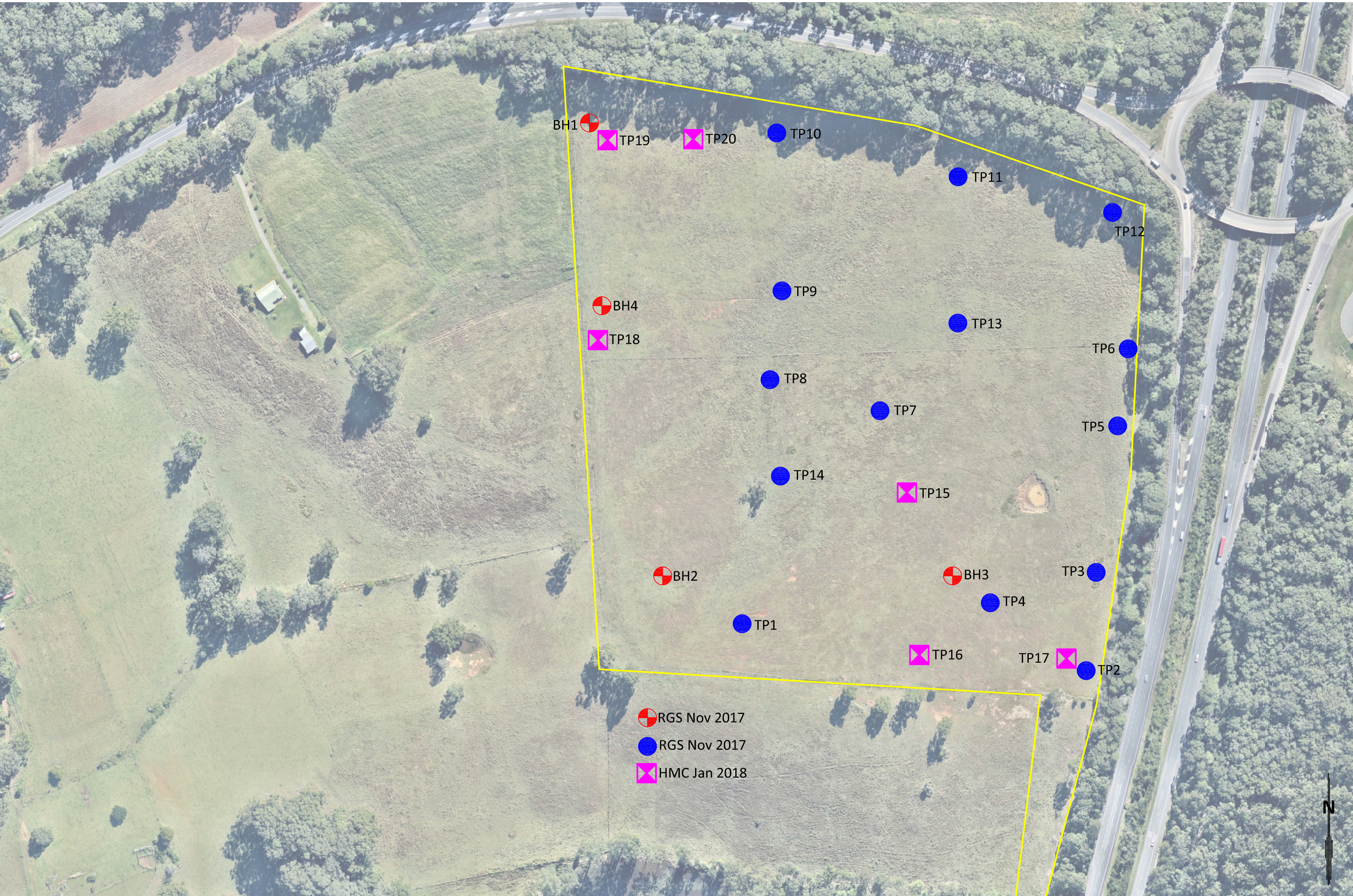
NUTRIENT BALANCE

Client:	Jones										
Location:	Port Macquarie HSC										
HMC Job Ref.	2018.013										
Parameters	Light clay soil, vegetation - grass, secondary treatment, 40kL/day										
Input Data	Effluent TN concentration	25	mg/L		Crop N Uptake	240	kg/ha/year	equals	66	mg/m2/day	3.65
	LAA proposed	130000	m2		Crop P Uptake	30	kg/ha/year	equals	8	mg/m2/day	
	Q	40000	L/day		P SORPTION						
	% loss to Soil (Geary & Gardner)	0.2			P-sorption	781	mg/kg	equals	9286	kg/ha	11.89
	Total N loss to soil (QxN)x0.2	200000	mg/day		Bulk Density	1.4	g/cm3	equals	1400	kg/m3	1000
	Remaining N Load after soil loss	800000	mg/day		Depth of Soil	0.5					
	Effluent P concentration	7	mg/L								
	Design Life of System	50	years								
	Method 1: Nutrient Balance Based on Annual Crop Uptake Rates										
	Minimum area required with zero buffer										
	LAA Required for Nitrogen	12167	m2								
	Phosphorous	102200000	mg/year								
		102.2	kg/year								
	P LOADING FROM STP	0.0008	kg/m2/year								
		79	kg/ha/yr								
	PHOSPHOROUS LONGEVITY FOR LAA	118	years								

## ***APPENDIX 5    Soil Investigation – Borehole and Testpit Locations***

SEE FOLLOWING PAGE







## APPENDIX 6 HMC Borelogs - Field Observations of Profile Changes in Testpits

See Appendix 5 for location of boreholes

Soil profile – TP15						
Approx. Depth (mm)	Field Texture Determination	Structure	Colour (MUNSELL)	Field pH	Coarse Fragments/ MEAT	EAL SAMPLE NO.
0-200	Clay Loam	Moderate	Dry Dark Brown (7.5YR3/4)	5.0	Nil 3/6	
200-1000	Silty Clay Loam	Strong	Moist Red 2.5YR4/8	5.0	Nil 3/6	
Soil profile – TP16						
Approx. Depth (mm)	Field Texture Determination	Structure	Colour (MUNSELL)	pH	Coarse Fragments	
0-200	Fine Sandy Clay Loam	Moderate	Dry Dark Reddish Brown ( 5YR3/4)	5.0	Nil 7/8	
200-1000	Silty Clay Loam	Strong	Moist Red 2.5YR4/8	5.0	Nil 3/6	
Soil profile – TP17						
Approx. Depth (mm)	Field Texture Determination	Structure	Colour (MUNSELL)	pH	Coarse Fragments	
0-300	Light – Medium Clay	Moderate	Dry Dark Greyish Brown 2.5YR4.2	5.0	Nil 3/6	
300-700	Silty Clay	Moderate	Moist Strong Brown 7.5YR5/6	5.0	Nil 3/6	
700-1300	Silty Clay	Strong	Moist Very Pale Brown 10YR8/2	5.0	Nil 3/6	
Soil profile – TP18						
Approx. Depth (mm)	Field Texture Determination	Structure	Colour (MUNSELL)	pH	Coarse Fragments	
100-700	Silty Clay Loam	Strong	Moist Red 2.5YR4/6	5.0	Nil 3/6	18A SITE 1
700-1200	Silty Clay	Strong	Moist Red 2.5YR4/6	5.0	Nil 3/6 (2)	18B SITE 2
Soil profile – TP 19						
Approx. Depth (mm)	Field Texture Determination	Structure	Colour (MUNSELL)	pH	Coarse Fragments	
0-150	Fine Sandy Clay Loam	Strong	Dry Brown 7.5YR4/3	5.0	Nil 7/8	19A Site 9
150-700	Silty Clay Loam	Moderate	Dry Yellowish Red 5YR4/6	5.0	Nil 3/6	19B Site 3
700-1000	Sandy Clay Loam	Moderate	Dry Brownish Yellow 10YR6/8	5.0	Few 3/6 (2) dispersive	19C Site 4

<b>Soil profile –TP20</b>						
Approx. Depth (mm)	Field Texture Determination	Structure	Colour (MUNSELL)	pH	Coarse Fragments	
0-100	Fine Sandy Clay Loam	Strong	Dry Dark Brown 7.5YR3/3	5.5	Nil 3/6	20A Site 5
600-1000-	Silty Clay Loam	Strong	Moist Yellowish Red 5YR4/6	5.0	Nil 3/6 (2)	20B Site6
<b>Soil profile – TP 21</b>						
Approx. Depth (mm)	Field Texture Determination	Structure	Colour (MUNSELL)	pH	Coarse Fragments	
0-400	Clay Loam	Moderate	Dry Dark Brown 10YR3/3	5.0	Nil 3/6	21A Site 7
400-1000	Silty Clay	Strong	Moist Strong Brown 10YR5/6	5.0	Nil 3/6 (2)	21 B Site 8

***APPENDIX 7    GRS Borelogs***

SEE FOLLOWING PAGES x 15

**CLIENT:** Commercial Asset Management Services Pty Ltd

PAGE: 1 of 2

**PROJECT NAME:** Highway Service Centre, Lot 11 DP1029846

**JOB NO:** RGS20621.1

**SITE LOCATION:** Cnr Pacific & Oxley Highway, Sancro

LOGGED BY: GC

**TEST LOCATION:** Refer to Figure 1

DATE: 15/11/17

DRILL TYPE: Truck Mounted Drill Rig

EASTING: 482445 m


**SURFACE RL:** 34.0 m






**BOREHOLE DIAMETER:** 100 mm

**INCLINATION:** 90°

**NORTHING:** 6519155 m

DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test				
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations		
AD/TC	Not Encountered					CL	0,20m <b>TOPSOIL:</b> Sandy CLAY, low plasticity, dark grey, traces of grass roots up to 5mm	M < w <sub>p</sub>	Fb			TOPSOIL		
					CH	<b>Sandy CLAY:</b> Medium plasticity, pale orange with pale brown mottling, Sand fine to medium, traces of Gravel, fine, subangular	VSt / Fb				RESIDUAL SOIL			
		1.00m	33.0	1.0	1.00m <b>Silty CLAY:</b> Medium to high plasticity, pale orange, with pale brown/pale grey mottling, some Sand fine to medium, traces of Gravel, fine, subangular, traces of Rock fabric		HP		250	EXTREMELY WEATHERED SANDSTONE				
		SPT 3,4,6 N=10												
		1.45m												
			32.0	2.0								HP	300	
		2.50m												
		SPT 5,8,13 N=21												
		2.95m	31.0	3.0								HP	220	
		4.00m	30.0	4.0								HP	250	
		SPT 5,15,16 N=31												
		4.45m												
		5.00m	29.0	5.0										
		5.50m												
		SPT 5,11,22 N=33												
		5.95m	28.0	6.0										
B														
7.00m	27.0	7.0												
SPT 11,17,25 N=42														
7.45m							Traces of Gravel, fine, subangular, Quartz							
Encountered														

<b>LEGEND:</b>		<b>Notes, Samples and Tests</b>		<b>Consistency</b>		<b>UCS (kPa)</b>		<b>Moisture Condition</b>	
<b>Water</b>				VS Very Soft		<25		D Dry	
 Water Level (Date and time shown)		U <sub>50</sub> 50mm Diameter tube sample		S Soft		25 - 50		M Moist	
 Water Inflow		CBR Bulk sample for CBR testing		F Firm		50 - 100		W Wet	
 Water Outflow		E Environmental sample		St Stiff		100 - 200		w <sub>p</sub> Plastic Limit	
<b>Strata Changes</b>		ASS Acid Sulfate Soil Sample		VSt Very Stiff		200 - 400		w <sub>L</sub> Liquid Limit	
 Gradational or transitional strata		B Bulk Sample		H Hard		>400			
 Definitive or distinct strata change				Fb Friable					
				</					



**CLIENT:** Commercial Asset Management Services Pty Ltd

PAGE: 2 of 2

**PROJECT NAME:** Highway Service Centre, Lot 11 DP1029846

**JOB NO:** RGS20621.1

**SITE LOCATION:** Cnr Pacific & Oxley Highway, Sancro

LOGGED BY: GC

**TEST LOCATION:** Refer to Figure 1

DATE: 15/11/17

DRILL TYPE: Truck Mounted Drill Rig

EASTING: 482445 m


**SURFACE RL:** 34.0 m

**BOREHOLE DIAMETER:** 100 mm

**INCLINATION:** 90°




**NORTHING:** 6519155 m

DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
AD/TC		8.50m	25.0	9.0		CH	<b>Sandy Silty CLAY:</b> Medium plasticity, pale brown/pale orange, with pale grey mottling, Sand fine to medium, traces of Rock fabric <i>(continued)</i>  Some Rock fabric, pale grey with orange mottling, traces of brown	M < w <sub>p</sub>	VSt / Fb			EXTREMELY WEATHERED SANDSTONE
		SPT 4,13,16 N=29										
		8.95m										
		10.00m	24.0	10.0								
		SPT 6,12,17 N=29										
		10.45m						23.0				
		11.50m										
		SPT 3,6,8 N=14	22.0	12.0								
		11.95m										
		13.00m						21.0				
		SPT 5,14,22 N=36										
		13.45m	20.0	14.0								
		14.50m										
	SPT 16,30/80 N=R											
	14.73m	19.0	15.0								GRADING TO HIGHLY WEATHERED SANDSTONE	

**LEGEND:**

### Water

-  Water Level  
(Date and time shown)
-  Water Inflow
-  Water Outflow

### Strata Changes

- — Gradational or transitional strata  
—— Definitive or distinct strata change

## Notes, Samples and Tests

- |                 |                             |
|-----------------|-----------------------------|
| U <sub>50</sub> | 50mm Diameter tube sample   |
| CBR             | Bulk sample for CBR testing |
| E               | Environmental sample        |
| ASS             | Acid Sulfate Soil Sample    |
| B               | Bulk Sample                 |

## Field Tests

- |          |   |
|----------|---|
| PID      | Photoionisation detector reading (ppm)                |
| DCP(x-y) | Dynamic penetrometer test (test depth interval shown) |
| HP       | Hand Penetrometer test (UCS kPa)                      |

[illegible]

- |     |            |           |
|-----|------------|-----------|
| VS  | Very Soft  | <25       |
| S   | Soft       | 25 - 50   |
| F   | Firm       | 50 - 100  |
| St  | Stiff      | 100 - 200 |
| VSt | Very Stiff | 200 - 400 |
| H   | Hard       | >400      |
| Fb  | Frable     |           |

UCS (kPa)
-----------

- <25  
25 - 50  
50 - 100  
100 - 200  
200 - 400  
>400

Moisture Condition
--------------------

- |       |               |
|-------|---------------|
| D     | Dry           |
| M     | Moist         |
| W     | Wet           |
| $W_p$ | Plastic Limit |
| $W_L$ | Liquid Limit  |

## Density

- | <b>Density</b> |              |                         |  |
|----------------|--------------|-------------------------|--|
| V              | Very Loose   | Density Index <15%      |  |
| L              | Loose        | Density Index 15 - 35%  |  |
| MD             | Medium Dense | Density Index 35 - 65%  |  |
| D              | Dense        | Density Index 65 - 85%  |  |
| VD             | Very Dense   | Density Index 85 - 100% |  |

# ENGINEERING LOG - BOREHOLE

**BOREHOLE NO:** BH2

**CLIENT:** Commercial Asset Management Services Pty Ltd

**PAGE:** 1 of 2

**PROJECT NAME:** Highway Service Centre, Lot 11 DP1029846

**JOB NO:** RGS20621.1

**SITE LOCATION:** Cnr Pacific & Oxley Highway, Sancro

**LOGGED BY:** CN/GC

**TEST LOCATION:** Refer to Figure 1

**DATE:** 14/11/17

**DRILL TYPE:** Truck Mounted Drill Rig

**EASTING:** 482507 m


**SURFACE RL:** 44.7 m

**BOREHOLE DIAMETER:** 100 mm

**INCLINATION:** 90°

**NORTHING:** 6518852 m

**DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result			
AD/TC	Not Encountered					CL	<b>TOPSOIL:</b> CLAY, medium to high plasticity, dark brown, pale orange, trace tree roots <b>Sandy CLAY:</b> High plasticity, orange, traces of yellow/pale grey, traces of Gravel, fine, subangular	M > w <sub>p</sub>	Fb	HP	250	TOPSOIL RESIDUAL SOIL		
		0.50m	44.0	CH										
		SPT 2,3,5 N=8		1.0		CH	<b>Silty CLAY:</b> Medium plasticity, pale orange with traces of yellow/white/pink, traces of Gravel, fine, subangular, traces of Rock fabric, traces of Sand fine to medium  Pale orange/pink, traces of white/dark brown/red          Some Rock fabric, white/pale grey with pink/red mottling	M < w <sub>p</sub>	Vst			HP	300	EXTREMELY WEATHERED SLATE
		0.95m	43.0											
		2.00m	42.0											
		2.45m	41.0											
		3.50m	40.0											
		SPT 3,6,9 N=15	39.0											
		3.95m	38.0											
		5.00m	37.0											
SPT 4,6,9 N=15														
Encountered		5.45m												
		6.50m												
		SPT 3,7,10 N=17												
		6.95m												
		8.00m						M ~ w <sub>p</sub>						

## LEGEND:

### Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

### Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

## Notes, Samples and Tests

- U<sub>50</sub> 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample
- ASS Acid Sulfate Soil Sample
- B Bulk Sample

### Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

## Consistency

- VS Very Soft
- S Soft
- F Firm
- St Stiff
- VSt Very Stiff
- H Hard
- Fb Friable

## UCS (kPa)

- <25
- 25 - 50
- 50 - 100
- 100 - 200
- 200 - 400
- >400

## Moisture Condition

- D Dry
- M Moist
- W Wet
- w<sub>p</sub> Plastic Limit
- w<sub>L</sub> Liquid Limit

## Density

- V Very Loose
- L Loose
- MD Medium Dense
- D Dense
- VD Very Dense

## Density Index

- <15%
- 15 - 35%
- 35 - 65%
- 65 - 85%
- 85 - 100%

**CLIENT:** Commercial Asset Management Services Pty Ltd

PAGE: 2 of 2

**PROJECT NAME:** Highway Service Centre, Lot 11 DP1029846

**JOB NO:** RGS20621.1

**SITE LOCATION:** Cnr Pacific & Oxley Highway, Sancro

LOGGED BY: CN/GC

**TEST LOCATION:** Refer to Figure 1

DATE: 14/11/17

DRILL TYPE: Truck Mounted Drill Rig

EASTING: 482507 m

**SURFACE RL:** 44.7 m

**BOREHOLE DIAMETER:** 100 mm

**INCLINATION:** 90°




**NORTHING:** 6518852 m

DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
AD/TC		SPT 3,5,5 N=10				CH	<p><b>Silty CLAY:</b> Medium plasticity, pale orange with traces of yellow/white/pink, traces of Gravel, fine, subangular, traces of Rock fabric, traces of Sand fine to medium (<i>continued</i>) Pale orange/pink, traces of yellow/red/white</p> <p>At approximately 9.0m, becoming pink, pale orange, traces of dark brown/yellow</p> <p>Pale pink/pale yellow, oxide staining, trace of dark brown</p> <p>Pale yellow/pale grey with traces of yellow/red</p>	M > w <sub>p</sub>	VSt			EXTREMELY WEATHERED SLATE
	8.45m	36.0	9.0	M < w <sub>p</sub>								
	9.50m	35.0	10.0									
	SPT 6,15,25 N=40	9.95m	34.0	11.0								
	11.00m	33.0	12.0									
	SPT 3,10,11 N=21	11.45m	32.0	13.0								
	13.00m	31.0	14.0									
	SPT 6,10,14 N=24	13.50m	30.0	15.0								
	13.50m											
		B										
		15.00m								HP	220	
		SPT 4,7,8 N=15										
		15.45m	29.0				Hole Terminated at 15.45 m					

**LEGEND:**

## Water

-  Water Level  
(Date and time shown)
-  Water Inflow
-  Water Outflow

### Strata Changes

- — Gradational or transitional strata  
—— Definitive or distinct strata change

## Notes, Samples and Tests

- |                 |                             |
|-----------------|-----------------------------|
| U <sub>50</sub> | 50mm Diameter tube sample   |
| CBR             | Bulk sample for CBR testing |
| E               | Environmental sample        |
| ASS             | Acid Sulfate Soil Sample    |
| B               | Bulk Sample                 |

## Field Tests

- |          |   |
|----------|---|
| PID      | Photoionisation detector reading (ppm)                |
| DCP(x-y) | Dynamic penetrometer test (test depth interval shown) |
| HP       | Hand Penetrometer test (UCS kPa)                      |


Consistency

- |     |            |
|-----|------------|
| VS  | Very Soft  |
| S   | Soft       |
| F   | Firm       |
| St  | Stiff      |
| VSt | Very Stiff |
| H   | Hard       |
| Fb  | Friable    |

## UCS (kPa)

- <25  
25 - 50  
50 - 100  
100 - 200  
200 - 400  
>400

Moisture Condition
--------------------

- |       |               |
|-------|---------------|
| D     | Dry           |
| M     | Moist         |
| W     | Wet           |
| $W_p$ | Plastic Limit |
| $W_L$ | Liquid Limit  |

## Density

- | <b>Density</b> |              |                         |  |
|----------------|--------------|-------------------------|--|
| V              | Very Loose   | Density Index <15%      |  |
| L              | Loose        | Density Index 15 - 35%  |  |
| MD             | Medium Dense | Density Index 35 - 65%  |  |
| D              | Dense        | Density Index 65 - 85%  |  |
| VD             | Very Dense   | Density Index 85 - 100% |  |



# ENGINEERING LOG - BOREHOLE

BOREHOLE NO: **BH3**

CLIENT: Commercial Asset Management Services Pty Ltd

PAGE: 1 of 2

PROJECT NAME: Highway Service Centre, Lot 11 DP1029846

JOB NO: RGS20621.1

SITE LOCATION: Cnr Pacific & Oxley Highway, Sancro

LOGGED BY: CN

TEST LOCATION: Refer to Figure 1

DATE: 14/11/17

DRILL TYPE: Truck Mounted Drill Rig

EASTING: 482698 m

SURFACE RL: 37.5 m

BOREHOLE DIAMETER: 100 mm

INCLINATION: 90°

NORTHING: 6518854 m

DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result		
AD/TC	Not Encountered					ML	0.10m <b>TOPSOIL:</b> SILT, low plasticity, dark brown, pale orange	D	Fb	HP	380	TOPSOIL	
		0.50m	37.0	1.0		CH	<b>Sandy CLAY:</b> Medium to high plasticity, orange, pale orange, Sand fine, traces of pale brown, traces of Gravel, fine, subangular	M ~ w <sub>p</sub>	St			RESIDUAL SOIL	
		0.95m											
			36.0										
		2.00m		2.0									
		SPT 2,6,6 N=12											
		2.45m	35.0	3.0									
		3.50m	34.0	4.0									
		SPT 3,5,8 N=13											
		3.95m	33.0	5.0									
5.00m	32.0	6.0											
SPT 5,10,16 N=26													
5.45m													
6.50m	31.0	7.0											
SPT 7,13,27 N=40													
6.95m													
8.00m	30.0												

## LEGEND:

### Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

### Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

## Notes, Samples and Tests

- U<sub>50</sub> 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample
- ASS Acid Sulfate Soil Sample
- B Bulk Sample

### Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

## Consistency

- VS Very Soft
- S Soft
- F Firm
- St Stiff
- VSt Very Stiff
- H Hard
- Fb Friable

## UCS (kPa)

- <25
- 25 - 50
- 50 - 100
- 100 - 200
- 200 - 400
- >400

## Moisture Condition

- D Dry
- M Moist
- W Wet
- W<sub>p</sub> Plastic Limit
- W<sub>L</sub> Liquid Limit

## Density

- V Very Loose Density Index <15%
- L Loose Density Index 15 - 35%
- MD Medium Dense Density Index 35 - 65%
- D Dense Density Index 65 - 85%
- VD Very Dense Density Index 85 - 100%





# ENGINEERING LOG - BOREHOLE

BOREHOLE NO: **BH3**

CLIENT: Commercial Asset Management Services Pty Ltd

PAGE: 2 of 2

PROJECT NAME: Highway Service Centre, Lot 11 DP1029846

JOB NO: RGS20621.1

SITE LOCATION: Cnr Pacific & Oxley Highway, Sancro

LOGGED BY: CN

TEST LOCATION: Refer to Figure 1

DATE: 14/11/17

DRILL TYPE: Truck Mounted Drill Rig

EASTING: 482698 m

SURFACE RL: 37.5 m

BOREHOLE DIAMETER: 100 mm

INCLINATION: 90°

NORTHING: 6518854 m

DATUM: AHD

Drilling and Sampling					Material description and profile information				Field Test		Structure and additional observations	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type		Result
AD/TC		SPT 3,10,15 N=25			CH	Silty CLAY: Medium plasticity, pale orange, traces of white/yellow, dark grey, traces of Gravel, fine, subangular, traces of Rock fabric (continued)	M < w <sub>p</sub>	VSt / H			EXTREMELY WEATHERED SLATE	
	8.45m	9.0										
	9.50m	28.0										Some pink, some Sand fine to medium
	SPT 6,9,21 N=30	10.0										
	9.95m	27.0					Pale yellow/pale brown, with white/brown mottling					
	11.00m	11.0										
	SPT 3,5,10 N=15	26.0										
	11.45m	12.0										
	12.50m	25.0					Pink/pale orange, traces of red/white, dark brown					
	SPT 4,8,14 N=22	13.0										
12.95m	24.0	Pale yellow with traces of white/black										
	14.50m		23.0									
	SPT 5,11,21 N=32		15.0									
	14.95m	15.00m										
			</									

## LEGEND:

### Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

### Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

## Notes, Samples and Tests

- U<sub>50</sub> 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample
- ASS Acid Sulfate Soil Sample
- B Bulk Sample

### Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

## Consistency

- VS Very Soft
- S Soft
- F Firm
- St Stiff
- VSt Very Stiff
- H Hard
- Fb Friable

## UCS (kPa)

- <25
- 25 - 50
- 50 - 100
- 100 - 200
- 200 - 400
- >400

## Moisture Condition

- D Dry
- M Moist
- W Wet
- w<sub>p</sub> Plastic Limit
- w<sub>L</sub> Liquid Limit

### Density

- V Very Loose Density Index <15%
- L Loose Density Index 15 - 35%
- MD Medium Dense Density Index 35 - 65%
- D Dense Density Index 65 - 85%
- VD Very Dense Density Index 85 - 100%

**CLIENT:** Commercial Asset Management Services Pty Ltd

PAGE: 1 of 1

**PROJECT NAME:** Highway Service Centre, Lot 11 DP1029846

**JOB NO:** RGS20621.1

**SITE LOCATION:** Cnr Pacific & Oxley Highway, Sancro

LOGGED BY: GC

**TEST LOCATION:** Refer to Figure 1

DATE: 15/11/17

DRILL TYPE: Truck Mounted Drill Rig

**EASTING:** 482471 m

**SURFACE RL:** 40.0 m

**BOREHOLE DIAMETER:** 100 mm

**INCLINATION:** 90°

**NORTHING:** 6518983 m

DATUM: AHD


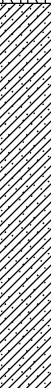

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result		
AD/TC	Not Encountered					CL CH	0.20m <b>TOPSOIL:</b> Sandy CLAY, low plasticity, dark grey/dark brown, Sand fine to medium, traces of grass roots up to 5mm  <b>Sandy CLAY:</b> Medium plasticity, orange/brown, Sand fine to medium, traces of Gravel, fine, subangular	$M < w_p$	Fb	HP	300	TOPSOIL	
		Fb / VSt	RESIDUAL SOIL										
		1.00m	39.0	1.0	1.00m <b>Silty CLAY:</b> Medium to high plasticity, pale orange, with pale grey mottling, traces of yellow, traces of Sand fine to medium, traces of Rock fabric At 1.4m, White, Clay with pale orange mottling	HP	280		EXTREMELY WEATHERED SLATE				
		SPT 4.5, 7 N=12											
		1.45m											
			38.0	2.0	At 2.0m, Colour change to purple								
					At 2.5m, Colour change to pale brown								
			37.0	3.0	3.00m <b>SLATE:</b> Pale purple/pale grey, highly fractured, low to medium strength foliated, recovered as Sandy GRAVEL At 3.5m, Colour change to pale brown/pale yellow								
					Pale purple/pale grey								
					At 4.5m, colour change to pale brown/pale yellow, with pale grey mottling, recovered as Gravelly SAND								
		4.00m	36.0	4.0								Drilling resistance increased	
SPT 24/110mm Refusal 4.11m													
		B											
			35.0	5.0									
			34.0	6.0									
		7.00m	33.0	7.0		7.03m							
		SPT 26/120mm Refusal 7.12m					Hole Terminated at 7.03 m Due to SPT Refusal						
LEGEND:					Notes, Samples and Tests					Consistency		UCS (kPa)	Moisture Condition
Water										VS Very Soft		<25	D Dry
Water Level (Date and time shown)										S Soft		25 - 50	M Moist
Water Inflow										F Firm		50 - 100	W Wet
Water Outflow										St Stiff		100 - 200	w <sub>p</sub> Plastic Limit
Strata Changes										VSt Very Stiff		200 - 400	w <sub>L</sub> Liquid Limit
Gradational or transitional strata										H Hard		>400	
Definitive or distinct strata change										Fb Friable			
										Density		V Very Loose	Density Index <15%
										L Loose			Density Index 15 - 35%
										MD Medium Dense			Density Index 35 - 65%
										D Dense			Density Index 65 - 85%
										VD Very Dense			Density Index 85 - 100%

# ENGINEERING LOG - TEST PIT

**CLIENT:** Commercial Asset Management Services Pty Ltd  
**PROJECT NAME:** Highway Service Centre, Lot 11 DP1029846  
**SITE LOCATION:** Cnr Pacific & Oxley Highway, Sancox  
**TEST LOCATION:** See figure 1

**TEST PIT NO:** TP01  
**PAGE:** 1 of 1  
**JOB NO:** RGS20621.1  
**LOGGED BY:** GC  
**DATE:** 27/11/17

**EQUIPMENT TYPE:** Backhoe  
**TEST PIT LENGTH:** 2.0 m  
**WIDTH:** 0.5 m  
**EASTING:** 482627 m  
**NORTHING:** 6518838 m  
**SURFACE RL:**  
**DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
400mm TOOTHED BUCKET	Not Encountered					CL	<b>TOPSOIL:</b> Sandy CLAY, low plasticity, dark brown, Sand fine to medium, traces of grass roots up to 5mm	M < w <sub>p</sub>	Fb			TOPSOIL
				0.25m		CH	<b>Sandy CLAY:</b> Medium to high plasticity, orange/red, Sand fine to medium, traces of Gravel, fine, subrounded		Fb / VSt		RESIDUAL SOIL	
				1.60m		CH	<b>Silty CLAY:</b> Medium plasticity, red/brown, with pale grey mottling, Sand fine to medium, traces of Gravel, fine to medium, subangular, traces of Rock fabric	HP	250	EXTREMELY WEATHERED SLATE		
		2.00m		2.0								
		B		2.5								
		3.00m		3.0								
				3.5			Hole Terminated at 3.00 m					

## LEGEND:

### Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

### Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

## Notes, Samples and Tests

- U<sub>50</sub> 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample
- ASS Acid Sulfate Soil Sample
- B Bulk Sample

### Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

## Consistency

- VS Very Soft
- S Soft
- F Firm
- St Stiff
- VSt Very Stiff
- H Hard
- Fb Friable

## UCS (kPa)

- <25
- 25 - 50
- 50 - 100
- 100 - 200
- 200 - 400
- >400

## Moisture Condition

- D Dry
- M Moist
- W Wet
- w<sub>p</sub> Plastic Limit
- w<sub>L</sub> Liquid Limit

### Density

- V Very Loose
- L Loose
- MD Medium Dense
- D Dense
- VD Very Dense

- Density Index <15%
- Density Index 15 - 35%
- Density Index 35 - 65%
- Density Index 65 - 85%
- Density Index 85 - 100%

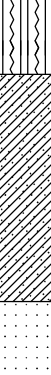


# ENGINEERING LOG - TEST PIT

**CLIENT:** Commercial Asset Management Services Pty Ltd  
**PROJECT NAME:** Highway Service Centre, Lot 11 DP1029846  
**SITE LOCATION:** Cnr Pacific & Oxley Highway, Sancox  
**TEST LOCATION:** See figure 1

**TEST PIT NO:** TP03  
**PAGE:** 1 of 1  
**JOB NO:** RGS20621.1  
**LOGGED BY:** GC  
**DATE:** 27/11/17

**EQUIPMENT TYPE:** Backhoe  
**TEST PIT LENGTH:** 2.0 m  
**WIDTH:** 0.5 m  
**EASTING:** 482833 m  
**NORTHING:** 6518785 m  
**SURFACE RL:**  
**DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
400mm TOOTHED BUCKET	Not Encountered				CL	0.25m	<b>TOPSOIL:</b> Sandy CLAY, low plasticity, dark brown, Sand fine to medium, traces of grass roots up to 5mm	M < w <sub>p</sub>	Fb	HP	300	TOPSOIL
					CH		<b>Sandy CLAY:</b> Medium to high plasticity, red/orange, Sand fine to medium, traces of Gravel fine to subrounded		Fb / Vst			RESIDUAL SOIL
												1.00m
						1.25m	Hole Terminated at 1.25 m Due to Refusal on Weathered Rock					
				1.5								
				2.0								
				2.5								
				3.0								
				3.5								

## LEGEND:

### Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

### Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

## Notes, Samples and Tests

- U<sub>50</sub> 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample
- ASS Acid Sulfate Soil Sample
- B Bulk Sample

### Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

## Consistency

- VS Very Soft
- S Soft
- F Firm
- St Stiff
- VSt Very Stiff
- H Hard
- Fb Friable

## UCS (kPa)

- <25
- 25 - 50
- 50 - 100
- 100 - 200
- 200 - 400
- >400

## Moisture Condition

- D Dry
- M Moist
- W Wet
- W<sub>p</sub> Plastic Limit
- W<sub>L</sub> Liquid Limit

### Density

- V Very Loose
- L Loose
- MD Medium Dense
- D Dense
- VD Very Dense

- Density Index <15%
- Density Index 15 - 35%
- Density Index 35 - 65%
- Density Index 65 - 85%
- Density Index 85 - 100%






# ENGINEERING LOG - TEST PIT

**CLIENT:** Commercial Asset Management Services Pty Ltd  
**PROJECT NAME:** Highway Service Centre, Lot 11 DP1029846  
**SITE LOCATION:** Cnr Pacific & Oxley Highway, Sancox  
**TEST LOCATION:** See figure 1

**TEST PIT NO:** TP04  
**PAGE:** 1 of 1  
**JOB NO:** RGS20621.1  
**LOGGED BY:** GC  
**DATE:** 27/11/17

**EQUIPMENT TYPE:** Backhoe  
**TEST PIT LENGTH:** 2.0 m  
**WIDTH:** 0.5 m  
**EASTING:** 482808 m  
**NORTHING:** 6518868 m  
**SURFACE RL:**  
**DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
400mm TOOTHED BUCKET	Not Encountered					CL	<b>TOPSOIL:</b> Sandy CLAY, low plasticity, dark grey, Sand fine to medium, traces of grass roots up to 5mm	M < w <sub>p</sub>	Fb	HP	300	TOPSOIL
		0.25m	CH	<b>Sandy CLAY:</b> Medium plasticity, pale brown, trace of orange/pale grey, Sand fine to medium, traces of Gravel, fine to medium, subangular		Fb / VSt	RESIDUAL SOIL					
		0.70m	CH	<b>Sandy Silty CLAY:</b> Medium to high plasticity, pale grey/white with orange/pale brown mottling, Sand fine to medium, traces of Rock fabric			EXTREMELY WEATHERED SANDSTONE					
		1.00m								EXTREMELY TO HIGHLY WEATHERED SANDSTONE		
		B		1.5			<b>SANDSTONE:</b> Medium to coarse, white with traces of orange, fractured, medium strength, foliated, excavated as Gravelly Sandy CLAY					
		3.00m		3.0			Hole Terminated at 3.00 m					
				3.5								

## LEGEND:

### Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

### Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

## Notes, Samples and Tests

- U<sub>50</sub> 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample
- ASS Acid Sulfate Soil Sample
- B Bulk Sample

### Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

## Consistency

- VS Very Soft
- S Soft
- F Firm
- St Stiff
- VSt Very Stiff
- H Hard
- Fb Friable

## UCS (kPa)

- <25
- 25 - 50
- 50 - 100
- 100 - 200
- 200 - 400
- >400

## Moisture Condition

- D Dry
- M Moist
- W Wet
- w<sub>p</sub> Plastic Limit
- w<sub>L</sub> Liquid Limit

### Density

- V Very Loose
- L Loose
- MD Medium Dense
- D Dense
- VD Very Dense

- Density Index <15%
- Density Index 15 - 35%
- Density Index 35 - 65%
- Density Index 65 - 85%
- Density Index 85 - 100%

# ENGINEERING LOG - TEST PIT

**CLIENT:** Commercial Asset Management Services Pty Ltd  
**PROJECT NAME:** Highway Service Centre, Lot 11 DP1029846  
**SITE LOCATION:** Cnr Pacific & Oxley Highway, Sancox  
**TEST LOCATION:** See figure 1

**TEST PIT NO:** TP06  
**PAGE:** 1 of 1  
**JOB NO:** RGS20621.1  
**LOGGED BY:** GC  
**DATE:** 27/11/17

**EQUIPMENT TYPE:** Backhoe  
**TEST PIT LENGTH:** 2.0 m  
**WIDTH:** 0.5 m  
**EASTING:** 482845 m  
**NORTHING:** 6518945 m  
**SURFACE RL:**  
**DATUM:** AHD

Drilling and Sampling				Material description and profile information				Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	
400mm TOOTHED BUCKET	Not Encountered			0.5		CL	<b>FILL:</b> Sandy CLAY, low plasticity, dark brown/grey, traces of grass roots up to 10mm	M < w <sub>p</sub>	Fb	FILL/TOPSOIL
		0.70m		0.70m		CL	<b>TOPSOIL:</b> Sandy CLAY, low plasticity, dark grey, Sand fine to medium, traces of grass roots up to 5mm			TOPSOIL
		B		1.0		CH	<b>Sandy CLAY:</b> Medium to high plasticity, orange/red with pale brown mottled, Sand fine to medium, trace of Gravel, fine to medium, subangular			RESIDUAL SOIL
		1.30m		1.30m		CH	<b>Silty CLAY:</b> Medium to high plasticity, pale grey/white with red mottling, traces of Rock fabric, traces of Gravel, fine, subangular			EXTREMELY WEATHERED SLATE
				2.0			Hole Terminated at 2.00 m			
				2.5						
				3.0						
				3.5						

## LEGEND:

### Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

### Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

## Notes, Samples and Tests

- U<sub>50</sub> 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample
- ASS Acid Sulfate Soil Sample
- B Bulk Sample

### Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

## Consistency

- VS Very Soft
- S Soft
- F Firm
- St Stiff
- VSt Very Stiff
- H Hard
- Fb Friable

## UCS (kPa)

- <25
- 25 - 50
- 50 - 100
- 100 - 200
- 200 - 400
- >400

## Moisture Condition

- D Dry
- M Moist
- W Wet
- w<sub>p</sub> Plastic Limit
- w<sub>L</sub> Liquid Limit

### Density

- V Very Loose
- L Loose
- MD Medium Dense
- D Dense
- VD Very Dense

- Density Index <15%
- Density Index 15 - 35%
- Density Index 35 - 65%
- Density Index 65 - 85%
- Density Index 85 - 100%

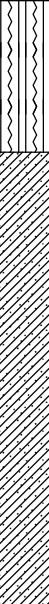


# ENGINEERING LOG - TEST PIT

**CLIENT:** Commercial Asset Management Services Pty Ltd  
**PROJECT NAME:** Highway Service Centre, Lot 11 DP1029846  
**SITE LOCATION:** Cnr Pacific & Oxley Highway, Sancox  
**TEST LOCATION:** See figure 1

**TEST PIT NO:** TP08  
**PAGE:** 1 of 1  
**JOB NO:** RGS20621.1  
**LOGGED BY:** GC  
**DATE:** 27/11/17

**EQUIPMENT TYPE:** Backhoe  
**TEST PIT LENGTH:** 2.0 m  
**WIDTH:** 0.5 m  
**EASTING:** 482590 m  
**NORTHING:** 6518949 m  
**SURFACE RL:**  
**DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
400mm TOOTHED BUCKET	Not Encountered			0.5		CL	<b>TOPSOIL:</b> Silty CLAY, dark grey, trace of grass roots up to 5mm	M < w <sub>p</sub>	Fb			TOPSOIL
				0.50m	CH	<b>Sandy CLAY:</b> Medium to high plasticity, orange/brown, Sand fine to medium, traces of Gravel fine, subrounded		Fb / VSt	HP	300	RESIDUAL SOIL	
				2.0			Hole Terminated at 2.00 m					
				2.5								
				3.0								
				3.5								

## LEGEND:

### Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

### Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

## Notes, Samples and Tests

- U<sub>50</sub> 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample
- ASS Acid Sulfate Soil Sample
- B Bulk Sample

### Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

## Consistency

- VS Very Soft
- S Soft
- F Firm
- St Stiff
- VSt Very Stiff
- H Hard
- Fb Friable

## UCS (kPa)

- <25
- 25 - 50
- 50 - 100
- 100 - 200
- 200 - 400
- >400

## Moisture Condition

- D Dry
- M Moist
- W Wet
- w<sub>p</sub> Plastic Limit
- w<sub>L</sub> Liquid Limit

## Density

- V Very Loose
- L Loose
- MD Medium Dense
- D Dense
- VD Very Dense
- Density Index <15%
- Density Index 15 - 35%
- Density Index 35 - 65%
- Density Index 65 - 85%
- Density Index 85 - 100%

# ENGINEERING LOG - TEST PIT

**CLIENT:** Commercial Asset Management Services Pty Ltd  
**PROJECT NAME:** Highway Service Centre, Lot 11 DP1029846  
**SITE LOCATION:** Cnr Pacific & Oxley Highway, Sancox  
**TEST LOCATION:** See figure 1

**TEST PIT NO:** TP09  
**PAGE:** 1 of 1  
**JOB NO:** RGS20621.1  
**LOGGED BY:** GC  
**DATE:** 27/11/17

**EQUIPMENT TYPE:** Backhoe  
**TEST PIT LENGTH:** 2.0 m  
**WIDTH:** 0.5 m  
**EASTING:** 482555 m  
**NORTHING:** 6519033 m  
**SURFACE RL:**  
**DATUM:** AHD

Drilling and Sampling				Material description and profile information				Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	
400mm TOOTHED BUCKET	Not Encountered						0.10m <b>TOPSOIL:</b> Sandy CLAY, low plasticity, dark brown	M < w <sub>p</sub>	Fb	HP 300
		0.20m				CH	<b>Sandy CLAY:</b> Medium to high plasticity, red/orange, Sand fine to medium, traces of Gravel, fine, subrounded		Fb / VSt	
		U50					0.45m			
		0.45m				CH	<b>Sandy CLAY:</b> Medium to high plasticity, pale brown/yellow, Sand fine to medium, some Gravel, fine to medium, subangular			
				0.5			0.70m			
				1.0			<b>SANDSTONE:</b> Medium to coarse grained, pale yellow/white, fractured, low to medium strength, foliated, excavated as Sandy GRAVEL			
				1.5						
				2.0			2.00m			
				2.5			Hole Terminated at 2.00 m			
				3.0						
				3.5						

## LEGEND:

### Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

### Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

## Notes, Samples and Tests

- U<sub>50</sub> 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample
- ASS Acid Sulfate Soil Sample
- B Bulk Sample

### Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

## Consistency

- VS Very Soft
- S Soft
- F Firm
- St Stiff
- VSt Very Stiff
- H Hard
- Fb Friable

## UCS (kPa)

- <25
- 25 - 50
- 50 - 100
- 100 - 200
- 200 - 400
- >400

## Moisture Condition

- D Dry
- M Moist
- W Wet
- W<sub>p</sub> Plastic Limit
- W<sub>L</sub> Liquid Limit

### Density

- V Very Loose
- L Loose
- MD Medium Dense
- D Dense
- VD Very Dense

- Density Index <15%
- Density Index 15 - 35%
- Density Index 35 - 65%
- Density Index 65 - 85%
- Density Index 85 - 100%







# ENGINEERING LOG - TEST PIT

**CLIENT:** Commercial Asset Management Services Pty Ltd  
**PROJECT NAME:** Highway Service Centre, Lot 11 DP1029846  
**SITE LOCATION:** Cnr Pacific & Oxley Highway, Sancox  
**TEST LOCATION:** See figure 1

**TEST PIT NO:** TP10  
**PAGE:** 1 of 1  
**JOB NO:** RGS20621.1  
**LOGGED BY:** GC  
**DATE:** 27/11/17

**EQUIPMENT TYPE:** Backhoe **EASTING:** 482594 m **SURFACE RL:**  
**TEST PIT LENGTH:** 2.0 m **WIDTH:** 0.5 m **NORTHING:** 6519163 m **DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
400mm TOOTHED BUCKET	Not Encountered				CL	CH	<b>TOPSOIL:</b> Sandy Silty CLAY, dark grey/dark brown, Sand fine to medium, traces of grass roots up to 5mm	M < w <sub>p</sub>	Fb	HP	350	TOPSOIL
					<b>Sandy CLAY:</b> Medium to high plasticity, red/brown with pale brown mottling, Sand fine to medium, traces of Gravel, fine, subangular		Fb / Vst		RESIDUAL SOIL			
							Hole Terminated at 2.00 m					

LEGEND:		Notes, Samples and Tests		Consistency		UCS (kPa)	Moisture Condition	
<b>Water</b>		U <sub>50</sub> 50mm Diameter tube sample		VS	Very Soft	<25	D	Dry
Water Level (Date and time shown)		CBR Bulk sample for CBR testing		S	Soft	25 - 50	M	Moist
Water Inflow		E Environmental sample		F	Firm	50 - 100	W	Wet
Water Outflow		ASS Acid Sulfate Soil Sample		St	Stiff	100 - 200	W <sub>p</sub>	Plastic Limit
<b>Strata Changes</b>		B Bulk Sample		VSt	Very Stiff	200 - 400	W <sub>L</sub>	Liquid Limit
Gradational or transitional strata		<b>Field Tests</b>		H	Hard	>400		
Definitive or distinct strata change		PID Photoionisation detector reading (ppm)		Fb	Friable			
		DCP(x-y) Dynamic penetrometer test (test depth interval shown)		<b>Density</b>		V	Very Loose	Density Index <15%
		HP Hand Penetrometer test (UCS kPa)		L	Loose			Density Index 15 - 35%
				MD	Medium Dense			Density Index 35 - 65%
				D	Dense			Density Index 65 - 85%
				VD	Very Dense			Density Index 85 - 100%

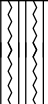

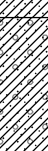



# ENGINEERING LOG - TEST PIT

**CLIENT:** Commercial Asset Management Services Pty Ltd  
**PROJECT NAME:** Highway Service Centre, Lot 11 DP1029846  
**SITE LOCATION:** Cnr Pacific & Oxley Highway, Sancox  
**TEST LOCATION:** See figure 1

**TEST PIT NO:** TP12  
**PAGE:** 1 of 1  
**JOB NO:** RGS20621.1  
**LOGGED BY:** GC  
**DATE:** 27/11/17

**EQUIPMENT TYPE:** Backhoe  
**TEST PIT LENGTH:** 2.0 m  
**WIDTH:** 0.5 m  
**EASTING:** 482825 m  
**NORTHING:** 6519104 m  
**SURFACE RL:**  
**DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
400mm TOOTHED BUCKET		E 0.10m				CL	<b>TOPSOIL:</b> Sandy Silty CLAY, low plasticity, dark grey, Sand fine to medium, traces of grass roots up to 5mm	M < w <sub>p</sub>	Fb			TOPSOIL
		0.50m		0.5		CH	<b>Sandy CLAY:</b> Medium to high plasticity, orange/red, Sand fine to medium, traces of Gravel, fine, subangular		Fb / St	HP	180	RESIDUAL SOIL
		B		1.0		CH	<b>Gravelly Sandy CLAY:</b> Medium plasticity, pale grey with pale brown/red mottling, Gravel fine to medium, subangular, iron oxide staining	M > w <sub>p</sub>		HP	120	
		1.50m		1.5								
				2.0			Hole Terminated at 2.00 m					
				2.5								
				3.0								
				3.5								

## LEGEND:

### Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

### Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

## Notes, Samples and Tests

- U<sub>50</sub> 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample
- ASS Acid Sulfate Soil Sample
- B Bulk Sample

### Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

## Consistency

VS	Very Soft	<25
S	Soft	25 - 50
F	Firm	50 - 100
St	Stiff	100 - 200
VSt	Very Stiff	200 - 400
H	Hard	>400
Fb	Friable	

## UCS (kPa)

## Moisture Condition

D	Dry
M	Moist
W	Wet
w <sub>p</sub>	Plastic Limit
w <sub>L</sub>	Liquid Limit

## Density

V	Very Loose	Density Index <15%
L	Loose	Density Index 15 - 35%
MD	Medium Dense	Density Index 35 - 65%
D	Dense	Density Index 65 - 85%
VD	Very Dense	Density Index 85 - 100%

## ***APPENDIX 8    Soil Investigation Laboratory Results***

SEE FOLLOWING PAGES

# WASTEWATER DISPOSAL SOIL ASSESSMENT (Page 1 of 1)

9 samples supplied by HMC Environmental Consulting Pty Ltd on 31st of January, 2018 - Lab Job No. G6986

Analysis requested by Helen Tunks. - Your Project: HMC2018.013

PO Box 311 TWEED HEADS NSW 2485

	SITE 1 HMCTP18A	SITE 2 HMCTP18B	SITE 3 HMCTP19B	SITE 4 HMCTP19C	SITE 5 HMTP20A	SITE 6 HMCTP20B	SITE 7 HMCTP21A	SITE 8 HMCTP21B	SITE 9 HMTP19A
Job No.	G6986/1	G6986/2	G6986/3	G6986/4	G6986/5	G6986/6	G6986/7	G6986/8	G6986/9
Description	Medium Clay	Light Clay	Medium Clay	Medium Clay	Medium Clay	Clay Loam	Medium Clay	Medium Clay	Medium Clay
Moisture Content (% moisture)	18	25	22	21	20	20	18	25	18
Modified Emerson Aggregate Test (SAR 5 Solution) <sup>note 12</sup>	MEAT Class 3/6 Slake <sub>1 see note 12</sub>	MEAT Class 3/6 Slake <sub>3 see note 12</sub>	MEAT Class 3/6 Slake <sub>2 see note 12</sub>	MEAT Class 3/6 Slake <sub>3 see note 12</sub>	MEAT Class 3/6 Slake <sub>1 see note 12</sub>	MEAT Class 3/6 Slake <sub>3 see note 12</sub>	MEAT Class 3/6 Slake <sub>1 see note 12</sub>	MEAT Class 3/6 Slake <sub>3 see note 12</sub>	MEAT Class 3/6 Slake <sub>1 see note 12</sub>
Soil pH (1:5 CaCl <sub>2</sub> )	4.70	4.17	4.19	3.94	4.58	4.49	4.68	3.89	4.84
Soil Conductivity (1:5 water dS/m)	0.053	0.022	0.032	0.023	0.019	0.019	0.017	0.030	0.038
Soil Conductivity (as EC <sub>e</sub> dS/m) <sup>note 10</sup>	0.452	0.190	0.271	0.200	0.166	0.161	0.143	0.259	0.323
Native NaOH Phosphorus (mg/Kg P)	50	7	6	6	43	5	38	4	66
Residual phosphorus remaining in solution from the initial phosphate phosphorus									
Initial Phosphorus concentration (ppm P)	31.89	31.89	31.89	31.89	31.89	31.89	31.89	31.89	31.89
72 hour - 3 Day (ppm P)	5.72	1.62	7.81	17.09	6.46	3.36	9.53	6.71	8.22
120 hour - 5 Day (ppm P)	4.86	1.19	6.71	16.59	5.32	2.68	9.26	6.37	7.36
168 hour - 7 Day (ppm P)	4.02	0.96	6.04	16.15	4.42	2.23	8.70	5.47	6.89
Equilibrium Phosphorus (ppm P)	2.95	0.49	4.80	15.55	3.07	1.45	8.27	4.87	5.94
<b>EXCHANGEABLE CATIONS</b>									
Calcium (cmol <sup>+</sup> /Kg)	2.83	0.27	1.72	0.18	2.48	0.22	4.21	0.45	3.32
kg/ha	1268	122	770	80	1114	97	1888	202	1492
mg/kg	566	55	344	36	497	43	843	90	666
Magnesium (cmol <sup>+</sup> /Kg)	2.76	1.91	3.26	3.31	2.06	2.85	2.56	4.24	2.89
kg/ha	753	520	888	902	560	776	698	1155	786
mg/kg	336	232	396	403	250	346	311	516	351
Potassium (cmol <sup>+</sup> /Kg)	0.57	0.07	0.10	0.07	0.11	0.04	0.12	0.09	0.50
kg/ha	502	65	89	65	94	31	102	83	441
mg/kg	224	29	40	29	42	14	46	37	197
Sodium (cmol <sup>+</sup> /Kg)	0.13	0.09	0.17	0.25	0.22	0.18	0.18	0.29	0.16
kg/ha	69	45	86	129	113	92	93	147	81
mg/kg	31	20	38	58	51	41	41	66	36
Aluminium (cmol <sup>+</sup> /Kg)	0.45	4.38	4.62	8.95	0.95	0.99	0.62	7.72	0.52
kg/ha	91	884	931	1804	191	201	124	1556	106
mg/kg	40	395	416	805	85	90	55	695	47
Hydrogen (cmol <sup>+</sup> /Kg)	0.18	1.29	1.82	3.16	0.39	0.98	0.33	11.21	0.08
kg/ha	4	29	41	71	9	22	7	251	2
mg/kg	2	13	18	32	4	10	3	112	1
ECEC (effective cation exchange capacity)(cmol <sup>+</sup> /Kg)	6.9	8.0	11.7	15.9	6.2	5.3	8.0	24.0	7.5
Exchangeable Calcium %	40.8	3.4	14.7	1.1	40.0	4.1	52.5	1.9	44.4
Exchangeable Magnesium %	39.9	23.8	27.9	20.8	33.2	54.3	32.0	17.7	38.6
Exchangeable Potassium %	8.3	0.9	0.9	0.5	1.7	0.7	1.5	0.4	6.7
Exchangeable Sodium % (ESP)	1.9	1.1	1.4	1.6	3.5	3.4	2.2	1.2	2.1
Exchangeable Aluminium %	6.5	54.7	39.5	56.2	15.3	18.9	7.7	32.2	7.0
Exchangeable Hydrogen %	2.7	16.1	15.6	19.8	6.3	18.6	4.1	46.7	1.1
Calcium/ Magnesium Ratio	1.02	0.14	0.53	0.05	1.21	0.08	1.64	0.11	1.15

## Notes:

- 1: ECEC = Effective Cation Exchange Capacity = sum of the exchangeable Mg, Ca, Na, K, H and Al
- 2: Exchangeable bases determined using standard Ammonium Acetate extract (Method 15D3) with no pretreatment for soluble salts. When Conductivity  $\geq 0.25$  dS/m soluble salts are removed (Method 15E2).
3. ppm = mg/Kg dried soil
4. Insitu P determined using 0.1M NaOH and shaking for 24 hrs before determining phosphate
5. Soils were crushed using a ceramic grinding head and mill; five 1g subsamples of each soil were used to which 40ml of 0.1M NaCl with Xppm phosphorus was added to each. The samples were shaken on an orbital shaker
6. Exchangeable sodium percentage (ESP) is calculated as sodium (cmol<sup>+</sup>/Kg) divided by ECEC
7. All results as dry weight DW - soils were dried at 60C for 48hrs prior to crushing and analysis.
8. Phosphorus Capacity method from Ryden and Pratt, 1980.
9. Aluminium detection limit is 0.05 cmol<sup>+</sup>/Kg; Hydrogen detection limit is 0.1 cmol<sup>+</sup>/Kg.  
However for calculation purposes a value of 0 is used.
10. For conductivity 1 dS/m = 1 mS/cm = 1000  $\mu$ S/cm; EC<sub>e</sub> conversions: sand loam 14, loam 9.5; day loam 8.6; heavy clay 5.8
11. 1 cmol<sup>+</sup>/Kg = 1 meq/100g
12. Emerson Aggregate Stability Test (EAST) for Wastewater applications (see Sheet 3 - Patterson, 2015). MEAT Class 1: Slaking, complete dispersion;  
Class 2: Slaking, some dispersion; Class 3-6: Slaking 1 slight to 3 complete, No dispersion; Class 7: No slaking, yes swelling; Class 8: No slaking, no swelling.



checked: .....

## PHOSPHORUS SORPTION TRIAL

9 samples supplied by HMC Environmental Consulting Pty Ltd on 31st of January, 2018 - Lab Job No. G6986  
Analysis requested by Helen Tunks. - Your Project: HMC2018.013

### Calculations for Equilibrium Absorption Maximum for Soil provided

I.D.	JOB NO.	Equilibrium P mg P/L (in solution)	Added P mg P/L	P Sorb at Equil. mg P/Kg	Native P mg P/Kg	Equilibrium P Sorption Level $\mu\text{g P/g soil}$	Divide $\emptyset$ (from Table)	Equilibrium Absorption Maximum (B) $\mu\text{g P/g soil}$
HMCTP18A	G6986/1	2.95	31.9	1157	50	1207	0.60	2,029
HMCTP18B	G6986/2	0.49	31.9	1256	7	1263	0.41	3,118
HMCTP19B	G6986/3	4.80	31.9	1084	6	1090	0.66	1,652
HMCTP19C	G6986/4	15.55	31.9	654	6	660	0.84	781
HMTTP20A	G6986/5	3.07	31.9	1153	43	1196	0.60	1,992
HMCTP20B	G6986/6	1.45	31.9	1217	5	1222	0.51	2,388
HMCTP21A	G6986/7	8.27	31.9	945	38	982	0.74	1,327
HMCTP21B	G6986/8	4.87	31.9	1081	4	1085	0.66	1,639
HMTTP19A	G6986/9	5.94	31.9	1038	66	1104	0.69	1,600

### Calculations for phosphorus sorption capacity

	JOB NO.	Equilibrium Absorption Maximum (B) $\mu\text{g P/g soil}$	multiply by theta of wastewater to be applied (=X)	minus the native P (=Y)	Kg P sorption / hectare (to a depth of 15cm) (1.95 is a correction factor for density, etc)	Kg P sorption / hectare (to a depth of 100cm) (1.95 is a correction factor for density, etc)
HMCTP18A	G6986/1	2029	(=B x theta)	(=X - native P)	(=Y x 1.95)	(=Y x 1.95 x 100/15)
HMCTP18B	G6986/2	3118	(=B x theta)	(=X - native P)	(=Y x 1.95)	(=Y x 1.95 x 100/15)
HMCTP19B	G6986/3	1652	(=B x theta)	(=X - native P)	(=Y x 1.95)	(=Y x 1.95 x 100/15)
HMCTP19C	G6986/4	781	(=B x theta)	(=X - native P)	(=Y x 1.95)	(=Y x 1.95 x 100/15)
HMTTP20A	G6986/5	1992	(=B x theta)	(=X - native P)	(=Y x 1.95)	(=Y x 1.95 x 100/15)
HMCTP20B	G6986/6	2388	(=B x theta)	(=X - native P)	(=Y x 1.95)	(=Y x 1.95 x 100/15)
HMCTP21A	G6986/7	1327	(=B x theta)	(=X - native P)	(=Y x 1.95)	(=Y x 1.95 x 100/15)
HMCTP21B	G6986/8	1639	(=B x theta)	(=X - native P)	(=Y x 1.95)	(=Y x 1.95 x 100/15)
HMTTP19A	G6986/9	1600	(=B x theta)	(=X - native P)	(=Y x 1.95)	(=Y x 1.95 x 100/15)

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

	JOB NO.	Equilibrium Absorption Maximum (B) $\mu\text{g P/g soil}$	multiply by theta of wastewater to be applied (ie. 0.84)	minus the native P (=Y)	Kg P sorption / hectare (to a depth of 15cm) (1.95 is a correction factor for density, etc)	Kg P sorption / hectare (to a depth of 100cm) (1.95 is a correction factor for density, etc)
HMCTP18A	G6986/1	2029	1704	1654	3,226	21,505
HMCTP18B	G6986/2	3118	2619	2612	5,094	33,961
HMCTP19B	G6986/3	1652	1388	1382	2,694	17,961
HMCTP19C	G6986/4	781	656	650	1,267	8,449
HMTTP20A	G6986/5	1992	1673	1631	3,180	21,198
HMCTP20B	G6986/6	2388	2006	2001	3,902	26,017
HMCTP21A	G6986/7	1327	1115	1077	2,101	14,005
HMCTP21B	G6986/8	1639	1377	1373	2,677	17,846
HMTTP19A	G6986/9	1600	1344	1278	2,492	16,616



**APPENDIX 9**    *Site Photos*



**Photo 1** Excavation of TP 15 – view north.



**Photo 2** View west over TP15





**Photo 3 Soil profile exposed at TP15**





**Photo 4 View to NW corner from TP15 – proposed land application area is located in the NW corner.**



**Photo 5 Excavation of TP16 – view east towards Pacific Highway.**



**Photo 6 View north along eastern boundary from TP 17.**





Photo 7 View west from TP 16.





**Photo 8 Soil profile exposed by mechanical excavation at TP 16. Not considered suitable for effluent land application area due to soil profile and proximity to drainage lines.**



**Photo 9 View west along internal fenceline through centre of property. The proposed effluent LAA location is at arrow.**



**Photo 10** View south to the SW corner of the property, on elevated broad ridge.



**Photo 11** View east and downslope from TP 18 located near western boundary within proposed LAA.





**Photo 12** View south along western boundary from TP 18.



**Photo 13 Soil profile exposed in TP 18**





**Photo 14 View along western boundary north towards TP 19**



**Photo 15 Soil profile exposed at TP 19 in NW corner**



**Photo 16** View west and upslope over location of TP 20.





**Photo 17 Soil profile exposed in TP 20**





**Photo 18 View east and downslope towards TP 21.**



**Photo 19 View east from NW corner along water main easement adjacent northern boundary.**



## **Attachment 11 Stormwater Management Plan**



# **Stormwater Management Plan**

## **Schedule 1 Permitted Use Amendment and Development Application Proposed Highway Service Centre**



**Part of Lot 11 in DP1029846  
1179 Oxley Highway,  
Thrumster  
Scott PDI Pty Ltd  
February 2018**



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**SCOTT PDI Pty Ltd**  
**PROPOSED HIGHWAY SERVICE CENTRE, PORT MACQUARIE**  
**STORMWATER MANAGEMENT STRATEGY**

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## **EXECUTIVE SUMMARY**

### **Background**

This report outlines a stormwater management strategy for proposed Highway Service Centre together with ancillary uses including a trailer exchange area, accommodation for Professional Drivers, Truck wash and maintenance bays at the intersection of the Pacific and Oxley Highways approximately 10 kilometres west of Port Macquarie.

The development proposal is consistent with the objectives of the Federal Heavy Vehicle Safety Program and proposed in a location identified within RMS strategic planning documents.

The objective of this report is to demonstrate the ability to satisfactorily address stormwater management issues associated with potential development of the site.

### **Proposed Development**

The development proposal consists of primary service station building incorporating a fuel canopy, a convenience store and food outlets, a professional driver's lounge and public areas; a standalone bowser arrangement for heavy vehicles; and a standalone food and drink outlet. Provision has been made for 25 heavy vehicle parking spaces, 6 trailer/caravan spaces, 95 general parking spaces and 24 staff parking spaces.

South of this area 70 spaces have been proposed to facilitate tuck/trailer breakdown and exchange. The southern extents also incorporate a mechanical servicing facility, truck wash bays and a small accommodation block.

The area of that described above is approximately 8.71ha and is largely impervious.

A new intersection arrangement has been proposed for the Oxley Highway frontage and a reconfigured exit lane will be necessary to the Pacific Highway frontage.

The area of entire development site is however approximately 18.4ha which accommodates earthworks batters. A significant amount of bulk earthworks is required to achieve the proposed final site levels.

### **Site Hydrology**

The stormwater catchment contributing to the development area is largely coincident with the site extents of 18.4ha.

The natural/existing surface falls general to the north east. An unnamed water course is depicted on the 1:25,000 topographic mapping which drains toward the northern boundary. Physical site inspection does not identify any specific defined channel. This watercourse however was intercepted by construction of the Port Macquarie interchange during the early 1990's. The overland flow paths are currently along the base of high batters adjacent to highway carriageways and directed to a single 1200mm diameter pipe crossing under the Oxley Highway at the very north eastern corner of the site.

Hydrological modelling of the existing and post-development scenarios has been undertaken to determine peak flow rates in a range of design storm events (20 year and 100 year ARI).



These peak flow rates have been adopted to determine the site requirements for on-site stormwater detention (OSD).

The site is not with the Flood Planning Area's defined by the Port Macquarie-Hastings LEP2011. (refer to **Appendix B**)

### Stormwater Quantity

In order to establish a stormwater quantity strategy for the existing catchment was modelled in DRAINS software then the development proposal was assessed similarly adopting area percentages pervious and impervious based on architectural layouts and establishing multiple sub catchments. The stormwater quantity strategy was prepared to satisfy the following criteria:

- Maintain pre development discharge rates post development
- Provided adequate stormwater detention areas
- Safely convey flows to a piped system

The analysis of the site has developed a strategy that achieved the above criteria being use of large scale underground detention cells. The ultimate configuration of these is of course subject to detailed engineering design and may be varied however the analysis demonstrates the objectives can be met.

### Stormwater Quality

The proposed layout of the site provides little opportunity to construct above ground quality treatment areas. As such Ecosol Gross Pollutant traps and treatment devices have been proposed. Detailed design and integration with landscaping proposal may provide additional opportunity to adopt landscaped treatment areas.

The MUSIC software package has been used to estimate average annual pollutant exports for the existing and post-development scenarios. In order to achieve NSW Office of Water pollutant reduction targets, as well as Port Macquarie-Hastings Council Engineering Specification D7 conditions requiring no net increase in average annual pollutant discharge, the proposed stormwater treatment train effectiveness has been assessed by comparing the average annual load of TSS, TP and TN arriving at a number of key locations within the site under two scenarios:

- Existing (pre-development)
- Post-development (no treatment)
- Post-development (with treatment)

The MUSIC model results indicate that the following stormwater treatment measures will be required within the site:

- Ecosol Gross Pollutant traps 4450,4460
- Ecosol Storm Pits class 2 (10L/s)





## Conclusion

This report has estimated the requirements for stormwater management for potential future development of the Highway Service Centre site.

The objectives of the stormwater management strategy recommended for the development site would be achieved by:

- Providing on-site stormwater detention to ensure no increase in peak flow rates following development when compared to existing site conditions.
- Removing pollutants from runoff to a sufficient extent to meet both Council and State government guidelines and adopt a stormwater treatment train approach that is consistent with current best practice WSUD.

Detailed design for construction approvals may vary the proposals suggested by this report however the analysis demonstrates the required standards for management of stormwater quantity and quality can be met.



## 1. INTRODUCTION

Hopkins Consultants have been engaged by Scott PDI Pty Ltd to prepare a Stormwater Management Plan to accompany applications to vary permitted land use and development. **Figure 1** shows the location of the proposed development site in context with surrounding area.



**Figure 1 Site Locality**

To achieve Port Macquarie-Hastings Council target requirements for water quality it is envisaged that Water Sensitive Urban Design (WSUD) will be used to create a development that promotes sustainable and integrated management of land and water resources, and incorporates best stormwater management, water conservation/reuse and environmental protection.

This document is provided to support the approval of the applications to be lodged with Port Macquarie-Hastings Council. The WSUD Strategy has been established on the basis of delivering design outcomes consistent with:

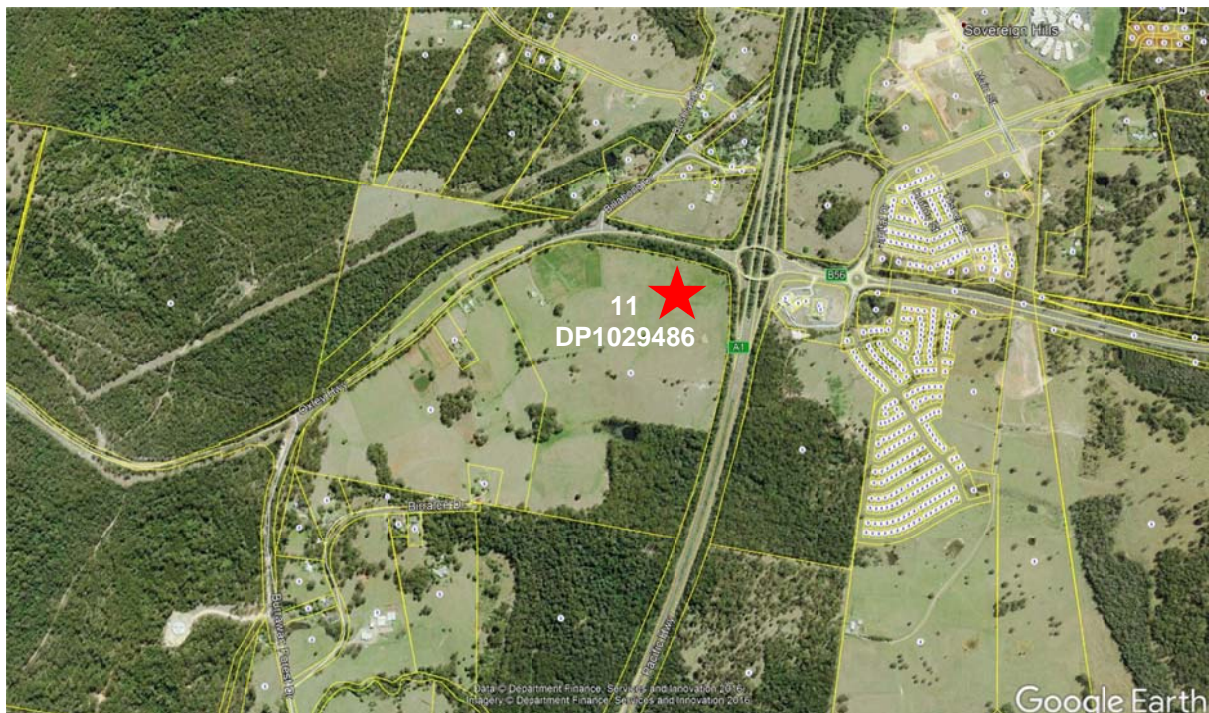
- Port Macquarie-Hastings Auspec Specification D7 (2003)
- NSW MUSIC Modelling Guidelines (August 2015)



## 1.1 Site Description

The site is located approximately 10 kilometres West of Port Macquarie and covers approximately 18.4 hectares of land being part of Lot 11 in DP1029846 at the intersection of the Pacific and Oxley Highways.

An aerial perspective of the current cadastral definition of the development area is illustrated in **Figure 2** below:

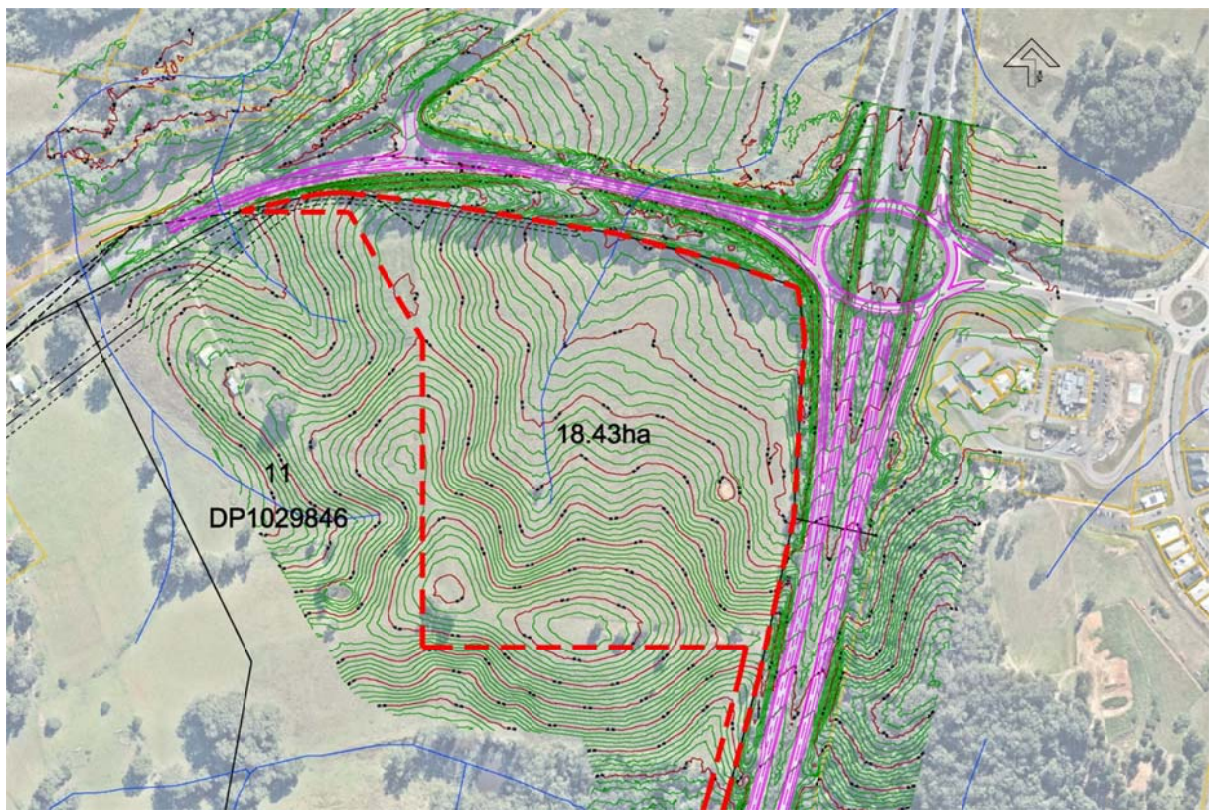


**Figure 2 Present Cadastral Boundaries**

The development area in its natural state ranges in elevation from RL50mAHD to RL11mAHD. Grades range from 18% to 4%. The land is clear (with the exception of road reserves) and currently used predominately for grazing purposes. Geotechnical reporting states the subsurface consists of sandy clay, weathered slate and weathered sandstone. The top soil profile ranges in thickness from 0.1m to 0.35m

**Figure 3** illustrates current topography noting however the course of the drainage path depicted has been artificially altered by construction of the present Highway interchange.





**Figure 3 Site Extents and Topography**





## 2. PROPOSED DEVELOPMENT

The development proposal is consistent with the 2014 RMS document “Highway Service Centres Along the Pacific Highway which states “A HSC may be established on the western side of the Pacific Highway at the Pacific/Oxley highways interchange (in addition to the current eastern side HSC provision).” RMS Planned stopping opportunities are shown within **Appendix A**.

### 2.1 Type of Development

The development proposal consists of primary service station building incorporating a fuel canopy, a convenience store and food outlets, a professional driver’s lounge and public areas; a standalone bowser arrangement for heavy vehicles; and a standalone food and drink outlet. Provision has been made for 25 heavy vehicle parking spaces, 6 trailer/caravan spaces, 95 general parking spaces and 24 staff parking spaces.

South of this area 70 spaces have been proposed to facilitate tuck/trailer breakdown and exchange. The southern extents also incorporate a mechanical servicing facility, truck wash bays and a small accommodation block.

The nature of the development accommodating combination heavy vehicles requires large areas of flat grades. Significant earthworks are proposed to establish a 9.3ha pad grading from RL25mAHD to RL20mAHD at 1% to NW in the vicinity of the proposed roundabout on the Oxley Highway.

The architectural layout of the proposed site prepared by TRG Queensland Pty Ltd is contained within **Figure 4** below:



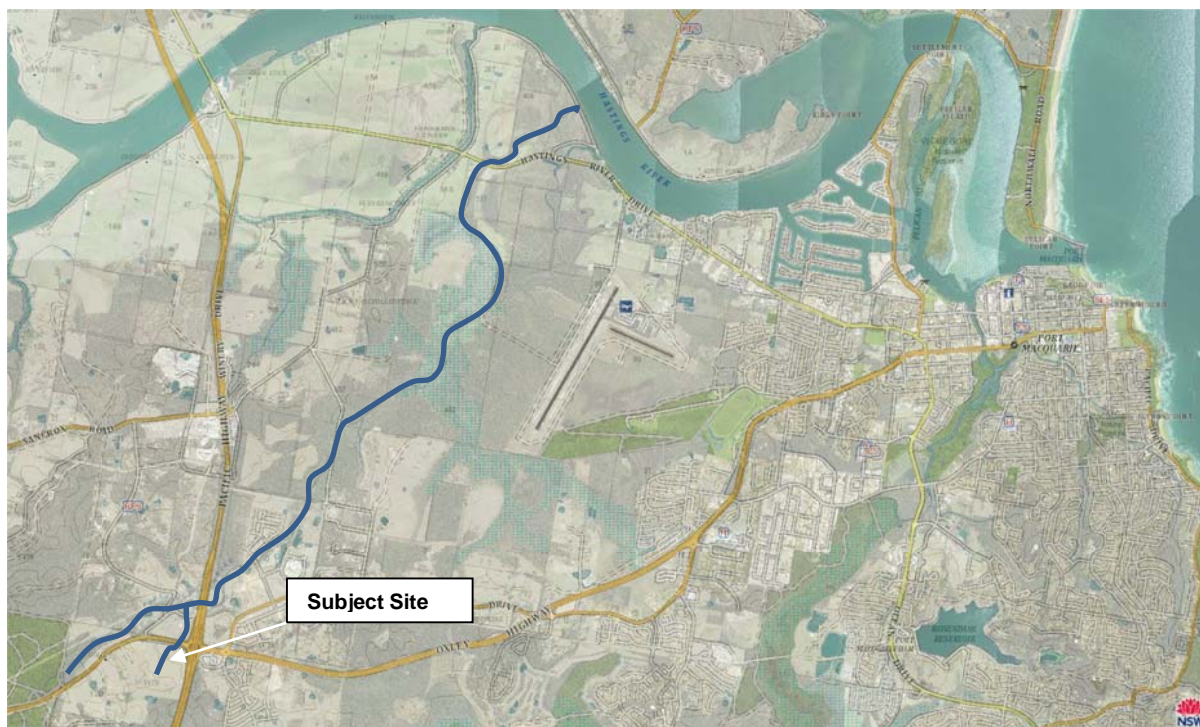
**Figure 4 Proposed Site Layout**



### 3. SITE HYDROLOGY

#### 3.1 Catchment Characteristics

The subject site is contained within a single catchment. The unnamed ephemeral watercourse identified within the site is intercepted by the Oxley Highway. Flows pass under the Highway via a 1200mm diameter pipe and eventually make confluence with Partridge Creek. Partridge Creek flows 6.5km to the NE through a series of swamps and joins the Hastings River east of Fernbank Creek and Blackmans Point. (refer also to **Figure 3**).



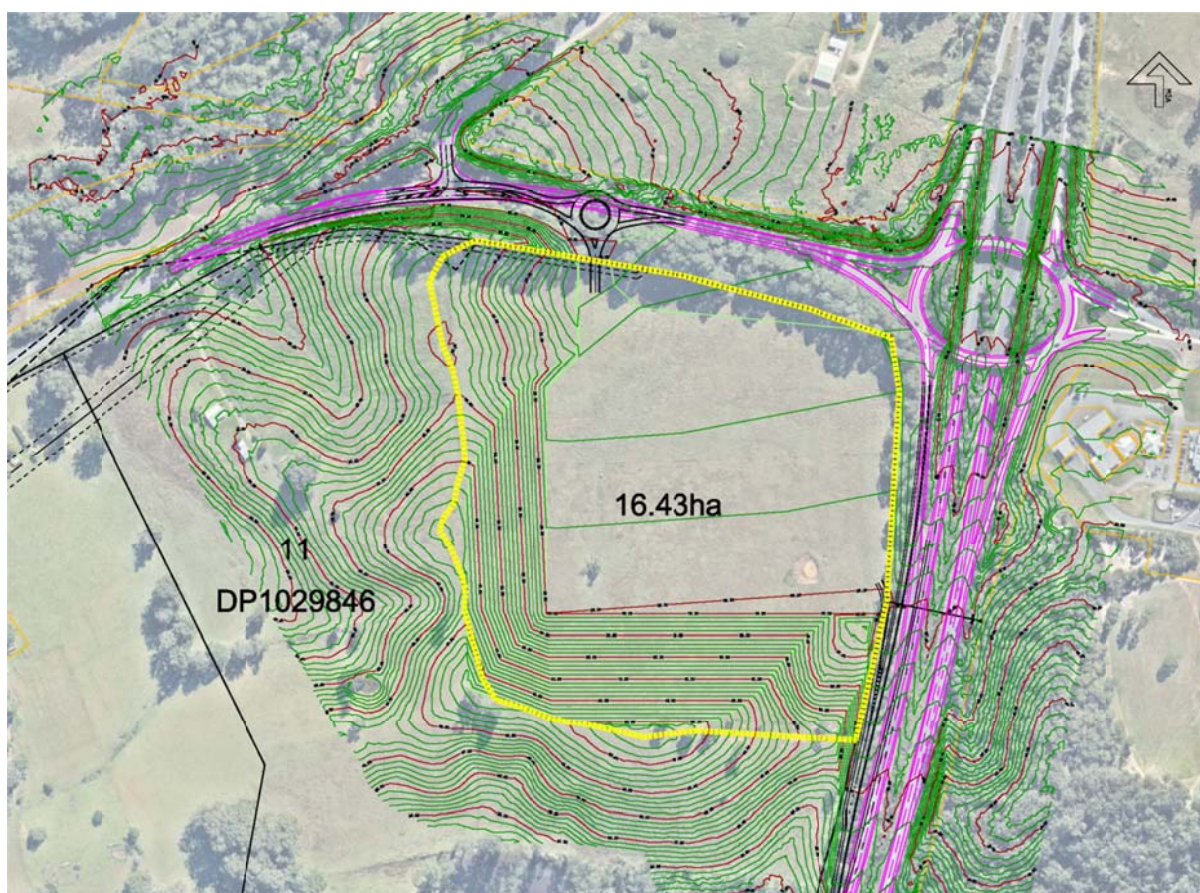
**Figure 5 Watercourses, Creeks and Rivers**

(source of Six Maps, NSW Govt.)

The extent of the site catchment analysed is depicted in **Figure 6** which also shows the proposed earthworks and general finished levels. The catchment area has been calculated at 16.43ha.

The area between the land boundary and existing highway carriageways has not been included in the assessment as stormwater matters shall be addressed in accordance with RMS requirements for the provision of new infrastructure. It is intended that any runoff within the road reserve shall be contained within those corridors.





**Figure 6 Catchment Boundary and Design Contours**

Predeveloped conditions shown within **Figure 3** are presented in **Table 1**.

**Table 1 Predeveloped catchment characteristics**

Catchment Name	Catchment Size (ha)	Average Slope (%)
1	16.43 ha	8.2 %



### 3.2 Hydrological Modelling

Hydrological modelling of the existing and proposed site conditions was undertaken using DRAINS. The DRAINS model layout is presented in **Appendix C**.

To model a catchment within DRAINS, the catchment is divided into sub-catchments based on watershed or pipe network boundaries. Data required for each sub-catchment includes catchment area, catchment slope, proportion of impervious area, and rainfall losses.

For the purposes of this study the 20 year and 100 year Average Recurrence Interval (ARI) storm events were modelled.

The existing and post-development model scenarios adopt the same catchment parameters with different percentage impervious to reflect the change in land use upon development of the site. This is due to the assumption that bulk earthworks will not alter catchment boundaries within the site.

### 3.3 Input Parameters

Intensity-frequency-duration (*IFD*) data was sourced for the Taree area from the Bureau of Meteorology online IFD data system, which is based on parameters in AR&R 2016. The adopted IFD parameters are included in **Table 2**.

**Table 2 IFD Data for Port Macquarie Airport (Bureau of Meteorology)**

Duration	2 year ARI Intensity (mm)	50 year ARI Intensity (mm)
1 hour	40	84.1
12 hour	108	225
72 hour	213	461

The adopted rainfall losses (initial and continuing) for the DRAINS models are presented in **Table 3**.

**Table 3 Initial/Continuing Loss Parameters**

Effective Impervious Area Initial Loss (mm)	1
Effective Impervious Area Continuing Loss (mm/hr)	0
Remaining Area Initial Loss (mm)	14
Remaining Area Continuing Loss (mm/hr)	4

### 3.4 Results

Based on the model input parameters outlined in Section 3.3, and an assumption that the existing site is 100% pervious, the peak flow rates for each catchment were approximated. A comparison of existing and post-development peak flow rates as modelled in DRAINS is included in **Section 4.3**.





## 4. STORMWATER QUANTITY

### 4.1 Objectives

In order to establish a stormwater quantity strategy for the subject site, each of the internal catchments were modelled in DRAINS.

The stormwater quantity strategy was prepared to satisfy the following criteria:

- Protect existing downstream water courses
- Discharge post development stormwater at pre developed flow rates.

### 4.2 Methodology

In order to satisfy the objectives of the stormwater quantity management strategy, it is proposed to match post-development peak flow rates with existing peak flow rates at the proposed point of discharge. This will be achieved through the provision of on-site stormwater detention (OSD) for the 20 year and 100 year ARI storm events. The 20 year ARI was selected because major stormwater infrastructure is typically designed to cater for peak flows up to the 20 year ARI. The 100 year ARI was selected as this event is used for flood planning levels.

The existing scenario model was developed on the basis that the site is 100% pervious. The percentage impervious for post-development model scenario was estimated based on Architectural site layout (Refer **Figure 4.**) These calculations determined post development ratio of impervious to pervious areas to be 44:56

OSD will be provided within the site to ensure that post-development peak flow rates match existing peak flow rates for a range of storm events up to the 100 year ARI event. In order to determine the required OSD volume, stage-storage and stage-discharge relationships were incorporated into nodes placed strategically within the site.

### 4.3 Results

The peak flow rates for the existing and post-development scenarios for the site are presented in **Table 4.**

**Table 4 Peak Flow Comparison**

Catchment	Area (ha)	Estimated Peak Flows (m <sup>3</sup> /s)								
		Existing			Post-Development			% Increase		
		5yr	20yr	100yr	5yr	20yr	100yr	5yr	20yr	100yr
1	16.43	N/A	5.03	7.53	N/A	7.53	11.11	N/A	150%	147%



**Table 5** summarises the detention volumes required at the three locations within the site to attenuate the post-development peak flows to the existing peak flows for a range of storm events up to the 100 year ARI event. It is noted that these volumes have been determined based on an R5 large lot land use.

**Table 5 Detention Storage Volumes**

Catchment	Contributing Area (ha)	Detention Storage Volume (m <sup>3</sup> )	Volume per unit area (m <sup>3</sup> /ha)
1	10.461	2623	250
	1.890	1355	350
	1.978		
	2.070	0	0
<b>TOTAL</b>	<b>16.40</b>	<b>3978</b>	<b>600</b>

The calculated volume per hectare of detention required to attenuate post-development peak flow rates back to existing peak flow rates varies across the site. This is primarily due to the location of each internal catchment within the site which influences the volume of detention storage required.

#### 4.4 Recommended Stormwater Quantity Strategy

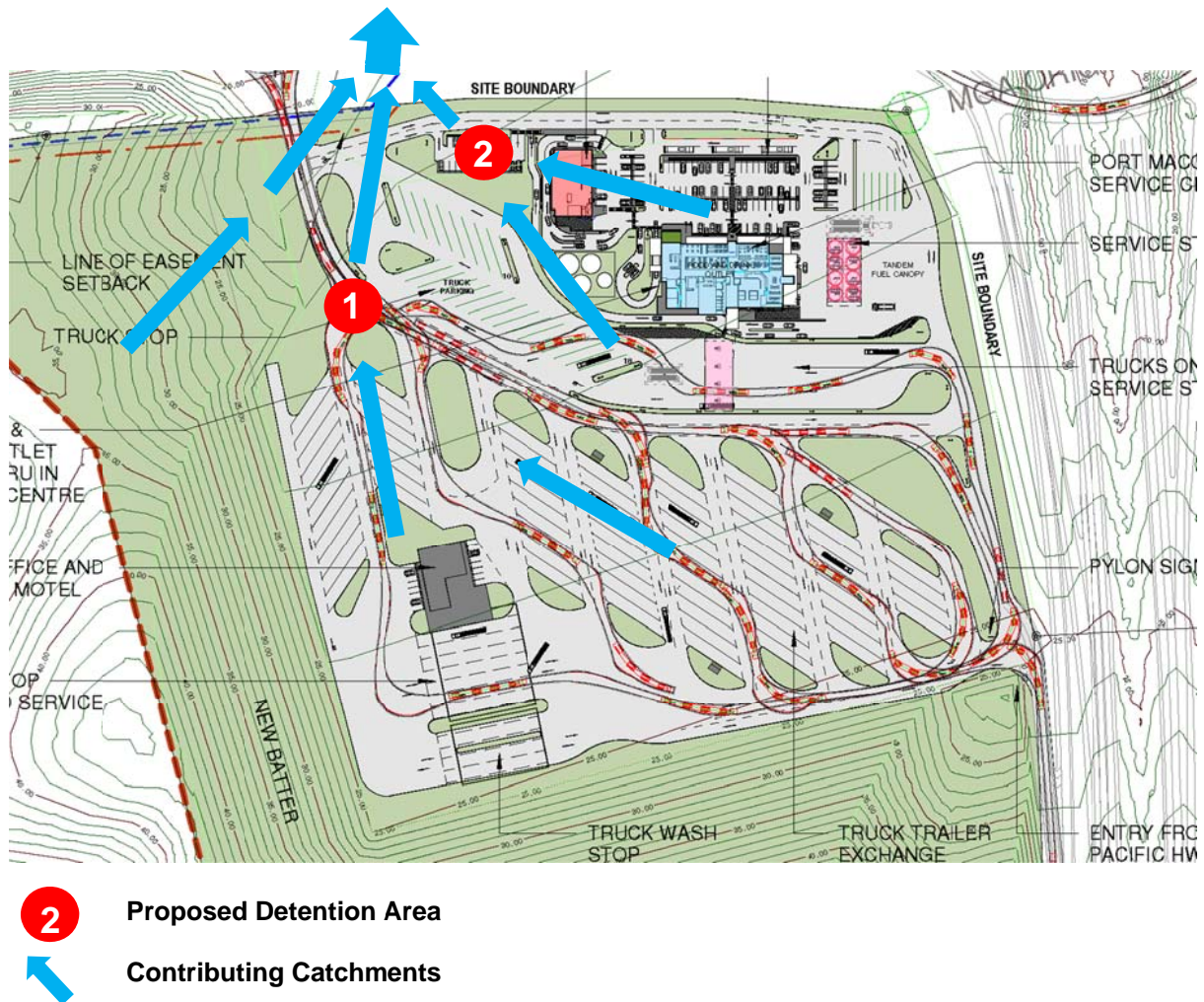
The development layout provides inadequate amounts of undeveloped surface area of sufficient dimension, in an appropriate location, to permit adoption of conventional above ground “basin” style stormwater detention.

We are not aware of any proposed reuse, recycle or rain harvesting strategies however should any of these be proposed, detention requirements will only be reduced

The recommended strategy to manage stormwater quantity on the site is to provide underground detention at two locations within the site adopting Precast Rocla OSD Box Units (or similar). The approximate location of these is shown in **Figure 7** and general system requirements tabled as follows.

Area No.	Plan Area (m <sup>2</sup> )	Depth (m)	Volume (m <sup>3</sup> )	No. Cells	Configuration
1	1270	2.4	2654	144	12 x 12
2	565	2.4	1370	64	8 x 8

The provision of the proposed system would attenuate peak flows and satisfy the objectives maintaining predevelopment discharge rates.



**Figure 7** Detention Areas and Sub-catchments



## 5. STORMWATER QUALITY

The implementation of Water Sensitive Urban Design is a key technique to minimise the pollution load which may be derived from urban areas, to reduce point source/wastewater discharges and to preserve the hydrologic regime of natural drainage systems, all of which will contribute to maintaining and improving ecological health outcomes of waterways. Without such intervention, the water quality, health and amenity of waterways upstream, within and downstream of an urban area can be seriously degraded.

Port Macquarie-Hastings Council requires that the development does not increase the mean annual pollutant load discharged into downstream waters when compared to existing site conditions for “greenfield” developments.

Council AUSPEC D7 specifications require reductions of Total Suspended Solids (TSS), Total Phosphates (TP) and Total Nitrates (TN) by 80%, 45% and 45% respectively.

In order to satisfy these conditions, the stormwater treatment train effectiveness has been assessed by comparing the average annual load of TSS, TP and TN arriving at a number of key locations within the site under two scenarios:

- Existing (pre-development)
- Post-development (with treatment)

### 5.1 MUSIC modelling

The MUSIC (Model for Urban Stormwater Improvement Conceptualisation) software package has been used to estimate average annual pollutant exports for the existing and post-development scenarios, thereby allowing the effectiveness of the proposed stormwater treatment train to be assessed.

MUSIC is a continual-run conceptual water quality assessment model developed by the Cooperative Research Centre for Catchment Hydrology (CRCCH). MUSIC can be used to estimate the long-term annual average stormwater volume generated by a catchment as well as the expected pollutant loads generated by the catchment. MUSIC is able to conceptually simulate the performance of a group of stormwater treatment measures (treatment train) to assess whether a proposed water quality strategy is able to meet specified water quality objectives.

MUSIC has been used because it has the following attributes:

- It can account for the temporal variation in storm rainfall throughout the year.
- Modelling steps can be as low as 6 minutes to allow accurate modelling of treatment devices.
- It can model a range of treatment devices.
- It can be used to estimate pollutant loads at any location within the catchment.
- It is based on logical and commonly accepted algorithms.

The model's algorithms are based on the known performance characteristics of common stormwater quality improvement measures. These data, derived from research undertaken by CRCCH and other organisations, represent the most reliable information currently available in the stormwater management industry.





In order to assess the existing and post-development with treatment conditions it is necessary to input relevant parameters into MUSIC. The parameters include catchment features, climate data, land usage and proposed treatment measures. The MUSIC model parameters are discussed in the following sections. The layout of each of the modelling scenarios is included in **Appendix D**.

#### 5.1.1 Rainfall data

Rainfall data used in the MUSIC modelling was sourced from the Bureau of Meteorology (BoM). The nearest rain gauge to the site is at Port Macquarie Airport, which is approximately 6 km from the site. The mean annual rainfall at this station over a period of 23 years is approximately 1428 mm. A six year period of pluviograph data was selected between 1<sup>st</sup> January 1963 and 31 December 1992 to be adopted in the MUSIC modelling. This range of rainfall generated an annual average of 1537 mm, which is in line with the long term average for the Port Macquarie station. It also represents a mix of average, wet and dry years.

#### 5.1.2 Evaporation

Monthly areal potential evapotranspiration values were obtained for the site from the 'Climate Atlas of Australia, Evapotranspiration' (Bureau of Meteorology, 2001) and are shown in **Table 6**.

**Table 6** *Monthly Areal Potential Evapotranspiration*

Month	Areal Potential Evapotranspiration (mm)
January	112
February	93
March	87
April	66
May	52
June	38
July	37
August	49
September	70
October	100
November	108
December	116

#### 5.1.3 Catchment Parameters

The existing scenario was modelled in MUSIC for each catchment by adopting a simple, single node model. For the existing scenario, each catchment adopted the rural EMC values as per Chapter 5 NSW MUSIC Modelling Guidelines (2015) The existing scenario assumed that all catchments are 100% pervious.

Catchment parameters for the proposed scenario were modelled based on the proposed landuse. An approximate pervious and impervious percentage was assigned to each of the land usage categories as shown below;



Source Node Category	Percentage Impervious
Pre-Developed	0%
Roof	100%
Carpark	100%
Landscape/batter	5%

#### 5.1.4 Pollution Concentrations

The stormwater pollutant Event Mean Concentrations (EMCs) that were used in the modelling were derived from Chapter 5 of NSW MUSIC Modelling Guidelines (2015). The pollutant concentrations that have been adopted in the MUSIC modelling are presented in **Table 7**.

**Table 7 Adopted Runoff Pollutant Concentrations for MUSIC source nodes**

Land Use Category		log <sub>10</sub> TSS (mg/l)		log <sub>10</sub> TP (mg/l)		log <sub>10</sub> TN (mg/l)	
		Base Flow	Storm Flow	Base Flow	Storm Flow	Base Flow	Storm Flow
<b>Rural</b>	Mean	1.15	1.95	-1.22	-0.66	-0.05	0.30
	Std. Dev.	0.17	0.32	0.19	0.25	0.12	0.19
<b>Roof</b>	Mean	0	1.30	0	-0.89	0	0.30
	Std. Dev.	0	0.32	0	0.25	0	0.19
<b>Carpark</b>	Mean	1.20	2.43	-0.85	-0.30	0.11	0.34
	Std. Dev.	0.17	0.32	0.19	0.25	0.12	0.19
<b>Landscape/Batter</b>	Mean	1.20	2.15	-0.85	-0.60	0.11	0.30
	Std. Dev.	0.17	0.32	0.19	0.25	0.12	0.19

#### 5.1.5 Soil Data and Model Calibration

**Table 8** outlines the soil properties recommended by NSW MUSIC Modelling Guidelines (2015) for adoption in MUSIC modelling. These values have been adopted in the MUSIC model.



**Table 8 Soil Parameters**

	Unit	Catchment Type			
		Rural	Roof	Carpark	Landscape/ Batter
<b>Impervious Area Parameters</b>					
Rainfall Threshold	mm/day	1	0.30	1.5	1
<b>Pervious Area Parameters</b>					
Soil Capacity	mm	142	142	142	142
Initial Storage	%	25	25	25	25
Field Capacity	mm	94	94	94	94
Infiltration Coefficient a	-	180	180	180	180
Infiltration Coefficient b	-	3	3	3	3
<b>Groundwater Properties</b>					
Initial Depth	mm	10	10	10	10
Daily Recharge Rate	%	25	25	25	25
Daily Baseflow Rate	%	25	25	25	25
Daily Deep Seepage Rate	%	0	0	0	0

## 5.2 Proposed Treatment Measures

There are a number of water sensitive urban design (WSUD) measures which may be incorporated to satisfy stormwater runoff quality targets. These include but are not limited to:

- *Gross Pollutant Traps*
- *Bio-retention Swales*
- *Bio-retention Basins*
- *Constructed Wetlands*
- *Storm Pits*
- *Rain Gardens*

The components of the proposed WSUD treatment train are presented in the following sections.

### 5.2.1 Mechanical Treatment

Due the limit availability of surface area available for conventional Bio-retention systems, mechanical treatment devices have been proposed.

A Gross Pollutant Trap addresses removal/reduction of suspended solids such as general waste products greater than 2mm and removes components of oil based pollutants.

Storm Pits provide filtration and cleansing downstream of a Gross Pollutant Trap.



## 5.3 Results

MUSIC models representing the existing and two developed scenarios (treated and untreated) were developed incorporating the parameters discussed in the preceding sections (rainfall, percentage imperviousness, evaporation, soil data, pollutant concentrations and stormwater treatment measures). Models were used to simulate the pollutant export generated during a mean rainfall and evaporation year.

### 5.3.1 Existing Scenario

The estimated existing mean annual pollutant loads for each outlet within the site are presented in **Table 9**.

**Table 9 Mean Annual Pollutant Loads – Existing Scenario**

Location	Flow (ML/year)	Pollutant Load (kg/year)		
		TSS (kg/yr)	TP (kg/yr)	TN (kg/yr)
1	117	7550	20.6	192

### 5.3.2 Proposed Development with treatment

The post-development scenario with treatment has been modelled in MUSIC to determine the type and extent of stormwater treatment measures that would be required to meet the Port Macquarie Hastings Council reduction targets and the objective to reduce the volume of pollutants discharged to receiving waters under the post-development scenario when compared to the existing scenario.

The estimated mean annual pollutant loads for the proposed development with treatment are presented in **Table 10**.

**Table 10 Mean Annual Pollutant Loads – Proposed Development Scenario with proposed treatment**

Location	Flow (ML/year)	Pollutant Load (kg/year)		
		TSS (kg/yr)	TP (kg/yr)	TN (kg/yr)
1	167	7650	21	156
	Target % reduction	80.1%	69.3%	57.4%





## 5.4 Construction Phase Water Quality

During the construction of subdivision works within the site, erosion and sediment control measures would be designed and implemented in accordance with the NSW Department of Housing “Managing Urban Stormwater – Soils and Construction” (Blue Book) and to the satisfaction of Council’s requirements. These controls would help mitigate the impacts of land disturbance on soils, landforms and receiving waters during the construction stage.

## 6. CONCLUSION

This report has determined the requirements for stormwater management for development of the site based on the basis of the proposed land use. The stormwater management strategy for the development would need to be verified at the Construction Certificate stage and is subject to detailed design.

The objectives of the stormwater management strategy recommended for the development of the proposed Highway Service Centre would be achieved by:

- Providing on-site stormwater detention as described to ensure no increase in peak flow rates following development when compared to existing site conditions.
- Removing pollutants from runoff to a sufficient extent to meet Council guidelines and adopt a stormwater treatment train approach that is consistent with current best practice WSUD.

Tabled results illustrate that all objects and targets for stormwater detention and quality are achievable.

## 7. REFERENCES

*NSW MUSIC Modelling Guidelines  
(August 2015) BMT WBM*

*Using MUSIC in Sydney’s Drinking Water Catchment  
(December 2012) Sydney Catchment Authority NSW*

*Port Macquarie-Hastings Council AUSPEC D5 & D7 specifications.*

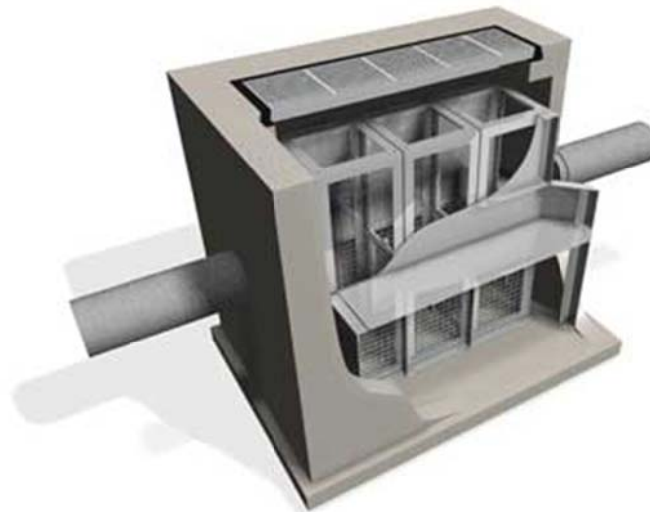
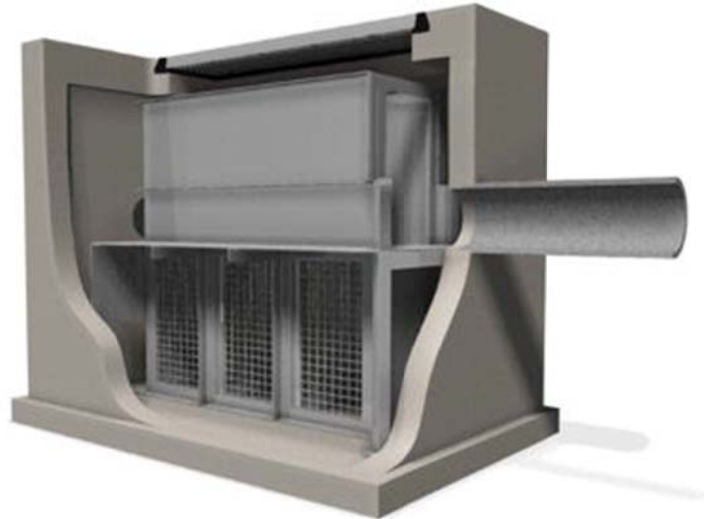


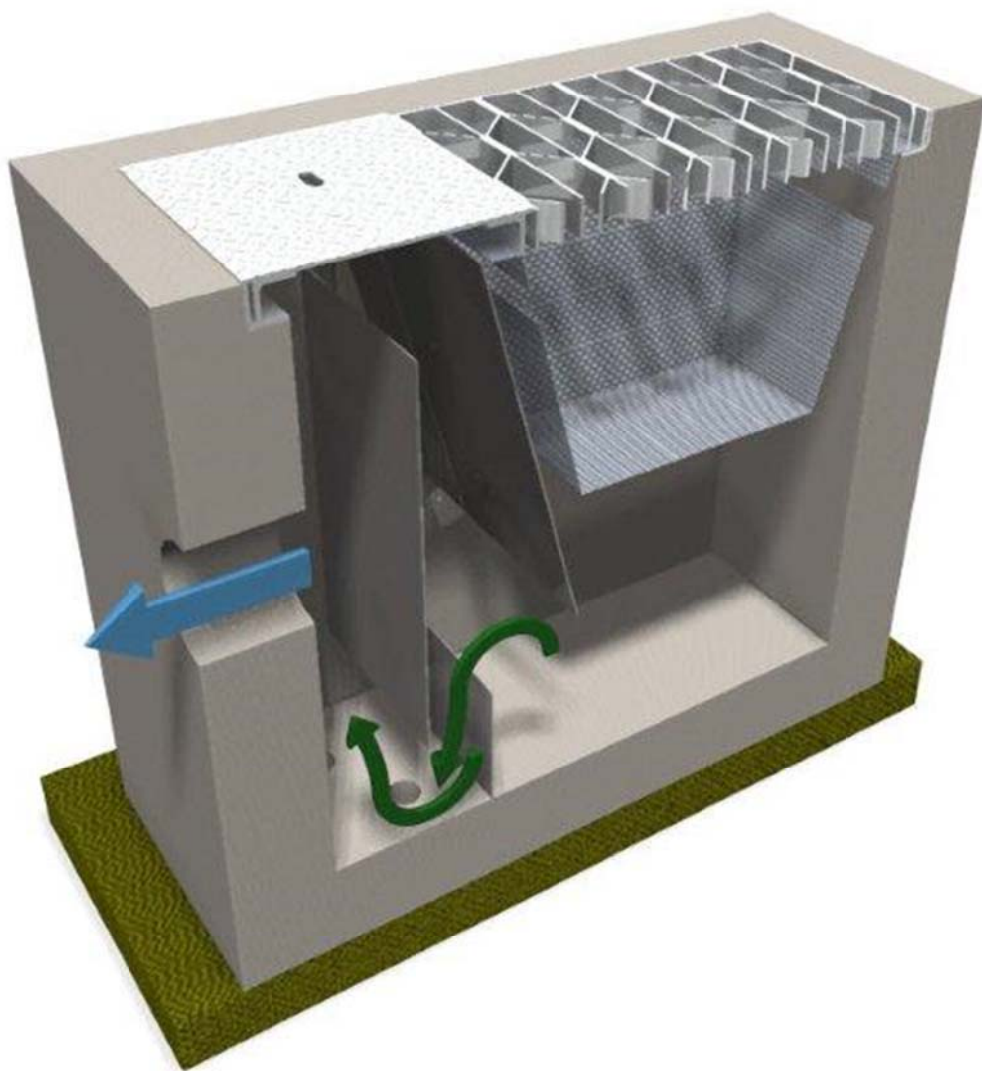
## APPENDIX A – RMS Future Planned Stopping Opportunities (RMS 2014)





## APPENDIX B – Ecosol GPT and Storm Pit



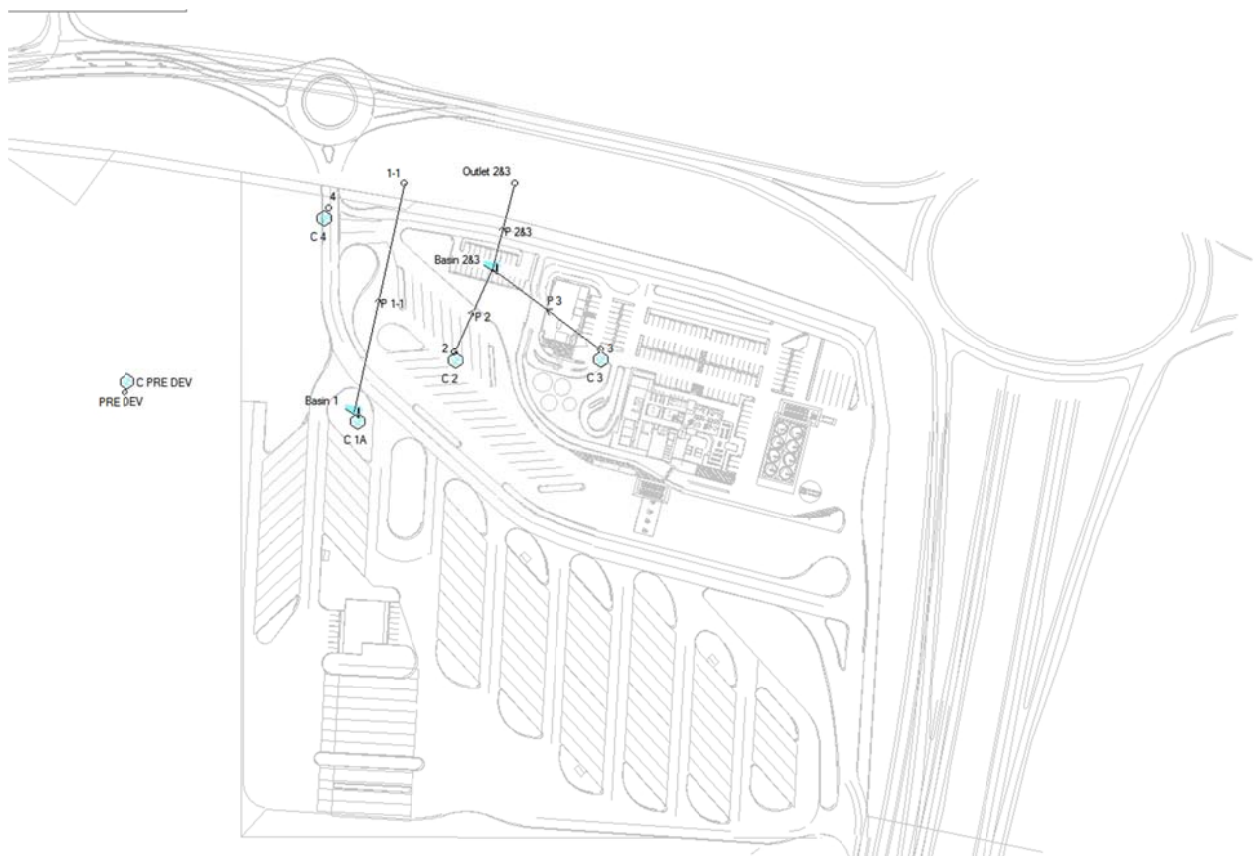






## APPENDIX C – DRAINS Report

### **Drains Model**







**Drains Model – ARI 100yr Peak Flow (m<sup>3</sup>/s) & Water Level**





## Stormwater Drainage

### Calculations (Data)

PIT / NODE Version  
DETAILS 13

Name	Type	Family	Size	Ponding Volume (cu.m)	Pressure Change Coeff. Ku	Surface Elev (m)	Max Pond Depth (m)	Base Inflow (cu.m/s)	Blocking Factor	x	y	Bolt-down lid	id	Part Full Shock Loss	Inflow Hydrograph
4	Node					20		0		48257	6519166.		27078		
										7.649	313		331		No
2	Node					21.6		0		48264	6519094.		27079		
Outlet										0.949	412		087		No
2&3	Node					21		0		48267	6519178.		27079		
										0.764	698		070		No
3	Node					22.2		0		48271	6519095.		27079		
PRE										3.767	559		088		No
DEV	Node					21		0		48247	6519074.		27080		
										5.245	344		288		No
1-1	Node					21		0		48261	6519179.		27083		
										5.482	000		327		No

### DETENTION BASIN DETAILS

Name	Elev	Surf. Area	Not Used	Outlet Type	K	Dia(mm)	Centre RL	Pit Family	Pit Type	x	y	HED	Crest RL	Crest Length(m)	id
------	------	------------	----------	-------------	---	---------	-----------	------------	----------	---	---	-----	----------	-----------------	----







P 3	3	Basin 2&3	10	18.700	18.600	1.00	RCP CL 2	900	900	0.6	NewFixed	1	3	0
P 1-1	1	Basin 1-1	110	20.000	18.900	1.00	RCP CL 2	825	825	0.6	NewFixed	2	Basin 1	0

#### DETAILS of SERVICES CROSSING PIPES

Pipe	Chg	Botto m Elev	Height of Service (m)	Chg	Bottom Elev (m)	Height of Service (m)	Chg	Botto m Elev	Height of Service (m)	etc
	(m)	(m)	(m)	(m)	Elev (m)	(m)	(m)	(m)	(m)	etc

#### CHANNEL DETAILS

Name	From	To	Type	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Base Width (m)	L.B. Slope (1:?)	R.B. Slope (1:?)	Manning n	Depth (m)	Roofe d
------	------	----	------	---------------	---------------	---------------	--------------	----------------------	---------------------	------------------------	--------------	--------------	------------

#### PIPE COVER DETAILS

Name	Type	Dia (mm)	Safe Cover (m)	Cover (m)
P 2	RCP CL 2	900	0.6	-0.97
P 2&3	RCP CL 2	825	0.6	-0.89
P 3	RCP CL 2	900	0.6	-0.97
P 1-1	RCP CL 2	825	0.6	-0.89



## Stormwater Drainage Calculations (20yr Results)

DRAINS results prepared from Version 2018.01

PIT / NODE DETAILS				Version 8			
Name	Max HGL	Max Pond HGL	Max Surface Flow Arriving (cu.m/s)	Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint
2	19.80		1.375				
Outlet 2&3	18.71		0.000				
3	19.80		1.439				
1-1	19.52		0.000				

### SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	EIA Max Q (cu.m/s)	Remaining Max Q (cu.m/s)	EIA Tc (min)	Remaining Tc (min)	Due to Storm
C 4	0.769	0.096	0.709	2.43	12.49	5% AEP, 20 min burst, Storm 4
C 2	1.047	0.968	0.080	3.89	4.00	5% AEP, 5 min burst, Storm 1
C 3	1.096	1.013	0.084	3.89	4.00	5% AEP, 5 min burst, Storm 1
C PRE DEV	5.026	2.689	2.916	2.09	19.10	5% AEP, 20 min burst, Storm 10
C 1A	4.605	2.284	2.903	4.60	7.17	5% AEP, 15 min burst, Storm 4



#### PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
P 2	1.050	1.65	19.847	19.834	5% AEP, 5 min burst, Storm 1
P 2&3	1.278	3.28	19.214	18.715	5% AEP, 25 min burst, Storm 4
P 3	1.097	1.72	19.849	19.834	5% AEP, 5 min burst, Storm 1
P 1-1	2.878	3.32	20.631	19.523	5% AEP, 1 hour burst, Storm 10

#### CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Due to Storm
------	-------------------	----------------	-----------------

#### DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level
Basin 2&3	19.80	675.7	1.278	1.278	0.000
Basin 1	21.48	1612.2	2.878	2.878	0.000





## Stormwater Drainage Calculations (100yr Results)

DRAINS results prepared from Version 2018.01

PIT / NODE DETAILS				Version 8			
Name	Max HGL	Max Pond HGL	Max Surface Flow Arriving (cu.m/s)	Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint
2	20.26		1.870				
Outlet 2&3	18.81		0.000				
3	20.27		1.957				
1-1	19.67		0.000				

### SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	EIA Max Q (cu.m/s)	Remaining Max Q (cu.m/s)	EIA Tc (min)	Remaining Tc (min)	Due to Storm
C 4	1.088	0.121	1.005	2.06	10.56	1% AEP, 15 min burst, Storm 8
C 2	1.506	1.300	0.206	3.45	3.55	1% AEP, 5 min burst, Storm 1
C 3	1.576	1.361	0.215	3.45	3.55	1% AEP, 5 min burst, Storm 1
C PRE DEV	7.530	3.088	4.813	1.87	17.08	1% AEP, 20 min burst, Storm 10
C 1A	6.921	2.663	4.259	3.83	5.98	1% AEP, 10 min burst, Storm 7



#### PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
P 2	1.494	2.35	20.264	20.249	1% AEP, 5 min burst, Storm 1
P 2&3	1.549	3.38	19.260	18.813	1% AEP, 25 min burst, Storm 1
P 3	1.555	2.44	20.266	20.249	1% AEP, 5 min burst, Storm 1
P 1-1	3.676	3.54	21.225	19.669	1% AEP, 25 min burst, Storm 1

#### CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Due to Storm
------	-------------------	----------------	-----------------

#### DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level
Basin 2&3	20.25	931.0	1.549	1.549	0.000
Basin 1	22.17	2372.1	3.676	3.676	0.000



**Port Macquarie Hastings Council Council Stormwater Drainage Detention Discharge & Storage Requirements**

D5 – Equivalent to difference in volume between Pre-development & Post development for flows up to ARI of 100yr, based on current percentage imperviousness of 0%

Pre-Development Discharge		Post Development Discharge
---------------------------	--	----------------------------

20yr = 5.03 m <sup>3</sup> /s	→	20yr = 4.93 m <sup>3</sup> /s
-------------------------------	---	-------------------------------

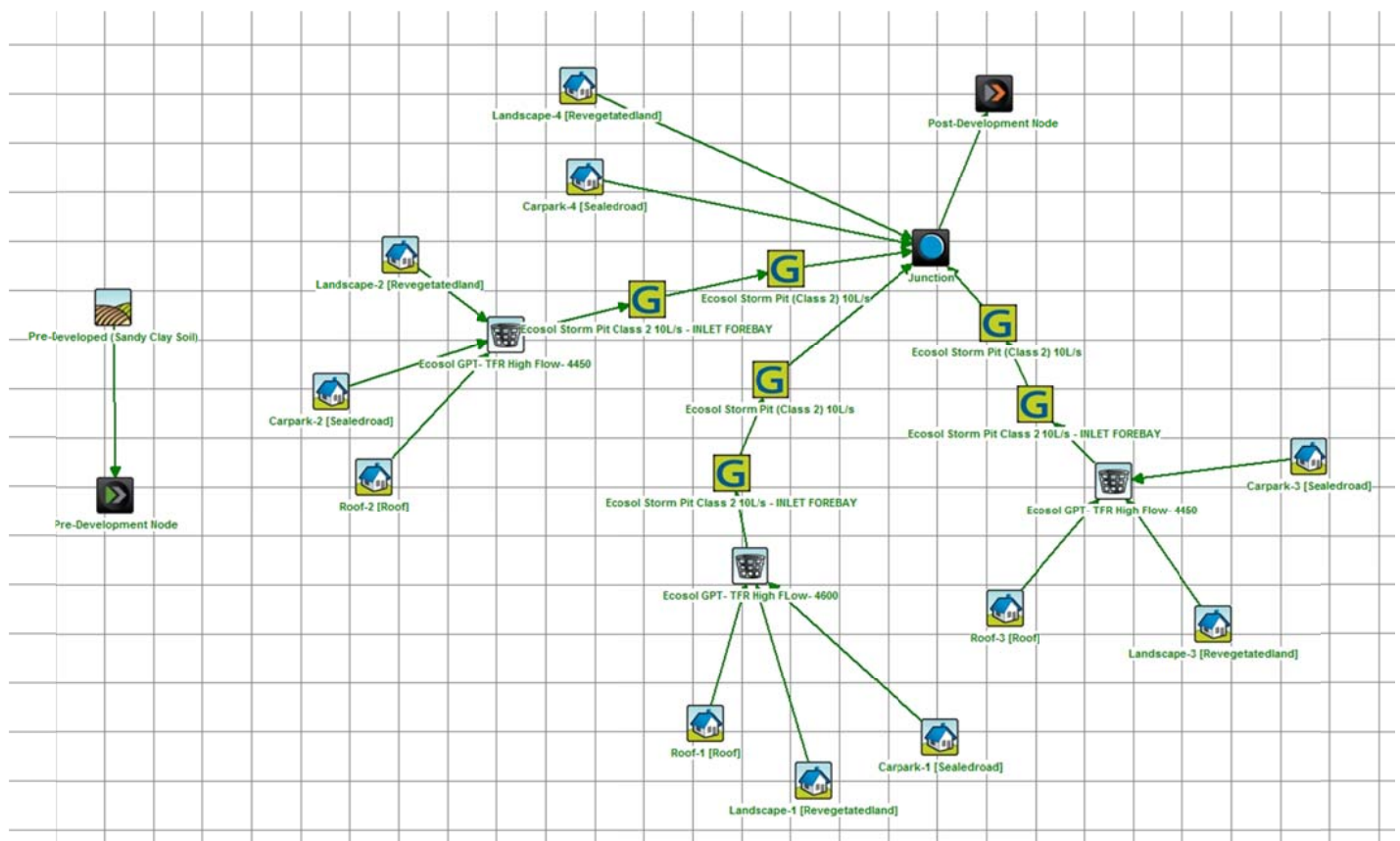
100yr= 7.53 m <sup>3</sup> /s	→	100yr= 6.32 m <sup>3</sup> /s
-------------------------------	---	-------------------------------

Therefore Detention areas1 & 2 comply with Port Macquarie-Hastings Council Discharge and Storage Requirements.



## APPENDIX D – MUSIC Report

### **MUSIC Model**







### **Treatment Train Effectiveness**

Treatment Train Effectiveness - Post-Development Node						
	Sources		Residual Load		% Reduction	
	Pre	Post	Pre	Post	Pre	Post
Flow (ML/yr)	117	167	117	167	0	0
Total Suspended Solids (kg/yr)	7550	38500	7550	7650	0	80.1
Total Phosphorus (kg/yr)	20.6	68.3	20.6	21	0	69.3
Total Nitrogen (kg/yr)	192	366	192	156	0	57.4
Gross Pollutants (kg/yr)	0	2520	0	110	0	95.6

## **Attachment 12 Contaminated Site Assessment**

**Commercial Asset Management Services Pty Ltd**

**Proposed Development, Lot 11 DP1029846, Oxley Highway,  
Thrumster**

**Stage 1 Contaminated Site Assessment**

Report No. RGS20621.1-AC

9 January 2018

**REGIONAL**  
GEOTECHNICAL SOLUTIONS





**Manning-Great Lakes**

**Port Macquarie**

**Coffs Harbour**

RGS20621.1-AC

9 January 2018

Commercial Asset Management Services Pty Ltd  
PO Box 520  
RUNAWAY BAY QLD 4216

**Attention: Graeme Jones**

Dear Graeme,

**RE: Proposed Development, Lot 11 DP1029846, Oxley Highway, Thrumster**  
**Stage 1 Contaminated Site Assessment**

As requested, Regional Geotechnical Solutions Pty Ltd (RGS) has undertaken a Stage 1 Contaminated Site Assessment for the proposed commercial development to be located within part of Lot 11 DP1029846, Oxley Highway, Thrumster.

The assessment found the site to be appropriate for the proposed industrial/commercial development from a site contamination perspective provided the recommendations and advice of this report are adopted.

If you have any questions regarding this project, or require any additional consultations, please contact the undersigned.

For and on behalf of

**Regional Geotechnical Solutions Pty Ltd**

**Tim Morris**

Senior Engineering Geologist





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## Figures

- Figure 1 Investigation Location Plan
- Figure 2 Historical Aerial Photograph (1997)

## Appendices

- Appendix A Site History Documentation
- Appendix B Results of Field Investigations
- Appendix C Results of Laboratory Testing



## 1 INTRODUCTION

As requested, Regional Geotechnical Solutions Pty Ltd (RGS) has undertaken a Stage 1 Contaminated Site Assessment for the proposed development to be located within part of Lot 11 DP1029846, Oxley Highway, Thrumster.

A large-scale Highway Service Centre is proposed in the north east corner of Lot 11. Details of the development are not yet available, however, it will likely involve:

- Large food court building which includes restaurants, public amenities and a covered eating area;
- Service station with attached shop and covered fuelling areas;
- Access road and large parking areas for both light and heavy vehicles; and
- Associated earthworks to provide a suitable building platform which may require cuts of up to approximately 15m and placement of up to 15m of fill including infilling of the existing drainage line.

The subject area within Lot 1 currently comprises cleared farm land that is used for grazing purposes with some scattered trees.

The purpose of the work described herein was to assess the suitability of the site for industrial/commercial land use with respect to the presence of site contamination resulting from past land use and activities, as well as providing discussions and recommendations regarding:

- Identification of Areas of Concern and Chemicals of Concern;
- Undertake limited targeted sampling and analysis at the selected Areas of Concern to allow some preliminary analysis of the presence of contamination (if any);
- Evaluation of test results against industry accepted criteria for the intended landuse;
- Conclusions regarding the presence of contamination at the site and its potential impacts on the proposed industrial/commercial landuse;
- The requirement for remediation, further investigation, or ongoing management of site contamination.

The work was commissioned by Graeme Jones of Commercial Asset Management Services Pty Ltd and was undertaken in accordance with proposal number RGS20621.1-AB dated 3 November 2017.

## 2 GUIDELINES AND ASSESSMENT CRITERIA

The assessment was aimed at fulfilling the requirements of a Stage 1 Contaminated Site Assessment in accordance with NSW EPA *Guidelines for Consultants Reporting on Contaminated Sites (2011)*.

To evaluate results and for guidance on assessment requirements, the assessment adopted the guidelines provided in the *National Environment Protection (Assessment of Site Contamination) Measure (NEPM 2013)*. The NEPM document provides a range of guidelines for assessment of



contaminants for various land use scenarios. The proposed landuse is commercial and as such comparison with the NEPM guideline values for Commercial/Industrial D landuse was considered appropriate. In accordance with the NEPM guideline the following criteria were adopted for this assessment:

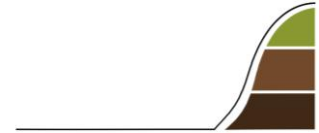
- Health Investigation Levels (HILs) for industrial land use were used to assess the potential human health impact of heavy metals and PAH;
- Health Screening Levels (HSLs) for coarse textured (sand) or fine textured (silt and clay) soils on an industrial land use site were adopted as appropriate for the soils encountered to assess the potential human health impact of petroleum hydrocarbons and BTEX compounds;
- Ecological Investigation Levels (EILs) for industrial land use were used for evaluation of the potential ecological / environmental impact of heavy metals and PAH;
- Ecological Screening Levels (ESLs) for coarse textured (sand) soils or fine textured (silt and clay) soils on an industrial land use site were adopted as appropriate for the soils encountered, to assess the potential ecological / environmental impact of petroleum hydrocarbons and BTEX compounds.

In accordance with NEPM 2013, exceedance of the criteria does not necessarily deem that remediation or cleanup is required, but is a trigger for further assessment of the extent of contamination and associated risks. The adopted criteria are presented in the results summary table in Appendix B.

### 3 METHODOLOGY

In accordance with the relevant sections of the *National Environmental Protection (Assessment of Site Contamination) Measure 1999 (Amended 2013)*, the assessment involved the following process:

- Site walkover to assess visible surface conditions and identify any evidence of contamination, or past activities that may cause contamination;
- Review of available recent and historical aerial photography for the last 50 years;
- A search of NSW DECCW records, or contaminated land notifications on the site;
- Government records of groundwater bores in the area;
- Land title search of the respective lots available from the Land Titles Office;
- Using the above information, characterise the site into Areas of Environmental Concern, in which the potential for contamination has been identified, and nominate Chemicals of Concern that might be associated with those activities;
- Undertake targeted sampling and analysis at the selected Areas of Concern to allow some preliminary analysis of the presence of contamination;
- Analyse samples for a suite of potential contaminants associated with the past activities;
- Evaluate the results against industry accepted criteria for the proposed landuse.



## 4 SITE SETTING and HISTORY

### 4.1 Site Description

The subject area of assessment is located in the north-eastern corner of Lot 11 DP1029846 and is bound to the north by the Oxley Highway and to the east by the Pacific Highway in an area of gently to moderately undulating topography. It is situated on the upper to lower slopes of two ridgelines that run along the southern and western boundaries of the site. Surface elevations across the subject area range from approximately RL 45m in the south western corner to approximately RL 13m in the north-eastern corner.

An image of the site taken from the NSW Department of Property Information website is reproduced below.



*The approximate extent of the proposed development within Lot 11 DP1029846, Oxley Highway, Thrumster outlined in red.*





## 4.2 Historical Aerial Photography

Aerial photographs of the site were purchased from the NSW Land and Property Management Authority and reviewed to assist in identifying past land uses that may contribute to site contamination. The results of the review are summarised in Table 1.

**Table 1 - Aerial Photograph Summary**

Year	Lot 11 DP1029846	Surrounding Land
1956	Site does not appear to be disturbed and is thickly vegetated with eucalypt forest.	Cleared farmland is located to the north. Thick vegetation is located to the south, west and east. Oxley Highway runs along the northern boundary.
1997	The site is mostly cleared and being used as farm land. One small farm dam present. There is some thick vegetation located in the south and west of the site, and along the eastern boundary.	The Pacific Highway and Oxley Highway interchange has been constructed.
2009 (Google Earth)	The vegetation in the southern, eastern and western section of the site has been cleared. Two small farm dams present. Subtle vegetation change inside eastern boundary indicates position of large fill stockpile	The land to the south has been cleared and is being used as farmland.
2017 (Google Earth)	No significant change.	Cleared farmland within Lot 11 to west of subject area has been used for market gardening (beans/peas?).

## 4.3 Site Observations

Fieldwork was undertaken on 27 November 2017. Observations made during the site visit are summarised below:

- The proposed development area comprised open farm land with internal fencing and livestock present;
- An intermittent drainage line bisects the site and drains to the north east;
- Two small farm dams were present and both contained water;
- A large vegetated spoil mound was located along the eastern boundary and was approximately 150m long, 22m wide and 3m high. TP5 was undertaken in the spoil mound and encountered mixed clay fill to 2m; and



- The adjacent Pacific and Oxley Highways are constructed on a combination of cut and fill with the fill embankments adjacent to the north east corner of the site up to approximately 8m in height. Modified drainage lines are present at the toe of the embankments. Although not observed it is assumed that there is a large storm water culvert present below the Oxley Highway embankment near the intersection that allows drainage of surface waters to the north.

A selection of images of the site is presented below.



*Large vegetated spoil mound located along the eastern boundary.*



*Looking south across site which comprises open cleared farm land.*



*Looking north along eastern boundary adjacent to Pacific Highway. Large vegetated spoil mound located on boundary.*



*TP5 – Mixed clay fill to 2m present in spoil mound.*



#### **4.4 NSW EPA Records**

A check with the NSW Office of Environment and Heritage website ([www.environment.nsw.gov.au](http://www.environment.nsw.gov.au)) revealed that no notices have been issued on the site under the Contaminated Land Management Act (1997).

#### **4.5 Land Title Search**

A list of past registered proprietors and lessors of the site was obtained from the Land Titles Office. A summary of the title details is included in Appendix A.

The title history search revealed the following:

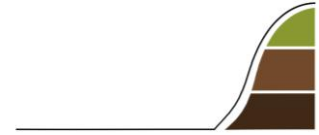
- Portion of former Lot 10 DP776843:
- 1839 - 1869: Jeremiah Walters, grantee;
- 1869 – 1988: Various farmers and individuals;
- 1988 – 1994: RTA acquired portion;
- 1994 – 2001: Stanley Raymond Hore, farmer Keith John Hore, farmer;
- Lot 11 DP1029846 created.
- 2001 – 2008: Keith John Hore; and
- 2008 – to date: Margaret Mary Hore.

#### **4.6 Geology**

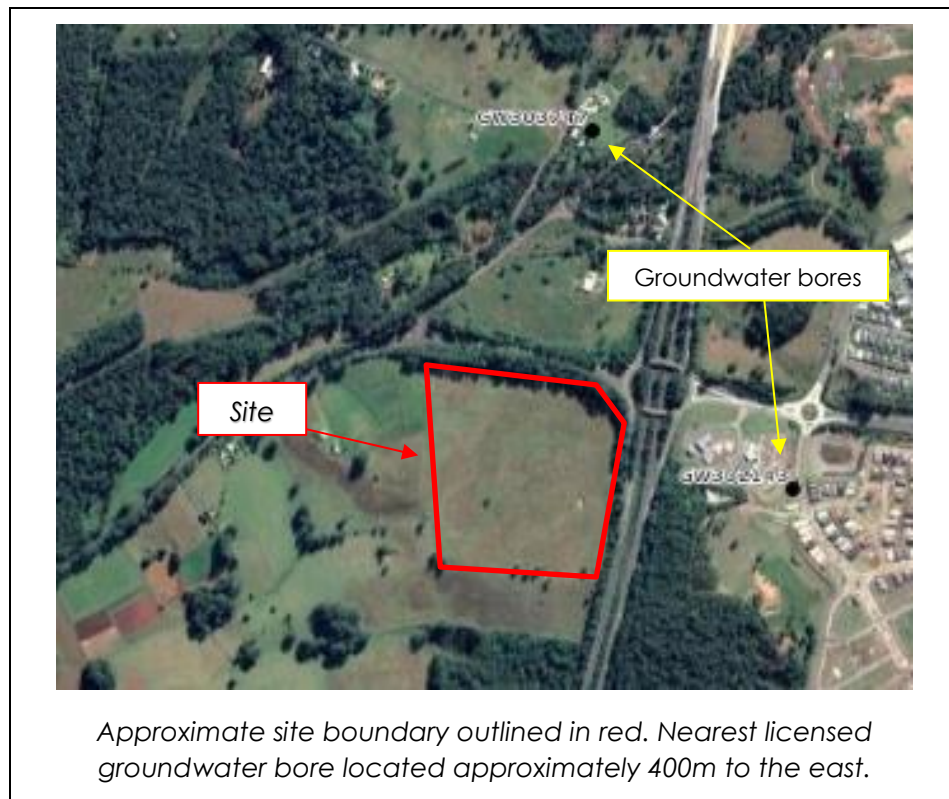
The site is situated in an area underlain by the Permian aged Thrumster Slate which comprises slate, slaty sandstone and rare limestone. Intrusive dolerites are also known to be present within the general vicinity. A deep weathered clay profile typically overlies the rock units in the Thrumster area.

#### **4.7 Groundwater**

A groundwater bore search on the NSW Water Information website, <http://waterinfo.nsw.gov.au/gw/> indicates no licensed groundwater bores within 200m of the site boundary. The nearest licensed bore is located approximately 400m to the east as shown below.



#### Groundwater Bore Map (From NSW Water website)



The bore located approximately 400m to the east of the site is licensed for domestic use and is currently active. The observed profile comprised clays to 3m overlying siltstone to 7m and basalt to 27m. The water bearing zone was present from 21 to 21.5m with a standing water level at 5m below surface.

Regional groundwater flow direction typically follows topographic slopes, which for this site would be towards the north east.

#### 4.8 Site History Summary

Based on available data the chronological development of the site was undertaken as summarised below:

- The site was purchased by Jeremiah Walters in 1839;
- The Hore family purchased the site in 1953 and are the current land owners;
- Aerial photographs indicate the site was mostly cleared of vegetation between 1956 and 1997, with some additional clearing between 1997 and 2009;





- The subject area has been used for cattle grazing. Adjacent paddock to the west of subject area within Lot 11 has been used for horticultural purposes. Discussions with the current property owner indicate beans and peas were grown in the modified paddock;
- The Pacific Highway and Oxley Highway interchange was constructed in the early 1990's; and
- A large vegetated spoil mound is present in the east of the site. It appears to have been placed between 1997 and 2007 when vegetation clearing works were also undertaken in the vicinity. A modified drainage line is present at the toe of the Pacific Highway embankment and it is possible that the spoil was generated from drainage improvement works in the Highway corridor.

## 5 SITE CONTAMINATION ASSESSMENT

### 5.1 Conceptual Site Model

Based on the site observations and knowledge obtained about site activities as outlined above, potential Areas of Concern and Chemicals of Concern were identified for the assessment as outlined in Table 2.

**Table 2: Conceptual Site Model**

Area of Concern	Mode of Potential Contamination	Chemicals of Concern	Targeted Sampling Location
AEC1: Spoil Mound	Imported fill of unknown origin	Heavy Metals, TPH, BTEX, PAH, OC/OPP, Asbestos	TP5
AEC2: Soils in drainage line	Runoff from herbicides and pesticides used for agricultural purposes.	Heavy Metals, TPH, BTEX, PAH, OC/OPP	TP8
AEC3: Soils in paddock	Herbicides and pesticides used for agricultural purposes.	Heavy Metals, TPH, BTEX, PAH, OC/OPP	TP7, TP12, TP13
Heavy Metals - Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel and Zinc BTEX - Benzene, Toluene, Ethylbenzene and Xylene TPH - Total Petroleum Hydrocarbons PAH - Polycyclic Aromatic Hydrocarbons OC/OPP - Organochlorine and Organophosphorus Pesticides			

### 5.2 Field Work

Field work for the assessment was undertaken on 27 November 2017 in conjunction with a geotechnical assessment of the site and was based on the supplied drawing titled "Highway Service Centre". Fieldwork included:



- Site walkover to assess visible surface conditions and identify any evidence of contamination, or past activities that may cause contamination;
- Two shallow test pits undertaken by hand tools, logged and sampled by an Engineering Geologist;
- Twelve test pits undertaken by a backhoe, logged and sampled by an Engineering Geologist; and
- Test pit locations were based on professional judgement with consideration of the site history and visible site features.

Engineering logs of the test pits are presented in Appendix A. The locations of the test pits are shown on Figure 1. They were obtained on site by measurement relative to existing site features.

Soil samples were taken from selected depths below the topsoil using disposable gloves and hand tools which were decontaminated between sampling points using Decon90 detergent and deionised water. The samples were collected in acid-rinsed 250mL glass jars and placed in an ice-chilled cooler box.

### **5.3 Laboratory Testing**

Samples were transported under chain-of-custody conditions to ALS Laboratory Group, a NATA accredited specialist chemical testing laboratory, to be tested for the following suite of contaminants;

- Polycyclic Aromatic Hydrocarbons (PAH)
- Total Petroleum Hydrocarbons (TPH)
- Benzene, Toluene, Ethyl-benzene, Xylenes (BTEX)
- Organochlorine Pesticides (OC/OPs)
- Heavy metals (arsenic, cadmium, chromium, cobalt, copper, lead, mercury, and zinc)
- Presence of asbestos

The results are presented in Appendix B.

### **5.4 Quality Control**

Samples were obtained using industry accepted protocols for sample treatment, preservation, and equipment decontamination. A duplicate of TP7(0- 0.1m) was submitted to the laboratory for analysis as TP15(0 – 0.1m). Results of the duplicate analysis indicated heavy metal concentrations correlated well between the samples.

In addition to the field QC procedures, the laboratory conducted internal quality control testing including surrogates, blanks, and laboratory duplicate samples. The results are presented with the laboratory test results in Appendix B.



On the basis of the results of the field and laboratory quality control procedures and testing the data is considered to reasonably represent the concentrations of contaminants in the soils at the sample locations at the time of sampling and the results can be adopted for this assessment.

## **6 SITE CONTAMINATION ASSESSMENT - RESULTS**

### **6.1 Analysis Results**

An appraisal of the laboratory test results presented in Appendix C is provided below with reference to the adopted soil investigation and screening levels discussed in Section 4.1.

- Concentrations of heavy metals were above detection, but were below adopted health investigation criteria for a Commercial / Industrial site;
- Concentrations of hydrocarbon contaminants were below detection;
- Concentrations of herbicide/pesticide contaminants were below detection; and
- Asbestos fibres were not detected in the soil samples submitted for analysis.

## **7 ASSESSMENT AND CONCLUSIONS REGARDING SITE CONTAMINATION**

### **7.1 Summary**

A Stage 1 Site Contamination Assessment was required to assess all past and present potentially contaminating activities and contamination types and confirm the property is suitable for industrial / commercial use.

Based on the results outlined in this report the following points and recommendations are made:

- A service centre development is proposed for the site which is likely to involve significant site regrading works;
- The subject area of the development is located within Lot 11 D1029846. The subject area comprises cleared farm land that has been used for grazing purposes;
- A large vegetated spoil mound is located in the east of the proposed development. The source of the fill is not known but it is possible that it was derived from drainage improvement works undertaken in the adjacent highway corridor;
- Soil samples from selected locations revealed contaminant concentrations did not exceed adopted guidelines.

### **7.2 Conclusion**

Based on the results obtained in this investigation the site is considered suitable for proposed industrial/commercial land use with regard to the presence of soil contamination provided the recommendations and advice of this report are adopted, and site preparation works are



conducted in accordance with appropriate site management protocols and legislative requirements.

Should any fill material from the spoil mound require removal off-site, it will require assessment for a Resource Recovery Exemption under Part 9, Clauses 91 and 92 of the Protection of the Environment Operations (Waste) Regulation 2014 in accordance with the Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014 – the Excavated Natural Material (ENM) Order 2014.

## **8 LIMITATIONS**

The findings presented in the report and used as the basis for recommendations presented herein were obtained using normal, industry accepted environmental practises and standards. To our knowledge, they represent a reasonable interpretation of the general condition of the site. Under no circumstances, however, can it be considered that these findings represent the actual state of the site at all points. If site conditions encountered during construction vary significantly from those discussed in this report, Regional Geotechnical Solutions Pty Ltd should be contacted for further advice.

This report alone should not be used by contractors as the basis for preparation of tender documents or project estimates. Contractors using this report as a basis for preparation of tender documents should avail themselves of all relevant background information regarding the site before deciding on selection of construction materials and equipment.

If you have any questions regarding this project, or require any additional consultations, please contact the undersigned.

For and on behalf of

**Regional Geotechnical Solutions Pty Ltd**

**Tim Morris**

Senior Engineering Geologist





## Figure



Approximate extent of proposed service centre development

AEC1: Approximate extent of large spoil mound

Legend	
	Borehole Location
	Test Pit Location

2012 SIX Viewer image

	<b>Client</b>	CAMS	Job No.	RGS20621.1
	<b>Project:</b>	PROPOSED SERVICE CENTRE LOT 11 DP1029846, OXLEY HIGHWAY	Drawn By:	GC
	<b>Title:</b>	PROPOSED INVESTIGATION LOCATION PLAN	Date:	15-Sep-17
			Drawing No.	<b>Figure 1</b>





Client	CAMS	Job No.	RGS20621.1
Project:	PROPOSED SERVICE CENTRE LOT 11 DP 1029846 OXLEY HIGHWAY, THRUMSTER	Drawn By:	GC
		Date:	8-Dec-17
Title:	1997 AERIAL PHOTOGRAPH	Drawing No.	Figure 2



# **Appendix A**

## **Site History Documentation**



# **ADVANCE LEGAL SEARCHERS PTY LTD**

(ACN 147 943 842)  
ABN 82 147 943 842

18/36 Osborne Road,  
Manly NSW 2095

Telephone: +612 9977 6713  
Mobile: 0412 169 809  
Email: [search@alsearchers.com.au](mailto:search@alsearchers.com.au)

10<sup>th</sup> November 2017

## **REGIONAL GEOTECHNICAL SOLUTIONS PTY LTD**

Suite 5D/23 Clarence Street,  
**PORT MACQUARIE, NSW, 2444**

**Attention: Tim Morris**

**RE:**

**Oxley Highway,  
Thrumster  
RGS20621.1**

## **Current Search**

Folio Identifier 11/1029846 (title attached)  
DP 1029846 (plan attached)  
Dated 08<sup>th</sup> October 2017  
Registered Proprietor:  
**MARGARET MARY HORE**

**Title Tree**  
**Lot 11 DP 1029846**

Folio Identifier 11/1029846

(a)	(b)
Folio Identifier 10/776843	Folio Identifier 4/880145
PA 63620	Folio Identifier 2/818332
Conv Book 3726 No. 682	Folio Identifier 21/803786
Conv Book 3047 No. 781	CA 47073
Conv Book 2565 No. 214	Conv Book 3189 No 219
Conveyance Book 2464 No 449	
Conveyance Book 2259 No. 149	
Serial No. 59 Page 20	

\*\*\*\*\*

**Summary of proprietor(s)**  
**Lot 11 DP 1029846**

Year	Proprietor(s)
	<b>(Lot 11 DP 1029846)</b>
2008 – todate	Margaret Mary Hore
2001 – 2008	Keith John Hore
2001 – 2001	Stanley Raymond Hore Keith John Hore

**See Notes (a) & (b)**

**Note (a)**

	<b>(Lot 10 DP 776843)</b>
1994 – 2001	Stanley Raymond Hore Keith John Hore
1993 – 1994	Roads and Traffic Authority
	<b>(Part Portion 2 Parish Macquarie – Area 2 Acres 2 Roods 25½ Perches – Conv Bk 3726 No. 682)</b>
1988 – 1993	Roads and Traffic Authority <i>(vide Acquisition)</i>
1988 – 1988	Lindsay Ethel Prior Morgans
	<b>(Part Portion 2 Parish Macquarie – Area 2 Acres 2 Roods 25½ Perches – Conv Bk 3047 No. 781)</b>
1972 – 1988	Lindsay Ethel Prior Morgans, his wife David Frederick George Morgans, plumber
	<b>(Part Portion 2 Parish Macquarie – Area 2 Acres 2 Roods 25½ Perches – Conv Bk 2565 No. 214)</b>
1961 – 1972	Phillip Ernest Jones, surveyors field hand / milk factory employee
	<b>(Part Portion 2 Parish Macquarie – Area 401 Acres 3 Roods 9 Perches – Conv Bk 2464 No. 449)</b>
1958 – 1961	Ernest Hore, farmer
	<b>(Part Portion 2 Parish Macquarie – Area 401 Acres 3 Roods 9 Perches – Conv Bk 2259 No. 149)</b>
1953 – 1958	William Joseph Hore, roofing tile manufacturer Ernest Hore, farmer
1953 – 1953	Lucy Eleanor McInherney, spinster / administrator Peter Ernest McInherney, farmer / administrator Hannah McInherney, estate
1869 – 1953	Hannah Walters, married woman Jeremiah Walters, estate
	<b>(Portion 2 Parish Macquarie and other lands – Area 1920 Acres – Serial No. 59 Page 20)</b>
1839 – 1869	Jeremiah Walters, grantee

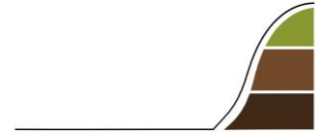
\*\*\*\*\*

**Note (b)**

	<b>(Lot 4 DP 880145)</b>
1998 – 2001	Stanley Raymond Hore, farmer Keith John Hore, farmer
	<b>(Lot 2 DP 818332)</b>
1992 – 1998	Stanley Raymond Hore, farmer Keith John Hore, farmer
	<b>(Lot 21 DP 803786)</b>
1990 – 1992	Stanley Raymond Hore, farmer Keith John Hore, farmer
1990 – 1990	Stanley Raymond Hore, farmer Keith John Hore, farmer Cicely Frances Hore, widow
	<b>(Part Portion 2 Parish Macquarie – Area 401 Acres 3 Roods 9 Perches – Conv Bk 3189 No 219)</b>
1975 – 1990	Stanley Raymond Hore, farmer Keith John Hore, farmer Cicely Frances Hore, widow
1975 – 1975	Cicely Frances Hore, widow / executrix Ernest Hore, estate
	<b>(Part Portion 2 Parish Macquarie – Area 401 Acres 3 Roods 9 Perches – Conv Bk 2464 No 449)</b>
1958 – 1975	Ernest Hore, farmer
	<b>(Part Portion 2 Parish Macquarie – Area 401 Acres 3 Roods 9 Perches – Conv Bk 2259 No 149)</b>
1953 – 1958	Ernest Hore, farmer William Joseph Hore, roofing tile manufacturer
1953 – 1953	Lucy Eleanor McInherney, spinster / administrator Peter Ernest McInherney, farmer / administrator Hannah McInherney, estate
1869 – 1953	Hannah Walters, married woman Jeremiah Walters, estate
	<b>(Portion 2 Parish Macquarie and other lands – Area 1920 Acres – Serial No. 59 Page 20)</b>
1839 – 1869	Jeremiah Walters, grantee

\*\*\*\*\*





## **Appendix B**

### **Results of Field Investigations**



## ENGINEERING LOG - TEST PIT

**CLIENT:** Commercial Asset Management Services Pty Ltd  
**PROJECT NAME:** Highway Service Centre, Lot 11 DP1029846  
**SITE LOCATION:** Cnr Pacific & Oxley Highway, Sancox  
**TEST LOCATION:** See figure 1

**TEST PIT NO:** TP01  
**PAGE:** 1 of 1  
**JOB NO:** RGS20621.1  
**LOGGED BY:** GC  
**DATE:** 27/11/17

**EQUIPMENT TYPE:** Backhoe  
**TEST PIT LENGTH:** 2.0 m  
**WIDTH:** 0.5 m  
**EASTING:** 482627 m  
**NORTHING:** 6518838 m  
**SURFACE RL:**  
**DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
400mm TOOTHED BUCKET	Not Encountered					CL	<b>TOPSOIL:</b> Sandy CLAY, low plasticity, dark brown, Sand fine to medium, traces of grass roots up to 5mm	M < w <sub>p</sub>	Fb			TOPSOIL
				0.25m		CH	<b>Sandy CLAY:</b> Medium to high plasticity, orange/red, Sand fine to medium, traces of Gravel, fine, subrounded		Fb / VSt			RESIDUAL SOIL
				1.60m		CH	<b>Silty CLAY:</b> Medium plasticity, red/brown, with pale grey mottling, Sand fine to medium, traces of Gravel, fine to medium, subangular, traces of Rock fabric			HP	250	EXTREMELY WEATHERED SLATE
		2.00m		2.0								
		B		2.5								
		3.00m		3.0								
				3.5			Hole Terminated at 3.00 m					

### LEGEND:

#### Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

#### Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

### Notes, Samples and Tests

- U<sub>50</sub> 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample
- ASS Acid Sulfate Soil Sample
- B Bulk Sample

#### Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

### Consistency

- VS Very Soft
- S Soft
- F Firm
- St Stiff
- VSt Very Stiff
- H Hard
- Fb Friable

### UCS (kPa)

- <25
- 25 - 50
- 50 - 100
- 100 - 200
- 200 - 400
- >400

### Moisture Condition

- D Dry
- M Moist
- W Wet
- W<sub>p</sub> Plastic Limit
- W<sub>L</sub> Liquid Limit

### Density

- V Very Loose
- L Loose
- MD Medium Dense
- D Dense
- VD Very Dense

- Density Index <15%
- Density Index 15 - 35%
- Density Index 35 - 65%
- Density Index 65 - 85%
- Density Index 85 - 100%



# ENGINEERING LOG - TEST PIT

TEST PIT NO: **TP02**

CLIENT: Commercial Asset Management Services Pty Ltd

PAGE: 1 of 1

PROJECT NAME: Highway Service Centre, Lot 11 DP1029846

JOB NO: RGS20621.1

SITE LOCATION: Cnr Pacific & Oxley Highway, Sancox

LOGGED BY: GC

TEST LOCATION: See figure 1

DATE: 27/11/17

EQUIPMENT TYPE: Backhoe

EASTING: 482834 m




SURFACE RL:

TEST PIT LENGTH: 2.0 m

WIDTH: 0.5 m

NORTHING: 6518760 m

DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result		
400mm TOOTHED BUCKET	Not Encountered					CL	<b>TOPSOIL:</b> Sandy CLAY, low plasticity, dark brown, Sand fine to medium, traces of grass roots up to 5mm	M < w <sub>p</sub>	Fb	HP	380	TOPSOIL	
		0.60m		CH	<b>Sandy CLAY:</b> Medium to high plasticity, orange/brown, Sand fine to medium, traces of Gravel, fine, subangular, variable thickness, 0.6-1.0m	Fb / VSt	RESIDUAL SOIL						
		B			<b>SANDSTONE:</b> Medium to coarse, pale yellow, trace of grey/orange, fractured, medium to high strength, massive, excavated as Sandy GRAVEL		EXTREMELY TO HIGHLY WEATHERED SANDSTONE						
		1.00m											
				1.20m			Hole Terminated at 1.20 m Due to Refusal on Weathered Rock						
				1.5									
				2.0									
				2.5									
				3.0									
				3.5									
<b>LEGEND:</b>					<b>Notes, Samples and Tests</b>					<b>Consistency</b>		<b>UCS (kPa)</b>	<b>Moisture Condition</b>
<b>Water</b>					U <sub>50</sub> 50mm Diameter tube sample					VS Very Soft		<25	D Dry
Water Level (Date and time shown)					CBR Bulk sample for CBR testing					S Soft		25 - 50	M Moist
Water Inflow					E Environmental sample					F Firm		50 - 100	W Wet
Water Outflow					ASS Acid Sulfate Soil Sample					St Stiff		100 - 200	W <sub>p</sub> Plastic Limit
<b>Strata Changes</b>					B Bulk Sample					VSt Very Stiff		200 - 400	W <sub>L</sub> Liquid Limit
Gradational or transitional strata					<b>Field Tests</b>					H Hard		>400	
Definitive or distinct strata change					PID Photoionisation detector reading (ppm)					Fb Friable			
					DCP(x-y) Dynamic penetrometer test (test depth interval shown)					<b>Density</b>		V Very Loose	Density Index <15%
					HP Hand Penetrometer test (UCS kPa)					L Loose			Density Index 15 - 35%
										MD Medium Dense			Density Index 35 - 65%
										D Dense			Density Index 65 - 85%
										VD Very Dense			Density Index 85 - 100%



## ENGINEERING LOG - TEST PIT

**CLIENT:** Commercial Asset Management Services Pty Ltd  
**PROJECT NAME:** Highway Service Centre, Lot 11 DP1029846  
**SITE LOCATION:** Cnr Pacific & Oxley Highway, Sancox  
**TEST LOCATION:** See figure 1

**TEST PIT NO:** TP03  
**PAGE:** 1 of 1  
**JOB NO:** RGS20621.1  
**LOGGED BY:** GC  
**DATE:** 27/11/17

**EQUIPMENT TYPE:** Backhoe  
**TEST PIT LENGTH:** 2.0 m  
**WIDTH:** 0.5 m  
**EASTING:** 482833 m  
**NORTHING:** 6518785 m  
**SURFACE RL:**  
**DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
400mm TOOTHED BUCKET	Not Encountered			0.25m		CL	<b>TOPSOIL:</b> Sandy CLAY, low plasticity, dark brown, Sand fine to medium, traces of grass roots up to 5mm	M < w <sub>p</sub>	Fb	HP	300	TOPSOIL
						CH	<b>Sandy CLAY:</b> Medium to high plasticity, red/orange, Sand fine to medium, traces of Gravel fine to subrounded		Fb / VSt			RESIDUAL SOIL
							<b>SANDSTONE:</b> Medium to coarse grained, pale yellow, traces of white/orange, fractured, medium to high strength, massive, excavated as Sandy GRAVEL					EXTREMELY TO HIGHLY WEATHERED SANDSTONE
				1.00m								
				1.25m			Hole Terminated at 1.25 m Due to Refusal on Weathered Rock					
				1.5								
				2.0								
				2.5								
				3.0								
				3.5								

LEGEND:		Notes, Samples and Tests		Consistency		UCS (kPa)	Moisture Condition	
<b>Water</b>		U <sub>50</sub> 50mm Diameter tube sample		VS	Very Soft	<25	D	Dry
Water Level (Date and time shown)		CBR Bulk sample for CBR testing		S	Soft	25 - 50	M	Moist
Water Inflow		E Environmental sample		F	Firm	50 - 100	W	Wet
Water Outflow		ASS Acid Sulfate Soil Sample		St	Stiff	100 - 200	W <sub>p</sub>	Plastic Limit
<b>Strata Changes</b>		B Bulk Sample		VSt	Very Stiff	200 - 400	W <sub>L</sub>	Liquid Limit
Gradational or transitional strata		<b>Field Tests</b>		H	Hard	>400		
Definitive or distinct strata change		PID Photoionisation detector reading (ppm)		Fb	Friable			
		DCP(x-y) Dynamic penetrometer test (test depth interval shown)		<b>Density</b>		V	Very Loose	Density Index <15%
		HP Hand Penetrometer test (UCS kPa)		L	Loose			Density Index 15 - 35%
				MD	Medium Dense			Density Index 35 - 65%
				D	Dense			Density Index 65 - 85%
				VD	Very Dense			Density Index 85 - 100%





# ENGINEERING LOG - TEST PIT

TEST PIT NO: **TP04**

CLIENT: Commercial Asset Management Services Pty Ltd

PAGE: 1 of 1

PROJECT NAME: Highway Service Centre, Lot 11 DP1029846

JOB NO: RGS20621.1

SITE LOCATION: Cnr Pacific & Oxley Highway, Sancox

LOGGED BY: GC

TEST LOCATION: See figure 1

DATE: 27/11/17

EQUIPMENT TYPE: Backhoe

EASTING: 482808 m


SURFACE RL:

TEST PIT LENGTH: 2.0 m

WIDTH: 0.5 m

NORTHING: 6518868 m

DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
400mm TOOTHED BUCKET	Not Encountered	B	1.00m	0.25m		CL	<b>TOPSOIL:</b> Sandy CLAY, low plasticity, dark grey, Sand fine to medium, traces of grass roots up to 5mm	M < w <sub>p</sub>	Fb	HP	300	TOPSOIL
						CH	<b>Sandy CLAY:</b> Medium plasticity, pale brown, trace of orange/pale grey, Sand fine to medium, traces of Gravel, fine to medium, subangular		Fb / VSt			RESIDUAL SOIL
						CH	<b>Sandy Silty CLAY:</b> Medium to high plasticity, pale grey/white with orange/pale brown mottling, Sand fine to medium, traces of Rock fabric					EXTREMELY WEATHERED SANDSTONE
							<b>SANDSTONE:</b> Medium to coarse, white with traces of orange, fractured, medium strength, foliated, excavated as Gravelly Sandy CLAY		EXTREMELY TO HIGHLY WEATHERED SANDSTONE			
			3.00m	3.0			Hole Terminated at 3.00 m					
				3.5								

## LEGEND:

### Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

### Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

## Notes, Samples and Tests

- U<sub>50</sub> 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample
- ASS Acid Sulfate Soil Sample
- B Bulk Sample

### Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

## Consistency

- VS Very Soft
- S Soft
- F Firm
- St Stiff
- VSt Very Stiff
- H Hard
- Fb Friable

## UCS (kPa)

- <25
- 25 - 50
- 50 - 100
- 100 - 200
- 200 - 400
- >400

## Moisture Condition

- D Dry
- M Moist
- W Wet
- W<sub>p</sub> Plastic Limit
- W<sub>L</sub> Liquid Limit

## Density

- V Very Loose
  - L Loose
  - MD Medium Dense
  - D Dense
  - VD Very Dense
- Density Index <15%  
Density Index 15 - 35%  
Density Index 35 - 65%  
Density Index 65 - 85%  
Density Index 85 - 100%



## ENGINEERING LOG - TEST PIT

TEST PIT NO: **TP05**

CLIENT: Commercial Asset Management Services Pty Ltd

PAGE: 1 of 1

PROJECT NAME: Highway Service Centre, Lot 11 DP1029846

JOB NO: RGS20621.1

SITE LOCATION: Cnr Pacific &amp; Oxley Highway, Sancox

LOGGED BY: GC

TEST LOCATION: See figure 1

DATE: 27/11/17

EQUIPMENT TYPE: Backhoe

EASTING: 482811 m

SURFACE RL:

TEST PIT LENGTH: 2.0 m

WIDTH: 0.5 m

NORTHING: 6518938 m

DATUM:

AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations				
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result					
400mm TOOTHED BUCKET	Not Encountered	E 0.10m		0.10m		CL	<b>FILL:</b> Sandy CLAY, low plasticity, dark brown/dark grey, Sand fine to medium, traces of grass roots up to 5mm	M < w <sub>p</sub>	Fb	HP	300	FILL/TOPSOIL				
		CH				<b>FILL:</b> Sandy CLAY, medium plasticity, grey/pale brown/grey, Sand fine to medium, some Gravel, fine to coarse, subrounded, traces of Cobbles up to 200mm	Fb / Vst		FILL							
		E 0.40m			0.5			CL	<b>TOPSOIL:</b> Sandy Silty CLAY, low plasticity, black	M > w <sub>p</sub>	Fb	HP	180	TOPSOIL		
		CH			<b>Sandy CLAY:</b> Medium to high plasticity, orange/brown, Sand fine to medium, trace of Gravel, fine, subangular			Fb / St	RESIDUAL SOIL							
		CH			<b>Silty CLAY:</b> Medium to high plasticity, dark grey/white, with red mottling, traces of Gravel, fine, subangular, traces of Rock fabric			M < w <sub>p</sub>			EXTREMELY WEATHERED SLATE					
		Hole Terminated at 2.70 m														
		3.0														
		3.5														

### LEGEND:

#### Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

#### Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

### Notes, Samples and Tests

- U<sub>50</sub> 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample
- ASS Acid Sulfate Soil Sample
- B Bulk Sample

#### Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

### Consistency

- VS Very Soft
- S Soft
- F Firm
- St Stiff
- VSt Very Stiff
- H Hard
- Fb Friable

### UCS (kPa)

- <25
- 25 - 50
- 50 - 100
- 100 - 200
- 200 - 400
- >400

### Moisture Condition

- D Dry
- M Moist
- W Wet
- W<sub>p</sub> Plastic Limit
- W<sub>L</sub> Liquid Limit

### Density

- V Very Loose
- L Loose
- MD Medium Dense
- D Dense
- VD Very Dense

- Density Index <15%
- Density Index 15 - 35%
- Density Index 35 - 65%
- Density Index 65 - 85%
- Density Index 85 - 100%



## ENGINEERING LOG - TEST PIT

**CLIENT:** Commercial Asset Management Services Pty Ltd  
**PROJECT NAME:** Highway Service Centre, Lot 11 DP1029846  
**SITE LOCATION:** Cnr Pacific & Oxley Highway, Sancox  
**TEST LOCATION:** See figure 1

**TEST PIT NO:** TP06  
**PAGE:** 1 of 1  
**JOB NO:** RGS20621.1  
**LOGGED BY:** GC  
**DATE:** 27/11/17

**EQUIPMENT TYPE:** Backhoe  
**TEST PIT LENGTH:** 2.0 m  
**WIDTH:** 0.5 m  
**EASTING:** 482845 m  
**NORTHING:** 6518945 m  
**SURFACE RL:**  
**DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
400mm TOOTHED BUCKET	Not Encountered			0.5		CL	<b>FILL:</b> Sandy CLAY, low plasticity, dark brown/grey, traces of grass roots up to 10mm	M < w <sub>p</sub>	Fb			FILL/TOPSOIL
		0.70m		0.50m		CL	<b>TOPSOIL:</b> Sandy CLAY, low plasticity, dark grey, Sand fine to medium, traces of grass roots up to 5mm					TOPSOIL
		B		0.70m		CH	<b>Sandy CLAY:</b> Medium to high plasticity, orange/red with pale brown mottled, Sand fine to medium, trace of Gravel, fine to medium, subangular		Fb / VSt			RESIDUAL SOIL
			1.30m	1.0		CH	<b>Silty CLAY:</b> Medium to high plasticity, pale grey/white with red mottling, traces of Rock fabric, traces of Gravel, fine, subangular			HP	350	EXTREMELY WEATHERED SLATE
				1.5								
				2.0			Hole Terminated at 2.00 m					
				2.5								
				3.0								
				3.5								

**LEGEND:**

**Water**

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

**Strata Changes**

- Gradational or transitional strata
- Definitive or distinct strata change

**Notes, Samples and Tests**

U<sub>50</sub> 50mm Diameter tube sample  
CBR Bulk sample for CBR testing  
E Environmental sample  
ASS Acid Sulfate Soil Sample  
B Bulk Sample

**Field Tests**

PID Photoionisation detector reading (ppm)  
DCP(x-y) Dynamic penetrometer test (test depth interval shown)  
HP Hand Penetrometer test (UCS kPa)

**Consistency**

VS Very Soft <25  
S Soft 25 - 50  
F Firm 50 - 100  
St Stiff 100 - 200  
VSt Very Stiff 200 - 400  
H Hard >400  
Fb Friable

**UCS (kPa)**

V Very Loose  
L Loose  
MD Medium Dense  
D Dense  
VD Very Dense

**Moisture Condition**

D Dry  
M Moist  
W Wet  
W<sub>p</sub> Plastic Limit  
W<sub>L</sub> Liquid Limit

Density Index <15%  
Density Index 15 - 35%  
Density Index 35 - 65%  
Density Index 65 - 85%  
Density Index 85 - 100%



## ENGINEERING LOG - TEST PIT

**CLIENT:** Commercial Asset Management Services Pty Ltd  
**PROJECT NAME:** Highway Service Centre, Lot 11 DP1029846  
**SITE LOCATION:** Cnr Pacific & Oxley Highway, Sancox  
**TEST LOCATION:** See figure 1

**TEST PIT NO:** TP07  
**PAGE:** 1 of 1  
**JOB NO:** RGS20621.1  
**LOGGED BY:** GC  
**DATE:** 27/11/17

**EQUIPMENT TYPE:** Backhoe  
**TEST PIT LENGTH:** 2.0 m  
**WIDTH:** 0.5 m  
**EASTING:** 482704 m  
**NORTHING:** 6518994 m  
**SURFACE RL:**  
**DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
400mm TOOTHED BUCKET	Not Encountered	E 0.10m 0.20m				CL	<b>TOPSOIL:</b> Sandy CLAY, low plasticity, dark brown, Sand fine to medium, traces of grass roots up to 5mm	M < w <sub>p</sub>	Fb			TOPSOIL
		0.50m		0.5		CH	<b>Sandy CLAY:</b> Medium to high plasticity, red/orange, Sand fine to medium, traces of Gravel, fine-subangular		Fb / VSt	HP	300	RESIDUAL SOIL
		0.70m										
		B 1.00m		1.0								
				1.5		CH	<b>Silty CLAY:</b> Medium plasticity, brown/red, with pale brown mottling, some Gravel, fine to medium, traces of Cobbles up to 200mm Chert, traces of Sand fine to medium grained					EXTREMELY WEATHERED SLATE
				2.0			Hole Terminated at 2.00 m					
				2.5								
				3.0								
				3.5								
<b>LEGEND:</b> <b>Water</b> Water Level (Date and time shown) Water Inflow Water Outflow <b>Strata Changes</b> Gradational or transitional strata Definitive or distinct strata change					<b>Notes, Samples and Tests</b> U <sub>50</sub> 50mm Diameter tube sample CBR Bulk sample for CBR testing E Environmental sample ASS Acid Sulfate Soil Sample B Bulk Sample <b>Field Tests</b> PID Photoionisation detector reading (ppm) DCP(x-y) Dynamic penetrometer test (test depth interval shown) HP Hand Penetrometer test (UCS kPa)					<b>Consistency</b> VS Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard Fb Friable <b>Density</b> V Very Loose L Loose MD Medium Dense D Dense VD Very Dense		<b>UCS (kPa)</b> <25 25 - 50 50 - 100 100 - 200 200 - 400 >400 <b>Moisture Condition</b> D Dry M Moist W Wet W <sub>p</sub> Plastic Limit W <sub>L</sub> Liquid Limit Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%



# ENGINEERING LOG - TEST PIT

TEST PIT NO: **TP08**

CLIENT: Commercial Asset Management Services Pty Ltd

PAGE: 1 of 1

PROJECT NAME: Highway Service Centre, Lot 11 DP1029846

JOB NO: RGS20621.1

SITE LOCATION: Cnr Pacific & Oxley Highway, Sancox

LOGGED BY: GC

TEST LOCATION: See figure 1

DATE: 27/11/17

EQUIPMENT TYPE: Backhoe

EASTING: 482590 m

SURFACE RL:

TEST PIT LENGTH: 2.0 m

WIDTH: 0.5 m

NORTHING: 6518949 m

DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
400mm TOOTHED BUCKET	Not Encountered			0.5		CL	<b>TOPSOIL:</b> Silty CLAY, dark grey, trace of grass roots up to 5mm	M < w <sub>p</sub>	Fb			TOPSOIL
				0.50m		CH	<b>Sandy CLAY:</b> Medium to high plasticity, orange/brown, Sand fine to medium, traces of Gravel fine, subrounded	Fb / VSt	HP	300		RESIDUAL SOIL
				2.0			Hole Terminated at 2.00 m					
				2.5								
				3.0								
				3.5								

## LEGEND:

### Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

### Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

## Notes, Samples and Tests

- U<sub>50</sub> 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample
- ASS Acid Sulfate Soil Sample
- B Bulk Sample

### Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

## Consistency

- VS Very Soft
- S Soft
- F Firm
- St Stiff
- VSt Very Stiff
- H Hard
- Fb Friable

## UCS (kPa)

- <25
- 25 - 50
- 50 - 100
- 100 - 200
- 200 - 400
- >400

## Moisture Condition

- D Dry
- M Moist
- W Wet
- W<sub>p</sub> Plastic Limit
- W<sub>L</sub> Liquid Limit

## Density

- V Very Loose
- L Loose
- MD Medium Dense
- D Dense
- VD Very Dense

- Density Index <15%
- Density Index 15 - 35%
- Density Index 35 - 65%
- Density Index 65 - 85%
- Density Index 85 - 100%





# ENGINEERING LOG - TEST PIT

TEST PIT NO: **TP09**

CLIENT: Commercial Asset Management Services Pty Ltd

PAGE: 1 of 1

PROJECT NAME: Highway Service Centre, Lot 11 DP1029846

JOB NO: RGS20621.1

SITE LOCATION: Cnr Pacific & Oxley Highway, Sancox

LOGGED BY: GC

TEST LOCATION: See figure 1

DATE: 27/11/17

EQUIPMENT TYPE: Backhoe

EASTING: 482555 m

SURFACE RL:

TEST PIT LENGTH: 2.0 m

WIDTH: 0.5 m

NORTHING: 6519033 m

DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
400mm TOOTHED BUCKET	Not Encountered	0.20m					0.10m <b>TOPSOIL:</b> Sandy CLAY, low plasticity, dark brown	M < w <sub>p</sub>	Fb			TOPSOIL
		U50				CH	<b>Sandy CLAY:</b> Medium to high plasticity, red/orange, Sand fine to medium, traces of Gravel, fine, subrounded		Fb / VSt	HP	300	RESIDUAL SOIL
		0.45m				CH	<b>Sandy CLAY:</b> Medium to high plasticity, pale brown/yellow, Sand fine to medium, some Gravel, fine to medium, subangular			HP	300	
							<b>SANDSTONE:</b> Medium to coarse grained, pale yellow/white, fractured, low to medium strength, foliated, excavated as Sandy GRAVEL					EXTREMELY TO HIGHLY WEATHERED SANDSTONE
				2.0			Hole Terminated at 2.00 m					
				2.5								
				3.0								
				3.5								

## LEGEND:

### Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

### Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

## Notes, Samples and Tests

- U<sub>50</sub> 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample
- ASS Acid Sulfate Soil Sample
- B Bulk Sample

### Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

## Consistency

- VS Very Soft
- S Soft
- F Firm
- St Stiff
- VSt Very Stiff
- H Hard
- Fb Friable

## UCS (kPa)

- <25
- 25 - 50
- 50 - 100
- 100 - 200
- 200 - 400
- >400

## Moisture Condition

- D Dry
- M Moist
- W Wet
- W<sub>p</sub> Plastic Limit
- W<sub>L</sub> Liquid Limit

## Density

- V Very Loose
  - L Loose
  - MD Medium Dense
  - D Dense
  - VD Very Dense
- Density Index <15%  
Density Index 15 - 35%  
Density Index 35 - 65%  
Density Index 65 - 85%  
Density Index 85 - 100%



## ENGINEERING LOG - TEST PIT

TEST PIT NO: **TP10**

CLIENT: Commercial Asset Management Services Pty Ltd

PAGE: 1 of 1

PROJECT NAME: Highway Service Centre, Lot 11 DP1029846

JOB NO: RGS20621.1

SITE LOCATION: Cnr Pacific & Oxley Highway, Sancox

LOGGED BY: GC

TEST LOCATION: See figure 1

DATE: 27/11/17

EQUIPMENT TYPE: Backhoe

EASTING: 482594 m

SURFACE RL:

TEST PIT LENGTH: 2.0 m

WIDTH: 0.5 m

NORTHING: 6519163 m

DATUM:

AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
400mm TOOTHED BUCKET	Not Encountered					CL	<b>TOPSOIL:</b> Sandy Silty CLAY, dark grey/dark brown, Sand fine to medium, traces of grass roots up to 5mm	M < w <sub>p</sub>	Fb	HP	350	TOPSOIL
						CH	<b>Sandy CLAY:</b> Medium to high plasticity, red/brown with pale brown mottling, Sand fine to medium, traces of Gravel, fine, subangular		Fb / VSt			RESIDUAL SOIL
							Hole Terminated at 2.00 m					

### LEGEND:

#### Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

#### Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

### Notes, Samples and Tests

- U<sub>50</sub> 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample
- ASS Acid Sulfate Soil Sample
- B Bulk Sample

#### Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

### Consistency

- VS Very Soft
- S Soft
- F Firm
- St Stiff
- VSt Very Stiff
- H Hard
- Fb Friable

### UCS (kPa)

- <25
- 25 - 50
- 50 - 100
- 100 - 200
- 200 - 400
- >400

### Moisture Condition

- D Dry
- M Moist
- W Wet
- W<sub>p</sub> Plastic Limit
- W<sub>L</sub> Liquid Limit

### Density

- V Very Loose
- L Loose
- MD Medium Dense
- D Dense
- VD Very Dense

- Density Index <15%
- Density Index 15 - 35%
- Density Index 35 - 65%
- Density Index 65 - 85%
- Density Index 85 - 100%





## ENGINEERING LOG - TEST PIT

**CLIENT:** Commercial Asset Management Services Pty Ltd  
**PROJECT NAME:** Highway Service Centre, Lot 11 DP1029846  
**SITE LOCATION:** Cnr Pacific & Oxley Highway, Sancox  
**TEST LOCATION:** See figure 1

**TEST PIT NO:** TP12  
**PAGE:** 1 of 1  
**JOB NO:** RGS20621.1  
**LOGGED BY:** GC  
**DATE:** 27/11/17

**EQUIPMENT TYPE:** Backhoe  
**TEST PIT LENGTH:** 2.0 m  
**WIDTH:** 0.5 m  
**EASTING:** 482825 m  
**NORTHING:** 6519104 m  
**SURFACE RL:**  
**DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
400mm TOOTHED BUCKET		E 0.10m				CL	<b>TOPSOIL:</b> Sandy Silty CLAY, low plasticity, dark grey, Sand fine to medium, traces of grass roots up to 5mm	M < w <sub>p</sub>	Fb			TOPSOIL
				0.35m		CH	<b>Sandy CLAY:</b> Medium to high plasticity, orange/red, Sand fine to medium, traces of Gravel, fine, subangular		Fb / St	HP	180	RESIDUAL SOIL
		B 0.50m		1.0		CH	<b>Gravelly Sandy CLAY:</b> Medium plasticity, pale grey with pale brown/red mottling, Gravel fine to medium, subangular, iron oxide staining	M > w <sub>p</sub>		HP	120	
				1.50m								
				2.0			Hole Terminated at 2.00 m					
				2.5								
				3.0								
				3.5								

LEGEND:		Notes, Samples and Tests		Consistency		UCS (kPa)	Moisture Condition	
<b>Water</b>		U <sub>50</sub> 50mm Diameter tube sample		VS	Very Soft	<25	D	Dry
Water Level (Date and time shown)		CBR Bulk sample for CBR testing		S	Soft	25 - 50	M	Moist
Water Inflow		E Environmental sample		F	Firm	50 - 100	W	Wet
Water Outflow		ASS Acid Sulfate Soil Sample		St	Stiff	100 - 200	W <sub>p</sub>	Plastic Limit
<b>Strata Changes</b>		B Bulk Sample		VSt	Very Stiff	200 - 400	W <sub>L</sub>	Liquid Limit
Gradational or transitional strata		<b>Field Tests</b>		H	Hard	>400		
Definitive or distinct strata change		PID Photoionisation detector reading (ppm)		Fb	Friable			
		DCP(x-y) Dynamic penetrometer test (test depth interval shown)		Density	V	Very Loose	Density Index <15%	
		HP Hand Penetrometer test (UCS kPa)			L	Loose	Density Index 15 - 35%	
					MD	Medium Dense	Density Index 35 - 65%	
					D	Dense	Density Index 65 - 85%	
					VD	Very Dense	Density Index 85 - 100%	



# ENGINEERING LOG - TEST PIT

**CLIENT:** Commercial Asset Management Services Pty Ltd  
**PROJECT NAME:** Highway Service Centre, Lot 11 DP1029846  
**SITE LOCATION:** Cnr Pacific & Oxley Highway, Sancox  
**TEST LOCATION:** See figure 1

**TEST PIT NO:** TP13  
**PAGE:** 1 of 1  
**JOB NO:** RGS20621.1  
**LOGGED BY:** GC  
**DATE:** 27/11/17

**EQUIPMENT TYPE:** Backhoe  
**TEST PIT LENGTH:** 2.0 m  
**WIDTH:** 0.5 m  
**EASTING:**  
**NORTHING:**  
**SURFACE RL:**  
**DATUM:** AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
400mm TOOTHED BUCKET	Not Encountered	E 0.10m				CL	<b>TOPSOIL:</b> Sandy Silty CLAY, low plasticity, dark grey, Sand fine to medium, traces of grass roots up to 10mm	M < w <sub>p</sub>	Fb			TOPSOIL
						CH	<b>Sandy CLAY:</b> Medium to high plasticity, orange/red, Sand fine to medium		Fb / VSt			RESIDUAL SOIL
				0.5			Hole Terminated at 0.40 m					
				1.0								
				1.5								
				2.0								
				2.5								
				3.0								
				3.5								

<b>LEGEND:</b> <b>Water</b> Water Level (Date and time shown) Water Inflow Water Outflow <b>Strata Changes</b> Gradational or transitional strata Definitive or distinct strata change	<b>Notes, Samples and Tests</b> U <sub>50</sub> 50mm Diameter tube sample CBR Bulk sample for CBR testing E Environmental sample ASS Acid Sulfate Soil Sample B Bulk Sample		<b>Consistency</b> VS Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard Fb Friable		<b>UCS (kPa)</b> <25 25 - 50 50 - 100 100 - 200 200 - 400 >400		<b>Moisture Condition</b> D Dry M Moist W Wet W <sub>p</sub> Plastic Limit W <sub>L</sub> Liquid Limit	
	<b>Field Tests</b> PID Photoionisation detector reading (ppm) DCP(x-y) Dynamic penetrometer test (test depth interval shown) HP Hand Penetrometer test (UCS kPa)		<b>Density</b> V Very Loose L Loose MD Medium Dense D Dense VD Very Dense		Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%			





# ENGINEERING LOG - TEST PIT

TEST PIT NO: **TP14**

CLIENT: Commercial Asset Management Services Pty Ltd

PAGE: 1 of 1

PROJECT NAME: Highway Service Centre, Lot 11 DP1029846

JOB NO: RGS20621.1

SITE LOCATION: Cnr Pacific & Oxley Highway, Sancox

LOGGED BY: GC

TEST LOCATION: See figure 1

DATE: 27/11/17

EQUIPMENT TYPE: Backhoe

EASTING: 482574 m

SURFACE RL:

TEST PIT LENGTH: 2.0 m

WIDTH: 0.5 m

NORTHING: 6518907 m

DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
400mm TOOTHED BUCKET	Not Encountered	E 0.10m				CL	<b>TOPSOIL:</b> Sandy CLAY, low plasticity, dark brown, Sand fine to medium, traces of grass roots up to 5mm	M < w <sub>p</sub>	Fb			TOPSOIL
		E 0.20m				CH	<b>Sandy CLAY:</b> Medium plasticity, brown, Sand fine to medium, traces of Gravel, fine, subrounded		Fb / VSt			RESIDUAL SOIL
		E 0.30m					Hole Terminated at 0.30 m					
				0.5								
				1.0								
				1.5								
				2.0								
				2.5								
				3.0								
				3.5								

## LEGEND:

### Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

### Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

## Notes, Samples and Tests

- U<sub>50</sub> 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample
- ASS Acid Sulfate Soil Sample
- B Bulk Sample

### Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

## Consistency

- VS Very Soft
- S Soft
- F Firm
- St Stiff
- VSt Very Stiff
- H Hard
- Fb Friable

## UCS (kPa)

- <25
- 25 - 50
- 50 - 100
- 100 - 200
- 200 - 400
- >400

## Moisture Condition

- D Dry
- M Moist
- W Wet
- W<sub>p</sub> Plastic Limit
- W<sub>L</sub> Liquid Limit

## Density

- V Very Loose
  - L Loose
  - MD Medium Dense
  - D Dense
  - VD Very Dense
- Density Index <15%  
Density Index 15 - 35%  
Density Index 35 - 65%  
Density Index 65 - 85%  
Density Index 85 - 100%



## **Appendix C**

### **Laboratory Test Results**



**Client:** CAMS  
**Job No.** RGS20621.1  
**Project:** PROPOSED SERVICE CENTRE  
**Location:** LOT 11 DP1029846, OXLEY HIGHWAY, THURMSTER

**Summary Table - Comparison of Chemical Analysis Results (concentrations in mg/kg) for a 'COMMERCIAL/INDUSTRIAL' Site.**

National Environment Protection (Assessment of Site Contamination) Measure (NEPM 2013)

Location	DEPTH (m)	MATERIAL	ASBESTOS PRESENCE	TOTAL RECOVERABLE HYDROCARBONS					PAH		BTEX	PCB	Sum OC Pesticides	HEAVY METALS							
				C6-C10	C10-C16	C16-C34	C34-C40	TOTAL 10-40	Total	b-a-p				As	Cd	Cr*	Cu	Pb	Ni	Zn	Hg
TP5	0-0.1	Clay Soil	-	<10	<10	<50	<100	<100	<50	<0.5	<0.2	<0.1	<0.05	6	<1	25	5	12	4	9	<0.1
TP5	0.3-0.4	Clay Soil	No	<10	<10	<50	<100	<100	<50	<0.5	<0.2	<0.1	<0.05	6	<1	12	<5	11	6	34	<0.1
TP7	0-0.1	Clay Soil	-	-	-	-	-	-	-	-	-	-	-	5	<1	59	13	7	7	8	<0.1
TP12	0-0.1	Clay Soil	-	-	-	-	-	-	-	-	-	-	-	<5	<1	41	8	10	5	8	<0.1
TP13	0-0.1	Clay Soil	-	-	-	-	-	-	-	-	-	-	-	<5	<1	54	22	7	8	18	<0.1
TP14	0-0.1	Clay Soil	-	-	-	-	-	-	-	-	-	-	-	<5	<1	52	20	5	4	12	<0.1
TP14	0.2-0.3	Clay Soil	-	-	-	-	-	-	-	-	-	-	-	<5	<1	70	16	7	7	10	<0.1
Duplicate of TP7 (0-0.1)																					
TP15	0-0.1		-	-	-	-	-	-	-	-	-	-	-	<5	<1	54	11	7	6	7	<0.1
Health Based Soil investigation Level:			0.001% (w/w)	1000	800				4000	40	NL	1	45	3000	900	3600	240000	1500	6000	400000	730
Ecological Investigation Level (EIL):																					
Ecological Screening Level (ESL):				215	170	1700	3300			0.7	75			Coarse grained soil in mg/kg							
				215	170	2500	6600			0.7	95			Fine grained soil in mg/kg							

**NOTES:**

- Denotes concentration exceeds health based guideline for Industrial/Commercial land use
  - Denotes concentration exceeds ecological guideline for Industrial/ Commercial land use
  - Denotes concentration exceeds health and ecological based guideline for Industrial/ Commercial land use
- \* Cr Total = (Cr III + Cr VI)  
# Cr VI

NL No Limit available  
LOR Limit of Reporting



Work Order	: ES1730356
Client	: REGIONAL GEOTECHNICAL SOLUTION
Contact	: MR TIM MORRIS
Address	: Unit 14 25-27 Hurley Drive COFFS HARBOUR NSW, AUSTRALIA 2450
Telephone	: +61 02 6553 5641
Project	: RGS20621.1 WEST GATEWAY
Order number	: ----
C-O-C number	: ----
Sampler	: ----
Site	: ----
Quote number	: EN/222/17
No. of samples received	: 8
No. of samples analysed	: 8

Page : 1 of 8  
Laboratory : Environmental Division Sydney  
Contact : Customer Services ES  
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164  
  
Telephone : +61-2-8784 8555  
Date Samples Received : 30-Nov-2017 15:00  
Date Analysis Commenced : 04-Dec-2017  
Issue Date : 07-Dec-2017 15:36



Accreditation No. 825  
Accredited for compliance with  
ISO/IEC 17025 - Testing

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

## Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Shaun Spooner	Asbestos Identifier	Newcastle - Asbestos, Mayfield West, NSW



## General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

Ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EA200 'Am' Amosite (brown asbestos)
- EA200 'Cr' Crocidolite (blue asbestos)
- EA200 'Trace' - Asbestos fibres ("Free Fibres") detected by trace analysis per AS4964. The result can be interpreted that the sample contains detectable 'respirable' asbestos fibres
- EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.
- EA200 Legend
- EA200 'Ch' Chrysotile (white asbestos)
- EA200: 'UMF' Unknown Mineral Fibres. "-" indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.
- EA200: Negative results for vinyl tiles should be confirmed by an independent analytical technique.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenzo(a,h)anthracene (1.0), Benzo(g,h,i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR.  
Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EA200: For samples larger than 30g, the <2mm fraction may be sub-sampled prior to trace analysis as outlined in ISO23909:2008(E) Sect 6.3.2-2
- EA200: 'Yes' - Asbestos detected by polarised light microscopy including dispersion staining.
- EA200: 'No\*' - No asbestos found, at the reporting limit of 0.1g/kg, by polarised light microscopy including dispersion staining. Asbestos material was detected and positively identified at concentrations estimated to be below 0.1g/kg.
- EA200: 'No' - No asbestos found at the reporting limit 0.1g/kg, by polarised light microscopy including dispersion staining.





## Analytical Results

Sub-Matrix: CLAY  
 (Matrix: SOIL)

Client sample ID

				TP5 0-0.1	TP5 0.3-0.4	TP7 0-0.1	TP12 0-0.1	TP13 0-0.1
Client sampling date / time				29-Nov-2017 00:00	29-Nov-2017 00:00	29-Nov-2017 00:00	29-Nov-2017 00:00	29-Nov-2017 00:00
Compound	CAS Number	LOR	Unit	ES1730356-001	ES1730356-002	ES1730356-003	ES1730356-004	ES1730356-005
				Result	Result	Result	Result	Result
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>								
Moisture Content	----	1.0	%	18.0	12.6	19.8	22.8	26.2
<b>EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples</b>								
Asbestos (Trace)	1332-21-4	5	Fibres	----	No	----	----	----
<b>EA200: AS 4964 - 2004 Identification of Asbestos in Soils</b>								
Asbestos Detected	1332-21-4	0.1	g/kg	----	No	----	----	----
Asbestos Type	1332-21-4	-	--	----	-	----	----	----
Sample weight (dry)	----	0.01	g	----	23.0	----	----	----
APPROVED IDENTIFIER:	----	-	--	----	S.SPOONER	----	----	----
<b>EG005T: Total Metals by ICP-AES</b>								
Arsenic	7440-38-2	5	mg/kg	6	6	5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	25	12	59	41	54
Copper	7440-50-8	5	mg/kg	5	<5	13	8	22
Lead	7439-92-1	5	mg/kg	12	11	7	10	7
Nickel	7440-02-0	2	mg/kg	4	6	7	5	8
Zinc	7440-66-6	5	mg/kg	9	34	8	8	18
<b>EG035T: Total Recoverable Mercury by FIMS</b>								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
<b>EP066: Polychlorinated Biphenyls (PCB)</b>								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	----	----	----
<b>EP068A: Organochlorine Pesticides (OC)</b>								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	----	----	----
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	----	----	----
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	----	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	----	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	----	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	----	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	----	----	----
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	----	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	----	----	----
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	----	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	----	----	----
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	----	----	----

Sub-Matrix: **CLAY**  
(Matrix: **SOIL**)

Client sampling date / time

## EP075(SIM)B: Polynuclear Aromatic Hydrocarbons



## Analytical Results

Sub-Matrix: CLAY  
 (Matrix: SOIL)

Client sample ID

				TP5 0-0.1	TP5 0.3-0.4	TP7 0-0.1	TP12 0-0.1	TP13 0-0.1
Client sampling date / time				29-Nov-2017 00:00	29-Nov-2017 00:00	29-Nov-2017 00:00	29-Nov-2017 00:00	29-Nov-2017 00:00
Compound	CAS Number	LOR	Unit	ES1730356-001	ES1730356-002	ES1730356-003	ES1730356-004	ES1730356-005
				Result	Result	Result	Result	Result
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued</b>								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	----	----	----
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	----	----	----
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	----	----	----
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	----	----	----
Benzo(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	----	----	----
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	----	----	----
Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	----	----	----
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	0.6	0.6	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	1.2	1.2	----	----	----
<b>EP080/071: Total Petroleum Hydrocarbons</b>								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	----	----	----
C10 - C14 Fraction	----	50	mg/kg	<50	<50	----	----	----
C15 - C28 Fraction	----	100	mg/kg	<100	<100	----	----	----
C29 - C36 Fraction	----	100	mg/kg	<100	<100	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	----	----	----
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	<10	----	----	----
>C10 - C16 Fraction	----	50	mg/kg	<50	<50	----	----	----
>C16 - C34 Fraction	----	100	mg/kg	<100	<100	----	----	----
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	----	----	----



## Analytical Results

Sub-Matrix: CLAY  
 (Matrix: SOIL)

Client sample ID

				TP5 0-0.1	TP5 0.3-0.4	TP7 0-0.1	TP12 0-0.1	TP13 0-0.1
Client sampling date / time				29-Nov-2017 00:00	29-Nov-2017 00:00	29-Nov-2017 00:00	29-Nov-2017 00:00	29-Nov-2017 00:00
Compound	CAS Number	LOR	Unit	ES1730356-001	ES1730356-002	ES1730356-003	ES1730356-004	ES1730356-005
				Result	Result	Result	Result	Result
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued</b>								
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	----	----	----
<b>EP080: BTEXN</b>								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	----	----	----
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	----	----	----
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	----	----	----
^ Total Xylenes	1330-20-7	0.5	mg/kg	<0.5	<0.5	----	----	----
Naphthalene	91-20-3	1	mg/kg	<1	<1	----	----	----
<b>EP066S: PCB Surrogate</b>								
Decachlorobiphenyl	2051-24-3	0.1	%	124	96.0	----	----	----
<b>EP068S: Organochlorine Pesticide Surrogate</b>								
Dibromo-DDE	21655-73-2	0.05	%	104	118	----	----	----
<b>EP068T: Organophosphorus Pesticide Surrogate</b>								
DEF	78-48-8	0.05	%	112	110	----	----	----
<b>EP075(SIM)S: Phenolic Compound Surrogates</b>								
Phenol-d6	13127-88-3	0.5	%	81.4	88.7	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%	82.3	83.8	----	----	----
2,4,6-Tribromophenol	118-79-6	0.5	%	103	94.5	----	----	----
<b>EP075(SIM)T: PAH Surrogates</b>								
2-Fluorobiphenyl	321-60-8	0.5	%	99.6	101	----	----	----
Anthracene-d10	1719-06-8	0.5	%	97.3	106	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%	85.5	90.6	----	----	----
<b>EP080S: TPH(V)/BTEX Surrogates</b>								
1,2-Dichloroethane-D4	17060-07-0	0.2	%	125	110	----	----	----
Toluene-D8	2037-26-5	0.2	%	84.8	108	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%	73.6	85.4	----	----	----



## Analytical Results

Sub-Matrix: **CLAY**  
 (Matrix: **SOIL**)

Client sample ID

				TP14 0-0.1	TP14 0.2-0.3	TP15 0-0.1	----	----
Client sampling date / time				29-Nov-2017 00:00	29-Nov-2017 00:00	29-Nov-2017 00:00	----	----
Compound	CAS Number	LOR	Unit	ES1730356-006	ES1730356-007	ES1730356-008	-----	-----
				Result	Result	Result	----	----
<b>EA055: Moisture Content (Dried @ 105-110°C)</b>								
Moisture Content	----	1.0	%	29.1	23.4	19.7	----	----
<b>EG005T: Total Metals by ICP-AES</b>								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	----	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	----	----
Chromium	7440-47-3	2	mg/kg	52	70	54	----	----
Copper	7440-50-8	5	mg/kg	20	16	11	----	----
Lead	7439-92-1	5	mg/kg	5	7	7	----	----
Nickel	7440-02-0	2	mg/kg	4	7	6	----	----
Zinc	7440-66-6	5	mg/kg	12	10	7	----	----
<b>EG035T: Total Recoverable Mercury by FIMS</b>								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	----	----

## Analytical Results

### Descriptive Results

Sub-Matrix: **CLAY**

Method: Compound	Client sample ID - Client sampling date / time	Analytical Results
<b>EA200: AS 4964 - 2004 Identification of Asbestos in Soils</b>		
EA200: Description	TP50.3-0.4 - 29-Nov-2017 00:00	Pale brown clay soil.

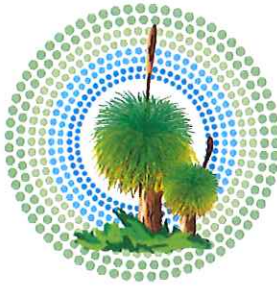




## Surrogate Control Limits

Sub-Matrix: CLAY		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP066S: PCB Surrogate</b>			
Decachlorobiphenyl	2051-24-3	39	149
<b>EP068S: Organochlorine Pesticide Surrogate</b>			
Dibromo-DDE	21655-73-2	49	147
<b>EP068T: Organophosphorus Pesticide Surrogate</b>			
DEF	78-48-8	35	143
<b>EP075(SIM)S: Phenolic Compound Surrogates</b>			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2,4,6-Tribromophenol	118-79-6	40	138
<b>EP075(SIM)T: PAH Surrogates</b>			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
<b>EP080S: TPH(V)/BTEX Surrogates</b>			
1,2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130

## **Attachment 13 Aboriginal Cultural Heritage Assessment**



# **Birpai Local Aboriginal Land Council**

## ***Aboriginal Cultural Heritage Assessment***

***Lot 11 DP 1029846***

***Pacific Highway and Oxley Highway***

***Port Macquarie***

***Prepared by***

***Birpai Local Aboriginal Land Council***

***In response to a***

***Rezoning Proposal***

***for Scott PDI No 6 Pty Ltd***

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## 1. Introduction

The subject land is located at the intersection of the Pacific Highway and the Oxley Highway (often referred to as the donut). The lot in question is approximately 18 ha on the South West side of the intersection. The proposed development area is a 10ha site on the north east corner. It consists of predominately cleared land, with an existing service centre to the East and the Billabong Wildlife Park to the north.

The proposal is to rezone the land to allow for a future Service Centre to be constructed.

The objectives of the Cultural Heritage Assessment are:

- To identify whether the subject land contains objects or is a place of importance or a part of the wider cultural landscape pertaining to local aboriginal people and the area.
- To determine if any potential harm on identified Aboriginal Cultural heritage would be likely to occur from the proposed rezoning and future development of the southern fringe of the land for residential uses.
- To determine the significance of potential harm to any identified Aboriginal objects, places or wider cultural heritage that may be associated with the subject land, should that be the case.

This assessment has been prepared for Scott PDI No 6 Pty Ltd for their proposed purchase and rezoning of Lot 11 DP 1029846. It is not to be used for any other purpose. If the sale of lot 11 does not proceed, then the Birpai Local Aboriginal Land Council agrees to assign to Margaret Mary Hore (Property Owner) the copyright to this cultural assessment.



## 2. Investigator and Contributors

The Site Investigations have been undertaken by:

Mr. Jason Holten, Sites Officer of the Birpai Local Aboriginal Land Council

The site investigator has significant local experience in carrying out site survey investigations and regularly undertakes Sites works in the Port Macquarie area. Mr. Holten has a wealth of knowledge of Aboriginal Culture and Heritage in the local area and is a descendant of the Birpai People.

Jason was accompanied by Mr. Graeme Jones on behalf of Scott PDI No 6 Pty Ltd on the inspection on the 27 November 2017

## 3. Previous Archaeological work

Search of the Aboriginal Heritage Information Management System (AHIMS) – Basic search conducted 12 December 2017 Lot 11, DP1029846 with a buffer of 50 m.

- Basic search identified no Aboriginal Places and no Aboriginal Site in the vicinity of the 50 m buffer.
- Cultural Heritage records held with Birpai Land Council include:

The Birpai Local Aboriginal Land Council holds no records of any items of cultural significance in the vicinity of the land in question.

Of the above resources, references to this area and the Birpai Aboriginal People were the primary search focus. Information relevant to the site or its immediate surrounds was identified as follows:

There are no known aboriginal cultural heritage sites within the subject land. Especially in the area of the proposed rezoning.

## 4. Landscape context

### General Coastal character & predictive model

The results of reviews of archaeological investigations to date indicate that rocky shore, sandy beach, estuarine and hinterland environments were typically utilised by Aboriginal groups. The densest and most diverse archaeological remains are generally found along the coast where food resources were richer. Reliance on estuarine and adjacent hinterland areas was probably sporadic, possibly using freshwater swamps as a primary resource.

A large proportion of recorded sites indicate they have been found on flat terrain, predominantly in coastal heath, along estuarine stream banks, some woodland and dry sclerophyll eucalypt forest and in subtropical rainforest. Less commonly, sites are also found in undulating to hilly terrain either in dry sclerophyll eucalypt forest. Even less so in steep rugged terrain.

There is a greater likelihood of the existence and discovery of Aboriginal sites into the coastal plain. Particularly the crests and basal slopes of low spurlines that extend into and are situated adjacent to flood prone valley floors.

Stone artefacts may occur as open artefact scatters and isolated finds. Midden deposits may occur subsurface on former beach ridges and other alluvial or colluvial deposits which fringe valley floors. Including the former shoreline of the marine embayment and subsequent estuary which formed following the last sea level rise at around 6000 years BP.

Open artefact scatters (or campsites) are considered more likely to occur on relatively flat terrain, well-drained and not too distant from sources of freshwater or along the crests of low ridgelines.

Scarred trees may occur wherever old-growth trees remain. Potential locations include road reserves, remnant riparian vegetation on farmlands, and isolated trees within the state forests.

Prehistoric burial sites are most likely to be found in locally elevated landforms with a relatively deep profile of soft sediments of in the deposits of midden sites.

## Local Aboriginal History

Before European settlement, Aboriginal people roamed the area and used the land to hunt and gather food. Aboriginal ties to the land can be identified with the significant sites in and around the Port Macquarie area with some sites recorded, including burial sites at the Town Green in the CBD.

## Location of the site

The subject land is located approximately 10km southwest of the Port Macquarie CBD, with an existing service centre to the East and the Billabong Wildlife Park to the north

On site, is predominantly cleared land with some vegetation on the property boundary.

## 5. Site Survey & Results

### Sampling Strategy

The sampling strategy is to attend the property by vehicle and undertake intensive walking inspection of the part of the site likely to be impacted upon by the proposed rezoning and future service centre.

The site survey was undertaken on 2 December 2016 by Mr Jason Holten, Senior Site Officer of Birpai Local Aboriginal Land Council.

### Survey Coverage

On 2 December 2016 exposure and visibility across the site is described as generally good.

No test excavations were considered necessary and were not undertaken.

## 6. Results of Survey of 27 November 2017

After a lot of walking over the proposed subdivision area the senior site officer, Mr Holten noted that there had been a lot of disturbance on the Lot over the years, with the removal of trees and stumps from the site and movement of topsoil. Any sign of Aboriginal activity in the area is believed to have been lost or destroyed by early white settlers to the area.

Mr Holten, Senior Sites Officer who attended the property and undertook the survey concluded that no evidence of Aboriginal activity was located on Lot 11 DP 1029846

### Analysis & Discussion

Consultation with local Aboriginal peoples with a relationship to the area revealed no knowledge of occupation or cultural heritage associations with the subject land.

No site recording is required as there are no material traces, evidence or expressed knowledge of Aboriginal land use of the site.


The proposed rezoning and future service centre is not considered likely to impact upon or have any significance for the local Aboriginal community and their cultural heritage.

The assessing site officer can see no reason why the proposal cannot continue.

### Recommendation

Based on the Site Inspection and other investigation, there is no reason from an Aboriginal Cultural and Heritage perspective that this rezoning cannot proceed. However any future development should include a restriction that in the event of any items of Aboriginal significance being found on the site, work is to cease and a Sites Officer from the Birpai Local Aboriginal Land Council is to be engaged to determine how best to proceed.

Signed

  
.....

Mr David Carroll

CEO - Birpai Local Aboriginal Land Council





## **Attachment 14 Economic Impact Assessment**



# Economic Impact Assessment

## Port Macquarie Highway Service Centre

Prepared for Scott PDI No. 6 Pty Ltd

February 2018  
17035

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Disclaimer

The sole purpose of this report is to provide Scott PDI No. 6 Pty Ltd (the Client) with information in accordance with Foresight Partners Pty Ltd's scope of services set out in its proposal to the Client.

Foresight Partners has relied upon information relevant to this report provided by government agencies, the Client and others. Except as otherwise stated in the report, Foresight Partners has not attempted to verify the accuracy or completeness of such information.

The assumptions underlying the findings, observations, forecasts and conclusions presented in this report are subject to significant uncertainties and contingencies. Therefore, actual results may differ significantly from forecast results. Foresight Partners do not make or imply any warranty or guarantee with respect to the data reported or to the findings, observations, forecasts and conclusions expressed in this report. Foresight Partners cannot confirm or guarantee achievement of any forecast growth or performance, as future events, by nature, are not amenable to independent confirmation or substantiation.

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## SUMMARY

Scott PDI No. 6 Pty Ltd (the Client) is seeking an amendment to the Port Macquarie-Hastings Local Environmental Plan (LEP) to permit a highway service centre on the western (northbound) side of the Pacific Highway at the intersection with the Oxley Highway in Thrumster. The proposed 18.4ha site is located about 10km west of the Port Macquarie CBD and 9km east of the township of Wauchope. The land is currently zoned Primary Production and is predominantly vacant.

The proposed highway service centre's commercial facilities are to include a 24 hour 1,560m<sup>2</sup> service station/convenience store, together with five food outlets (one on a stand-alone pad) with a combined 940m<sup>2</sup> gross floor area, common dining hall area, and separated fueling areas for cars and heavy vehicles. Services aimed at long haul heavy vehicles include a truck office, eight room motel, truck tyre and service centre, and truck wash. Extensive vehicle parking, and rest areas are also provided at the centre in accordance with the Roads and Maritime Services (RMS) *General Requirements for Highway Service Centres*. The service centre will provide a direct road safety benefit for truck drivers and travellers using the Pacific Highway, preserving road safety and efficiency on the Pacific Highway.

The suitability and desirability for the use of the site for a major highway service centre has been flagged and supported in both the *Mid-North Coast Regional Strategy 2006-31* and *Section 117(2) - Local Planning Directions of the Environmental Planning and Assessment Act 1979*. These documents recognise the uniqueness of the commercial opportunity presented at the subject site. There are limited opportunities for commercial development in the highway corridor and the subject site has potential to deliver substantial benefits in accordance with the Highway Service Centre Policy of the NSW Government.

Foresight Partners was commissioned to prepare an economic impact and needs assessment of the proposed development.

### Service Centre Network

Foresight Partners undertook an extensive inventory of service stations along the Pacific Highway corridor stretching from Macksville to Taree which identified 50 service stations, including three existing highway service centres. The newest is the Puma Energy service station in South Kempsey, the BP centre to the east of the site, and a Caltex centre just outside Taree. Although these large centres are highway based and perform some functions of a highway service centre only the Puma Energy Station in South Kempsey satisfies all the criteria of a highway service centre as defined by the RMS.

In the urban area away from the highway in six service stations were identified in Port Macquarie, and a further six were located in the township of Wauchope. Of these twelve stations only four are capable of accommodating large heavy vehicles, and only one is staffed 24 hours a day, with a further three open for fuel purchases via an unmanned credit card machine.

The BP highway service centre in Thrumster is in the midst of a staged redevelopment which will predominantly update and expand station facilities such as food outlets and parking arrangements. The planned works bring the existing station more in line with contemporary highway service station standards, which the current facility does not meet without the upgrades. Even with the proposed upgrades the completed station will still only provide eighteen heavy vehicle spaces, of which just ten are suitable for B-Doubles, which falls short of RMS heavy vehicle parking criteria for highway service centres.

### Market Characteristics

Port Macquarie-Hastings current population of 79,905 at 2016 is projected to increase by 11,595 people to 91,500 by 2031 under the 2016 NSW State and Local Government Area Population and Household Projections (Main Series) produced by the NSW Planning and Environment. This will add a further 6,100 households and an estimated 9,295 additional vehicles by 2031.

The Annual Average Daily Traffic (AADT) past the subject site northbound on the on the Pacific Highway is estimated at around 10,300 vehicles in 2017, of which around 2,060 or 20% were heavy vehicles. This is projected to grow to 11,720 in 2021 (the highway service centre's assumed first full year of trading) and to 16,210 vehicles by its tenth year of operation in 2031, and reflects a 3.3% average annual growth rate.

Traffic on the Oxley Highway is estimated at 15,000 vehicles in 2017, of which 750 or 5% are heavy vehicles. This is also projected to grow at 3.3% per annum and reach 17,080 in 2021 and 23,630 in 2031.

### Demand Analysis and Impacts

The proposed highway service centre's petrol station and convenience store forecast turnover in 2021 is based on vehicle turn-in rates for both light and heavy vehicles from the Oxley Highway and Pacific Highways. Average fuel consumption rates, transaction amount, fuel prices (for 2017) and contribution of non-fuel sales (convenience retail sales) were applied to the light and heavy vehicle turn-in rates to produce an estimated annual turnover of \$32.9 million at 2021 for the service station/convenience store.

Estimates of the sales potential for the five food outlets, based on productivity levels and average store turnovers for Australian fast food services anticipate sales at 2021 of about \$5.6 million dollars.

The proposed highway service centre's total forecast turnover at 2021 is \$38.5 million. The forecast levels of sales at 2021 are, in our opinion, unlikely to impact the viability and level of service offered by existing service station and food outlets in or near the Port Macquarie-Hastings LGA. Growth in traffic volumes along the Pacific Highway in the vicinity of the subject site, together with projected increases in resident spending for meals out/takeaway food in Port Macquarie, are sufficient to ameliorate economic impacts on affected businesses over time.

## Need for Highway Service Centre

The proposed development will assist in accommodating current and forecast future demand by local residents, visitors, heavy vehicle drivers and other road users travelling in or through the Port Macquarie and Mid-North Coast areas. The community and economic benefits of employment and increased road safety further add to the need for the proposed highway service centre.

This capital expenditure is thought to generate 60-75 job years during construction and once operational, the highway service centre is likely to employ in the order of 200 people in full-time, part time and casual positions.

Management of driver fatigue is a significant part of road safety, and adequate provision of rest stops has been a major focus of federal and state road authorities for lowering the road toll. The proposed highway service centre either meets or exceeds all of the criteria as outlined by the NSW RMS of a highway service centre.

The provision of rest areas for heavy vehicles on the NSW road network is integral to ensuring drivers have appropriate locations where they can stop during their journey for effective rest and meet their fatigue management obligations. Heavy vehicle rest areas provided by state road authorities, together with commercial truck stop facilities and company depots, form part of Australia's road freight logistics infrastructure. As the subject site is specifically designed to cater to truck and heavy vehicle traffic using the Pacific Highway, the proposed highway service centre will provide all drivers with more options for rest, fuel and food without deviating from the highway corridor.

## Conclusions

From our investigations we conclude that there is a strong need for the proposed highway service centre at the proposed site. This need is demonstrated by the following:

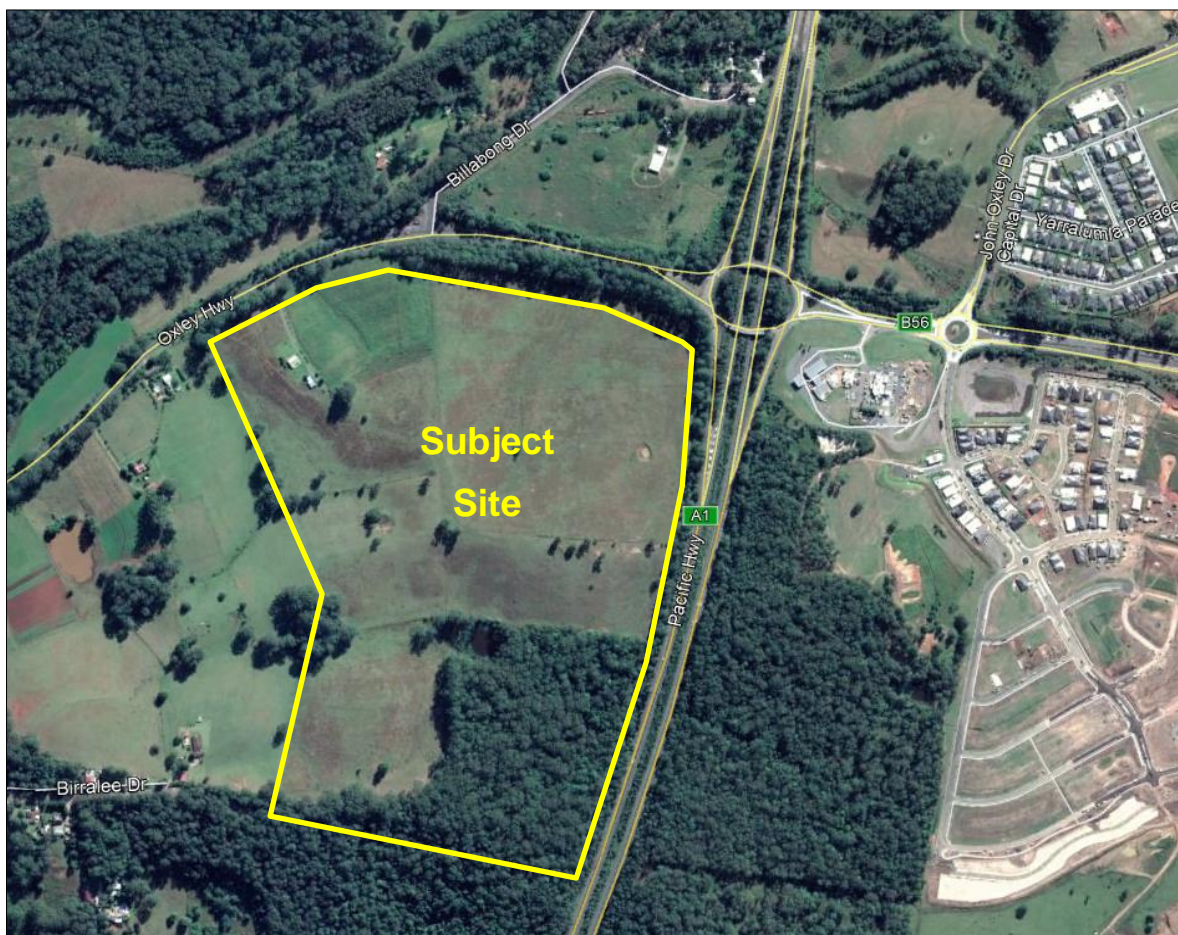
- There are limited highway service centres meeting RMS guidelines along the Pacific Highway between South Kempsey and Taree. No facilities of the scale proposed exist within the Mid-North Coast region.
- The proposed subject site will have auxiliary facilities and features which cater to long haul truck drivers. This level of services proposed are not currently provided in existing facilities in the region, and has the potential to establish the location as a hub for the long haul heavy vehicles.
- The development will generate net community benefits through its contribution to road safety for the motoring public and especially heavy vehicle drivers.
- The centres potential economic impacts will not threaten the viability or level of service presently enjoyed by residents and visitors, but will enhance the overall level of service by providing a facility not presently available in the region. Any potential impacts are likely to be in the short term and would be made good through the provision of a new and multi-function facility.

# 1. INTRODUCTION

Scott PDI No. 6 Pty Ltd is seeking to develop a highway service centre on the southwestern corner of the intersection of the Pacific and Oxley Highway in Port Macquarie. The proposed subject lot is 18.4ha and located at 1179 Oxley Highway, Sancrox (11/DP1029846), approximately 10km west of the Port Macquarie CBD and 9km east of the township of Wauchope.

The land is zoned RU1 Primary Production under the 2011 Port Macquarie-Hastings Local Environment Plan. Containing a single residential dwelling, it is predominantly cleared and vacant, with only the northeastern corner section of the block nearest to the highway intersection proposed for development.

**Figure 1.1: Proposed Port Macquarie Highway Service Centre Site**



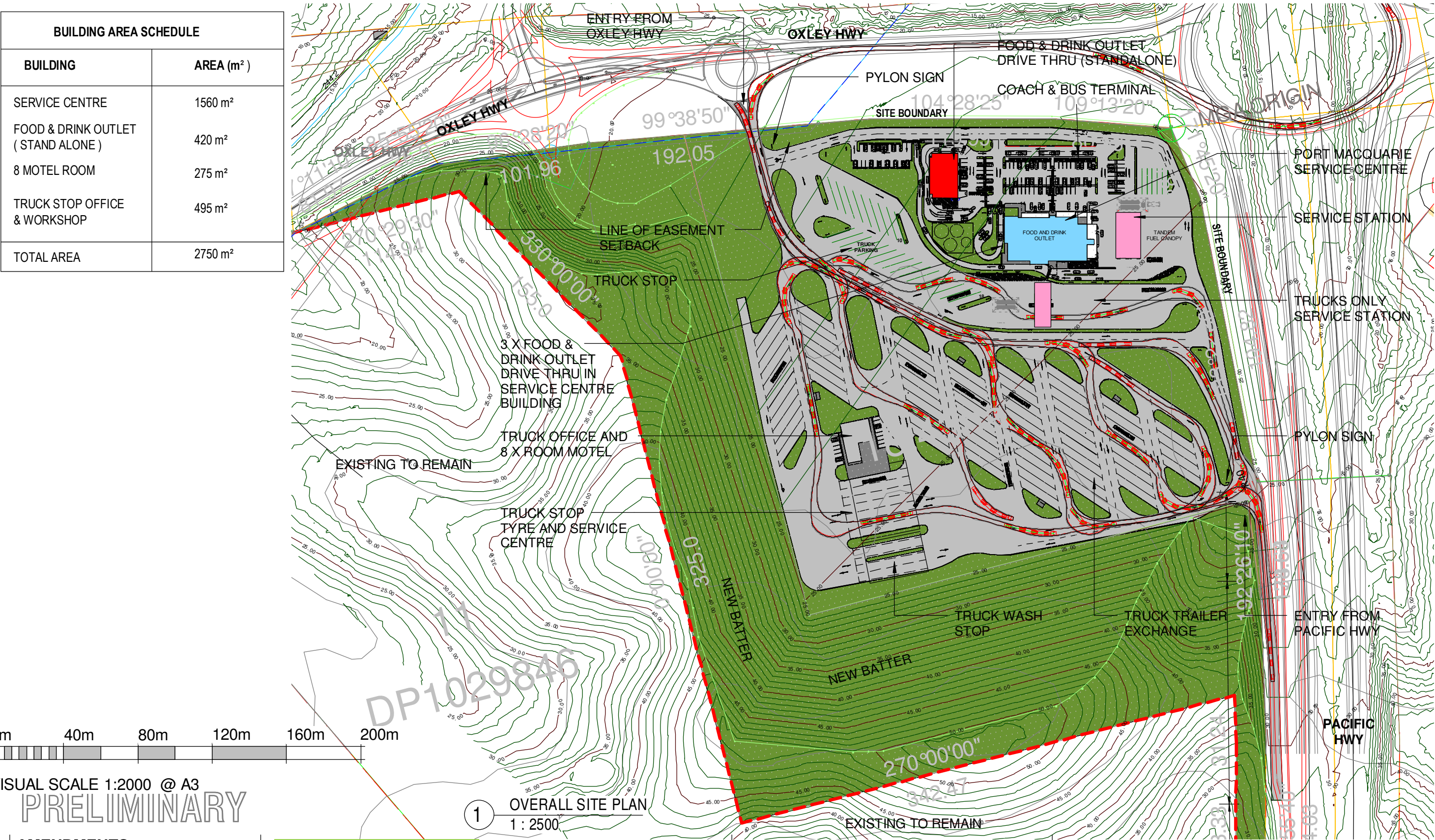
Source: Google Earth Imagery, May 2017.

The proposed development will have two points of entry, a dedicated slip entrance road from the northbound lane of the Pacific Highway, and from a future roundabout on the Oxley Highway. A visual overview of the proposed subject site and its access point is shown in Figure 1.2.



Figure 1.2: Port Macquarie Highway Service Centre, Overall Site Layout and Access Plans

BUILDING AREA SCHEDULE	
BUILDING	AREA (m <sup>2</sup> )
SERVICE CENTRE	1560 m <sup>2</sup>
FOOD & DRINK OUTLET ( STAND ALONE )	420 m <sup>2</sup>
8 MOTEL ROOM	275 m <sup>2</sup>
TRUCK STOP OFFICE & WORKSHOP	495 m <sup>2</sup>
TOTAL AREA	2750 m <sup>2</sup>



0m 40m 80m 120m 160m 200m

VISUAL SCALE 1:2000 @ A3  
PRELIMINARY

AMENDMENTS

AMD	DATE	AMENDMENT DETAILS	BY
1	19-01-18	SCHEMATIC	MW
2	30-01-18	SCHEMATIC	MW
3	31-01-18	SCHEMATIC DESIGN	MW
4	06-02-18	PRELIMINARY ISSUE TO CLIENT	MW
5	07-02-18	NEW SITE EXTENT & PROPOSED EASEMENT WIDENING	MW
6	08-02-18	ROUND ABOUT AND SITE ENTRY	MW



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PORT MACQUARIE  
SERVICE CENTRE

PACIFIC & OXLEY HIGHWAYS, PORT  
MACQUARIE, New South Wales



SCALE : As indicated @A3

DATE : Jan 2018

DRAWN : MW

SHEET TITLE : OVERALL PROPOSED  
SITE PLAN

PROJECT NUMBER : 415172

SHEET NUMBER : A003

REVISION

6

PORT MACQUARIE SERVICE CENTRE



The proposed new highway service centre will comprise:

- 25 B-Double truck parking bays, as well as heavy vehicle, bus and recreational vehicle parking and rest areas;
- Truck and trailer exchange with some 70 B-Double bays;
- Service station with separated truck (4 bowzers – 4 truck capacity) and car (8 bowser – 16 car capacity) fuelling bays with covered canopies;
- Service centre of approximately 1,560m<sup>2</sup> with convenience store, indoor and outdoor common seating areas and children's play equipment;
- A total of five food outlets comprising three fast food outlets and a café within the main service centre building (with a combined shop floor area of some 520m<sup>2</sup>) and one fast food outlet on a separate pad with a floor area of 420m<sup>2</sup>;
- Separate truckers lounge with amenities such as laundry and showers;
- Truck office and eight room motel; and
- Truck stop tyre and service centre (with truck wash).

The proposed facility is in keeping with the most recent requirement criteria for highway service centres as defined by the New South Wales Roads and Maritime Services (RMS) and as such the service centre will provide a direct road safety benefit for truck drivers and travellers using the Pacific Highway.

The suitability of the subject site for a highway service centre is identified in both the *Mid-North Coast Regional Strategy 2006-31*<sup>1</sup> and *Section 117(2) - Local Planning Directions of the Environmental Planning and Assessment Act 1979*<sup>2</sup>. The planning documents recognise the limited number of suitable commercial opportunities along the Pacific Highway corridor the opportunity to deliver a highway service centre on the subject site. The site will deliver a commercial development in the highway corridor in accordance with the Highway Service Centres Policy of the NSW Government, and contribute to road safety and fatigue management.

## 1.1 Purpose of Report and Methodology

Foresight Partners was commissioned by Scott PDI No. 6 Pty Ltd to prepare an economic needs assessment addressing, among other objectives, sources of market demand, existing and potential future competition, and an evaluation of the centre's role in contributing to road safety benefits for motorists and heavy vehicle operators.

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<sup>1</sup> NSW Department of Planning, *Mid North Coast Regional Strategy 2006-31*, pg. 27, March 2009.

<sup>2</sup> Section 117(2) of the *Environmental Planning and Assessment Act 1979*. **Direction 5.4** Commercial and Retail Development along the Pacific Highway, North Coast. (6) Table 1: Highway service centres that can proceed. Issued 21 August 2015.

The tasks undertaken in forming the basis of this assessment included:

- A reconnaissance of the Port Macquarie, Wauchope and mid north coast corridor service station network, an area extending from Macksville in the north to Taree/Glenithorne in the south;
- An inventory of existing highway rest areas, service stations and any accompanying convenience retail, food outlets or accommodation, noting their capacity (number of bowzers/pumps, accessibility, hours of operation, facilities and amenities) particularly as they relate to truck and heavy vehicle drivers;
- Analysis of current and forecast traffic volumes on the Pacific Highway near the subject site using available traffic census information from the RMS and traffic assessments provided by the Client;
- Analysis of projected population growth, vehicle ownership and average household expenditure on meals out/takeaway food within the Port Macquarie area;
- Estimation of the market potential for the proposed service centre based on benchmark turn-in rates and expenditure profiles for existing highway service centres and service stations; and
- Identification of community benefits of the highway service centre with respect to road safety for truck drivers, travellers, and residents using the Pacific Highway.

Section 2 of this report provides an overview of the existing service station network in Port Macquarie, Wauchope and the mid north coast region. It also identifies any other proposed or approved service centre developments in the vicinity of the subject site. This section also identifies rest areas along the Pacific Highway corridor.

Section 3 examines the population growth and socio-economic characteristics of Port Macquarie and the surrounding mid north coast area. This section also forecasts traffic volumes past the site for the purposes of evaluating the highway centre's likely market performance (sales generation).

Section 4 presents a demand analysis and forecasts the performance of the proposed development based on demand generated by fuel and retail sales. The performance of the fast food outlets which form a part of the development are also assessed in this section. The potential impacts that these facilities could have on existing service station and fast food outlets in Port Macquarie, along the Pacific Highway and elsewhere are also discussed.

Section 5 discusses community need and demand for a highway service centre on the subject site in Port Macquarie, including employment, road safety and community benefits.

## 2. SERVICE CENTRE NETWORK

The following section details the current supply of service stations and service centres along the Pacific Highway (A1) to Macksville in the north and Taree to the south, as well as stations to the east and west in Port Macquarie and Wauchope. This section sets out each stations' facilities, and particularly their capacity to cater to trucks and heavy vehicles using the Pacific Highway.

### 2.1 Requirements for Highway Service Centres

The NSW State Government Standard Instrument - Principal Local Environmental Plan defines highway service centres as a "building or place used to provide refreshments and vehicle services to highway users"<sup>3</sup>.

General requirements for highway service centres are provided by RMS in the *Highway Service Centres along the Pacific Highway - Policy Review*<sup>4</sup> and include:

- That the centre is open 24 hours a day, seven days a week;
- That all traffic arrangements are safe and efficient;
- At least 25 heavy vehicle parking spaces be provided (nominally to suit B-Doubles, with capacity to expand to cater for longer combinations in the future) be provided;
- Parking spaces for recreational vehicles and coaches;
- The provision of children's play area and tourist information;
- That use of toilets and other amenities be free of obligation to purchase goods and services. Separate undercover fuel areas for heavy and light vehicles; and
- That no alcohol be sold on site.

Although separation distances between highway service centres are not mandated, guidelines typically aim to establish service centres where driving intervals between towns exceeds two hours on major rural freeways<sup>5</sup>.

### 2.2 Existing Port Macquarie Area Service Stations

A comprehensive inventory was undertaken of the service station network located primarily along the Pacific Highway and Oxley Highway, as well as the Port Macquarie urban area.

---

<sup>3</sup> Standard Instrument – Principal Local Environmental Plan, Dictionary, *Highway Service Centre*.

<sup>4</sup> Highway Service Centres along the Pacific Highway – Policy Review, May 2014. RMS 14.143, Page 4.

<sup>5</sup> Feasibility Study - Parking and Rest Opportunities in Areas Zoned for Industrial Purposes: Options Assessment, May 2010. Austroads Research Report AP-R354/10, Page 36.

In total 50 individual service stations were visited, and a detailed summary of their key characteristics are listed in Appendix Table A1 and shown in Figure A1 at the end of this report.

### 2.2.1 Highway Service Centres

Three existing highway service centres were observed in the study area:

- The newly established large Puma Energy station in South Kempsey;
- The large Caltex travel centre in Glenthorne, just outside Taree; and
- The nearby BP service centre on the southbound side of the Pacific Highway in Thrumster, to the east of the subject site.

The key features of these stations are shown in Table 2.1 and their locations in Figure 2.1.

**Table 2.1: Highway Service Centres on the Pacific Highway, Mid North Coast New South Wales**

Map Ref	Affiliation	Town	Dist. from Site (Km)	Bow-sers (No.)	Max vehicle (No.)	Hours of Operation	Facilities	Comments
1	BP	Port Macquarie	0.2	6 (+3 for trucks)	12 (+ 5 trucks)	24 Hrs	McDonalds and KFC (both with drive-thrus) Subway, Olivers Real Food	Caravan and truck parking (2hr maximum), prepay at counter between 10pm-5am
<b>North of Site</b>								
2	Puma	South Kempsey	39.0	6 (+3 for trucks)	12 (+6 for trucks)	24 Hrs	McDonalds and Red Rooster (with drive- thrus), Subway, Fredos Pies, convenience store, children's play area, food hall seating, tourist destination pamphlets/maps	Highway service centre with showers, truckers lounge, laundry facilities and B-Double overnight parking
<b>South of Site</b>								
3	Caltex	Glenthorne (Taree)	70.3	8 (+5 for trucks)	16 (+6 trucks)	24 Hrs	McDonalds and KFC (both with drive-thrus) Coolibah Café, Subway, dining hall, children's play equipment, picnic tables	B-Double, caravan and bus access and parking

Source: Foresight Partners field inspections, Company websites. January 2018.

#### BP Port Macquarie

The nearest service station is BP located across the Pacific Highway on the southeast of its intersection with the Oxley Highway. The site lacks direct access off of the Pacific Highway for southbound traffic with all these vehicles required to manoeuvre a roundabout, then making a left-in turn from the Oxley Highway.

The station has recently added a Oliver's Real Food outlet which commenced operating on a stand-alone pad in October 2017, joining existing restaurants on site which comprise a McDonalds, KFC (both with drive-thru) and a Subway. None of these restaurants operate on a 24hr/7 day week basis, with McDonalds coming the closest with extended Friday and Saturday all night trading hours.

The service station is relatively small for a highway based centre and features a limited offering of hotbox food, self-serve coffee, and tourism destination pamphlets. At present the station does not allow overnight parking for truckers, with signs indicating the maximum allowable parking limit of two hours. It was noted that the station requires customers to enter the store to prepay for fuel between the hours of 10pm and 5am.

This centre is in the midst of a staged redevelopment which will predominantly update and expand station facilities such as food outlets and parking arrangements. Further stages will improve and add parking facilities, add a children's play area, outdoor seating area (picnic tables) and upgrade the service station convenience store and existing subway restaurant.

The planned works bring the existing station more in line with contemporary highway service station standards, which the current facility does not meet without the upgrades.

Even with the proposed upgrades the completed station will still only provide eighteen heavy vehicle spaces, of which just ten are suitable for B-Doubles, which falls short of RMS heavy vehicle parking criteria for highway service centres. The BP service centre adjoins a newly developing residential area, which may influence some of its potential uses and activities.

#### **Puma Energy South Kempsey**

This new Puma Energy station is the newest highway service station in the region being completed in May 2015. The service centre caters to passing travellers and includes four fast food outlets with a common dining hall, childrens play equipment, and extensive car, trailer and truck parking. The site also serves the long haul trucking community with 25 B-Double parking spaces (meeting the RMS requirement), separated truck and car fuelling areas, truckers lounge, shower and laundry facilities.

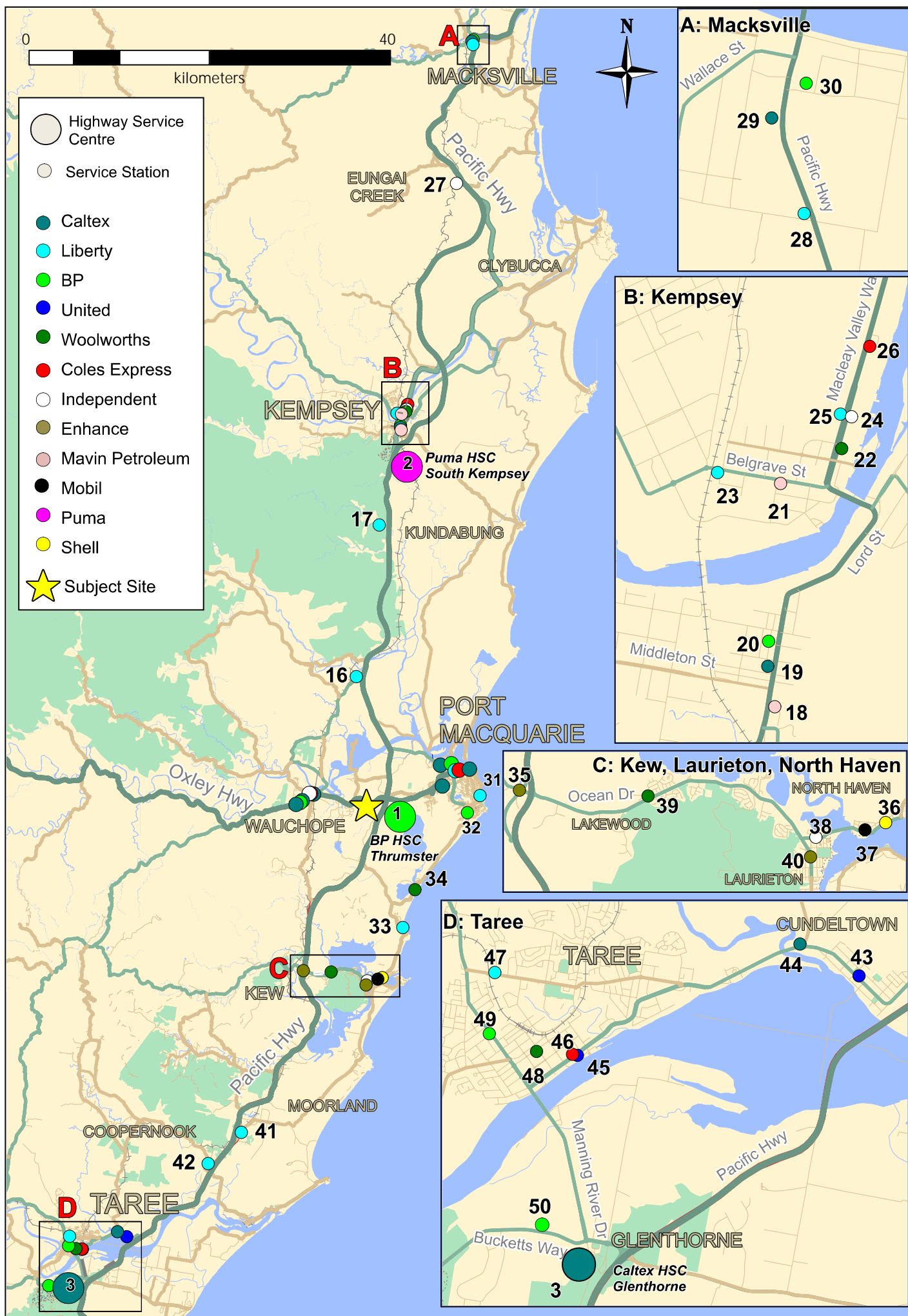
#### **Glenthorne Service Centre (Taree)**

The Caltex highway service centre has only indirect access as it is located approximately 600 metres away from the Pacific Highway intersection. The station has separated truck and car fuelling areas and some 23 B-Double parking space.

At the time of inspection the station was busy and competition for car parks high, with many people opting to park in unmarked spaces on the site's perimeter or in oversize B-Double designated spaces.



**Figure 2.1: Pacific Highway Petrol Station Network, Mid North Coast NSW,**



### 2.2.2 Port Macquarie and Wauchope Urban Area Service Stations

The proposed service station is located roughly at the mid-point between the urban centres of Port Macquarie in the east and Wauchope in the west. The centre will be convenient for traffic travelling between the two towns (including resident commuter traffic).

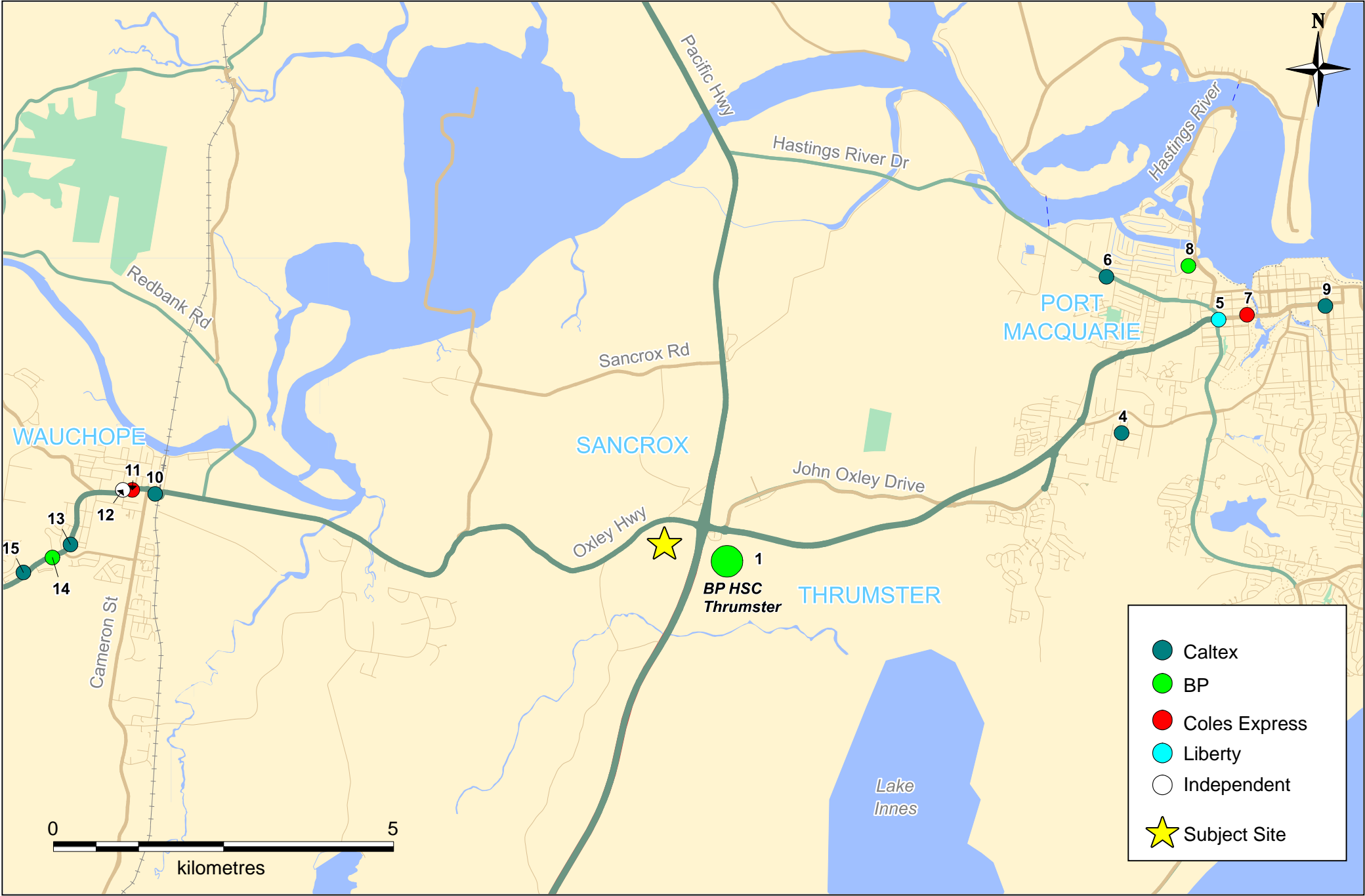
Details of the these service stations are summarised in Table 2.2 and shown in Figure 2.2

**Table 2.2: Service Stations in the Surrounding Port Macquarie Urban Area**

Map Ref	Affiliation	Town	Dist. from Site (Km)	Bow-sers (No.)	Max vehicle (No.)	Hours of Operation	Facilities	Comments
<b>Port Macquarie</b>								
4	Caltex (Jindalee Road)	Port Macquarie	7.4	4	6	24 Hrs (Card Machine)	Small convenience store, mechanic workshop	B-Double access
5	Liberty (Gordon Street)	Port Macquarie	9.2	2	3	M-F: 8am - 5pm Sat: 8am - 12 noon Sun: Closed	Operating out of Bridgestone Tyre Centre	Constrained service station design which is very compact with tight manoeuvrability
6	Caltex (Hastings River Drive)	Port Macquarie	9.3	4	8	M-F: 5am - Midnight Sat: 5am - Midnight Sun: 6am - 10pm	Star Mart convenience store	One additional LPG bowser
7	Coles Express	Port Macquarie	9.6	4	8	M-F: 6am - 10pm Sat: 6am - 10pm Sun: 6am - 10pm	Small convenience store, trailer hire, mechanic workshop	
8	Woolworths	Port Macquarie	9.8	4	8	M-F: 6:30am - 8:30pm Sat: 6:30am - 7pm Sun: 7am - 7pm	Small convenience store	On additional LPG bowser
9	Caltex (Lord Street)	Port Macquarie	11.3	4	8	24 Hrs	Star Mart convenience store, Car Wash	
<b>Wauchope</b>								
10	Caltex	Wauchope	8.9	4	8	24 Hrs (Card Machine)	Bottle-O with drive-thru is attached to building	Part of the Hastings Co-Op
11	Coles Express	Wauchope	9.3	4 (+1 for trucks)	6 (+1 for trucks)	M-F: 6am - 9pm Sat: 6am - 9pm Sun: 7am - 9pm	Convenience store	
12	Independent (Doherty B&E Auto Repair)	Wauchope	9.4	3	4	M-F: 6:30am - 6pm Sat: 7am - 1pm Sun: Closed	Mechanic workshop, car detailing, and car sale yard	
13	Caltex	Wauchope	10.8	3 (+1 for trucks)	(+1 for trucks)	M-F: 6am - 8pm	Small convenience store	One additional LPG bowser, part of the Hastings Co-Op
14	BP	Wauchope	11.2	4	8	M-F: 5am - 10pm Sat: 6am - 10pm Sun: 6am - 10pm	Convenience store, trailer hire	B-Double access
15	Caltex	Wauchope	11.6	1	1	24 Hrs (Card Machine)	Unmanned Diesel Depot	Part of the Hastings Co-Op, closest station to Timbertown and its associated accommodation, bar and restaurants

Source: Foresight Partners field inspections, Company websites. January 2018.

Figure 2.2: Local Petrol Station Network, Port Macquarie and Wauchope Urban Area



## Port Macquarie

Six service stations were identified in the main Port Macquarie urban area. Of these stations two were open 24 hours a day, one through the use of an unmanned card machine. The Caltex at the industrial area on Jindalee Road was the most appropriate for heavy vehicles with the ability to accommodate B-Doubles, however outside of this station only two other stations appear capable of accommodating other heavy vehicles.

## Wauchope

The town of Wauchope approximately 9km west of the subject site was the location of six petrol stations, of which half are part of the Hastings Co-op and operated under the Caltex brand. All stations in Wauchope are located to the west of the North Coast Railway line which periodically closes traffic flow originating from the Highway due to passing trains. Two of the town's stations, both part of the Hastings Co-op, operate 24 hours a day. One is staffed until 8pm. The other is an unmanned, single bower diesel fuelling station operating only via a credit card machine.

## 2.3 Pacific Highway Rest Areas

The New South Wales Department of Transport is currently undertaking a major upgrade to the Pacific Highway between Hexham (near Newcastle) and the Queensland border, and is one of the largest ongoing road infrastructure projects in NSW. As part of these upgrades new and improved highway rest areas have been created along the highway, adding to the existing network of rest areas already in place.

The new rest areas in Clybucca Rest and Four Mile Hill incorporate leading contemporary designs such as segregated truck rest areas that further separate livestock and refrigerated vehicles to reduce noise near sleeping truckers. The flow through design and easy parking for caravans, trucks and cars assist passing travellers, trucks and commuters who may be fatigued. The upgraded Pacific Highway works have improved the provision of these facilities, and represent a move towards incorporating all road users, rather than just holiday makers. However, even with the recent improvements only a small proportion (three of fourteen) of the surrounding rest areas shown in Table 2.3 provide overnight parking for trucks. This table does not include highway service centres, which have been discussed in Section 2.2.1, however they do serve an important function as rest stops for highway traffic.

**Table 2.3: Pacific Highway Corridor Rest Areas, NSW Mid-North Coast**

Rest Area	For Vehicles Travelling	Distance from Subject Site	Co-Ordinates	Type	Rest Area Amenities	Overnight Truck Parking	Truck Access
<b>South of Site</b>							
Sapling Creek	Northbound	8.7km	-31.53284, 152.7885	Rest Area	Toilets, Picnic Tables, Shelter, Bins	No	Yes
Burrawan	Northbound	12.7km	-31.5517, 152.75461	Rest Area	Toilets, Picnic Tables, Shelter, Bins	No	No
Kew Driver Reviver (iKew Centre)	Both Directions	23.0km	-31.63502, 152.72221	Driver Reviver	Toilets, Picnic Tables, Shelter Bins	No	No
Tom Cat Creek	Both directions	40.7km	-31.76491, 152.67148	Rest Area	Toilets, Picnic Tables, BBQ, Shelter, Bins	No	No
Four Mile Hill	Northbound	72.3km	-31.96361, 152.46523	Large Separated Rest Area	Toilets, Picnic Tables, Shelter, Playground, Bins	Yes	Yes
Talawahl Creek	Southbound	83.4km	-32.04994, 152.44678	Recreational Rest Area	Toilets, Picnic Tables, Shelter, Playground, Bins	No	Yes
<b>North of Site</b>							
Hasting-Port Macquarie Driver Reviver	Southbound	2.9km	-31.44077, 152.82394	Driver Reviver	Tea/Coffee, Toilets, Picnic Tables, Bins	No	No
Log Wharf Reserve	Both directions	16.5km	-31.32733, 152.79603	Recreational Rest Area	Toilets, Picnic Tables, Shelter, Bins	No	No
Bloodwood Ridge	Northbound	34.8km	-31.16386, 152.8198	Rest Area	Toilets, Picnic Tables, Shelter, Bins	No	Yes
Clybucca Rest Area	Both directions	69.6km	-30.90962, 152.919	Large Separated Rest Area	Toilets, Picnic Tables, BBQ, Shelter, Bins	Yes	Yes
Paddys Rest	Both directions	83.1km	-30.8133, 152.871	Recreational Rest Area	Toilets, Picnic Tables, BBQ, Shelter, Playground, Bins	No	No

Source: Foresight Partners field inspections, NSW Roads & Maritime Services:

'Rest Areas Map', <https://secure.rms.nsw.gov.au/roads/using-roads/trip-information/rest-areas/map/>

'Driver Reviver Map' <http://roadsafety.transport.nsw.gov.au/stayingsafe/fatigue/driverreviver/map/>

## 2.4 Approved and Proposed Developments

Only one development application relevant to the proposed development was identified.



There is an application (DA2017-871) before Council for a proposed service station located at 16 Sancrox Road, Port Macquarie in an industrial area approximately 2.6km north of the subject site.

There was a previous application (DA2016-801) on the same site for a service station which was refused at a Development Assessment Panel Meeting on the 10<sup>th</sup> of May 2016. The minutes from this meeting list the reasons for the refusal as:

- 1. The proposal is characterised as a highway service centre and is a prohibited land use in the IN1 general industry zone under the Port Macquarie-Hastings LEP 2011.*
- 2. The proposal is likely to result in adverse traffic and safety impacts in the immediate locality.*
- 3. The proposal has potential to result in adverse economic impacts in terms of planning highway service centre sites within the Port Macquarie-Hastings Local Government Area.*

## 3. MARKET CHARACTERISTICS

The Pacific Highway serves as a major interstate coastal route for heavy and light vehicles and carries a large volume of traffic through the region. The proposed highway service centre will serve this passing traffic, as well as current and future Port Macquarie residents and workers using the Pacific and Oxley Highways as part of their commute. This section briefly outlines the population growth prospects and selected socio-economic characteristics of the Port Macquarie area population, followed by current and projected traffic counts past the subject site.

### 3.1 Population Growth

Table 3.1 sets out population projections for the four Local Government Areas (LGA) comprising the Mid-North Coast region at five year intervals to 2036. Port Macquarie-Hastings is the fastest growing LGA in the Mid-North Coast region and is forecast to add an additional 14,795 persons by 2036. This represents an annual increase of 0.9% and accounts for approximately two thirds of the Mid-North Coast region's growth. Figure 3.1 shows the LGAs boundaries.

**Table 3.1: Port Macquarie LGA and Mid North Coast Population Growth 2016-2036**

Local Government Area	2011	2016	2021	2026	2031	2036	Total Increase 2016-36	Total % Increase 2016-36	Average Annual Growth Rate 2016-36
Port Macquarie-Hastings	75,232	79,905	83,900	87,900	91,500	94,700	14,795	18.5%	0.9%
Nambucca	19,235	19,521	20,250	20,550	20,800	20,850	1,329	6.8%	0.3%
Kempsey	29,128	29,454	30,300	30,700	30,850	30,850	1,396	4.7%	0.2%
Mid-Coast	88,818	91,958	93,300	94,850	95,850	96,250	4,292	4.7%	0.3%
<b>Total</b>	<b>212,413</b>	<b>220,838</b>	<b>227,750</b>	<b>234,000</b>	<b>239,000</b>	<b>242,650</b>	<b>21,812</b>	<b>9.9%</b>	<b>0.5%</b>

Source: ABS 2011 and 2016 Census; 2016 New South Wales State and Local Government Area Population Projections, NSW Dept. of Planning and Environment

### 3.2 Selected Socio-economic Characteristics

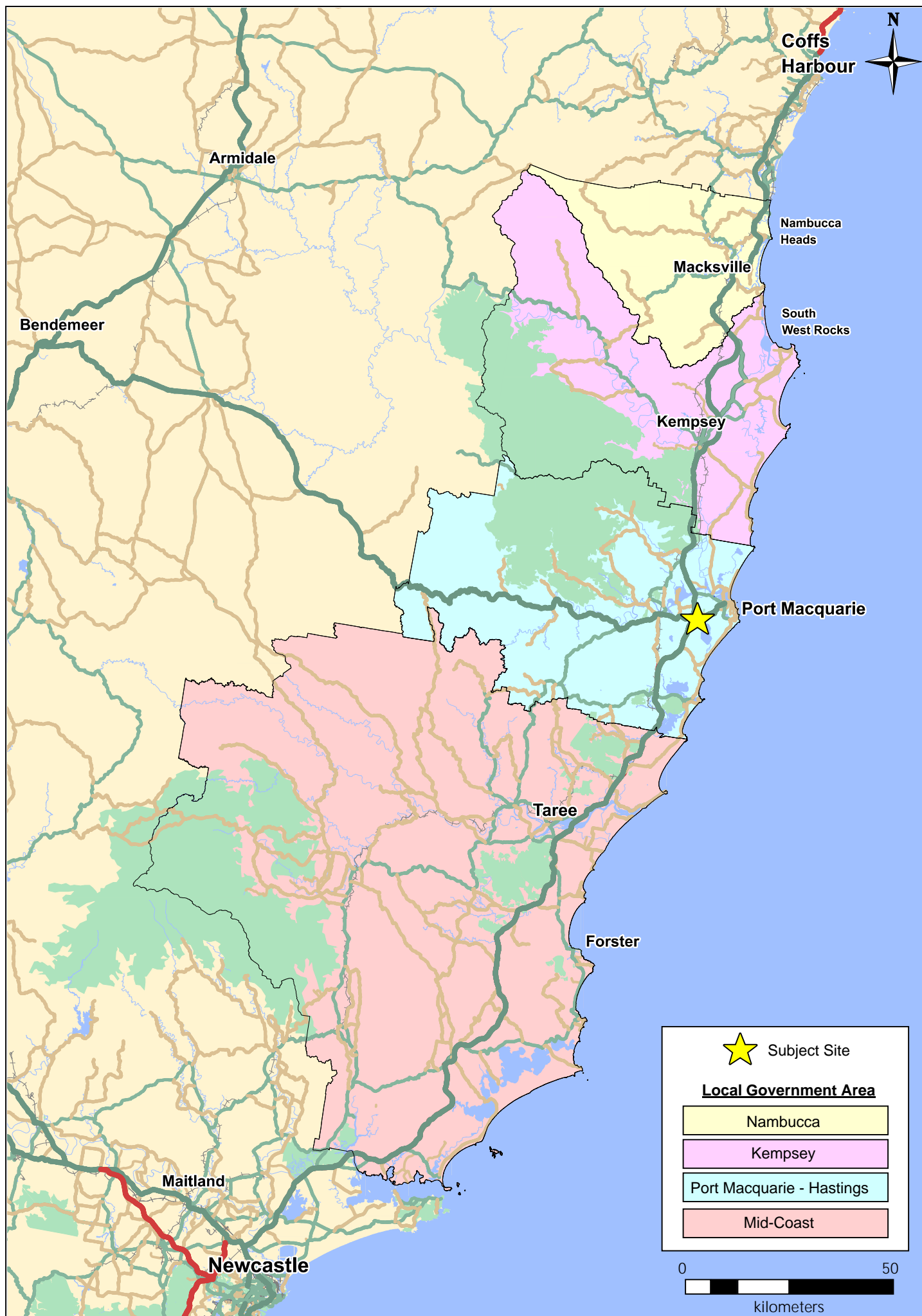
A summary of the key socio-economic characteristics as at the 2016 Census for the Port-Macquarie-Hastings LGA and Mid-North Coast region are shown in Table 3.2. Data for the state of New South Wales serves as a benchmark. Some key points of difference between these areas are:

- Port Macquarie-Hastings has a higher average household income (\$72,778) than the Mid-North Coast region (\$65,601), however this is still significantly lower than the NSW state average (\$97,626).

- The LGA and Mid-North Coast region have a much higher proportion of persons aged 65+ (27.6%) than NSW (16.2%) reflecting the region's popularity with retirees as well as a the propensity for younger age groups to leave the region for work and education purposes.
- Labour force participation rates are much lower in the Port Macquarie LGA (52.0%) and Mid-North Coast region (48.7%) than in NSW as a whole (63.3%), again reflecting the area's large retiree population.
- Mobility is high with only 6.1% of Port Macquarie-Hastings households without a motor vehicle compared to 9.5% for NSW as a whole. Based on detailed vehicle per household data it is estimated that there were a total of 51,818 vehicles in the Port Macquarie LGA at the time of the 2016 Census, averaging 1.5 vehicles per dwelling.

The above characteristics suggest that the Port Macquarie-Hastings area households are more car-dependent and, despite lower average household incomes, may spend above average levels on fuel, given the destinations many households would have for work, shopping, education and other activities.

**Figure 3.1: Mid North Coast Local Government Areas and Subject Site**



**Table 3.2: Summary of Selected Socio-Economic Characteristics**

	Port Macquarie Hasting LGA	Mid-North Coast	New South Wales
<b>Age (%)</b>			
0-14	16.8	16.3	18.6
15-24	9.6	9.5	12.6
25-44	18.8	17.8	27.7
45-64	27.3	28.4	25.0
65+	27.6	28.1	16.2
<b>Employment (%)</b>			
In labour force	52.0	48.7	63.3
Unemployed	6.7	8.1	6.2
White collar occupations	68.9	66.2	71.9
Employed per household	0.9	0.8	1.2
<b>Household Income (%)</b>			
\$0-\$41,600	38.3	43.1	26.8
\$41,600-\$78,000	28.9	29.5	23.2
\$78,000-\$130,000	19.9	17.9	24.0
Over \$130,000	12.9	9.5	26.0
Average (\$2017 values)	\$72,778	\$65,601	\$97,626
<b>Dwelling Structure (%)</b>			
Detached	73.8	80.3	66.9
Semi-detached	13.2	9.7	12.2
Flats/units	10.8	7.8	20.0
Other structure	2.2	2.2	0.8
<b>Dwelling Tenure (%)</b>			
Owned	43.6	45.9	33.2
Purchasing	27.4	26.2	33.3
Renting	27.3	26.7	32.7
<b>Mobility (%)</b>			
No car	6.1	6.2	9.5
1 Car	40.9	41.2	37.8
2 or more cars	52.9	52.6	52.7
<b>Education (Aged 20+) (%)</b>			
Bachelors Degree	10.5	8.7	17.4
Grad Dip/Grad Cert	1.5	1.3	1.8
Postgraduate Degree	2.2	1.7	6.1
<b>Family Type (%)</b>			
Couples with Children	22.3	20.4	32.8
Couples without Children	34.1	34.1	26.8
Single Parent Household	10.9	11.5	10.8
Lone Person Household	29.1	30.1	24.3
Group/Other Household	3.6	3.8	5.3
<b>Ethnicity (%)</b>			
Only English spoken at home	96.8	97.1	73.1
<b>Average Household Size (no.)</b>	2.33	2.31	2.66

Source: ABS 2016 Census

### 3.3 Current and Forecast Traffic Volumes

Traffic volumes have been based on traffic counts completed by TTM Consulting (on behalf of the Client) as part of investigations undertaken for the proposed highway service centre.

The Annual Average Daily Traffic (AADT) past the subject site was in 2017 was estimated at:



- 10,289 vehicles per day (20% heavy vehicle) for the Pacific Highway northbound; and
- Around 15,000 vehicles per day (about 5% heavy vehicle) on the Oxley Highway location.

Foresight Partners have applied a 3.3% per annum growth rates to forecast AADT volumes between 2017 and 2031, consistent with the traffic planning advice from TTM Consulting (on behalf of the client). This growth has taken into account the forecast population growth shown in Table 3.1 as well as the importance of the highway corridor connecting the major cities of Sydney and Brisbane, and the resulting AADT forecasts are shown in Table 3.3.

**Table 3.3: Annual Average Daily Traffic (AADT) Past the Subject Site, Pacific and Oxley Highways**

	2017	2021	2026	2031
<b>Pacific Highway (Northbound)</b>				
Heavy Vehicles	2,058	2,343	2,756	3,242
Other Vehicles	8,231	9,373	11,025	12,968
<i>Total</i>	<i>10,289</i>	<i>11,716</i>	<i>13,781</i>	<i>16,210</i>
<b>Oxley Highway (Western Section)</b>				
Heavy Vehicles	750	854	1,005	1,182
Other Vehicles	14,250	16,226	19,086	22,450
<i>Total</i>	<i>15,000</i>	<i>17,080</i>	<i>20,091</i>	<i>23,632</i>

Source: TTM Consulting (2017 figures); Foresight Partners forecasts.

The proposed highway service centre would serve through traffic along the Pacific Highway as well as local Port Macquarie area resident populations. Local residents are likely to form a significant part of the site's recorded passing traffic, particularly along the Oxley Highway, but it is not practical (or even possible) to separate local resident movements from through traffic travel on available information. However, it is reasonable to assume that much of the heavy vehicle traffic would fall in the 'through traffic' category.

## 4. DEMAND ANALYSIS

This section outlines the demand for the proposed highway service centre and estimates its sales potential from fuel, convenience goods, and dining/takeaway food. The analysis is based on assumed turn-in rates, average fuel consumption and other industry benchmarks relevant to service station operations.

### 4.1 Service Station Demand and Turnover

Applying turn-in rates to the forecast AADT counts at 2021 (the assumed first full year of trade) and at subsequent years generates an estimate of daily customers for the proposed highway service centre and is the basis for estimating its potential market and fuel sales.

#### 4.1.1 Assumed Turn-in Rates

Given the variation in locations and traffic environments in which service stations, and to a lesser extent, highway service centres can operate, universal rule of thumb or benchmark turn-in rates are not readily applicable or even available. Although dated (March 2002) the Road Planning and Design Manual produced by Queensland's Department of Transport and Main Roads provides some design guidance for highway service centres<sup>6</sup>, including turn-in rates:

*The volume of traffic expected to use a Service Centre access may be estimated using the "turn-in rate". This rate will vary depending on the services available and the spacing of facilities along the road. Some Service Centres in NSW have achieved turn-in rates of 10-15%. Individual service stations on the Bruce Highway (SE Region) have shown rates of 4-6%. Up to 10% has been measured.*

*For initial design purposes a rate of 8-10% could be assumed if better information is not available (pg. 20-4 'Rest Areas').*

Given the number and location of service stations in and near the Port Macquarie area (including those located off of the Pacific Highway) catering to passenger vehicles and other light vehicles, and the paucity of stations equipped to cater to heavy vehicles, we have adopted more modest turn-in rate rates as shown in Table 4.1.

Passenger and commercial light vehicle drivers have more choice in service station options particularly in the Port Macquarie and Wauchope urban areas. Truck and heavy vehicle drivers are more constrained, with fewer options and limited accessibility. The facilities proposed as part of the subject site development are superior to all service stations inventoried, with only the highway service centres in Glenthorne (Taree) to the south and South Kempsey in the north comparable.

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<sup>6</sup> Chapter 20: Roadside Amenities.

**Table 4.1: Assumed Turn-In Rates of Passing Traffic (Purchasing Fuel), Port Macquarie Service Centre**

Traffic Source	Vehicle Type		All Vehicles
	Light Vehicles	Heavy Vehicles	
Pacific Highway (Northbound Lane)	5%	4%	4.8%
Oxley Highway	3%	2%	3.0%

Source: Foresight Partners.

Turn-in rates have been calculated for both northbound traffic on the Pacific Highway as well as traffic on the Oxley Highway passing the northern entrance to the site. Trade entering from the Oxley highway roundabout entrance are probably more likely to be local. However overall light vehicle turn in rates will be low because the Oxley Highway carries mainly local traffic who have a range of well-established local service stations. The Oxley Highway will also pick up some southbound heavy vehicles because of its superior facilities catering to truck drivers.

Note that the turn-in rates assumed for this economic need and impact analysis represent those anticipated to make fuel (and convenience store) purchases. Drivers who may only stop for fast food, use the amenities or simply to take a break would be in addition to the vehicles underpinning the economic analysis.

#### 4.1.2 Other assumptions

Other assumptions underpinning the forecast fuel turnover of the proposed new highway service centre include:

- Fuel turnover will increase in line with projected increases in traffic volume (3.3% per annum) to 2031.
- The price of fuel is 139.0 cents per litre, and is held constant over time. The Australian Institute of Petroleum's Retail Prices for NSW show the average retail price per litre of petrol and diesel were very similar in Port Macquarie (139.0 and 137.0 cents, respectively as at February 2018). However, it is acknowledged that fuel prices will continue to fluctuate significantly over time.
- Average fuel transaction of 43 litres per vehicle and subsequent average fuel expenditure of \$59.77 is assumed for light vehicles, which is sourced from the Australasian Association of Convenience Stores' (AACS) *State of the Industry Report*, 2015.
- An average fuel transaction for heavy vehicles of 141 litres is estimated based on total kilometres travelled by light and heavy vehicles in NSW in 2016 and the weighted average fuel consumption for each (11.11 litres per 100kms for light

vehicles and 36.37 litres per 100kms for heavy vehicles)<sup>7</sup>. The average resulting fuel transaction for heavy vehicle is \$195.60.

### Convenience store sales

The convenience store component of most modern service stations form a vital part of their service function. The AACS State of the Industry Report 2015 notes that the average merchandise transaction in 2015 was \$9.80 (pg. 8). This represents about 14% of combined fuel and non-fuel sales per transaction.

IBISworld's *Fuel Retailing in Australia* industry report (December 2017) estimates the average annual sales per retail fuel outlet in Australia is \$4.6 million in 2017-18 of which 79.2% is generated by fuel sales comprising petrol (69.1%), diesel (7.3%), and LPG and other gas (2.8%). Convenience retail goods and services generate 18.2% of sales, with auto related goods (oils, lubricants, additives) contributing the remaining 2.6% of sales<sup>8</sup>.

Table 4.2 sets out our estimates of potential sales for the service station component of the proposed highway service centre at 2021 and in subsequent years (at constant December 2017 dollar values). Non-fuel (convenience store) sales should generate between 15% and 20% of total sales and we have assumed 15.0% for light vehicles and lower 12.5% for heavy vehicles for this analysis.

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<sup>7</sup> Australian Bureau of Statistics: *Survey of Motor Vehicle Use, Australia, 12 months ended 30 June 2016 – Table 4 (cat. no. 92080)*. Note that this is a weighted average transaction over a range of heavy vehicles, including buses. It does not reflect a single class of truck. Long haul vehicles for example, have fuel capacities of 900-1,200 litres or more.

<sup>8</sup> The average annual sales per Australian fuel establishment can vary significantly from year to year due to the volatility of fuel prices, as well as changes in the number of establishments in a given year (currently 7,551 establishments), but the proportion of sales generated by non-fuel merchandise has shown greater stability over time (IBISworld *Fuel Retailing in Australia - Industry G4000 report series*, various years).

**Table 4.2: Forecast Sales, Proposed Pacific Highway Service Centre – 2021 to 2031 (2017 \$ values)**

	2021	2026	2031
<b>Light vehicles AADT</b>			
<b>Pacific Highway</b>	<b>9,373</b>	<b>11,025</b>	<b>12,968</b>
Highway Service Centre Turn-in rate	5.0%	5.0%	5.0%
Daily Patronage (Vehicles)	469	551	648
<b>Oxley Highway</b>	<b>16,226</b>	<b>19,086</b>	<b>22,450</b>
Highway Service Centre Turn-in rate	3.0%	3.0%	3.0%
Daily Patronage (Vehicles)	487	573	674
<b>Total Light Vehicles</b>	<b>955</b>	<b>1,124</b>	<b>1,322</b>
Average fuel sale per Vehicle (Litres)	43	43	43
Fuel sales per annum (Million Litres)	14.995	17.638	20.747
<b>Fuel sales per annum (\$m)</b>	<b>20.8</b>	<b>24.5</b>	<b>28.8</b>
<b>Heavy vehicles AADT</b>			
<b>Pacific Highway</b>	<b>2,343</b>	<b>2,756</b>	<b>3,242</b>
Highway Service Centre Turn-in rate	4.0%	4.0%	4.0%
Daily Patronage (Vehicles)	94	110	130
<b>Oxley Highway</b>	<b>854</b>	<b>1,005</b>	<b>1,182</b>
Highway Service Centre Turn-in rate	2.0%	2.0%	2.0%
Daily Patronage (Vehicles)	17	20	24
<b>Total Heavy Vehicles</b>	<b>111</b>	<b>130</b>	<b>153</b>
Average fuel sale per Vehicle (Litres)	141	141	141
Fuel sales per annum (Litres)	5.691	6.695	7.875
<b>Fuel sales per annum (\$m)</b>	<b>7.9</b>	<b>9.3</b>	<b>10.9</b>
<b>Total vehicles AADT - Pacific Highway</b>			
	11,716	13,781	16,210
<b>Total vehicles AADT - Oxley Highway</b>			
	17,080	20,091	23,632
<b>Daily Patronage (Vehicles)</b>	<b>1,066</b>	<b>1,254</b>	<b>1,475</b>
Average fuel sale per Vehicle (Litres)	53	53	53
Fuel sales per annum (Million Litres)	20.687	24.333	28.622
<b>Fuel sales per annum (\$m)</b>	<b>28.8</b>	<b>33.8</b>	<b>39.8</b>
<b>Convenience Retail Sales (\$m)</b>	<b>4.1</b>	<b>4.8</b>	<b>5.7</b>
<b>Total service station sales (\$m)</b>	<b>32.9</b>	<b>38.7</b>	<b>45.5</b>

Note: Totals may not add due to rounding in calculations. \$1.39/litre fuel price.

Foresight Partners calculations.

Market demand for the proposed service station component of the highway service centre has the potential to generate sales of about \$32.9 million, assuming 2021 as its first full year of trading. Assuming constant market growth (3.3% per annum), this would increase to \$38.7 million in 2026 and \$45.5 million in 2031 (constant 2017 dollars values).



The above forecast sales potential are based on a snapshot of current market conditions and industry performance characteristics as at 2018. They will invariably change over time as fuel prices and market conditions fluctuate. For example, should fuel prices return to their three year average of \$1.32 per litre, the highway service centre sales at 2021 would decrease to \$31.2 million.

## 4.2 Restaurant and Takeaway Food Demand and Turnover

Fast food, takeaway and “on the go” food outlets are a key feature of modern highway service centres, and provide quick and convenient food services to travelers and local residents alike. Major national franchise chain restaurants such as McDonalds, KFC, Subway and others locate stores in well positioned highway service centres, along with many regional food service and local café operators. The proposed highway service centre is planned to include three fast food outlets plus a café in the main service centre and one fast food outlet on an external stand-alone pad. Drive through access would be provided by the stand-alone fast food outlet, as well as by two of the three service station based fast food outlets.

Although it is too early in the approval and development process to nominate the specific potential tenants, we understand that there is already market interest from major chain operators seeking to establish as part of the highway service centre.

As noted in Section 2.2 (Table 2.1), a number of the Port Macquarie region’s fast food outlets are located along the Pacific Highway corridor adjacent to or part of a petrol station. As noted earlier the nearby BP service centre at Thrumster has a McDonalds and KFC, both with a drive-thru, as well as Olivers Real Food and Subway restaurants. Though many service stations offer hot box food (e.g. pies and sausage rolls), only 11 of the 50 inventoried service stations (including all three highway service centres) provided a significant fast food offer.

### 4.2.1 Sources of Demand and Turnover

Passing travelers and long haul truckers from outside of the local area will comprise a significant component of the proposed food outlets patronage base. However the fast food component will also draw some local resident, worker and visitor spending independently of the service station. Patronage by these customers will be driven by locational convenience and appeal of the food offering, and requires a different approach in estimating demand and turnover potential.

The Port Macquarie-Hastings LGA is a significant tourism destination on the New South Wales mid-north coast. Some key metrics for the Local Government Area produced by Tourism Research Australia<sup>9</sup> indicate that the area:

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<sup>9</sup> Tourism Research Australia, *Local Government Area Profiles: Port Macquarie-Hastings, 2016*

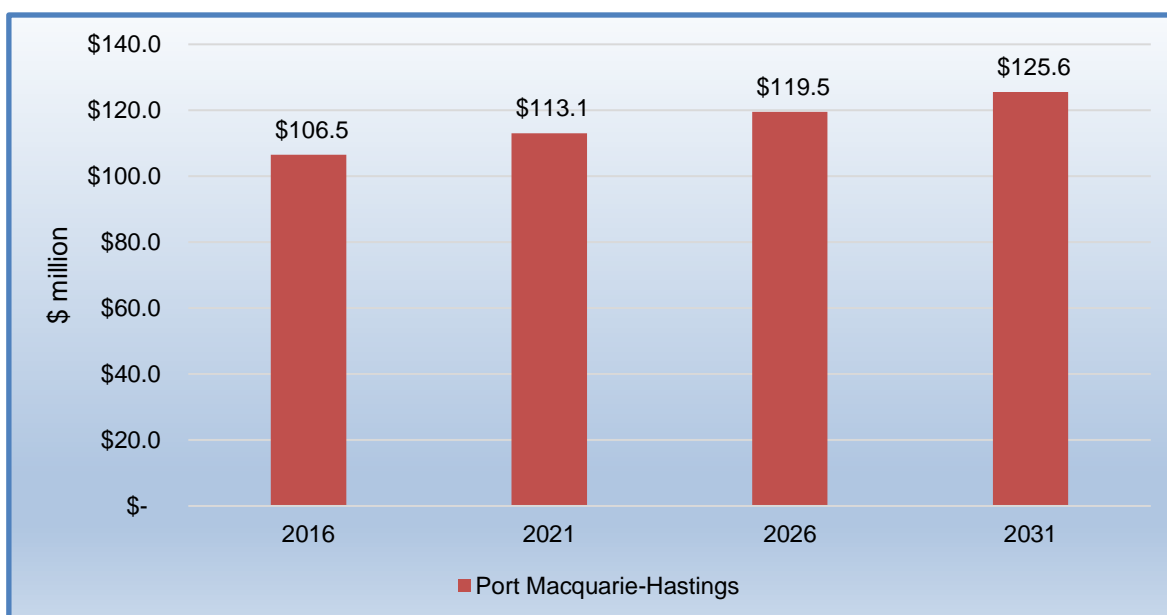
- Attracted 1.465 million visitors in 2016. This comprised 681,000 domestic day visitors, 728,000 domestic overnight visitors, and 56,000 international visitors.
- 2.676 million visitor nights were spent in the Port Macquarie-Hastings LGA in 2016.
- Visitors spent an average of \$302 per trip to the region, with a total annual expenditure of \$443 million dollars.

Holiday makers and other visitors make a significant contribution to Port Macquarie's local economy, including the support of its restaurants, fast food outlets and service stations.

Port Macquarie-Hastings household spending on meals out-takeaway can be estimated from the ABS Household Expenditure Survey, 2015-16 based on weekly spending patterns for non-metropolitan households in NSW. On average these households spend \$60.23 on meals out and fast food per week or \$3,132 per annum.

When applied to the number of households in the area from 2016 to 2031 (Table 3.1) an estimate of the total annual meals out/takeaway spending potential can be generated, as shown in Figure 4.1.

**Figure 4.1: Total Available Household Spend, Meals Out/Takeaway Food, Port Macquarie-Hastings LGA, June 2016 to 2031 (December 2017 \$ values)**



Source: ABS 2015-16 Household Expenditure Survey; Foresight Partners estimates.

Total available expenditure potential on meals out/takeaway food generated by Port Macquarie-Hastings LGA households is forecast to increase by \$19.1 million, from \$106.5 million in 2016 to:

- \$113.1 million in 2021;
- \$119.5 million in 2026;
- \$125.6 million in 2031.

About \$12.5 million is forecast to occur between 2021 and 2031, the first 10 years of operation for the new highway service centre. This \$12.5 million increase in spending is *theoretically* sufficient to support an additional 2,088m<sup>2</sup> of meals out/takeaway food floorspace in the LGA, assuming an average productivity level (turnover per square metre) of \$6,000/m<sup>2</sup>. In practice, only part of this additional spending could be captured by the proposed highway service centre's food outlets.

The average turnover per fast food store in Australia is about \$590,000, although this average reflects a very wide range of businesses<sup>10</sup>. On this basis, the five food outlets would generate sales of about \$2.95 million. However, as the mix of food outlets is expected to include one or more major national chain outlets, overall sales are likely to be higher.

The five café/food outlets proposed in the Pacific Highway service centre will occupy about 940m<sup>2</sup> of gross floor area. This comprises 520m<sup>2</sup> in the main service centre and 420m<sup>2</sup> in the external stand-alone outlet, and excludes all common seating areas floor space.

To estimate turnover for the five fast food outlets we have applied an industry benchmark of \$6,000/m<sup>2</sup> to the 940m<sup>2</sup> to generate an indicative turnover of \$5.6 million in 2021.

Local residents and workers in the Port Macquarie LGA area are likely to generate a significant proportion of the highway service centres fast food sales, as local residents have greater opportunity and are more likely to pass the site much more frequently than passing visitor and through traffic. Assuming that 40% (or \$2.26 million) of the \$5.6 million estimate originates from Port Macquarie-Hastings residents and workers and 60% originates from visitor spending, the proposed highway service centre would require just over a 2.0% share of the \$113.1 million in meals out/takeaway food spending generated by Port Macquarie-Hastings households at 2021.

In Foresight Partners opinion, this level of market share should be readily achievable, but actual turnover figures will be determined by the mix of food outlets provided and hours of operation.

At a constant 2.0% market share and consistent visitor contribution of 60%, the total food outlet sales redirected to the highway service centre from the local market would increase to about \$2.37 million in 2026 and \$2.49 million in 2031.

### 4.3 Total Highway Service Centre Turnover and Potential Impacts

The combined sales potentially achievable by the highway service station, its convenience store, and the food outlets which comprise the highway service centre are estimated at:

- \$38.5 million in 2021 (the assumed first full year of trade);
- \$44.6 million in 2026; and

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<sup>10</sup> IBISWorld's *Fast Food and Takeaway Food Services in Australia* report, (December 2017) shows revenues of \$19.7 billion generated by some 33,728 establishments. However, some individual major chain stores can achieve sales in excess of \$5 million and employ 100 or more people per store.

- \$51.7 million in 2031.

The \$38.5 million in turnover at 2021, also represents the potential impacts upon existing service stations, cafes/restaurants and takeaway food outlets, although their distribution will differ.

#### 4.3.1 Potential Highway Service Centre Impacts

The proposed service station/convenience store sales of \$32.9 million (\$28.8 million fuel, \$4.1 million convenience store) are expected to be distributed over many service stations, both within Port Macquarie, the Mid-North Coast area and beyond the region.

Of the \$32.9 million service station impact \$8.9 million (or 27%) is forecast to originate from heavy vehicles. Impacts from these users will be spread over a range of highway service stations along the Pacific Highway corridor, and over great distances. Within the Mid-North Coast area, impacts will fall primarily upon the three existing highway service centres at South Kempsey (Puma Energy), Port Macquarie (BP) and Glenthorne (Caltex) which are the proposed service centre's most comparable and nearest competitors.

Of the \$8.9 million in impacts we estimate 50% will be spread amongst these three highway service centres stations, and the remaining 50% will occur well beyond the study region, owing to the extended range of long haul highway vehicles. Under these assumptions impacts would average about \$1.5 million each.

Light vehicle sales are estimated to account for approximately \$24.0 million (or 73%) of the facilities turnover in 2021. It is the light vehicle fuel sales (including a share of convenience retail sales) that are likely to be most relevant to smaller competing service stations in the Port Macquarie and Wauchope urban areas. If impacts were concentrated *only* on the petrol stations in Wauchope and Port Macquarie urban areas (12 stations), the average impact would amount to an average of about \$2.0 million at 2021.

However, impacts are likely to be spread over a larger number of service stations than just these 12 in Port Macquarie and Wauchope, including service stations to the north and south of Port Macquarie, including the three highway service centres. The actual distribution of impacts will be strongly influenced by the brand operator secured for the proposed highway service centre.

Several factors will help to mitigate the level of impacts on any single service station at 2021:

- The highway service centre function of the development is aimed at providing 24 hour easy access refueling facilities for all motorists, with dedicated truck and other large vehicle parking and service centre amenities for heavy vehicle drivers (including an eight room motel) which are presently unavailable in Port Macquarie, and only partially available at sites to the north and south of the area. By providing easy access to purpose built facilities (incorporating RMS defined requirements) the centre is expected to serve long haul heavy vehicle users of the Pacific Highway that might otherwise bypass Port Macquarie. A superior provision of

facilities and features will also appeal to light vehicle drivers passing through or visiting the area.

- Northbound traffic is currently not as well served as southbound traffic on the Pacific Highway in the Port Macquarie area. The nearby BP at Thrumster is on the eastern side of the highway and therefore more convenient to southbound traffic. In addition, the new Puma station in South Kempsey, the most comparable service station to the proposed development, is located on the eastern side of the highway and more conveniently accessible to southbound traffic.
- Although the future operator of the proposed highway service centre is subject to the outcome of commercial negotiations, brand loyalty is also likely to mitigate potential impacts on some stations. Fuel discount dockets offered by the major supermarket chains provide an incentive for many motorists to bypass the nearest service station in favour of their brand. Fuel cards offered by other operators also encourage brand loyalty and this marketing device may be of greater relevance to the subject site due to its orientation towards commercial truckers.
- The population growth in Port Macquarie and the wider mid-north coast region, and resultant concomitant traffic growth on the Pacific Highway corridor, will help to ameliorate potential impacts over time. Traffic along the highway is projected to increase by around 3.3% per annum to 2031, and population growth in Port Macquarie is forecast to grow at a lower rate around of 1%. As noted in Section 3.2, household growth between 2016 and 2031 is likely to add a further 9,295 vehicles to the LGA. At an average annual fuel consumption of 1,345 litres for passenger cars in NSW (in 2016), these additional cars alone would generate demand for an additional 12.5 million litres of fuel per annum by 2031, which will also underpin need for additional service stations as well as support existing ones<sup>11</sup>.

Impacts upon any one service station will also be determined by the ultimate operator. Should the operator be part of a branded franchise already present in Port Macquarie or the Pacific Highway corridor, potential impacts are likely to be weighted towards sister stations, especially if they offer customer loyalty benefits (Coles Express/Woolworths discount fuel dockets). On the other hand, with an operator new to the area impacts would be more dispersed.

The impacts upon the nearby BP highway service centre in Thrumster will be mitigated as that centre will remain the more accessible station for southbound vehicles on the Pacific Highway. The addition of the proposed centre would balance the current arrangements, and enhance the ease of access for northbound vehicles seeking fuel, food and rest.

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<sup>11</sup> ABS Survey of *Motor Vehicle Use, Australia, 12 months ended 30 June 2016*. Tables 4 and 5, Cat. No. 9208.0



#### 4.3.2 Potential Food Outlet Impacts

The forecast \$5.6 million in sales generated by the fast food outlets at 2021 will similarly be redirected from a range of outlets from within Port Macquarie, the surrounding LGA and beyond. Of this total turnover, approximately 40% or \$2.3 million is expected to originate from Port Macquarie-Hastings LGA residents, and the other 60% from visitors and through traffic such as holiday makers and truckers.

As previously noted in Section 4.2.1, the growth in household spending on meals out/takeaway food will increase by \$12.5 million between 2021 and 2031. Levels of impact upon any one trader are therefore likely to be minor and ameliorated by growth in resident spending and visitor spending. As with fuel sales, the proposed highway service centres is also expected to capture food spending that might not otherwise occur in the Port Macquarie area, particularly for northbound traffic.

#### 4.3.3 Impact Implications

Based on the analyses undertaken and described above, the forecast levels of sales at 2021 are, in our opinion, unlikely to impact the viability and level of service offered by existing service stations and food outlets in or near the Port Macquarie area or along the Pacific Highway.

Growth in traffic volume along the Pacific Highway corridor, together with projected increases in resident spending for meals out/takeaway in Port Macquarie are sufficient to ameliorate economic impacts on affected businesses over time.

As discussed later in Section 5, the proposed highway service centre will generate a number of significant benefits which further add to the need and demand for the new facility.

### 4.4 Alternative Sites

Highway service centres provide extensive parking and rest areas for heavy vehicle drivers as well as the motoring public and, as previously noted, the RMS have defined criteria for these developments including parking areas for up to 25 B-double parking spaces as well as parking for buses and recreational vehicles and trailer parking spaces. Coupled with the separate refueling plazas for light and heavy vehicles, convenience store, amenities and other features that constitute a highway service centre, they therefore require relatively large sites adjacent to, and with easy access from, the highway being served. This means that alternative sites for the proposed facilities are very limited due to the site scale required and dependence on a neighbouring highway intersection.

The subject site is well positioned to deliver the required facilities and amenities comprising a highway service centre and is well located to facilitate easy and safe ingress from the Pacific Highway northbound as well as ingress/egress via the Oxley Highway.

The subject site not only meets the RMS requirements, but in the case of B-Double parking significantly exceeds the required provision. Layout plans for the station show a provision of 25 B-Double truck parking spaces near to the main building (meeting RMS definitions),

but beyond this providing a further 70 B-Double spaces in the truck and trailer exchange area. As part of Foresight Partners' field reconnaissance of the Port Macquarie and Mid-North Coast area, and a review of land use zones, no other potential alternative locations for a major highway service centre could be identified.

## 5. NEED FOR HIGHWAY SERVICE CENTRE

Sustained population growth, intercity travel, and the resultant increase in economic activity will drive the need and demand for additional highway service centres and facilities along the Pacific Highway. The proposed development will assist in accommodating current and forecast future demand by local residents, visitors, heavy vehicle drivers and other road users travelling in or through the Port Macquarie and Mid-North Coast areas.

Port Macquarie is projected to experience the fastest growth in the Mid-North Coast area, and whilst this overall growth is still relatively modest it will contribute to the need for additional service station facilities, as will continued growth in traffic using the Pacific Highway

Community and economic benefits of employment and increased road safety further add to the need for the proposed highway service centre.

### 5.1 Need and Demand

The suitability and desirability for the use of the site for a major highway service centre has been flagged and supported in both the *Mid-North Coast Regional Strategy 2006-31* and *Section 117(2) - Local Planning Directions of the Environmental Planning and Assessment Act 1979*<sup>12</sup>. These documents recognise the uniqueness of the commercial opportunity presented at the subject site. There are limited opportunities for commercial development in the highway corridor and the subject site has potential to deliver substantial benefits in accordance with the Highway Service Centre Policy of the NSW Government.

Our analysis on the highway service centre network corroborate the site suitability and potential need and demand for the proposed development. The proposed centre's commercial performance should not jeopardise the viability and function of competition fuel retailers and will meet an identified need.

### 5.2 Employment

The highway service centre will directly support construction related jobs during its construction phase. The number of jobs (jobs years) supported will be a function of the project's capital costs, which are likely to be in the range of \$20-25 million. This capital expenditure is thought to generate 60-75 job years during construction.

Once operational, the highway service centre is likely to employ in the order of 200 people in full-time, part time and casual positions, depending on the hours of operation of the food outlets. For comparison the recently completed Puma Highway Service Station in South

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<sup>12</sup> Section 117(2) of the *Environmental Planning and Assessment Act 1979*. **Direction 5.4** Commercial and Retail Development along the Pacific Highway, North Coast. (6) Table 1: Highway service centres that can proceed. Issued 21 August 2015

Kempsey employees approximately 185 staff across all outlets in the station, with 120 positions in the McDonalds restaurant alone<sup>13</sup>.

### 5.3 Community Benefits

The proposed highway service centre will enhance the choice and variety of service stations in the local area as well as provide a major new facility serving travelers and truck drivers using the Pacific Highway. The Pacific Highway – Oxley Highway interchange is currently served by the BP highway service centre and is well positioned to serve southbound Pacific Highway traffic, although access is somewhat indirect. The proposed development will provide a more comprehensive facility with direct access into the site for northbound traffic.

The range and scale of truck specific facilities such as truck wash, extensive trailer exchange, tyre/service centre and small motel are not currently provided by other highway service centres in the mid-north coast region, and this facility will support a truck hub for long and short haul truck drivers.

### 5.4 Road Safety and Fatigue Management

A major benefit of the proposed highway service centre is its potential contribution towards road safety.

Driver fatigue management is a significant part of contemporary road safety, and the adequate provision of road and highway rest stops has been a major focus of both federal and state road authorities for lowering the road toll. The importance of these safety provisions is reflected by support from the NSW RMS, which has indicated a general support for the Port Macquarie Highway Service Centre and the role it can play along the Pacific Highway. The important role of highway service centres play in improving road safety and mitigating road fatigue is addressed in the 2014 Policy Review document<sup>14</sup>.

The location of a large truck rest on the proposed site near a major highway interchange is preferential to being located in an industrial estate. The Austroads' feasibility study examining the establishment of rest areas in industrial precincts identified a number of issues and concerns of truck operators relating to rest areas more generally<sup>15</sup>. The report identified that operators consistently reported problems with the number, location and quality of rest facilities citing:

- Inadequate sites can lead to fatigue or drivers breaching driving hour requirements;

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<sup>13</sup> The Macleay Argus, *Bypass Service Centre is Open*, Todd Connaughton, 5 May 2015.

<sup>14</sup> *Highway Service Centres along the Pacific Highway – Policy Review*, May 2014. RMS 14.143.

<sup>15</sup> Feasibility Study - Parking and Rest Opportunities in Areas Zoned for Industrial Purposes: Options Assessment, May 2010. Austroads Research Report AP-R354/10.

- Hard-stand areas are needed in all new and existing rest areas to help drivers comply with operating standards in all weather conditions;
- Need for facilities integrated with fuel, food, showers and potentially accommodation at strategic locations to improve productivity; and
- The needs and requirements of female driver/operators differ for that of males.

Operators also identified that personal safety for drivers is a major disincentive to parking away from heavily used areas. Also, diversion off a driver's route (to an industrial area) for rest breaks is not desirable as it can add to the driving hours and kilometres travelled, and may even involve breaking down loads in order to access food services (within towns). Drivers prefer to use existing stops that provide food and other facilities for socialising and may be unwilling to go to new areas off of established routes.

A June 2011 survey conducted jointly by the National Roads and Motorists' Association and the Transport Workers Union of over 320 heavy vehicle drivers found that<sup>16</sup>:

- 75% of heavy vehicle drivers responded that they found rest stops in NSW inadequate and scarce, while two-thirds admitted to having driven while tired; and
- 33% wanted new rest areas to be built closer to service stations and town centres, whereas 85% wanted bypasses to divert travel away from major towns.

Long haul freight in Australia is borne mainly by articulated vehicles, representing 42% of the total 18.2 billion heavy vehicle kilometres travelled in Australia over a 12 month period ending June 2016<sup>17</sup>. Driver fatigue management is critical for this kind of road travel.

The provision of rest areas for heavy vehicles on the Australian road network is integral to ensuring drivers have appropriate locations where they can stop during their journey for effective rest and meet their fatigue management obligations. Heavy vehicle highway rest areas provided by state road authorities, together with commercial truck stop facilities and company depots, form part of Australia's road freight logistics infrastructure.

## 5.5 Conclusions

From our investigations we conclude that there is a strong need for the proposed highway service centre at the proposed site. This need is demonstrated by the following:

- There are limited highway service centres meeting RMS guidelines along the Pacific Highway between South Kempsey and Taree. No facilities of the scale proposed exist within the Mid-North Coast region.

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<sup>16</sup> BusinessWise Survey, June 2011. National Roads and Motorists' Association/Transport Workers Union.

<sup>17</sup> Australian Bureau of Statistics: *Survey of Motor Vehicle Use, Australia, 12 months ended 30 June 2016 – Table 1 (cat. no. 92080)*



- The proposed subject site will have auxiliary facilities and features which particularly cater to long haul truck drivers. The level of services proposed are not currently provided in existing facilities in the region, and has the potential to establish the location as a hub for the long haul heavy vehicle operators (and other truck drivers).
- The development will generate net community benefits through its contribution to road safety for the motoring public and especially in the management of fatigue for heavy vehicle drivers.
- The proposed centre's potential economic impacts will not threaten the viability or level of service presently enjoyed by residents and visitors, but will enhance the overall level of service by providing a facility not presently available in the region. Any potential impacts are likely to be in the short term and would be made good through the provision of a new and multi-function facility.

# Appendix

## Appendix 1

**Table A1: Summary of Service Station Characteristics, Mid North Coast New South Wales**

Map Ref	Affiliation	Town	Dist. from Site (Km)	Bow-sers (No.)	Max vehicle (No.)	Hours of Operation	Facilities	Comments
<b>North of Subject Site</b>								
16	Liberty	Telegraph Point	14.8	4	8	M-F: 6am - 7pm Sat: 6am - 7pm Sun: 6am - 7pm	Workshop, small convenience store	Vacant 'Stockyard Café' located adjacently
17	Liberty	Kundabung	34.2	3	3	M-F: 8am - 5pm Sat: 9am - 12 noon Sun: 9am - 12 noon	Small Australia Post office, small convenience store, picnic tables, autogas bowser	
18	Mavin Petroleum	South Kempsey	43.0	7	8	M-F: 7am - 6pm Sat: 7:30am - 12 noon Sun: Closed	Bulk fuel orders, kerosene bowser	
19	Caltex	South Kempsey	43.2	5	8	24 Hrs	Convenience store, hot take away food	One additional LPG Bowser
20	BP	South Kempsey	43.5	5	7	24 Hrs (Card Machine)	Workshop	
21	Mavin Petroleum	Kempsey	45.5	5 (+3 for trucks)	4 (+2 for trucks)	24 Hrs (Card Machine)	Small convenience store	Attendants pump fuel for customers
22	Woolworths	Kempsey	45.6	4	8	M-F: 7am - 8pm Sat: 6:30am - 9pm Sun: 7am - 8pm		One additional LPG Bowser, located in Woolworths/Big W car park
23	United	Kempsey	45.7	6	12	24 Hrs	Small convenience store	
24	Independent (Oasis Service Station and Gas)	Kempsey	45.8	4	8	M-F: 6am - 7pm Sat: 7am - 5pm Sun: 7am - 5pm	Auto Car Wash, small convenience store	
25	Liberty	Kempsey	45.8	5	8	24 Hrs	24 Hr dine-in restaurant, small convenience store	One additional LPG Bowser, restaurant has dedicated lounge/seating area
26	Coles Express	Kempsey	46.5	6	12	M-F: 6am - 10pm Sat: 7am - 11pm Sun: 7am - 11pm	Convenience store	B-Double access, Park Drive Motel with 24hr check-in located next door
27	Independent	Eungai	78.5	3	2	M-F: 7am - 6pm Sat: 8am - 6pm Sun: 8am - 12 noon	General store with dine-in/takeaway food, liquor supplies and Australia Post service	Located on the kerbside of the road, only accessible from one side
28	United	Macksville	96.5	3	6	24 Hrs (Card Machine)	Small store, full bakery attached	
29	Caltex	Macksville	96.8	9	18	24 Hrs	Convenience store, dine-in restaurant, indoor & outdoor seating, children's play equipment	B-Double access and parking available
30	BP	Macksville	97.1	3	5	M-F: 6:30am - 5:00pm Sat: Closed Sun: Closed	Bulk fuel truck facilities	Webb Petroleum administrative centre depot, bulk orders inc. kerosene and turpentine

Map Ref	Affiliation	Town	Dist. from Site (Km)	Bow-sers (No.)	Max vehicle (No.)	Hours of Operation	Facilities	Comments
<b>South of Subject Site</b>								
31	Liberty	Port Macquarie	12.5	2	4	M-F: 6:30am - 7:30pm Sat: 6:30am - 7:30pm Sun: 6:30am - 7:30pm	Part of the Shelly Beach Store with range of groceries, Asty's Takeaway (hot food to order), Chemist	
32	BP	Port Macquarie	12.9	4	8	M-F: 5:30am - 9pm Sat: 6am - 8pm Sun: 6am - 8pm	Small convenience store, Pacific Plaza Automotive (mechanic) on site	Located in the car park of the Lighthouse Plaza shopping centre, one additional uni-gas bowser
33	Liberty	Bonny Hills	17.4	3	6	Sun-Th: 6am - 8pm F & Sat: 6am - 8:30pm	Bonny View Store, Takeaway and Bottleshop (Super Cellars) attached	
34	Woolworths	Lake Cathie	17.5	2	4	M-F: 6:30am - 8pm Sat: 7am - 8pm Sun: 7am - 8pm	Small convenience store	Located in the car park of the Woolworths anchored shopping centre
35	Enhance	Kew	22.8	5	8	24 Hrs (Card Machine)	Convenience store, covered picnic tables, next to Kew Tyre and Auto Centre	
36	Shell	North Haven	24.1	4	8	M-F: 5:30am - 9pm Sat: 5:30am - 9pm Sun: 5:30am - 9pm	Mechanic workshop	Attendants pump fuel for customers
37	Mobil	North Haven	24.7	2	4	M-F: 5:30am - 8pm Sat: 5:30am - 8pm Sun: 5:30am - 8pm	Small convenience store	North Haven glass and screen business located on site
38	Access Fuels	Laurieton	25.9	2	4	M-F: 5:30am - 8pm Sat: 5:30am - 8pm Sun: 5:30am - 8pm	Small convenience store, Camden Haven Tyre and Brake business on site	One additional LPG bowser
39	Woolworths	Lakewood	26.0	2	4	M-F: 6am - 9pm Sat: 7am - 9pm Sun: 7am - 8pm	Located in the carpark of the Woolworths anchored shopping centre	
40	Enhance	Laurieton	26.5	2	4	M-F: 5:30am - 7pm Sat: 6am - 6:30pm Sun: 6am - 6:30pm	Small convenience store, car and tyre servicing business located in the same building	
41	Liberty	Moorland	45.6	4	8	24 Hrs (Card Machine)	The Milestone Café (open til late), small convenience store, picnic tables	
42	Liberty	Coopernook	50.5	3	4	M-F: 6am - 8pm Sat: 7am - 8pm Sun: 7am - 8pm	Fast food to order with seating available, small convenience store	
43	United	Cundletown	64.5	5	6	M-F: 6am - 9pm Sat: 6am - 9pm Sun: 6am - 9pm	Small convenience store, mechanic workshop	One additional LPG bowser, next to park with picnic tables and children's play equipment

Map Ref	Affiliation	Town	Dist. from Site (Km)	Bow-sers (No.)	Max vehicle (No.)	Hours of Operation	Facilities	Comments
44	Caltex	Cundletown	65.3	4	8	M-F: 5:30am - 9pm Sat: 6am - 9pm Sun: 7am - 8pm	Convenience store, pay phone booth	Adjacent to the Dawson River Tourist Park which has accommodation and river access
45	United (Victoria Street)	Taree	69.7	4	8	24 Hrs	Convenience store, fast food outlet (currently vacant)	Fast food outlet attached to convenience store is currently vacant and listed for sale
46	Coles Express	Taree	69.8	6	12	M-F: 5am - 10pm Sat: 6am - 10pm Sun: 6am - 10pm	Convenience store	
47	United (Muldoon Street)	Taree	70.8	5	8	24 Hrs	Small convenience store	B-Double access
48	Woolworths	Taree	71.2	3	6	M-F: 6am - 9pm Sat: 7am - 8pm Sun: 7am - 8pm		One additional LPG bowser
49	BP	Taree South	71.2	3	5	M-F: 5:30am - 8pm Sat: 5:30am - 7pm Sun: 5:30am - 8pm	Small convenience store, trailer hire	
50	BP	Taree	72.2	4	8	M-F: 4:30am - 9pm Sat: 6am - 9pm Sun: 6am - 9pm	Jack and Co convenience store with fresh food and coffee	

Source: Foresight Partners field inspections, Company websites. January 2018.



## **Attachment 15 Bushfire Hazard Assessment**

# **BUSHFIRE HAZARD ASSESSMENT**

**Highway Service Centre Plan  
Proposed Additional  
Use/Rezoning**

**Part Lot 11 DP 1029846  
Cnr Oxley and  
Pacific Highway  
Sancrox**

**Scott PDI No. 6 Pty Ltd**

**December 2017**

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**APPENDIX 1 – Plan Layout**

## 1.0 INTRODUCTION

As requested a Bushfire Hazard Assessment has been carried out for the proposed rezoning of the site, to permit the use of a Service Centre & Ancillary Uses located at Part Lot 11 in DP 1029846 Cnr Oxley and Pacific Highway, Sancrox.

The report is based on a site assessments carried out on the 27<sup>th</sup> November 2017 and is based upon the relevant requirements of NSW Rural Fire Services, *Planning for Bushfire Protection*, 2006 (PfBP,2006) and AS 3959-2009.

The report is being completed for the rezoning with the intention that this report can be utilized throughout the planning process.

### 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 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 can meet 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.

As per the Rural Fire Service's Fast Fact of 01/10 all development on bushfire prone land in NSW should comply with the requirements of Addendum Appendix 3 and other bushfire protection measures identified within NSW Rural Fire Service, *Planning for Bushfire Protection*, 2006.

### 1.3 Location

The exact location can be seen in **Appendix 1**.

Locality – Sancrox

Local Government Area – Port Macquarie Hastings Council

Closest Rural Fire Service – Sancrox/Thrumster

Closest Fire Control Centre – Wauchope

**Figure 1: Topographical Map**





**Figure 2: Aerial Map**

### 1.4 Site History and Proposal

Currently the subject lot has a rural use and it proposed to rezone the area (part lot) as nominated below for a Service Centre and Ancillary use development.

The plan of Part 11 in DP1029846 subject to the proposed additional use can be seen as **Appendix 1**.

The aerial below details the area (part lot) that will be considered in the report.

**Figure 3**

## 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.

The assessment of slope and vegetation being carried out in accordance with Appendix 2 and Appendix 3 of NSW Rural Fire Service, PFBP, 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 following table shows the results:

**Table 1 – Vegetation Slopes**

Hazard Aspect	Slope	Upslope/Downslope or Flat
North	15-20°	Downslope
East	15-20°	Downslope
South	10-15° 0-5°	Downslope Downslope
West	5-10°	Downslope

### 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 and then converting Keith to AUSLIG using Table A3.5.1 of Appendix 3 (2010).

#### **2.3.1 Vegetation**

The vegetation within the subject lot, with the exception of the southeast corner, is grassland managed by cattle grazing.

There are two pockets of remnant forest on the western boundary and there is forest vegetation in the south eastern corner.



**Photo 1 - Forest vegetation in the southeast**



**Photo 2 - Remnant vegetation on the western boundary**



**Photo 3 - Strip of vegetation on the northern boundary**



**Photo 4 - Typical of managed grassland on site**



**Photo 5 - Looking from the north to the northern boundary of the lot**



## 2.4 Hazards

The hazards identified on the subject lot and the adjoining lots can be seen below:



**Figure 4: Hazards**

For the purposes of the report, the grassland vegetation that is currently being managed has been considered grassland.

The hazard vegetation identified for determination of APZ is summarized as follows:

**Table 2 – Summary of Hazard Characteristics**

Hazard Aspect	Hazard	Slope	Upslope/Downslope or Flat
North	Rainforest	15-20°	Downslope
East	Rainforest	15-20°	Downslope
South	Grassland Forest	10-15° 0-5°	Downslope Downslope
West	Grassland	5-10°	Downslope

## 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

It is noted that the development is considered as infill development in accordance with PfBP, 2006.

The following provisions of PfBP, 2006 have been identified.

##### **3.1.1 Defendable Space/Asset Protection Zone**

To ensure that the aims and objectives of NSW Rural Fire Services, PfBP, 2006, are achieved 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.

It is recommended that the defendable space be based upon the minimum requirements for Asset Protection Zones as set out in NSW Rural Fire Services, PfBP, 2006.

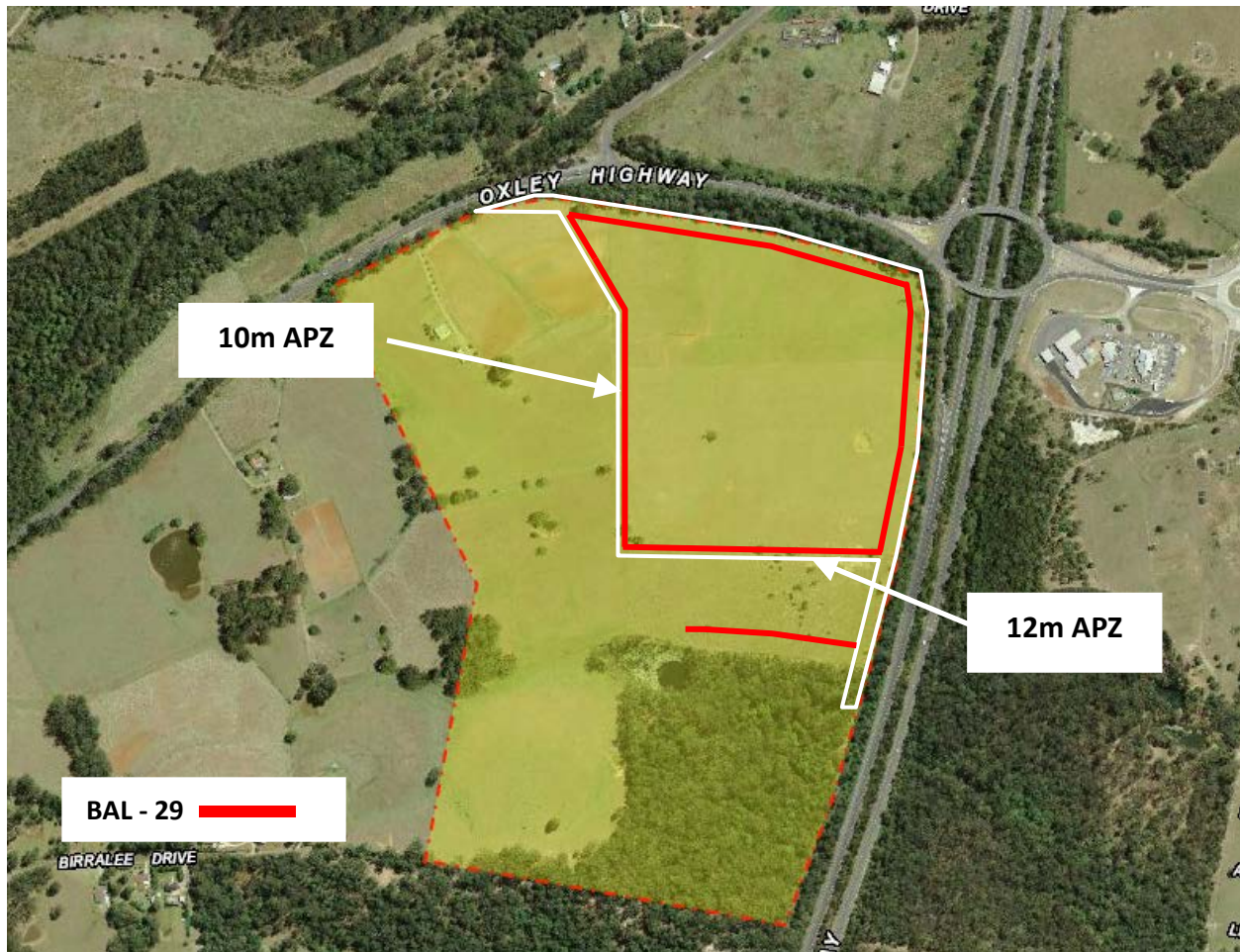
**Table 3 - Asset Protection Zone Requirements (PfBP 2006)- Residential**

Hazard Aspect	Hazard	Slope	IPA	OPA	Total APZ Required for Rural/Residential Development (IPA + OPA)
North	Rainforest	15-20° Downslope	25m	-	25m
East	Rainforest	15-20° Downslope	25m	-	25m
South	Grassland Forest	10-15° Downslope 0-5° Downslope	12m 11m	- 10m	12m 21m
West	Grassland	5-10° Downslope	10m	-	10m

It is recommended that the minimum Asset Protection Zones for Rural/Residential Development be applicable for the proposed rezoning.

The Bushfire Attack Level Contour lines (which indicate Minimum Asset Protection Zones) can be seen below:

**Figure 5**



It should be noted that with respect to the northern and eastern hazards this vegetation is likely to be removed as part of the process due to the requirement for access and egress.

### **3.1.2 Operational Access and Egress**

It is proposed that access will be obtained from the Pacific Highway and also from Oxley Highway. It is assumed that the Service Centre will be catering for large vehicles so access around the complex will be available.

### **3.1.3 Services - Water, Gas and Electricity**

As set out in the Aims and Objectives of Planning for Bushfire Protection, 2006 it is necessary to ensure that the utility services are adequate to meet the needs of firefighters (and others assisting in bush firefighting).

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.

Electricity supply will be connected throughout the subject area.

Reticulated gas services are not available to the bushfire prone areas of the proposal, however any reticulated or bottled gas is to be installed and maintained in accordance with AS 1596 and the requirements of the relevant authorities. Metal piping is to be used. All fixed gas cylinders are 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 kept close to a building, the release valves are to be directed away from the building and at least two (2) metres away from any combustible material, so that they do not act as a catalyst to combustion. Connections to and from gas cylinders need to be metal. Polymer sheathed flexible gas supply lines to gas meters adjacent to buildings are not to be used.

### **3.1.4 Landscaping**

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

When planning any future landscaping 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, PfBP, 2006, contains standards that are applicable to the provision and maintenance of landscaping. Any landscaping proposed to be undertaken in conjunction with the proposed rezoning 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 bushfire protection measures that are applicable to the provision of landscaping.

### 3.2 Construction of Buildings

#### 3.2.1 General

As noted in the Aims and Objectives of Planning for Bushfire Protection the BCA does not provide for any bushfire specific Performance requirement and as such AS 3959 does not apply as a set of “deemed to satisfy” provisions.

### 4.0 SPECIFIC OBJECTIVES FOR A SERVICE STATION IN BUSHFIRE PRONE AREAS

Planning for Bushfire Protection, 2006 identifies Service Stations as Controlling Development Types. In addition to the above recommended compliance measures, the six key Bush Fire Protection Measures (BPMs) are considered in the following table:

**Table 4**

Bushfire Protection Measure	Comment
The provision of clear separation of buildings and bushfire hazards, in the form of fuel-reduced APZ (and their subsets inner and outer protection areas and defensible space)	As can be seen from the reporting there is low hazard adjoining the proposed area to be rezoned. It is likely this hazard will be reduced with the removal of the vegetation to the east and north for the access and egress into the Service Centre
Construction standards and design	It is recommended the buildings be constructed to resist ember penetration (BAL 12.5)
Appropriate access standards for residents, fire fighters, emergency service workers and those involved in evacuation	There is a through road proposed for the development
Adequate water supply and pressure	It is assumed that a hydrant system will be installed as part of the subdivision
Emergency management arrangements for fire protection and/or evacuation	Service stations have heightened risk awareness with numerous procedures in place. It is expected that the development will have an Emergency Plan in accordance with AS 3745 (2010)
Suitable landscaping, to limit fire spreading to a building	Any landscaping should consider the recommendations in Planning for Bushfire Protection, 2006

### 5.0 RECOMMENDATIONS

The following recommendations are made with respect to the bushfire prone areas:

1. An Asset Protection Zone as detailed in Section 3.1.1 of this report is considered.
2. Access and Egress is to be provided as detailed in Section 3.1.2 of this report is to be provided.
3. A water supply (including gas bottle supply) as detailed in Section 3.1.3 of this report is to be provided.
4. Adopt landscaping principals in accordance with Section 3.1.4 of this report.
5. The Bushfire Attack levels as detailed in the report are considered.

6. In addition to the requirements of this report it is recommended that a bushfire survival plan be developed and implemented for the subject site. In this regard your attention is drawn to the Rural Fire Service website.

## 6.0 CONCLUSION

It is suggested that with the implementation of this report, and its recommendations, that the bushfire risk for the proposed rezoning 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 the proposed rezoning can be completed 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 development and must not be used for any other purpose.
2. A reassessment will be required to verify consistency with this assessment if there is building alterations and/or additions, change in use, 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- Plan Layout**



## **Attachment 16 RMS Correspondence 25 June 2018**





File No: NTH18/00076

Attn: Craig Swift – McNair  
General Manager  
Port Macquarie Hastings Council  
PO Box 84  
PORT MACQUARIE NSW 2444

Attention: Jeffery Sharp

Dear Mr Swift - McNair

**Pacific Highway / Oxley Highway Interchange  
Planning Proposal Port Macquarie Highway Service Centre**

I refer to your email of 3 May 2018 requesting advice that Roads and Maritime Services is satisfied that the proposed highway service centre can be safely and efficiently integrated into the Pacific Highway/Oxley Highway interchange and the local road network.

I am pleased to advise that Scott PDI No. 6 Pty Ltd has committed to undertaking additional traffic modelling that is required to determine the impact of their proposal on the surrounding road network and further has committed to pursue an appropriate planning mechanism to ensure no further direct access to the Oxley Highway from the subdivided land parcel should it be developed in the future.

Based on the above Roads and Maritime Service is satisfied that a traffic solution can be found that will enable the proposed highway service centre to be safely and efficiently integrated into the Pacific Highway/Oxley Highway interchange and the local road network.

If you have any further enquiries regarding the above comments please do not hesitate to contact Liz Smith, Manager Land Use Assessment on (02) 6640 1362 or via email at: [development.northern@rms.nsw.gov.au](mailto:development.northern@rms.nsw.gov.au)

Yours faithfully

John Alexander  
Director Northern Region  
25 June 2018