REVIEW OF ENVIRONMENTAL FACTORS

GOVERNOR MACQUARIE DRIVE UPGRADES NEWBRIDGE ROAD TO ALFRED ROAD CHIPPING NORTON

DATE: OCTOBER 2020

LIVERPOOL CITY COUNCIL

LIVERPOOL THE GREAT SOUTH WEST

Document Control Sheet

Issue No.	Amendment	Date	Prepared By	Checked By
A	Early Draft to LCC	24th July 2020	SVD	IB
B	Draft to LCC	13th August 2020	SVD	IB
C	Final to LCC	19th October 2020	SVD	LCC

Executive Summary

Liverpool City Council (LCC) have commissioned ADW Johnson (ADWJ) to undertake this Review of Environmental Factors (REF) to investigate any potential environmental impacts associated with the construction and operation of upgrades to Governor Macquarie Drive section from Newbridge Road to Alfred Road in Chipping Norton.

The proposed upgrade works will be undertaken by LCC of and as such, Clause 94 of State Environmental Planning Policy (Infrastructure) (ISEPP) provides that they can be carried out without consent. This REF has therefore been prepared in accordance with Sections 5.5 and 5.7 of the Environmental Planning Assessment Act 1979 (EP&A Act), which requires LCC, as a self-determining authority, to fully consider the potential impacts of any proposed activities. This REF has also been prepared in accordance with Clause 228 of the Environmental Planning and Assessment Regulations 2000 (EP&A Regs) which details elements to be considered when assessing the potential impact of an activity on the environment.

Having assessed the full suite of environmental issues that may be impacted by the proposal, key environmental risks identified were generally construction based impacts such as traffic, soil and water degradation, noise and vibration and waste generation. Given the nature of activity, there were no significant operational risks identified.

Where potential environmental impacts have been identified, mitigation measures have been developed to minimise or remove the extent of impact. These mitigation measures would be further detailed in a Construction Environmental Management Plan (CEMP). Methods for implementing and monitoring these measures would be included in these plans.

Subject to the implementation of identified mitigation measures, it is considered that the construction and operation of the proposed infrastructure works are unlikely to significantly impact on the environment. With this in mind, an Environmental Impact Statement (EIS) is not required and this REF is an adequate level of impact assessment for this project.

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1.0 Introduction

1.1 PROPOSAL IDENTIFICATION

Governor Macquarie Drive (GMD) is a regional road under the control of LCC which operates as a designated heavy vehicle route providing access to industrial developments within the area as well as residential suburbs and Warwick Farm Racecourse. It links the State Roads of Hume Highway and Newbridge Road and accommodates approximately 15,000 vehicles per day.

GMD currently experiences service issues associated with heavy vehicle usage including truck parking within the travel lanes, and traffic delays in GMD due to right turn movements affecting through traffic on approach to the existing signalised intersection with Newbridge Road. Consequently, LCC was able to secure Federal Government funding of approximately $1.4 million to upgrade the GMD section between Newbridge Road and Alfred Road in order to improve the traffic efficiency and safety.

The geographical location of the project is:

Item	Road Name	Road Section		Latitude	Longitude
1	GMD	Newbridge Road to Alfred Road	Start	-33.928580	150.962314
			End	-33.923283	150.962078

This REF will detail the works required to undertake the proposed works. The REF will explore all potential environmental impacts and indicates measures to minimise environmental impacts.

This report has been commissioned by LCC and should be read in conjunction with the Concept Deign Plans (refer to **Appendix 1**).

The major elements of the GMD upgrade include:

- Rehabilitation of the existing pavement;
- Reconfigure GMD between Newbridge Road to Alfred Road to a four (4) lane divided road;
- Extend the existing southbound right turn lane by approximately 80m;
- Restrict GMD intersection with Balanada Avenue to left in/left out movements only;
- Restrict right turn movements into/out of the commercial properties at Lots 165 – 166 DP 240250 and Lots 220-221 DP 242001;
- Review existing intersection treatment at Nuwarra Road and Balanada Avenue intersection; and
- Provide shared pathways on each side.

See Figures 1.1 and 1.2.

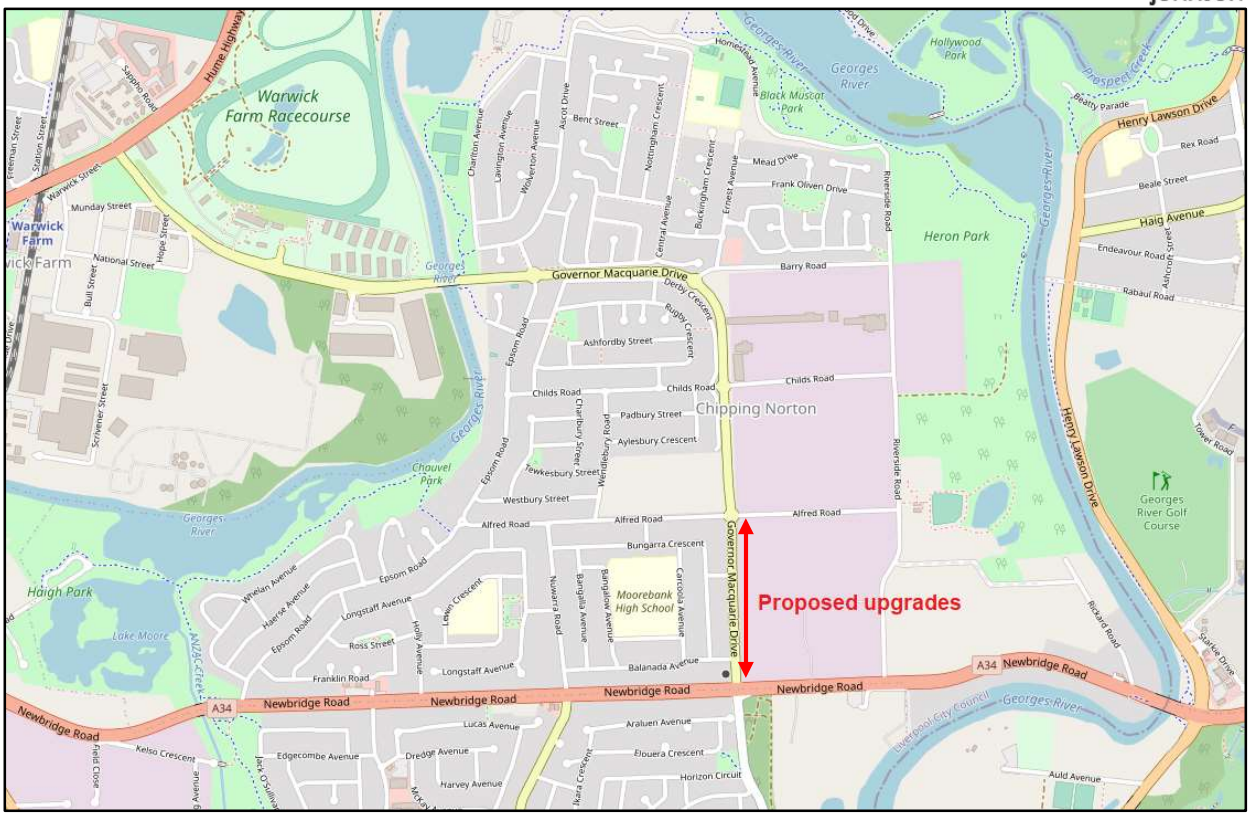


Figure 1.1: Location of GMD Upgrade Works

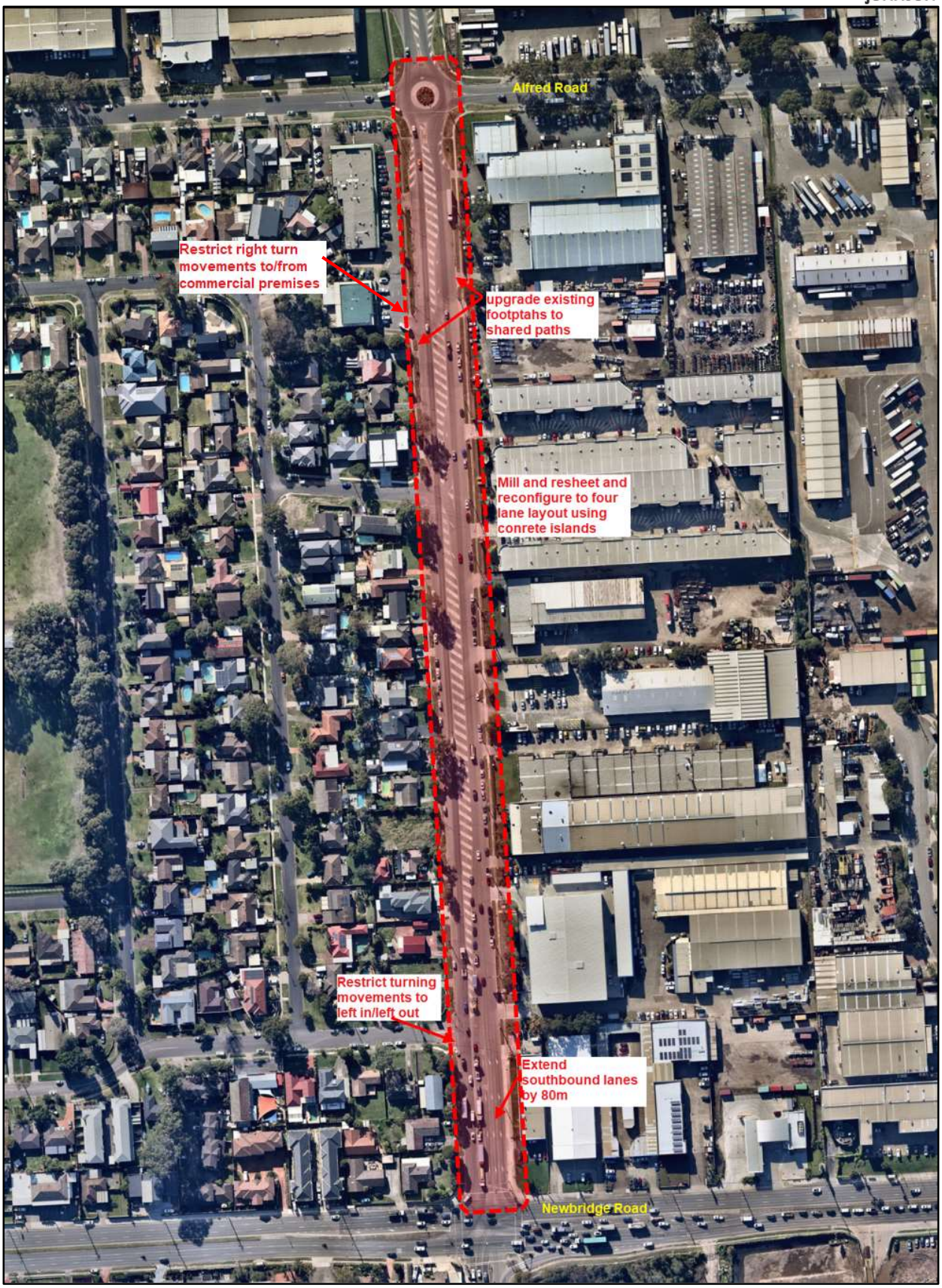


Figure 1.2: Existing GMD Layout showing Proposed Upgrades

1.2 PURPOSE OF THE REPORT

This REF has been prepared by ADWJ for LCC, who is also the determining authority in accordance with Division 5.1 of the EP&A Act.

The purpose of the REF is to describe the proposal, to document likely impacts on the environment, and to list remedial measures to minimise impact on environment.

The description of the proposed works and associated environmental impacts have been undertaken in context of Clause 228 of the EP&A Regs, the *Biodiversity Conservation Act 2016* (BC Act), *the Fisheries Management Act 1994* (FM Act), and the Australian Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). In doing so, the REF helps to fulfil the requirements of Section 5.5 of the EP&A Act to ensure that LCC examines and takes into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

The findings of the REF will consider:

- Whether the proposal is likely to have a significant impact on the environment and therefore necessitate an EIS to be prepared and approval to be sought from the Minister for Planning and Infrastructure under Division 5.1 of the EP&A Act;

- The significance of any impact on threatened species as defined by the BC Act and/or FM Act, in Section 1.7 of the EP&A Act and therefore the requirement for a Species Impact Statement ("SIS"); and

- The potential for the proposal to significantly impact a matter of national environmental significance or Commonwealth land and the need to make a referral to the Department of Agriculture, Water and the Environment for a decision by the Commonwealth Minister for the Environment on whether assessment and approval is required under the EPBC Act.

The overall objective of this report is to provide the determining authority (LCC) with information to the fullest extent possible of all matters affecting or likely to affect the environment by the construction and operation of the GMD upgrade works.

2.0 Proposal Need and Justification

2.1 BACKGROUND

GMD between Newbridge Road and Alfred Road is the main access road for the industrial precinct to the east and the residential precinct to the west. Consequently, it receives significant heavy vehicle traffic from industrial businesses within this area as well as residential traffic including pedestrian and cyclist use.

TfNSW and LCC also require that right turning traffic at the GMD/Balanada Avenue intersection be removed to provide for more efficient and safer movements along GMD on approach to the signalised intersection with Newbridge Road. LCC suggested that this REF should also review the existing access arrangements at the Nuwarra Road and Balanada Avenue intersection. This is considered relevant to assess potential impacts on the local community due to the proposed changes at the GMD and Balanada Avenue intersection.

In addition, LCC also suggested that the existing access arrangements from the shops located on the west side at the GMD and Alfred Road intersection be considered.

2.2 OBJECTIVES OF THE PROPOSAL

2.2.1 Objectives

The objectives of the proposed intersection upgrade are as follows:

- Increase mid-block road capacity on GMD by providing two (2) additional traffic lanes between Newbridge Road and Alfred Road.
- Improve traffic efficiency for both freight and general traffic between Hume Highway and Newbridge Road, which are two (2) major arterial road corridors connecting to Western Sydney Airport (WSA).
- Improve the freight network capacity and accessibility between industrial precincts in Warwick Farm, Chipping Norton, Moorebank and the WSA.
- Increase road capacity on the road connection between two (2) classified state roads (Hume Highway and Newbridge Road).
- Improve road safety at the Newbridge Road/GMD/Brickmakers Drive intersection and along the GMD road section between Newbridge and Alfred Road.
- Increase road capacity of the midblock section 900 vehicle/h to 1800-2000 vehicle/h in each direction.
- Improve traffic efficiency and reduce travel time on GMD between Newbridge Road and Alfred Road by modifying the road section between Newbridge Road and Alfred Road from two (2) lanes to four (4) lanes.
- Minimise right turn movement queuing spillback into the southbound through traffic lane on GMD and improve traffic efficiency at the intersection.

- Improve performance of the existing signalised intersection by increasing capacity on GMD.

- Manage congestion and reduce delays to all traffic modes including freight movements along GMD.

- Increase amenity for local residents with better traffic flow, enhanced road safety and better access between residential precincts and the arterial road network.

- Increase opportunities for local business with improved transport access to and from the shopping precincts.

- Reduce travel times and subsequent fuel consumption and greenhouse gas emissions.

- Improve road safety.

2.2.2 Performance Indicators

The following performance indicators would be used to ascertain whether the proposed works had achieved the above objectives:

- Reducing rear-end crashes by the proposed extension of the right turn bay from GMD to Newbridge Road by preventing spilling of right turn vehicles into the through lane.

- Reducing the number of crashes at driveways along GMD by removing right turn movements through divided carriageways.

- Preventing head-on crashes by installing a raised median and providing divided carriageways on GMD.

2.3 EXISTING ROAD AND INFRASTRUCTURE

GMD between Newbridge Road and Alfred Road has a 23m wide carriageway; is generally a four (4) lane road, with one (1) travelling and parking lane in each direction. Travelling lanes are delineated through painted chevron line markings.

The intersection with Alfred Road is controlled via a roundabout, and the intersection with Newbridge Road is controlled by signals involving 80m southbound left and right turning lanes. Other intersections along this stretch of road include Coolarn Street and Balanda Avenue which currently permit both left and right turning movements.

Both sides of GMD include unrestricted parking.

Both sides of GMD also include approximately 1.2m wide footpaths on both sides.

2.4 OPTIONS CONSIDERED

2.4.1 Identified Options

Options considered for the proposed works are summarised below:

Upgrade Option	Upgrade Option Description
'Minor' Option (Chosen)	▪ Extension of the existing right turn bay on GMD by 50m and upgrading the bay with channelised raised concrete median; ▪ Upgrade of GMD to allow for a four (4) lane corridor between Newbridge Road and Alfred Road by installation of a central median island, resurfacing and linemarking.
'Do Nothing' Option	A "do-nothing" option has been considered, however, no benefits are gained with this option. The proposed project will greatly improve safety and accessibility in the area.

2.4.2 Methodology for Selection of Preferred Option

This project is part of LCC's proposal to widen GMD from its current generally single lane configuration in each direction to a four (4) lane divided road. As part of this, an approximate 400m road section fronting a recent development by the Australian Turf Club (ATC) has been widened to a four (4) lane road configuration (see Figure 1.3). The subject works would therefore continue this arrangement.

Figure 1.3: Recent GMD Upgrades fronting Warwick Farm Racecourse

The provision for on-street parking has also been considered where on-street parking demand exists.

This option was successfully presented for Federal Government funding under its Western Sydney Infrastructure Plan (WSIP). It is noted that Council is also undertaking approximately 260m of GMD road widening close to the Hume Highway intersection under the WSIP.

These improvements, combined with the proposed project, would deliver approximately 41% (1.5km of 3.7km length of GMD) of the total GMD length to a four (4) lane divided road.

Public participation also helped in identifying the preferred option. Public participation was considered through:

- Records of continued complaints received from public regarding delays and road safety concerns;
- Representation by the State Local Member and Councillors on behalf of constituents;
- LCC concerns regarding road crashes.

The project would benefit the wider community of Liverpool, Fairfield, Campbelltown and Camden Local Government Areas (LGAs). Council has received numerous complaints from the local community about traffic delays on GMD, particularly at the intersection of Newbridge Road.

2.5 PROJECT JUSTIFICATION

In addition to the existing and approved developments within the abovementioned precincts, the Department of Planning, Infrastructure and Environment (DPIE) has approved an amendment to the Liverpool Local Environmental Plan (LEP) for the Liverpool City Centre. The amendment will permit mixed use developments with forecast population increase of approximately 12,000 in the next 10 years.

LCC is also undertaking a review of its existing LEP, funded by DPIE, to rezone some of the Moorebank Industrial Area into a high density residential precinct. These changes would increase traffic flows along GMD and hence, the need for improvements identified in this project.

Taking the above into consideration, the proposed works would achieve the objectives listed above by addressing the following transport issues in the GMD road section between Newbridge Road and Alfred Road intersections.

2.5.1 Mid-block Capacity

The section of GMD between Newbridge Road and Alfred Road has single traffic lane and a kerbside parking lane in each direction. This road section provides direct access(s) to industrial, warehousing, residential and neighbourhood shopping centre developments.

This road section carries approximately 760 vehicles and 850 vehicles per hour in AM and PM peak periods. The vehicle capacity ratios are 0.84 and 0.95 in AM and PM peak periods respectively. This indicates that the mid-block section is operating close to its capacity. Additional traffic lanes along this section of GMD will increase mid-block capacity from the existing 900 vehicle/h to 1,800-2,000 vehicle/h in each direction. This will improve traffic efficiency and reduce travel time on GMD between Newbridge Road and Alfred Road intersections.

2.5.2 Illegal Truck Parking Issue

The current road configuration has a wide chevron central median which is attracting truck parking and cause road safety issue. The proposed landscaped central concrete median will prevent illegal truck parking. This will promote traffic and pedestrian safety.

2.5.3 Road Safety Issue

This road section has had a total of 27 recorded crashes including 16 injured crashes for the five (5) years period, between July 2014 to June 2019. The primary crash type for the mid-block section involved vehicles turning in and out of driveways and rear-end crashes at the Newbridge Road and GMD intersection.

Item	Location	Intersection	Reported Crashes	Injury Crashes
1	Intersection of Newbridge Road and GMD	Crash data for the 5 year period within 30m of the intersection	16	11
2	GMD between Newbridge Road and Alfred Road	Crash data for the 5 year period	5	2
3	Intersection of GMD and Alfred Road	Crash data for the 5 year period within 30m of the intersection	6	3

The project will restrict all driveway access(s) to left in/left out only. This would reduce crashes at the existing driveways through the provision of raised median and is to prevent head-on crashes.

The existing right turn bay from GMD into Newbridge will be formalised with a concrete median which would reduce the number of crashes such as rear-end, lane changing, overtake turning and 'U' turning vehicle crashes.

In addition, removal of right turning movements at the GMD intersections with Balanada Avenue and into the shopping precinct would reduce crashes and travel-time. The exiting right turning movement at the GMD intersections with Coolarn Street would remain to maintain access to the adjoining residential precinct. The existing left turn restrictions from Balanada Avenue onto Nuwarra Road would be removed and a central median would be provided to restrict right turn movements, refer Figure 1.4 below. This will provide easy access to Newbridge Road for the existing residential precinct bounded between GMD and Nuwarra Road.

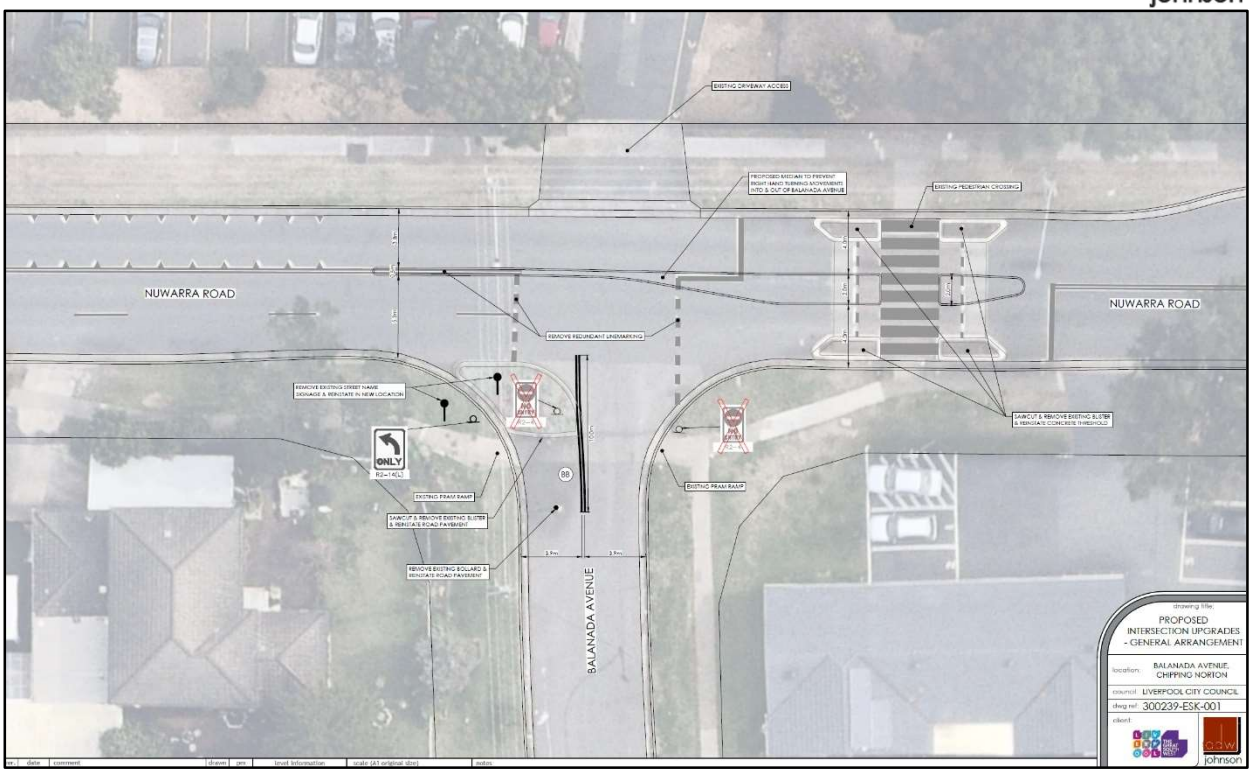


Figure 1.4: Proposed Intersection Upgrades – Balanada Ave and Nuwarra Road

2.5.4 Intersection Congestion

Newbridge Road/GMD is a four-way signalised intersection. SIDRA intersection performance analysis indicates that the Newbridge Road/GMD/Brickmakers Drive intersection is currently operating at Level of Service (LoS) F in the AM and PM peak periods with the Degree of Saturation of 1.129 and 1.074 in AM peak hour and PM peak hour respectively. This indicates an unacceptable level of service and the intersection is operating at capacity with delays.

Intersection	Demand flow (vehicles per hour)	Control type	DoS	Average delay (seconds)	LoS	95% back of queue (metres)
AM Peak	5496	Signals	1.129	132.3	LoS F	734
PM Peak	5967	Signals	1.074	91	LoS F	716.2

In addition, the right turn movements from GMD to Newbridge Road are experiencing significantly delays with queue spillback to a through lane along GMD.

The project includes lengthening the existing right bay by approximately 80m. This will address queue spillback issue and increase through lane capacity.

2.5.5 General Benefits to Local and Wider Community

The project would provide the following additional benefits to local and wider communities:

- Newbridge Road and GMD are B-double routes which carry a high percentage of heavy vehicles. These vehicles, from GMD, regularly use Newbridge Road, Moorebank Avenue, M5, and M7 Motorways, for freight movements to Moorebank Intermodal Terminals, National Road and Rail Network and other industrial precincts within the Sydney South-West Region. In addition, heavy vehicles will use the proposed M12 Motorway to access WSA.

- The proposed works would increase the mid-block capacity of the subject section of GMD and improve traffic efficiency for both general traffic and freight movements, reduce travel time and greenhouse gas emissions.

- The road environment/amenity would improve with additional landscaping along the median. The proposed landscaping would also create barrier between industrial and residential developments.

- Jaywalking pedestrians could safely use the proposed median where possible, to cross GMD in stages.

3.0 Description of the Proposal

3.1 SCOPE OF WORKS

3.1.1 The Proposal

The proposed upgrade to GMD between Newbridge Road to Alfred Road would include the following general features:

- Reconstruct the existing pavement to a depth of 50mm;
- Reconfigure GMD to a divided four (4) lane road by removing existing chevron linemarking and replacing with raised concrete median with barrier kerb to LCC specifications;
- Traffic lane widths would be a minimum of 3.5m in each direction;
- Extend the existing southbound right turn lane to approximately 160m including tapers;
- Include northbound merge lane to Alfred Road roundabout;
- Provide two (2) southbound lanes exiting Alfred Road roundabout;
- Provide a raised concrete island to the Coolarn Street intersection whilst maintaining all existing movements;
- Provide truck parking along both sides;
- Provision of off road shared pathways to both sides of GMD;
- Restrict the intersection of Balanada Avenue to left in/left out movements only;
- Restrict right turn movements into/out of the commercial properties at Lots 165 – 166 DP 240250 and Lots 220-221 D P242001;
- Install signage as necessary;
- Ancillary construction facilities (discussed below); and
- Augmentation of the existing traffic control signals at GMD/Newbridge Road intersection.

Further to the above, the following aspects of GMD will be maintained:

- Maintain existing 60km/hr speed limit;
- Maintain existing 23.4m pavement width;
- Maintain existing trees.

Plans detailing the above are provided within Appendix 1.

3.1.2 Design

The following parameters have been adopted for proposed design. It is noted that these parameters have been incorporated into the concept design and as such, will be further refined during the detailed design phase.

Design Parameters: The existing posted speed limit along the GMD is 60km/hr. A design speed of 70km/hr has been adopted for the design purposes.

Design Vehicle: GMD is a nominated 25m B-Double route in accordance with the RMS Restricted Access Vehicle Map NSW.

A 9.9m service vehicle, 12.m single unit truck and 19m semi-trailer have been adopted as the design vehicles for various intersections throughout the extent of works.

12m single unit truck, 19m semi-trailer and 25m B-doubles have been adopted as the check vehicles for various intersections throughout the extent of works.

Lane Widths: All through lane widths are 3.5m. All turning lanes have been adopted as 3.5m wide in accordance with Table 4.3 of Austroads Part 3 Geometric Design.

Verges: Existing verge widths of 4-4.6m have been retained which will accommodate the 2.5m width shared pathways.

Horizontal: The horizontal alignment has remained unchanged.

Vertical: It is proposed to match the existing longitudinal grades and crossfalls. Compliance with Austroads guides and RMS supplements with respect to road grades, crossfalls, super elevation etc. would be confirmed during the detailed design phase.

Pavement Type: A preliminary geotechnical assessment and pavement design has been undertaken on the site. A heavily bound flexible pavement structure is proposed for new pavement works. A detailed pavement design and report would be provided with the detailed design submission.

Service relocation: None proposed

3.2 CONSTRUCTION ACTIVITIES

3.2.1 Work Methodology

The overall construction would be undertaken in the following three (3) stages:

- Stage 1 – Construction (milling, earthworks and drainage): one (1) month;
- Stage 2 – Construction (raised concrete traffic islands): one (1) month;
- Stage 3 – Construction (final wearing course, shared path. signposting and linemarking): one (1) month.

The general work methodology for the above involves the following processes (listed in chronological order except where undertaken throughout the construction process):

- Detailed Design;
- Preparation and implementation of construction documents;
- Establish traffic control measures in accordance with a Traffic Management Plan (TMP);
- Installation of on-site environmental controls;
- Installation of work area on-site compound;
- Pavement, drainage and general concrete installation;
- Ongoing waste management;
- Remediate area in accordance with standard environmental safeguards.

Detailed Design

The detailed design would be undertaken in accordance with comments provided by LCC and would include any recommendations provided as part of this REF.

Preparation and Implementation of Construction Documents

Once the detailed design is confirmed and approved by LCC, any necessary construction documents as recommended as part of the REF would be prepared and implemented as necessary.

Establish Traffic Control Measures in accordance with Traffic Management Plan (TMP)

The following control measures would be installed:

- Installation of temporary signage;
- Stop/go controls for construction vehicles;
- Concrete barriers and barrier boards;
- Temporary linemarking;
- Traffic speed lowered to 40km/h.

Further details with regards to the above would be provided within the TMP which would be prepared prior to construction commencing.

Installation of On-Site Environmental Controls

Construction of the proposed works would begin with the installation of on-site environmental controls such as erosion and sedimentation control measures in accordance with LCC policies.

Installation of On-Site Compound

Installation of on-site compound requirements would be discussed with the construction agency after works are awarded.

Pavement and Asphalt Installation

- Pavement milling of the existing asphalt wearing course;
- Installation of concrete median kerb, including concrete infill;
- Construction of intermediate asphalt layers as required;
- Median island landscape planting;
- Construction of the final 50mm wearing course;
- Installation of shared paths.

Ongoing Waste Management

The site shall be kept in a clean and tidy order at all times, with contractors being educated as to the importance of recycling and waste reduction. Waste management protocols would be included within the Construction Environmental Management Plan (CEMP) which would be prepared prior to construction commencing but which would generally include:

- Promoting the use of recycled resources through the purchasing policy;
- Minimise use of packaging materials and recycle packaging products where possible;
- Waste concrete shall be sent to a concrete recycling plant where possible;
- Chemical and contaminated waste shall be disposed of through an approved and licensed facility;

- Any mulch or green waste containing weeds shall be stockpiled separately and appropriately disposed of;
- Office waste paper will be recycled and reused where possible;
- General waste that is not recyclable will be disposed of in a bin/skip provided by an approved waste disposal operator;
- All waste will be removed from site as applicable on completion of the project.

Remediate area in accordance with Standard Environmental Safeguards

Following completion of the proposed works, all temporary barriers, signage, work area compound and environmental control devices would be removed and any exposed areas will be stabilised.

The above provides a general explanation of the anticipated construction methodology, however this may be further refined during the construction planning phase.

3.2.2 Plant, Equipment and Contractors

The following typical plant and equipment would be expected to be used during construction:

- Rollers;
- Vibratory rollers;
- Compactors;
- Pavement mill;
- Asphalt paver;
- Excavator;
- Concrete trucks;
- Concrete pumps;
- Semi-trailers.

The breakdown above provides a basic list of the anticipated plant and equipment proposed to be used. It should be noted however, that this may be further refined during the construction planning phase.

3.3 TIMING AND STAGING

The commencement date and duration of construction works are yet to be determined by LCC.

3.4 ENVIRONMENTAL MANAGEMENT PLAN – CONSTRUCTION PHASE ACTIVITIES

During construction, appropriate environmental safeguards would be implemented. A CEMP covering the construction phase would be prepared by the contractor prior to the commencement of construction.

All mitigation measures required prior to construction have been identified within Section 7 and would be addressed within the CEMP.

4.0 Statutory Framework

4.1 RELATIONSHIP TO PLANNING BACKGROUND

4.1.1 Environmental Planning and Assessment Act

As discussed above, the proposed REF will detail the works required to provide the GMD upgrade. It will explore all potential environmental impacts and necessary safeguards as a consequence of these works.

The process of obtaining environmental planning approval is set out in the EP&A Act. Taking the above into consideration, the application of Clause 94 of State Environmental Planning Policy (Infrastructure) 2007 ("ISEPP") (discussed below) characterises the proposed infrastructure works as "development permitted without consent". This means that the project falls under Division 5.1 of the EP&A Act, rather than Division 4, as the works would be undertaken by LCC as a public authority and the determining authority.

Division 5.1 of the EP&A Act establishes, under Section 5.5, a duty for determining authorities to "*examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity*" when determining if an activity should be undertaken.

5.5 Duty to Consider Environmental Impact

(1) For the purpose of attaining the objects of this Act relating to the protection and enhancement of the environment, a determining authority in its consideration of an activity shall, notwithstanding any other provisions of this Act or the provisions of any other Act or of any instrument made under this or any other Act, examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity.

This report has been prepared to assess the potential environmental impact of the infrastructure for the purposes of satisfying LCC's duty under Section 5.5 of the EP&A Act.

(3) Without limiting subsection (1), a determining authority shall consider the effect of an activity on any wilderness area (within the meaning of the Wilderness Act 1987) in the locality in which the activity is intended to be carried on.

The infrastructure site is not located within any wilderness area.

In addition to the above, Clause 228 of the EP&A Regs which details elements to be considered when assessing the potential impact of an activity on the environment has been provided within Appendix 5.

4.2 ENVIRONMENTAL PLANNING INSTRUMENTS

4.2.1 SEPP (Infrastructure) 2007 (ISEPP)

ISEPP aims to facilitate the effective delivery of infrastructure across the State.

Clause 94 of ISEPP permits development on any land for the purpose of a road or road infrastructure facilities to be carried out by or on behalf of a public authority without consent.

Clause 94 states:

(1) Development for the purpose of a road or road infrastructure facilities may be carried out by or on behalf of a public authority without consent on any land. However, such development may be carried out without consent on land reserved under the National Parks and Wildlife Act 1974 only if the development—
(a) is authorised by or under the National Parks and Wildlife Act 1974, or
(b) is, or is the subject of, an existing interest within the meaning of section 39 of that Act, or
(c) is on land to which that Act applies over which an easement has been granted and is not contrary to the terms or nature of the easement.

As the works are for the upgrade to GMD which is to be carried out by LCC, it can be assessed under Division 5.1 of the EP&A Act and as such, development consent from LCC is not required. Further, the proposed works are not located on land reserved under the *National Parks and Wildlife Act 1974*.

Part 2 of the ISEPP contains provisions for public authorities to consult with local councils and other public authorities prior to the commencement of certain types of development. Consultation, including consultation as required by ISEPP (where applicable), is discussed in Section 5 of this REF.

4.2.2 SEPP (Coastal Management) 2018 ("Coastal SEPP")

The Coastal SEPP aims to promote an integrated and coordinated approach to land use planning in the coastal zone in a manner consistent with the objects of the Coastal Management Act 2016. The SEPP applies to land within the coastal zone which includes coastal wetlands and littoral rainforests area, coastal vulnerability areas, coastal environment areas and coastal use areas. The location for works does not fall within any of these areas (see Figure 4.1).

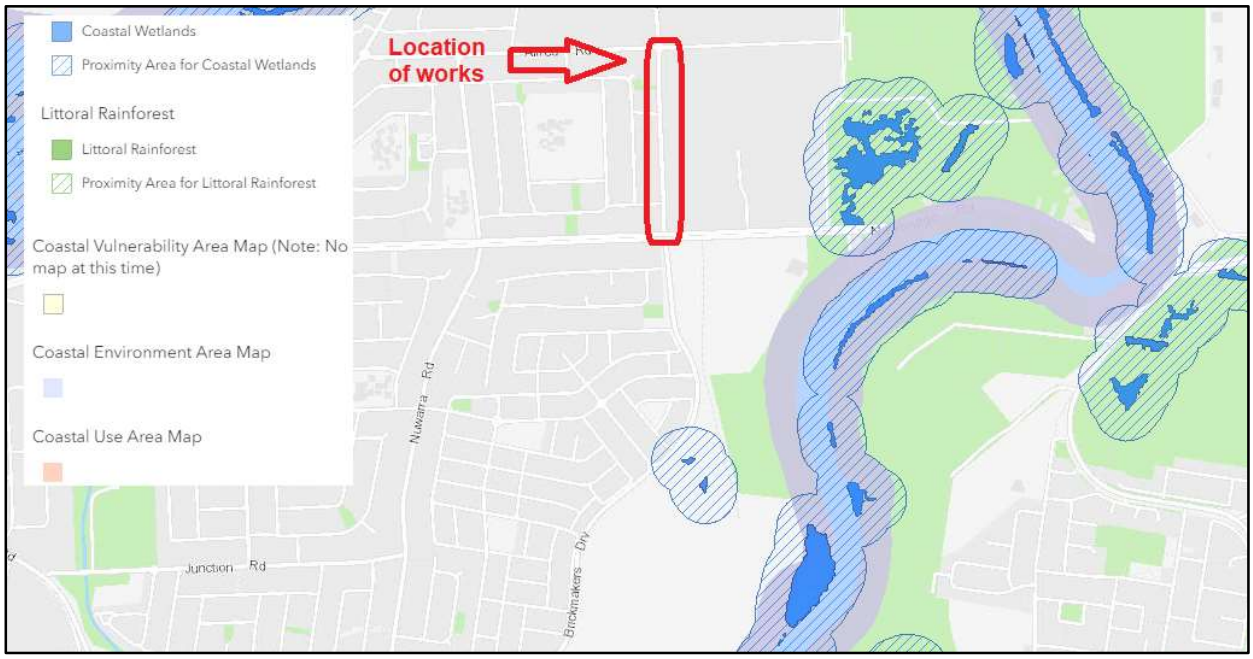


Figure 4.1: Coastal Management SEPP Map

4.2.3 SEPP (Koala Habitat Protection) 2019 ("Koala SEPP")

Whilst the Koala SEPP does not apply to activities assessed under Division 5.1 of the EP&A Act (only "development" assessed under Division 4), the principles of the SEPP have been applied in the environmental assessment to determine the potential for the study area to support Koala habitat.

The SEPP encourages the conservation and management of natural vegetation areas that provide habitat for koalas to ensure permanent free-living populations would be maintained over their present range. Whilst the location of works is identified as being within the koala development map (see Figure 4.2), the works would not require the removal of any trees which would be considered koala habitat. For this reason, the works are considered to achieve the aims of the Koala SEPP.

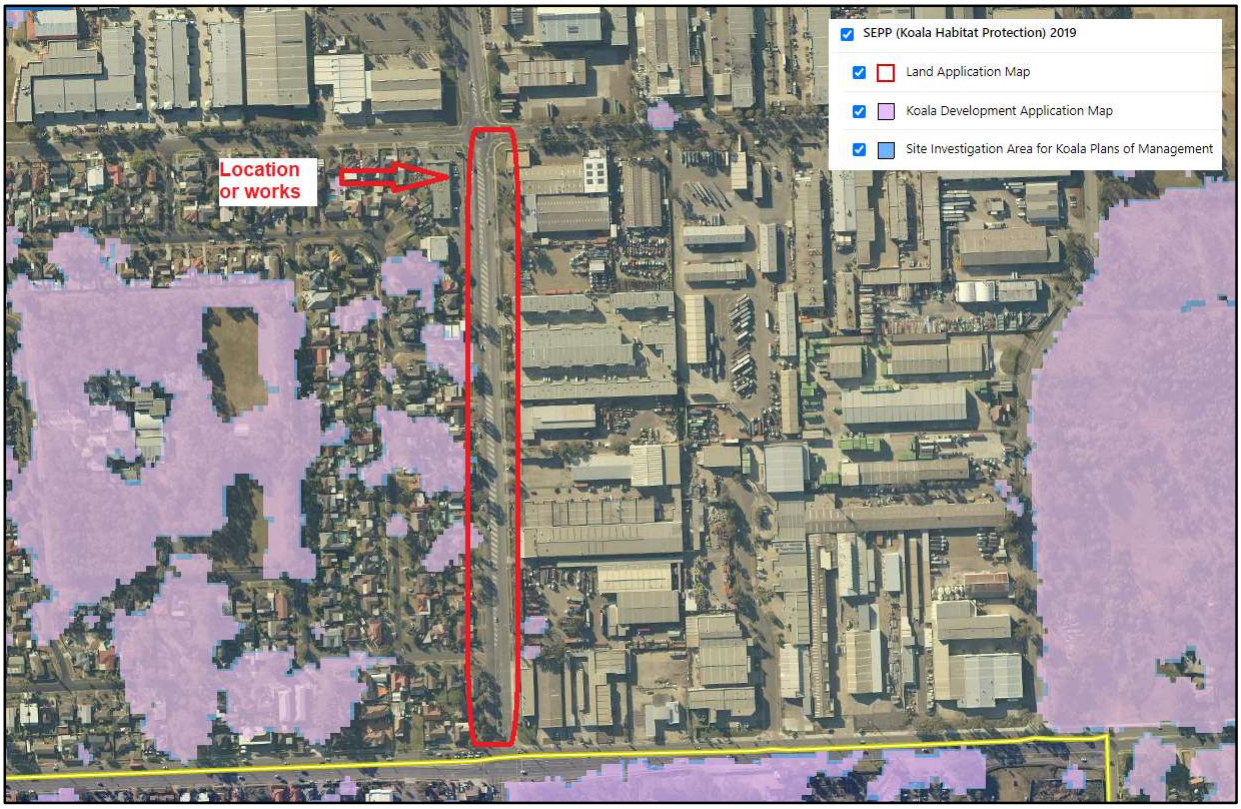


Figure 4.2: Koala SEPP Map

4.2.4 SEPP 55 (Remediation of Land)

SEPP 55 aims to promote the remediation of contaminated land for the purpose of reducing the risk of harm to human health or any other aspect of the environment.

As the proposed works would be located within existing road reserves, they are not considered to be affected by contamination.

4.2.5 SEPP (State and Regional Development) 2011

The proposed infrastructure does not constitute State Significant Development under this SEPP and as such, assessment against the provisions contained within this SEPP is not required.

4.2.6 Liverpool Local Environmental Plan (LEP) 2008

The upgrade works are located entirely within the GMD road reserve which is located upon R3 Medium Density Residential zoned land where "roads" are permissible with consent (see Figure 4.3).

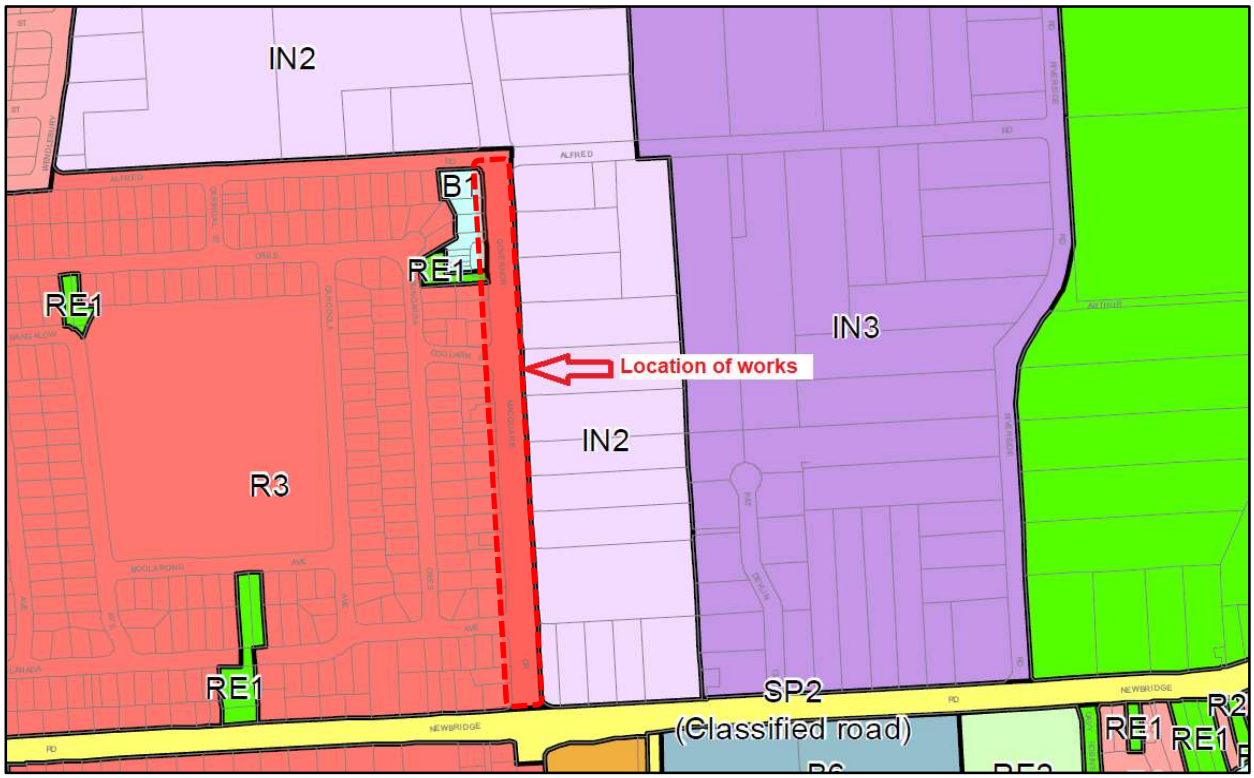


Figure 4.3: Zoning Map

Regardless of the zoning, Clause 5.12 is applicable and states:

5.12 Infrastructure development and use of existing buildings of the Crown

(1) This Plan does not restrict or prohibit, or enable the restriction or prohibition of, the carrying out of any development, by or on behalf of a public authority, that is permitted to be carried out with or without development consent, or that is exempt development, under State Environmental Planning Policy (Infrastructure) 2007.

Taking the above into consideration, the requirements of the ISEPP are applicable to the proposed works.

4.3 NSW & COMMONWEALTH LEGISLATION

4.3.1 Commonwealth Environmental Protection and Biodiversity Conservation Act 1999

The Commonwealth EPBC Act is administered by the Department of Environment and Energy.

The EPBC Act focuses on Commonwealth interests on matters of national environmental significance such as:

- World Heritage Properties;
- National Heritage Places;

- RAMSAR Wetlands;
- National Threatened Species and Ecological Communities;
- Migratory Species;
- Nuclear Actions;
- Commonwealth Marine Areas;
- Great Barrier Reef; and
- Coal Seam Gas and Mining.

Assessments of significance are undertaken in accordance with the Significant Impact Guidelines 1.1 – Matters of National Environmental Significance ("NES") to determine whether a proposed action is likely to have a significant impact on a matter of NES protected by the EPBC Act. If it is determined that the proposal would have a significant impact on a matter of NES, then the action must be referred to the Department of the Environment and Energy. Permits and applications need to also be made for activities which would affect any listed species or ecological community within a Commonwealth area.

The proposed infrastructure has been assessed with regards to its impact upon the above matters of NES as follows:

World Heritage Properties

The site is not a World National Heritage place, and is not in close proximity to any such area.

National Heritage Places

The site is not a National heritage place, and is not in close proximity to any such place.

Ramsar Wetlands

The proposed infrastructure is not anticipated to have any impact on any Ramsar wetlands given that the subject site is located approximately 35km to the closest, being the Towra Point Nature Reserve wetlands.

Great Barrier Reef

The site is not part of, or within close proximity to, the Great Barrier Reef Marine Park.

Commonwealth Marine Areas

The site is not part of, or within close proximity to, any Commonwealth Marine Area.

Threatened Ecological Communities

No threatened ecological community listed under the EPBC Act is present within the site, or will be impacted by the proposal.

Threatened Species

No threatened fauna or flora listed under the EPBC Act have been detected on the site. In addition, EPBC listed threatened fauna have very limited potential to utilise the site as part of a broader foraging range.

Migratory Species

EPBC listed migratory species have very limited potential to utilise the vegetation present onsite and it is not considered that the development of this land as proposed is likely to significantly affect the availability of potential habitat for such mobile species, or disrupt migratory patterns.

Nuclear Actions

N/A

Coal Seam Gas and Mining

N/A

A complete assessment with regards to matters of NES is provided within the Environmental Assessment Report (EAR) located within Appendix 2.

Taking the above into consideration, the project is considered unlikely to have any significant impact on any matters of NES. With this in mind, the activity is not deemed to be a controlled action under the EPBC Act and a referral to the Department of the Environment and Energy is not considered necessary.

4.3.2 Biodiversity Conservation Act 2016

Section 7.2 of the BC Act states:

7.2 Development or activity "likely to significantly affect threatened species"

For the purposes of this Part, development or an activity is likely to significantly affect threatened species if—

(a) it is likely to significantly affect threatened species or ecological communities, or their habitats, according to the test in section 7.3, or

(b) the development exceeds the biodiversity offsets scheme threshold if the biodiversity offsets scheme applies to the impacts of the development on biodiversity values, or

(c) it is carried out in a declared area of outstanding biodiversity value.

To avoid doubt, subsection (1)(b) does not apply to development that is an activity subject to environmental impact assessment under Part 5 of the Environmental Planning and Assessment Act 1979.

As discussed above, the proposed works would not require the removal of any trees as the existing pavement width will be maintained and as the proposed shared pathways will meander around the existing trees located within the verge.

Taking the above into consideration, the proposed works are unlikely to have a significant impact on threatened species in accordance with Section 7.2 (1)(a).

Further, the proposed works are not located within a declared area of outstanding biodiversity value pursuant to Clause 7.2(1)(c).

In summary, the activity is unlikely to significantly affect threatened species pursuant to Section 7.2 of the BC Act.

Full details with regards to the above, including a 5-part test in accordance with Section 7.3 is provided within the EAR located within Appendix 2.

4.3.3 National Parks and Wildlife Act 1974

The National Parks and Wildlife Act 1974 ("NPW Act") is administered by the Office of Environment and Heritage ("OEH") and is the primary legislation for the protection of Aboriginal cultural heritage in NSW.

In terms of Aboriginal heritage, the objects of the Act are:

(1) The objects of this Act are as follows:
(b) the conservation of objects, places or features (including biological diversity) of cultural value within the landscape, including, but not limited to:
(i) places, objects and features of significance to Aboriginal people, and

Part 6 of the NPW Act provides specific protection for Aboriginal objects and places by making it an offence to harm them. If harm to Aboriginal objects and places is anticipated, there is a requirement to apply for an Aboriginal Heritage Impact Permit ("AHIP") under Sections 87 and 90 of the Act.

An AHIMS search has been prepared and is provided as Appendix 4. No Aboriginal sites or places have been recorded or declared within the works area. Furthermore, the works are located over an existing road reserve and as such, have been extensively disturbed through the road itself as well as service installation. With this in mind, the proposed works would not require an AHIP under the NPW Act.

4.3.4 Heritage Act 1977

The Heritage Act 1977 was introduced to conserve the environmental heritage of NSW. Environmental heritage is defined as including buildings, works, relics, or places which are of historic, scientific, cultural, social, archaeological, architectural, natural or aesthetic significance to the state.

The site is not identified as containing or being adjacent a heritage item, nor as being located within a heritage conservation area.

4.3.5 Fisheries Management Act 1994

Threatened Species & Endangered Ecological Communities

Schedules 4, 4A and 5 of the FM Act contain lists of fish and marine vegetation species, ecological communities and populations which have been determined by the NSW Fisheries Scientific Committee as being under threat of serious decline that could ultimately lead to extinction. Section 221ZX of the FM Act provides requires that a SIS be prepared for an activity that is likely to significantly affect threatened species, populations or ecological communities or their habitats as listed under the FM Act.

No habitat for any of the threatened species, populations or communities listed under the Act are considered to be affected given the nature of the location for the proposed infrastructure works and as such a SIS is not required.

Key Threatening Processes ("KTP")

Schedule 6 of the FM Act contains a list of KTPs, diseases and noxious fish and marine vegetation that have a negative impact on listed threatened species, populations and/ or communities.

No KTPs have the potential to affect the site as a consequence of the proposed infrastructure.

Taking the above into consideration, it is concluded that the proposed infrastructure would not significantly impact on threatened species, populations or ecological communities, or their habitats as listed under the FM Act and as such, a SIS is not required.

4.3.6 Water Management Act 2000

The Water Management Act 2000 ("WMA") provides for the integrated and sustainable management of NSW waters through the requirement for certain developments/activities to gain licenses/approvals including:

Chapter 3: Part 2 - Licenses

Water Access Licence

Water access licences (WALs) entitle licence holders to specified shares in the available water within a particular water management area and to take water at specified times, rates or circumstances from specified areas or locations.

As the proposed works generally involve the milling and resheeting of the existing pavement, there would be no requirement to obtain a WAL.

Chapter 3: Part 3 – Approvals

Controlled Activity

Section 91E of the WMA makes it unlawful for a person to carry out a controlled activity within waterfront land without a Control Activity Approval.

The proposed works would not include any works on waterfront land, with the nearest watercourse being over 800m to the west at Georges River.

Aquifer Interference

Section 91F of the WMA makes it unlawful for a person to carry aquifer interference activity without an aquifer interference approval.

As the proposed works generally involve the milling and re-sheeting of the existing pavement, there would be no aquifer interference.

4.3.7 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* ("POEO Act") establishes the NSW Environmental Regulatory Framework and determines whether an Environment Protection Licence ("EPL") is needed for certain works.

The relevant objects of the Act are to:

- *Protect restore and enhance the quality of the environment in NSW, particularly with regard to ESD;*
- *Provide increased opportunities for community involvement;*
- *Ensure community access to information about pollution; and*
- *Reduce risk to human health and degradation of the environment.*

Chapter 3 of the POEO Act provides for a single licensing arrangement to replace the different licences and approvals that were required under separate Acts relating to air pollution, water pollution, noise pollution and waste management.

Schedule 1 of the POEO Act lists activities for which a licence is required and includes road construction as follows:

35 Road construction

(1) This clause applies to road construction, meaning the following—

(a) the construction of roads (including the widening or rerouting of existing roads) and any related tunnels, earthworks and cuttings,

(b) any extraction of materials necessary for that construction,

(c) any on site processing (including crushing, grinding or separating) of any extracted materials or other materials used in that construction.

(2) However, this clause does not apply to—

(a) the maintenance or operation of any road, or

(b) the replacement of part of an existing road.

(3) The activity to which this clause applies is declared to be a scheduled activity if the activity results in one or more of the following—

(a) the extraction or processing (over the life of the construction) of more than—

(i) 50,000 tonnes of materials in the case of premises in the regulated area or in the local government areas of Bega Valley, Eurobodalla, Goulburn Mulwaree, Queanbeyan-Palerang Regional or Snowy Monaro Regional, or

(ii) 150,000 tonnes of material in any other case,

(b) the existence of 4 or more traffic lanes (other than bicycle lanes or lanes used for entry or exit) for a continuous length of at least—

(i) 1 kilometre—where the road is in a metropolitan area and is classified, or proposed to be classified, as a freeway or tollway under the Roads Act 1993, or

(ii) 3 kilometres—where the road is in a metropolitan area and is classified, or proposed to be classified, as a main road (but not a freeway or tollway) under the Roads Act 1993, or

(iii) 5 kilometres—where the road is not in a metropolitan area and is classified, or proposed to be classified, as a main road, freeway or tollway under the Roads Act 1993.

In response to the above, the proposed upgrades would most likely be considered "maintenance" or "replacement". Further, the amount of road base required in the works would be significantly less than 150,000 tonnes and the length of the road is less than 3km. For these reasons, the proposed works would not require an EPL under the POEO Act.

4.3.8 Roads Act 1993

The Roads Act 1993 outlines the processes involved with the opening of roads, road levels, closing of public roads, roadwork, regulation of traffic (both temporary and permanent) by roads authorities, entry onto land and financial assistance to roads authorities.

Section 138 of the Act provides:

138 Works and structures
(1) A person must not:
(a) erect a structure or carry out a work in, on or over a public road, or
(b) dig up or disturb the surface of a public road, or
(c) remove or interfere with a structure, work or tree on a public road, or
(d) pump water into a public road from any land adjoining the road, or
(e) connect a road (whether public or private) to a classified road,

otherwise than with the consent of the appropriate roads authority.

Any approvals required pursuant to Section 138 would be obtained prior to construction commencing.

4.3.9 Waste Avoidance & Resource Recovery Act 2001

The objects of this Act include encouraging efficient use of resources and reducing environmental harm in accordance with the principals of ecologically sustainable development. The Act establishes a waste hierarchy for the avoidance, resource recovery and disposal of waste.

To meet these objectives the Act sets in place, a hierarchy of waste management by way of avoidance, recovery and disposal in descending order.

It is LCC policy to recycle existing material to minimise disposal of road material.

4.3.10 Crown Lands Act 1989

The Crown Lands Act 1989 is administered by the NSW Department of Lands and controls the administration and management of Crown land. The object of the Act is to ensure that Crown Land is managed for the benefit of the NSW community.

Given that the proposal does not involve Crown land, the Crown's consent is not required from the NSW Department of Lands.

4.3.11 Biosecurity Act 2015

The primary obligations of this Act is to provide a framework for the prevention, elimination and minimisation of biosecurity risks posed by biosecurity matter, dealing with biosecurity matter, carriers and potential carriers, and other activities that involve biosecurity matter, carriers or potential carriers.

Given that the construction of the shared pathways may require the removal of topsoil, the spread of weeds is a possibility. During construction, the removal of or disturbance to these weeds would be managed using industry-standard best practices to ensure the obligations of this Act were met in terms of minimisation of biosecurity, weed and pathogen risks. These have been incorporated into the mitigation measures discussed within Section 6.

5.0 Stakeholder and Community Consultation

5.1 COMMUNITY CONSULTATION

5.1.1 Adjoining and/or Affected Landholders

The proposed works would occur within close proximity to both residential and business users, with the closest being approximately 5m from the works (installation of the shared pathway). At times, driveways to these properties would be blocked and general construction impacts would occur. For these reasons, consultation with residents/businesses in the immediate vicinity will be undertaken prior to the completion of the Concept Design.

5.1.2 Local Aboriginal Communities

Consultation with Local Aboriginal Communities is not considered necessary in this instance due to the minor nature of the works and its location within a disturbed setting.

5.1.3 The General Community

Consultation with the general community will be undertaken prior to the finalisation of the Detailed Design. Consideration of submissions received in this regard will be assessed and amendments to the design/construction process will be applied if required. The subject REF would be updated to address submissions received.

5.2 GOVERNMENT AGENCY & STAKEHOLDER CONSULTATION

5.2.1 ISEPP Clause 13-15 Consultation with Council

Clauses 13-15 of the ISEPP identifies instances when the relevant Council should be consulted as part of the infrastructure works as follows:

Clause 13(1)

This clause applies to development carried out by or on behalf of a public authority that this Policy provides may be carried out without consent if, in the opinion of the public authority, the development:

> *(a) will have a substantial impact on stormwater management services provided by a council, or*

The proposed infrastructure would impact on the existing stormwater management services provided by LCC. LCC have reviewed the initial concept designs in this regard and any comments provided have been incorporated in the Concept Design.

> *(b) is likely to generate traffic to an extent that will strain the capacity of the road system in a local government area, or*

The proposed infrastructure would have a minor impact on increased traffic during construction, however it would be temporary only not. The proposed upgrades would restrict right turn movements into and out of Balanada Avenue which would alter traffic flows locally.

These restrictions have been applied as a result of consultation with Transport for New South Wales (TfNSW) who advised there were safety concerns over the existing situation due the proximity of the signalised intersection to the south and the high traffic volumes GMD experiences.

> *(c) involves connection to, and a substantial impact on the capacity of, any part of a sewerage system owned by a council, or*

The proposed infrastructure would have no impacts on the existing sewerage system.

> *(d) involves connection to, and use of a substantial volume of water from, any part of a water supply system owned by a council, or*

The proposed infrastructure does not involve connection to a water system owned by Council.

> *(e) involves the installation of a temporary structure on, or the enclosing of, a public place that is under a council's management or control that is likely to cause a disruption to pedestrian or vehicular traffic that is not minor or inconsequential, or*
>
> *(f) involves excavation that is not minor or inconsequential of the surface of, or a footpath adjacent to, a road for which a council is the roads authority under the Roads Act 1993 (if the public authority that is carrying out the development, or on whose behalf it is being carried out, is not responsible for the maintenance of the road or footpath).*

TfNSW and LCC have been consulted throughout the design phase and will continue to be consulted through the detailed design phase through to construction. Comments received from both authorities with regards to the design have been incorporated as required.

Clause 14 is not applicable as the infrastructure does not impact on items of local heritage significance.

Clause 15 is not applicable as the infrastructure would not change flood patterns within a flood liable area.

Clause 15AA is not applicable as the infrastructure does not fall under any of the relevant provisions (i.e. falls under Division 18 which is not listed under subsection 2).

Clause 15A is not applicable as the works are not located on land that is within a coastal vulnerability area.

5.2.2 ISEPP Clause 16 Consultation with Other Public Authorities

Clause 16 of the ISEPP identifies instances when public authorities other than the Council should be consulted as part of the infrastructure works, as follows:

> *(1) A public authority, or a person acting on behalf of a public authority, must not carry out specified development that this Policy provides may be carried out without consent unless the authority or person has:*

(a) given written notice of the intention to carry out the development (together with a scope of works) to the specified authority in relation to the development, and

(b) taken into consideration any response to the notice that is received from that authority within 21 days after the notice is given.

*(2) For the purposes of subclause (1), the following development is **specified development** and the following authorities are **specified authorities** in relation to that development:*

(a) development adjacent to land reserved under the National Parks and Wildlife Act 1974 or to land acquired under Part 11 of that Act—the Office of Environment and Heritage,

(b) development on land in Zone E1 National Parks and Nature Reserves or in a land use zone that is equivalent to that zone—the Office of Environment and Heritage,

(c) development adjacent to an aquatic reserve or a marine park declared under the Marine Estate Management Act 2014—the Department of Industry,

(d) development in the foreshore area within the meaning of the Sydney Harbour Foreshore Authority Act 1998—the Sydney Harbour Foreshore Authority,

(e) development comprising a fixed or floating structure in or over navigable waters—Roads and Maritime Services,

(f) development for the purposes of a health services facility, correctional centre or group home, or for residential purposes, in an area that is bush fire prone land (as defined by the Act)—the NSW Rural Fire Service,

(g) development that may increase the amount of artificial light in the night sky and that is on land within the dark sky region as identified on the dark sky region map—the Director of the Observatory,

(h) development on defence communications facility buffer land within the meaning of clause 5.15 of the Standard Instrument—the Secretary of the Commonwealth Department of Defence,

(i) development on land in a mine subsidence district within the meaning of the Mine Subsidence Compensation Act 1961—the Mine Subsidence Board.

Clause 16 is not applicable as the proposed infrastructure is not identified as a "specified development". Specifically, the infrastructure is not located within any of the above areas, including mine subsidence districts.

5.2.3 Consultation Beyond ISEPP

In addition to the above, consultation has been undertaken with TfNSW throughout the funding and design stage of the project. Both LCC and TfNSW have worked together to define the current issues and identify appropriate solutions for this section of GMD. These have been discussed in detail within Section 2.

6.0 Consideration of Environmental Factors

It is a requirement under Division 5.1 of the EP&A Act that all matters likely to affect the environment by reason of the activity be taken into account to the fullest extent possible.

The potential environmental impacts of the proposed infrastructure works have been generated based on the following:

- The background and objectives behind the proposed works as discussed within Section 2;
- The infrastructure components proposed, and the construction activities required to develop them, as discussed within Section 3;
- The legislative framework within which the works must comply, as discussed within Section 4;
- The input from relevant stakeholder and community consultation, as discussed within Section 5; and
- The existing environmental conditions, potential impacts and proposed safeguards, discussed below within Section 6.

6.1 LAND USES & SERVICES

6.1.1 Existing Environment

Site Description: The section of GMD between Newbridge Road and Alfred Road provides direct access(s) to industrial, warehousing, residential and neighbourhood shopping centre developments within the area.

Property Description: The proposed works are located entirely within the GMD road reserve and would not encroach into any private properties.

Services/Easements: Various services run along both sides of GMD, however these would not be impacted by the proposed works.

6.1.2 Impact Assessment

Construction

The construction of the proposed infrastructure has the potential to impact on land use through general impacts on public amenity and potential disruption to services during construction.

Operation

The operation of the GMD upgrade would have a general improvement to the existing land users within the vicinity through the improved traffic and safety situation as discussed in detail within Section 2.

6.1.3 Safeguards

Based on the existing environment and impact assessment of the infrastructure on or by land uses, the following safeguards are proposed:

1.1 Notification would be given to all property owners who adjoin the infrastructure at least 14 days prior to works commencing. The notification shall include a brief description of the works and the dates and times they would be undertaken along with contact details in the case of complaints.

1.2 A Dial Before You Dig must be undertaken prior to any works commencing in order to locate buried services. If works are to be undertaken below power lines refer to Ausgrid Guidelines NS 209 Operating Cranes and Plant in Proximity to Power Line. If works are to be undertaken within the vicinity of Telstra pits refer to the Network Integrity Help Desk on 1800 653 935.

1.3 LCC will consult with relevant service providers during detailed design to identify possible interactions and develop procedures to be implemented to minimise the potential for service interruptions which have the potential to impact on existing land use.

Other mitigation measures which also relate to land use are included below within more specific categories.

6.2 SOILS & GEOLOGY

6.2.1 Existing Environment

Topography: The topography across the subject section of GMD is essentially level, with a slight crest opposite No. 13 GMD at 7m AHD. Grades along GMD are less than 5% and are not considered a site constraint.

Rock: Given that the proposed infrastructure would only involve pavement milling of the existing asphalt wearing course, rock would not be encountered during construction.

Contamination: As the proposed works would be located within an existing road reserve, it is not considered to be affected by contamination.

Mine Subsidence: The subject site is not located within a mine subsidence district.

Acid Sulphate Soils (ASS): Liverpool LEP 2008 identifies the infrastructure area as containing Class 2 and 5 ASS (see Figure 6.1).

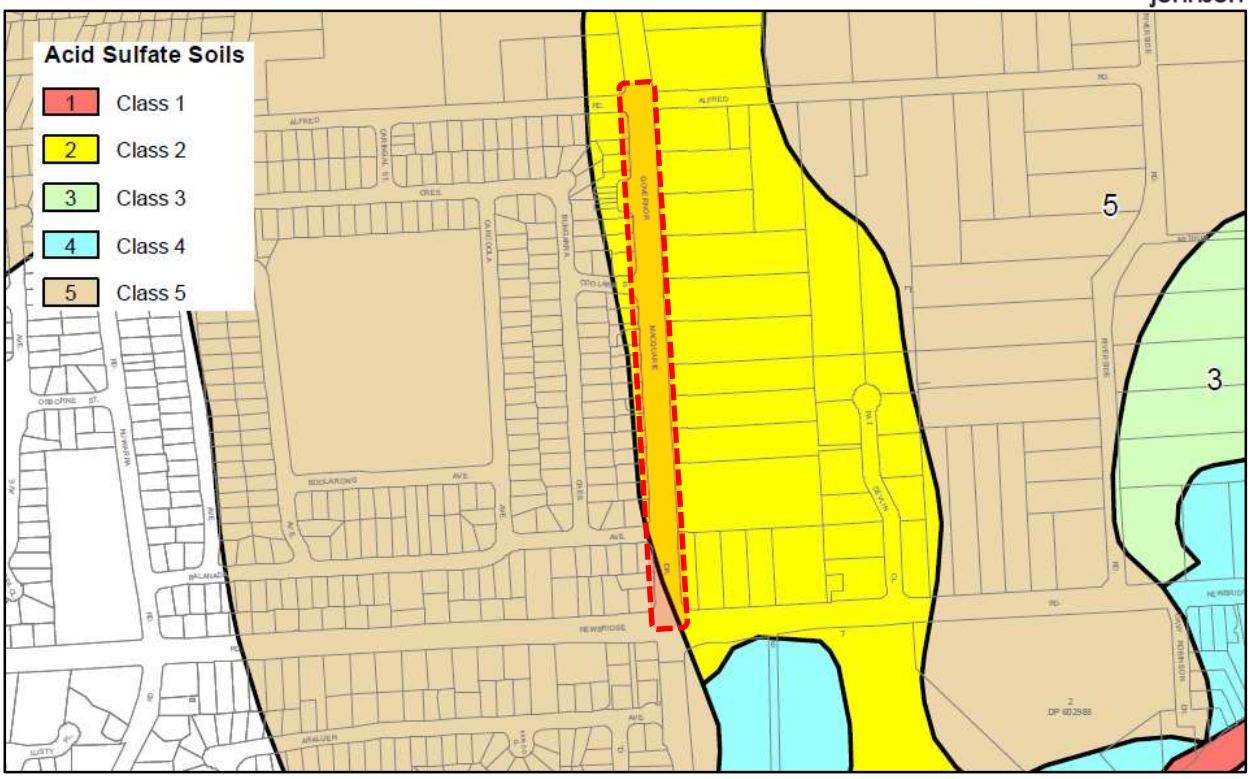


Figure 6.1: LEP ASS Map

Landslip: The site is not located within an area expected to be subject to landslip given its gentle topography and soil structure.

Natural Cliff Features, Rock Outcrops or Rock Shelves: The site does not contain any cliff features, rock outcrops or rock shelves.

High Erosion Potential: The site does not have a high erosion potential due to the generally sealed nature of the works area and surrounds and gentle topography. Ground disturbing works would however, be required to install the shared pathways.

6.2.2 Impact Assessment

Construction

Based on the existing environment discussed above, construction of the proposed infrastructure has the potential to impact on, or be impacted by soils through:

- Disturbance to ASS: Due to the presence of Class 2 ASS, works which penetrate the nature ground level have the potential to expose ASS. Whilst the majority of works would occur at ground level, site preparation works for the shared pathways may occur below natural ground level.

- Erosion and Sedimentation: Impact to soils associated with construction activities would generally be limited to short-term erosion by means of wind and water.

- Disturbance to Topsoil: The removal of topsoil would be required as part of the construction works and as such, soil restoration measures would need to be adopted.

Operation

There were no ongoing impacts on soils and geology identified as a result of the proposed works.

6.2.3 Safeguards

Based on the existing environment and impact assessment of the infrastructure on or by soils and geology, the following safeguards are proposed:

2.1 Prior to the disturbance of ASS, an Acid Sulfate Soils Management Plan (ASSMP) should be prepared in accordance with ASSMAC guidelines.

2.2 An Erosion and Sediment Control Plan shall be prepared including measures consistent with the requirements of LCC. Such measures are to be put in place prior to the commencement of construction.

2.3 Where excavated soil is to be used in site restoration, it would be excavated and stockpiled in sequential layers corresponding to the existing soil profile. Topsoil and leaf litter is to be removed first and windrowed in separate stockpiles of less than 1m in height on the upslope side of excavations. Soil layers would be replaced sequentially so that the soil profile is restored as closely as possible to its pre-work status.

The natural landform of the site(s) would be restored as closely as possible to the pre-works condition.

Rehabilitating exposed areas as soon as possible following excavation and completed no more than 10 days after works.

2.4 Should any unexpected contaminants be encountered during the works, work in the area would cease immediately and the LCC Officer would be contacted to seek and advise on the appropriate action.

6.3 HYDROLOGY, FLOODING & WATER

6.3.1 Existing Environment

Watercourses/Drainage Lines: The nearest watercourse to the proposed works, is over 800m to the west at Georges River.

Flooding: The site is impacted by low and medium risk flooding (see Figure 6.2)

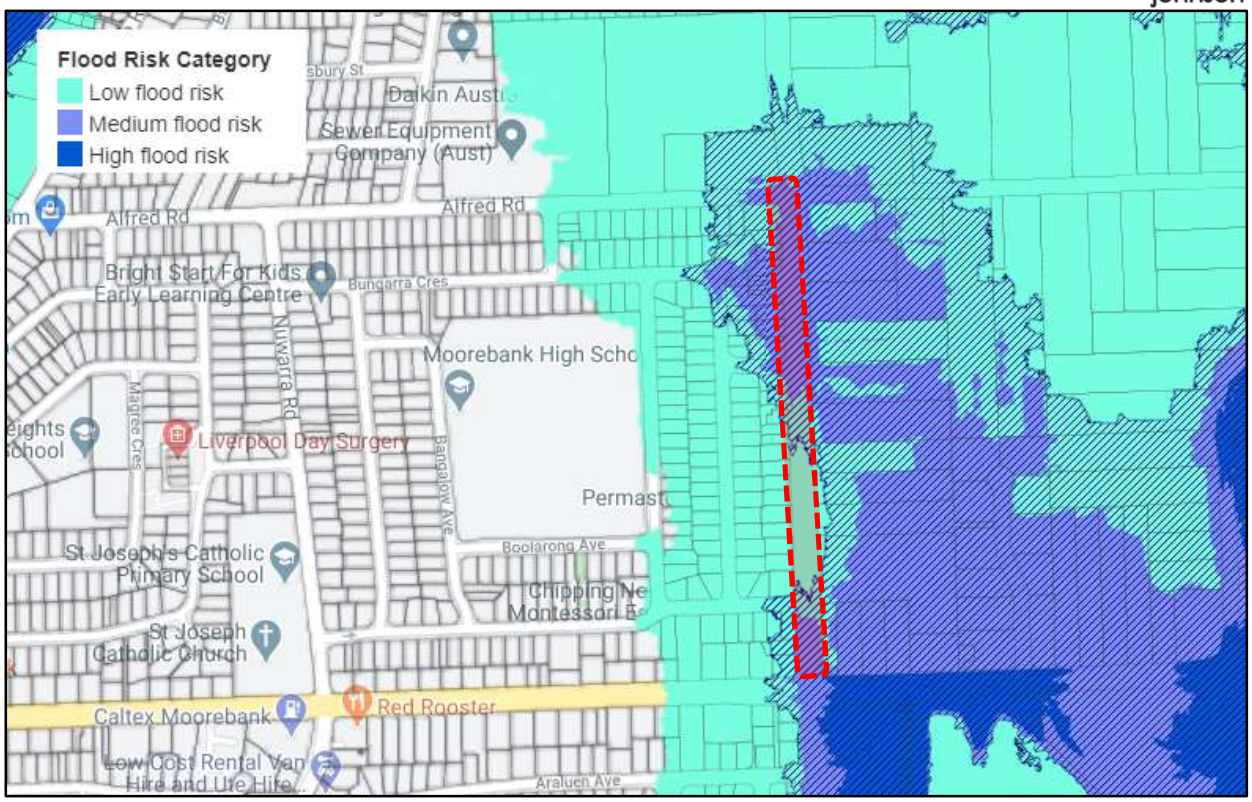


Figure 6.2: Flood Map

Drinking Catchment: The site is not located within a drinking water catchment.

6.3.2 Impact Assessment

Construction

Based on the existing environment discussed above, the construction of the proposed infrastructure has the potential to impact on or be impacted by hydrology, flooding and water through:

- Works within flood prone land: Should construction occur during a period of flood, potential impacts on flood waters or obstruction to flood waters may occur.
- Erosion and Sedimentation: During earthworks for the construction of the proposed infrastructure works, surface soils would be exposed leading to potential soil erosion and sediment export. Potential impacts occurring directly from the soil eroded during the construction could include increased turbidity in receiving water bodies, damage to aquatic biota and siltation of downstream waterways.
- Fuels, Concrete wash and Chemicals: Spillage of fuels, concrete and chemicals used in construction works has the potential to impact upon surface water quality.

Operation

There were no ongoing impacts on hydrology, flooding and water identified as a result of the proposed works.

6.3.3 Safeguards

Based on the existing environment and impact assessment of the infrastructure on or by hydrology, flooding and water, the following safeguards are proposed:

3.1 In the event of heavy rainfall, no construction equipment, including stockpiles shall be located within flood affected portions of the site, so as to not block the passage of flood waters.

3.2 All fuels, chemicals and liquids are to be stored in an impervious bunded area away from:

- Rivers, creeks or any areas of concentrated water flow;
- Flooded or poorly drained areas including those identified within Figure 6.2;
- Slopes above 10%;
- The storage and handling of fuels and chemicals shall comply with Australian Standard AS1940;
- A 'spill kit' will be kept on site at all times for potential chemical or fuel spills;
- Any fuel, lubricant or hydraulic fluid spillages on land are to be collected using absorbent material and the contaminated material disposed of at an Office of Environment & Heritage licensed waste depot.

3.3 Potable water is to be used for wash down of vehicles and equipment.

3.4 Water quality control measures are to be used to prevent any materials (e.g. concrete, grout, sediment etc.) entering drain inlets or waterways. Containment material is to be used to capture / filter water used in wash down.

3.5 No concrete wash out is to be carried out on-site.

3.6 Water required for the proposal would be obtained from an approved source (e.g. potentially including hydrants or tankers).

6.4 BIODIVERSITY

6.4.1 Existing Environment

Native Vegetation/Endangered Ecological Communities (EEC): Scattered native species of trees and shrubs have been planted on the nature strip on the western side of the road.

EPBC Act & BC Act listed threatened species, ecological community or migratory species: None identified during site inspection and none anticipated due to lack of suitable habitat.

Wetlands, Aquatic flora or habitat (i.e. seagrasses, mangroves): Nil

Weeds/Pests: Roadside weeds were present within the GMD road verges.

National Parks: N/A

Coastal Management 2018: N/A

6.4.2 Impact Assessment

Construction

Based on the existing environment discussed above, the construction of the proposed infrastructure has the potential to impact on ecology through:

- Spread of Weeds: The proposed works area contains a variety of weeds, which if not managed properly, construction impacts could aid in their spread.

Operation

There were no ongoing impacts on biodiversity identified as a result of the proposed works.

6.4.3 Safeguards

Based on the existing environment and impact assessment of the infrastructure on or by biodiversity, the following safeguards are proposed:

4.1 No tree removal shall occur as a result of the installation of the shared pathway. The pathway shall meander around existing trees in order to avoid removal where necessary.

4.2 The native trees and shrubs to be retained should be fenced off and signs installed to notify workers of their sensitive nature.

4.3 Pruning of native trees required in the scope of the proposed works should be undertaken by a qualified arborist.

4.4 No machinery or material should be stored within the retained vegetation or within the dripline of retained trees.

4.5 Equipment should be cleaned thoroughly and disinfected before entering and exiting site to prevent weed and disease introduction such as *Phytophthora cinnamomi* (Root-rot fungus), Myrtle Rust and others.

4.6 Effective weed control should be used on site, ensuring that appropriate methods are used to eliminate and dispose of highly competitive weeds.

Full details with regards to biodiversity matters are located within the EAR (refer to Appendix 2).

6.5 NOISE & VIBRATION

6.5.1 Existing Environment

Noise Environment: The site is in an area of mixed suburban and commercial/industrial activity. There are residential receivers along the western side of the road and commercial/semi industrial receivers along the eastern side of the road.

Unattended noise logging was undertaken to quantify the existing acoustic environment of the area which recorded a background noise level of 59 dB(A) at residential receivers.

Sensitive Receivers: The nearest sensitive receivers to the works are the existing dwellings

located on the western side of GMD (see Figure 6.3).

Critically Sensitive Receivers: The nearest critically sensitive receiver to the works is Moorebank High School, approximately 200m to the west (see Figure 6.3).

There are no other critically sensitive receivers such as nursing homes or hospitals in the nearby vicinity.

Figure 6.3: Nearby Sensitive Receivers

Vibration: Given the close proximity of the existing dwellings on GMD, it is considered reasonable to make an assessment of vibrational impacts in this regard.

6.5.2 Impact Assessment

Construction

Based on the existing environment discussed above, the construction of the proposed infrastructure has the potential to impact on noise and vibration through:

- General construction based noise: Construction works for the proposed upgrades would occur for more than three (3) weeks, however noise at one (1) location would generally move along the alignment of GMD.

  Equipment used during construction may include excavators, drilling equipment, trucks, rollers, generators and compactors – all machines likely to emit potential noise.

In order to minimise impacts on traffic during construction, some works would need to be undertaken outside of the standard working hours of:

- Monday-Friday: 7:00am to 6.00pm;
- Saturday: 8.00am to 1.00pm;
- Sunday and Public Holidays: no work.

To assess the impacts in this regard, a Construction Noise and Vibration Assessment was undertaken. The assessment concluded that construction works would exceed the recommended noise management levels. Full details in this regard are provided within the Construction Noise and Vibration Assessment located within Appendix 3.

- Vibration associated with the use of construction equipment: Vibration impacts on buildings and humans can occur when construction requires heavy equipment to remove existing road surfaces or compact new road surfaces etc.

  To assess the impacts in this regard, a Construction Noise and Vibration Assessment was undertaken. The assessment concluded that construction works may exceed the recommended vibration levels for human comfort but would be unlikely to cause damage to buildings. Full details in this regard are provided within the Construction Noise and Vibration Assessment located within Appendix 3.

Operation

The proposed works would increase the capacity of GMD, however would also improve its LoS. With this in mind, the noise currently experience during operation is likely to be similar to that following the upgrades works.

There were no ongoing vibration impacts identified as a result of the proposed works given that the alignment of GMD would not alter.

6.5.3 Safeguards

Based on the existing environment and impact assessment of the infrastructure by noise and vibration, the following safeguards are proposed:

5.1 Residents in streets adjacent to the construction site should be notified of the project. This would, typically, be done by a letterbox drop. Included in the notification should be a description of proposed works and an outline of the proposed time frame for the various stages of the works.

The letterbox drop should include, as a minimum, all residences and commercial premises within 100m of the edge of GMD and include residences in GMD, Balanada Avenue, Bungarra Crescent and Coolarn Street.

The contact name and phone number of a responsible person should be given out so that residents may comment on the works and indicate any particularly significant noise sensitive times.

The advice should also advise the name and phone number of the person responsible for accepting and dealing with complaints. All complaints or communications should be answered promptly and a record kept of all complaints, responses and actions.

5.2 A Construction Noise and Vibration Management Plan shall be prepared for the works. The plan would detail the specific measures to be implemented to reduce construction noise and vibration levels, including, but not limited to:

- The plan would cover aspects including site noise planning, scheduling of high noise activities, operator instruction, plant maintenance, plant noise audit and complaints management;
- Construction hours should generally be limited to Monday to Friday 7.00am to 6.00pm, Saturday 8.00am to 1.00pm with no work on Sunday or public holidays where works adjoin residential receivers. Works outside of these hours would require the prior approval of LCC and be determined in consideration with any submissions received during the community consultation phase;
- Any work that is performed outside normal work hours or on Sundays and public holidays is to minimise noise impacts in accordance with Roads and Maritime's Construction Noise and Vibration Guideline (April 2016);
- The main contractor should plan to coordinate subcontractors so that there are no unnecessary cumulative impacts arising from the simultaneous activities of more than one (1) subcontractor. That is, planning to avoid, if practical, having more than one (1) noisy activity taking place in close proximity. It is good practice to appoint a single coordinator to oversee all significant noise producing activities;
- All personnel working on the job including subcontractors and their employees must be made aware of their obligations and responsibilities with regard to minimising noise emissions;
- Site inductions and toolbox meetings to all employees and subcontractors must include information about the need to minimise noise impacts to surrounding areas;
- Contractors should familiarise themselves with methods of controlling noisy machines and alternative construction procedures. These are explained in AS2436-1981 "Guide to Noise Control on Construction, Maintenance and Demolition Sites";
- Any activities identified in in the risk assessment phase that are known or have the potential to create excessive noise should, where possible, be scheduled to occur at times to cause least annoyance to the community. Carrying out such work during early morning should be avoided. This includes start up and idling etc. of heavy machinery prior to commencement of work;
- Mechanical plant should be silenced using best available control technology. Noise suppression devices should be maintained to manufacturer's specifications;
- All equipment used on the site shall have exhaust systems that have been recommended by the manufacturer as having the lowest associated noise for that machine;
- Machines which are used intermittently such as rollers or other earthmoving machinery should either be shut down in the intervening periods between use or throttled down to a minimum;
- Any portable equipment with the potential to create high levels of noise e.g. compressors, generators etc. should only be selected for use if it incorporates effective noise control. This equipment should be located where practical so that site sheds, or previously erected structures are between it and the nearest potentially affected receivers. Where no such barriers are present, this machinery should be located behind a portable screen or enclosure;

- The effectiveness of a noise barrier or screen depends on its length, height and its position relative to the source and the receiver. A screen designed to reduce noise from a stationary source should, where possible, extend a distance of twice the length of the noise source beyond the direct line of sight between the source and the receiver;
- Plant known to emit noise strongly in one (1) direction, such as a concrete agitator, should, where possible, be oriented such that the noise is directed away from the closest or the most noise sensitive receivers;
- Regular and effective maintenance of all equipment including vehicles moving on and off the site should be conducted. Prompt attention must be given to repair of loose or rattling parts and broken equipment. All maintenance work should only be carried out by qualified persons;
- When selecting contractors and/or equipment for the job, preference must be given to those with capacities best suited to the task at hand. That is the use of larger machines with excess capacity should be avoided unless these can be shown to be quieter than smaller capacity machines;
- Site access should be designed such that delivery vehicles, and other heavy vehicles moving through the site can do so with minimum need to reverse;
- Where possible, loading and unloading of plant and materials should be carried out away from potentially affected receivers. No delivery of plant or materials should be accepted before 7am Monday to Friday or 8am on Saturday;
- Care should be taken not to drop materials from height either into, or out of trucks or other rigid surfaces. The surface to which the materials are being moved should be covered by some resilient material. Particular care should be taken during the loading or unloading of any scaffolding;
- Where the construction machinery including vibratory rollers, rollers or excavators (or other potentially vibration inducing machinery or processes) is to be operated within 15m of an existing building, vibration monitoring shall be undertaken during the first phases of the use of that machinery;
- Prior to any construction work being carried out a dilapidation survey should be carried where vibratory rollers, rollers or excavators (or other potentially vibration inducing machinery or processes) is to be operated within 15m of an existing building.

6.6 AIR QUALITY & ENERGY

6.6.1 Existing Environment

The air quality of GMD would be as expected for a heavily congested main road within an industrial and residential setting, thus being affected by significant traffic exhaust.

As noted within the noise assessment above, sensitive receivers exist within the vicinity of the works.

6.6.2 Impact Assessment

Construction

Based on the existing environment discussed above, the construction of the proposed infrastructure has the potential to impact the air quality of residential properties through:

- Overspray from linemarking paints: In windy conditions, over-spray from linemarking paint can impact adjoining landowners/pedestrians and road users.

- Dust Generation: Dust can be generated by a number of construction activities including excavation; stockpiling; and vehicle movements.

- Emissions from Construction Equipment: Additional heavy vehicles required during construction have the potential to impact upon air quality.

  The burning of fossil fuel, as required for the operation of most construction equipment, is usually a significant contributor to greenhouse gas emissions on infrastructure projects. Fuel use is likely to be the largest overall contributor to GHG emissions during the construction of this project.

- Line marking spray: Line marking requires the use of paint sprayed onto the road surface. In windy conditions, this can blow onto adjoining properties, vehicles, pedestrians etc.

Operation

The proposed works would increase the capacity of GMD, however would also improve its LoS. With this in mind, whilst additional vehicles may use this road, there would be less congestion and this would reduce idle exhaust emissions.

6.6.3 Safeguards

Based on the existing environment and impact assessment of the infrastructure on air quality, the following safeguards are proposed:

6.1 Complaints during construction works are to be handled by the contractor. A contact name and number is to be displayed at the construction site.

6.2 To mitigate against the potential for dust to occur during construction, the following measures would be adopted:

- All work sites, general work areas and stockpiles will be closely monitored for dust generation and watered down (with clean water) or covered (via seeding or tarpaulins) in the event of dry and/or windy conditions;
- Rehabilitating exposed areas as soon as possible following excavation;
- Ensuring mud is not carried onto public roads by vehicle tyres;
- All loads of excavated material, soil, fill and other erodible matter that are transported to or from the work site will be kept covered at all times during transportation and will remain covered until they are unloaded either for use at the work site, reuse or disposal at an OEH licensed waste disposal facility.

6.3 To mitigate against the potential odour concerns from construction equipment emissions, the following measures would be adopted:

- All working vehicles and construction equipment to be equipped with properly maintained exhaust systems that comply with the relevant Australian Standards;
- Machinery and vehicles will not be left running or idling when not in use;
- Odour or air pollutant emission complaints will be dealt with promptly and the source will be eliminated wherever practicable;
- Proper maintenance of vehicle exhaust systems, and regular visual inspections of emissions;

- Works (including the spraying of paint and other materials) are not to be carried out during strong winds or in weather conditions where high levels of dust or airborne particulates are likely;
- Diesel vehicles and equipment will be turned off when not in use for a period of more than five minutes, and not left idling.

6.4 Works (including the spraying of paint and other materials) are not to be carried out during strong winds or in weather conditions where high levels of dust or airborne particulates are likely.

6.7 NON-ABORIGINAL HERITAGE

6.7.1 Existing Environment

A search of the NSW heritage database, Commonwealth EPBC heritage list and LEP has been conducted to reveal that no European heritage items are located near the proposed infrastructure.

6.7.2 Impact Assessment

Construction

The proposed infrastructure works would have no impact on any Non-Aboriginal heritage conservation areas or items.

Operation

There would be no impact on Non-Aboriginal heritage during the operation of GMD.

6.7.3 Safeguards

Based on the existing environment and impact assessment of the infrastructure on Non-Aboriginal Heritage, the following precautionary safeguard is proposed:

7.1 If unrecorded relics are identified in the Project Area during works, then all works in the immediate area must cease and the area would be cordoned off.

Department of Planning, Industry and Environment (DPIE) and LCC will be informed to determine the appropriate management strategy.

6.8 ABORIGINAL HERITAGE

6.8.1 Existing Environment

An Aboriginal Heritage Information Management System (AHIMS) search has been conducted to reveal that no Aboriginal sites or places have been declared/recorded across either Lot 1 or Lot 2 (refer to **Appendix 4**). Furthermore, due to the disturbed nature of the GMD road reserve, it is considered unlikely that any items would be discovered during the course of the works.

6.8.2 Impact Assessment

Construction

The proposed infrastructure works would have no impact on any Aboriginal heritage items.

Operation

There would be no impact on Aboriginal heritage during the operation of the GMD.

6.8.3 Mitigation Measures

Based on the existing environment and impact assessment of the infrastructure on Aboriginal Heritage, the following precautionary safeguards are proposed:

8.1 If unrecorded Aboriginal object/s are identified in the Project Area during works, then all works in the immediate area must cease and the area would be cordoned off. Department of Planning, Industry and Environment (DPIE) will be informed to determine the appropriate management strategy.

8.2 In the unlikely event that skeletal remains are identified, work must cease immediately in the vicinity of the remains and the area must be cordoned off. The proponent must contact the local NSW Police who would make an initial assessment as to whether the remains are part of a crime scene or possible Aboriginal remains. If the remains are thought to be Aboriginal, Department of Planning, Industry and Environment must be contacted. A Department of Planning, Industry and Environment officer would determine if the remains are Aboriginal or not; and a management plan must be developed in consultation with the relevant Aboriginal stakeholders before works recommence.

6.9 VISUAL AMENITY

6.9.1 Existing Environment

Visibility from residential properties: The works site currently presents as congested heavy vehicle route which is readily visible by both business and residents along GMD.

Scenic Value: The works area does not have a significant scenic value.

6.9.2 Impact Assessment

Construction

Based on the existing environment, visual impacts due to construction of the proposed roadworks would be minimal given the temporary nature of the works and would relate to construction equipment and processes only.

Operation

Above ground/visible aspects of the proposed works would be minimal as the pavement width of the road would generally remain unchanged. The visual environment may however, improve through the introduction of landscaping along medians. This would provide a visual relief to road users and adjoining land owners.

Further to the above, no tree removal, acoustic walls, retaining walls, areas of shotcrete, or altered lighting would be required.

6.9.3 Mitigation Measures

Based on the existing environment and impact assessment of the infrastructure on the visual environment, the following precautionary safeguards are proposed:

9.1 The site will be kept rubbish free at all times.

9.2 Temporary erosion and sediment controls would be removed from the site once landforms have been assessed as stable.

9.3 All disturbed areas would be rehabilitated and progressively stabilised following the completion of the works.

9.4 Landscaping is to be managed in accordance with LCC guidelines.

6.10 TRAFFIC & ACCESS

6.10.1 Existing Environment

The existing traffic environment has been discussed at length within Section 2.

6.10.2 Impact Assessment

Construction

Based on the existing environment discussed above, the construction of the proposed infrastructure has the potential to impact on traffic and access through:

- Increased construction vehicle traffic: The construction of the proposed infrastructure has the potential to impact on traffic and transportation through increased construction vehicle movements to and from the site.
- Disruption to Private Property Access: For short periods, it is likely that vehicular access to all properties along the impacted length of GMD will be disrupted.
- Road Closures: Temporary road or lane closures would be required as part of the proposed construction process.

Operation

The proposed works have been designed so as to improve traffic conditions along GMD by providing two (2) full northbound and southbound lanes; extending the existing southbound right turn lane by 80m; and providing linemarked truck parking on each side. Traffic flows will also be improved by restricting right turn movements into and out of Balanda Avenue as well as the existing commercial properties at Lots 165 – 166 DP 240250 and Lots 220-221 DP 242001. Full details with regards to the benefits of the proposed upgrades to the traffic environment have been provided within Section 2.

Despite the above, restricting the above right turn movements will have the following ongoing impacts:

- Access to the commercial properties at Lots 165 – 166 DP240250 and Lots 220-221 DP242001 could only occur from the northbound lane of GMD or from the alternate access in Alfred Road.

- Removing right turn movements at Balanda Avenue will have a local impact on traffic movements due to the fact that the Nuwarra Road/Balanda Avenue intersection allows for left in/right in movements only.

  Transdev have advised that current bus movements from Moorebank High at the intersection of GMD and Balanada Avenue is one (1) left and three (3) right. Removing the right hand turn movements will require buses leaving the school to use Nuwarra Road which is considered problematic due to the congestion at St Joseph's Primary School.

  In order for local traffic to access GMD from Nuwarra Road (or vice versa), the following route would need to be followed: Boolarong (R) → Carcoola Avenue (L) → Balanda (L)→ GMD (R) at Roundabout to return to GMD (R) Newbridge Road (see Figure 6.4).

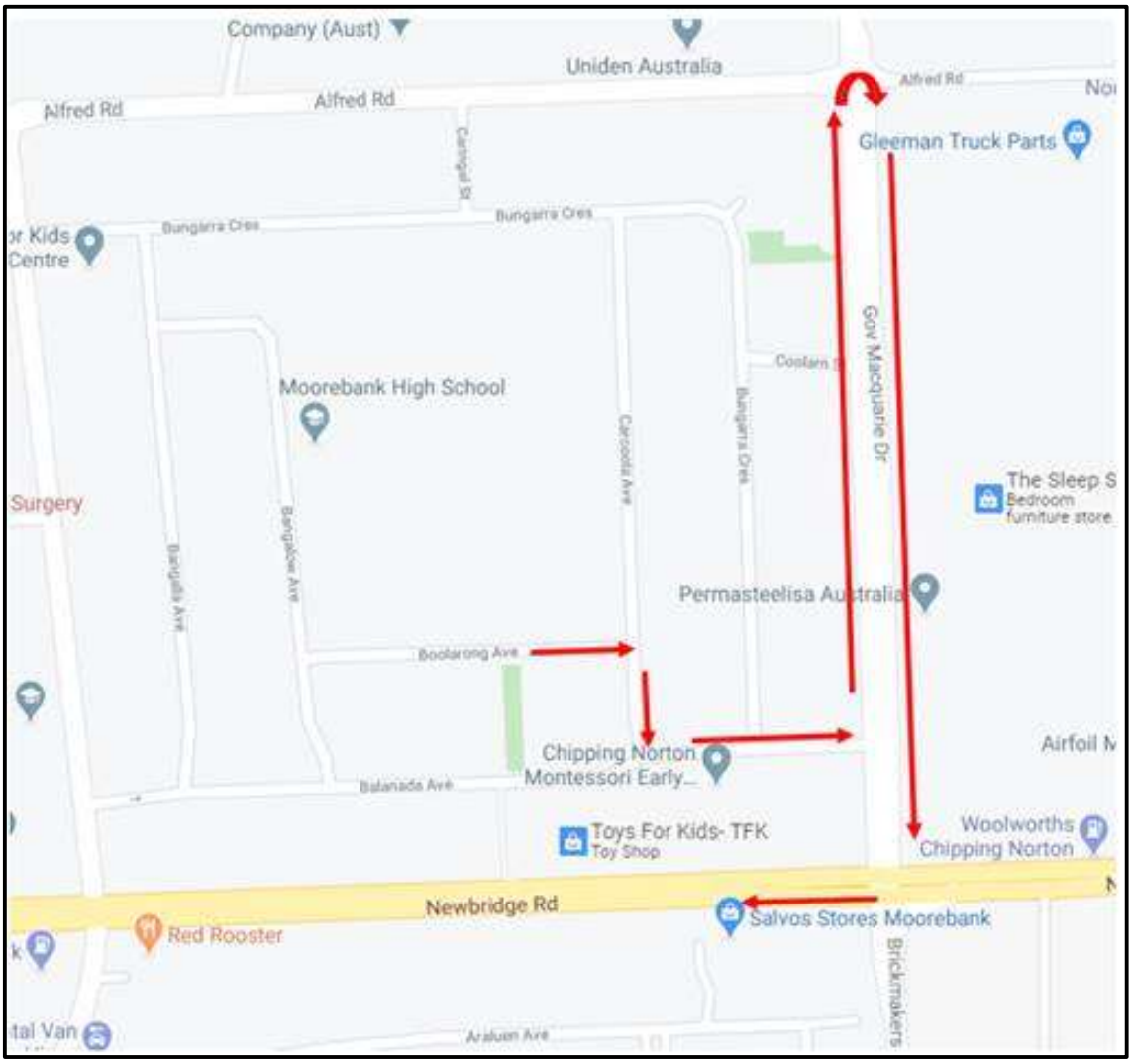


Figure 6.4: Potential Alternate Bus Route

Based on the above, it is considered necessary to review the existing intersection treatment at Nuwarra Road and Balanda Avenue intersection as part of the Detailed Design.

6.10.3 Mitigation Measures

Based on the existing environment and impact assessment of the infrastructure on traffic and access, the following mitigation measure is proposed:

10.1 Review of the existing intersection treatment at Nuwarra Road and Balanda Avenue intersection shall be undertaken as part of the Detailed Design to allow for right and left turn movements.

10.2 Where possible, current traffic movements and property accesses are to be maintained during the workday. Any disturbance is to be minimised to prevent unnecessary traffic delays.

10.3 Where changes to access arrangements are necessary, LCC will advise owners and tenants and consult with them in advance regarding alternate access arrangements.

10.4 Where works would affect the free flow of traffic, a Road Occupancy Licence would be obtained from the Road Authority and a Traffic Control Plan would be prepared in accordance with the requirements of the Roads and Maritime's Traffic Control at Worksites Manual (2018) and Australian Standard (AS1743.3 Traffic Control Devices for Projects on Roads).

10.5 The Contractor would prepare a Traffic Management Plan in consultation with the relevant traffic authorities prior to the commencement of construction works.

10.6 Appropriate signage (such as variable message signs) and supervision would be provided at all times to ensure that all work areas are controlled and that unauthorised personnel (e.g. pedestrians) are excluded from work areas.

10.7 Vehicle movement arrangements would be developed to limit impacts on other road users (including pedestrians, vehicles and cyclists) and the environment, with specific regard to other road works in the area, local traffic movement requirements and peak traffic volumes.

10.8 Appropriate pedestrian traffic controls must be set up to allow safe passage of pedestrians around the work site.

6.11 WASTE GENERATION

6.11.1 Existing Environment

Properties in the area are serviced by LCC waste management services.

6.11.2 Impact Assessment

Construction

Construction works have the potential to generate waste through the following activities:

- Green waste from the removal of top soil and grasses (addressed within Section 6.2);
- Generation of hazardous waste: Generation of hazardous waste (i.e. oils, fuels, lubricants, concrete washout etc) is possible during construction, which if not disposed of appropriately, has the potential to pollute the environment;

- General waste from construction site amenities: The primary waste management objective would be to minimise waste generation where possible and encourage reuse of waste materials. Collection and disposal of waste should be undertaken progressively to lessen the impact of its presence.

Operation

The potential for generation of waste following construction of the proposed infrastructure works would be limited to waste generated from periodic maintenance.

6.11.3 Mitigation Measures

The following mitigation measures are proposed, based on the existing environment and impact assessment of the infrastructure on waste generation:

11.1 A Waste Management Plan shall be prepared in accordance with the Waste Avoidance and Resource Recovery Act and include:

- All waste generated during the course of the works will be reused or removed from the work areas as soon as practicable and disposed of in accordance with waste regulations;
- Evidence of the lawful disposal or reuse of waste will be retained and provided to the LCC on request;
- All vessels used for contaminated or hazardous waste should be sealed, labelled according to their contents, and stored within bunded areas until their removal from the work site;
- Any fuel, lubricant or hydraulic fluid spillages will be collected using absorbent material and the contaminated material disposed of at a licensed waste facility;
- The work site(s) will be left clean and free of weeds, debris and other rubbish at the end of works;
- All hazardous wastes on site will be removed and disposed in accordance with the state and national regulations and guidelines and best practice for the removal of these materials.

11.2 Any concrete washout would be established in accordance with Best Practice Guidelines (Department of Environment and Conservation's Environmental Best Practice Management Guideline for Concreting Contractors).

6.12 SOCIO-ECONOMIC SETTING

6.12.1 Existing Environment

As discussed above, properties located along the subject section of GMD include residential, commercial and industrial premises. Access to these uses is provided directly off GMD.

6.12.2 Impact Assessment

Construction

Aside from those issues discussed above, additional negative socio-economic impacts during the construction of the proposed infrastructure works are considered unlikely.

Ongoing

The amendments to GMD will generally have positive social-economic impacts through reduced crash incidents, improve safety and improve traffic efficiencies. These are discussed in full within Section 2. Despite these benefits, the restriction of right turn movements into/out of GMD may impact access to some commercial and industrial properties which may have impacts on business accessibility. On balance, the proposed benefits are considered to outweigh these impacts.

6.12.3 Mitigation Measures

No additional safeguards or management measures are required beyond those discussed previously under separate environmental considerations.

6.13 CUMULATIVE IMPACTS

The proposal has the potential to have temporary cumulative environmental effects with other existing or likely future activities (other construction projects in the area), however the effects would be minimal due to the limited scope of works for the activities covered in this REF, and the potential impacts on the environment would be minimised with the implementation of the safeguards set out in Section 6.

7.0 Summary of Safeguards

In order to prevent the potential environmental issues highlighted within Section 6, the following safeguards are proposed:

ASPECT	SAFEGUARD	TIMING	RESPONSIBILITY
A Construction Environmental Management Plan shall be prepared by the contractor prior to any construction occurring on site and shall include (but not limited to) the following mitigation methods:			
1. Land Uses and Services			
Disruption to surrounding residents	1.1. Notification would be given to all property owners who adjoin the infrastructure at least 14 days prior to works commencing. The notification shall include a brief description of the works and the dates and times they would be undertaken along with contact details in the case of complaints.	Prior to Construction Commencing	Contractor/LCC
Avoidance of existing services/easements	1.2. A Dial Before You Dig must be undertaken prior to any works commencing in order to locate buried services. If works are to be undertaken below power lines, refer to Ausgrid Guidelines NS 209 Operating Cranes and Plant in Proximity to Power Line. If works are to be undertaken within the vicinity of Telstra pits, refer to the Network Integrity Help Desk on 1800 653 935. 1.3. LCC will consult with relevant service providers during detailed design to identify possible interactions and develop procedures to be implemented to minimise the potential for service interruptions which have the potential to impact on existing land use.	Prior to Construction Commencing	Contractor
		Prior to Construction Commencing	LCC
2. Soils and Geology			
Disturbance to ASS	2.1 Prior to the disturbance of ASS, an Acid Sulfate Soils Management Plan (ASSMP) should be prepared in accordance with ASSMAC guidelines.	Prior to Construction Commencing	Contractor
Disturbance to Topsoil	2.2 An Erosion and Sediment Control Plan shall be prepared including measures consistent with the requirements of LCC. Such measures are to be put in place prior to the commencement of construction. 2.2 Where excavated soil is to be used in site restoration, it would be excavated and stockpiled in sequential layers corresponding to the	Prior to Construction Commencing	Contractor

	existing soil profile. Topsoil and leaf litter is to be removed first and windrowed in separate stockpiles of less than 1m in height on the upslope side of excavations. Soil layers would be replaced sequentially so that the soil profile is restored as closely as possible to its pre-work status. The natural landform of the site(s) would be restored as closely as possible to the pre-works condition. Rehabilitating exposed areas as soon as possible following excavation and completed no more than 10 days after works.		
Discovery of potential contaminants	2.3 Should any unexpected contaminants be encountered during the works, work in the area would cease immediately and the LCC Officer would be contacted to seek and advise on the appropriate action.	Prior to Construction Commencing	Contractor
3. Hydrology, Flooding & Water			
Flooding	3.1 In the event of heavy rainfall, no construction equipment, including stockpiles shall be located within flood affected portions of the site, so as to not block the passage of flood waters.	During Construction	Contractor
Fuels, Concrete wash and Chemicals	3.2 All fuels, chemicals and liquids are to be stored in an impervious bunded area away from: • Rivers, creeks or any areas of concentrated water flow; • Flooded or poorly drained areas including those identified within Figure 6.2; • Slopes above 10%; • The storage and handling of fuels and chemicals shall comply with Australian Standard AS1940; • A 'spill kit' will be kept on site at all times for potential chemical or fuel spills; • Any fuel, lubricant or hydraulic fluid spillages on land are to be collected using absorbent material and the contaminated material disposed of at an Office of Environment & Heritage licensed waste depot. 3.3 Potable water is to be used for wash down of vehicles and equipment.	Prior to Construction Commencing/ During Construction	Contractor

	3.4 Water quality control measures are to be used to prevent any materials (e.g. concrete, grout, sediment etc.) entering drain inlets or waterways. Containment material is to be used to capture / filter water used in wash down. 3.5 No concrete wash out is to be carried out on-site. 3.6 Water required for the proposal would be obtained from an approved source (e.g. potentially including hydrants or tankers).		
4. Biodiversity			
Vegetation impacts	4.1 No tree removal shall occur as a result of the installation of the shared pathway. The pathway shall meander around existing trees in order to avoid removal where necessary. 4.2 The native trees and shrubs to be retained should be fenced off and signs installed to notify workers of their sensitive nature. 4.3 Pruning of native trees required in the scope of the proposed works should be undertaken by a qualified arborist. 4.4 No machinery or material should be stored within the retained vegetation or within the dripline of retained trees.	During Construction	Contractor
Spread of weeds/disease	4.5 Equipment should be cleaned thoroughly and disinfected before entering and exiting site to prevent weed and disease introduction such as *Phytophthora cinnamomi* (Root-rot fungus), Myrtle Rust and others. 4.6 Effective weed control should be used on site, ensuring that appropriate methods are used to eliminate and dispose of highly competitive weeds.	During Construction	Contractor

5. Noise & Vibration			
General construction based noise and vibration	5.1 Residents in streets adjacent to the construction site should be notified of the project. This would, typically, be done by a letterbox drop. Included in the notification should be a description of proposed works and an outline of the proposed time frame for the various stages of the works. The letterbox drop should include, as a minimum, all residences and commercial premises within 100m of the edge of Governor Macquarie Drive and include residences in Governor Macquarie Drive, Balanada Avenue, Bungarra Crescent and Coolarn Street. The contact name and phone number of a responsible person should be given out so that residents may comment on the works and indicate any particularly significant noise sensitive times. The advice should also advise the name and phone number of the person responsible for accepting and dealing with complaints. All complaints or communications should be answered promptly and a record kept of all complaints, responses and actions.	Prior to Construction Commencing	Contractor/LCC
	5.2 A Construction Noise and Vibration Management Plan shall be prepared for the works. The plan would detail the specific measures to be implemented to reduce construction noise and vibration levels, including, but not limited to: • The plan would cover aspects including site noise planning, scheduling of high noise activities, operator instruction, plant maintenance, plant noise audit and complaints management; • Construction hours should generally be limited to Monday to Friday 7.00am to 6.00pm, Saturday 8.00am to 1.00pm with no work on Sunday or public holidays where works adjoin residential receivers. Works outside of these hours would require the prior approval of LCC and be determined in consideration with any submissions received during the community consultation phase; • Any work that is performed outside normal work hours or on Sundays and public holidays is to minimise noise impacts in	Prior to Construction Commencing/ During Construction	Contractor

	accordance with Roads and Maritime's Construction Noise and Vibration Guideline (April 2016); • The main contractor should plan to coordinate subcontractors so that there are no unnecessary cumulative impacts arising from the simultaneous activities of more than one subcontractor. That is, planning to avoid, if practical, having more than one noisy activity taking place in close proximity. It is good practice to appoint a single coordinator to oversee all significant noise producing activities; • All personnel working on the job including subcontractors and their employees must be made aware of their obligations and responsibilities with regard to minimising noise emissions; • Site inductions and toolbox meetings to all employees and subcontractors must include information about the need to minimise noise impacts to surrounding areas; • Contractors should familiarise themselves with methods of controlling noisy machines and alternative construction procedures. These are explained in AS2436-1981 "Guide to Noise Control on Construction, Maintenance and Demolition Sites"; • Any activities identified in in the risk assessment phase that are known or have the potential to create excessive noise should, where possible, be scheduled to occur at times to cause least annoyance to the community. Carrying out such work during early morning should be avoided. This includes start up and idling etc. of heavy machinery prior to commencement of work; • Mechanical plant should be silenced using best available control technology. Noise suppression devices should be maintained to manufacturer's specifications; • All equipment used on the site shall have exhaust systems that have been recommended by the manufacturer as having the lowest associated noise for that machine; • Machines which are used intermittently such as rollers or other earthmoving machinery should either be shut down in the intervening periods between use or throttled down to a minimum; • Any portable equipment with the potential to create high levels of noise e.g. compressors, generators etc. should only be		

	selected for use if it incorporates effective noise control. This equipment should be located where practical so that site sheds, or previously erected structures are between it and the nearest potentially affected receivers. Where no such barriers are present this machinery should be located behind a portable screen or enclosure; • The effectiveness of a noise barrier or screen depends on its length, height and its position relative to the source and the receiver. A screen designed to reduce noise from a stationary source should, where possible, extend a distance of twice the length of the noise source beyond the direct line of sight between the source and the receiver; • Plant known to emit noise strongly in one direction, such as a concrete agitator, should, where possible, be oriented such that the noise is directed away from the closest or the most noise sensitive receivers; • Regular and effective maintenance of all equipment including vehicles moving on and off the site should be conducted. Prompt attention must be given to repair of loose or rattling parts and broken equipment. All maintenance work should only be carried out by qualified persons; • When selecting contractors and/or equipment for the job, preference must be given to those with capacities best suited to the task at hand. That is the use of larger machines with excess capacity should be avoided unless these can be shown to be quieter than smaller capacity machines; • Site access should be designed such that delivery vehicles, and other heavy vehicles moving through the site can do so with minimum need to reverse; • Where possible, loading and unloading of plant and materials should be carried out away from potentially affected receivers. No delivery of plant or materials should be accepted before 7am Monday to Friday or 8am on Saturday; • Care should be taken not to drop materials from height either into, or out of trucks or other rigid surfaces. The surface to which the materials are being moved should be covered by some		

	resilient material. Particular care should be taken during the loading or unloading of any scaffolding; • Where the construction machinery including vibratory rollers, rollers or excavators (or other potentially vibration inducing machinery or processes) is to be operated within 15m of an existing building, vibration monitoring shall be undertaken during the first phases of the use of that machinery; • Prior to any construction work being carried out a dilapidation survey should be carried where vibratory rollers, rollers or excavators (or other potentially vibration inducing machinery or processes) is to be operated within 15m of an existing building.		
6. Air Quality & Energy			
General Air Quality impacts	6.1 Complaints during construction works are to be handled by the contractor. A contact name and number is to be displayed at the construction site.	During Construction	Contractor
Dust, odour and overspray	6.2 To mitigate against the potential for dust to occur during construction, the following measures would be adopted: • All work sites, general work areas and stockpiles will be closely monitored for dust generation and watered down (with clean water) or covered (via seeding or tarpaulins) in the event of dry and/or windy conditions; • Rehabilitating exposed areas as soon as possible following excavation; • Ensuring mud is not carried onto public roads by vehicle tyres; • All loads of excavated material, soil, fill and other erodible matter that are transported to or from the work site will be kept covered at all times during transportation and will remain covered until they are unloaded either for use at the work site, reuse or disposal at an OEH licensed waste disposal facility. 6.3 To mitigate against the potential odour concerns from construction equipment emissions, the following measures would be adopted: • All working vehicles and construction equipment to be equipped with properly maintained exhaust systems that comply with the relevant Australian Standards;	Prior to Construction Commencing/ During Construction	Contractor

	• Machinery and vehicles will not be left running or idling when not in use; • Odour or air pollutant emission complaints will be dealt with promptly and the source will be eliminated wherever practicable; • Proper maintenance of vehicle exhaust systems, and regular visual inspections of emissions; • Works (including the spraying of paint and other materials) are not to be carried out during strong winds or in weather conditions where high levels of dust or airborne particulates are likely. • Diesel vehicles and equipment will be turned off when not in use for a period of more than five minutes, and not left idling. 6.4 Works (including the spraying of paint and other materials) are not to be carried out during strong winds or in weather conditions where high levels of dust or airborne particulates are likely.		
7. Non-Aboriginal Heritage			
Impacts on unrecorded Non-Aboriginal heritage items	7.1 If unrecorded relics are identified in the Project Area during works, then all works in the immediate area must cease and the area would be cordoned off. Department of Planning, Industry and Environment (DPIE) and LCC will be informed to determine the appropriate management strategy.	During Construction	Contractor
8. Aboriginal Heritage			
Impacts on unrecorded Aboriginal heritage items	8.1 If unrecorded Aboriginal object/s are identified in the Project Area during works, then all works in the immediate area must cease and the area would be cordoned off. Department of Planning, Industry and Environment (DPIE) will be informed to determine the appropriate management strategy. 8.2 In the unlikely event that skeletal remains are identified, work must cease immediately in the vicinity of the remains and the area must be cordoned off. The proponent must contact the local NSW Police who would make an initial assessment as to whether the remains are part of a crime scene or possible Aboriginal remains. If the remains are thought to be Aboriginal, Department of Planning, Industry and	During Construction	Contractor

	Environment must be contacted. A Department of Planning, Industry and Environment officer would determine if the remains are Aboriginal or not; and a management plan must be developed in consultation with the relevant Aboriginal stakeholders before works recommence.		
9. Visual Amenity			
General visual amenity impacts	9.1 The site will be kept rubbish free at all times. 9.2 Temporary erosion and sediment controls would be removed from the site once landforms have been assessed as stable. 9.3 All disturbed areas would be rehabilitated and progressively stabilised following the completion of the works. 9.4 Landscaping is to be managed in accordance with LCC guidelines.	During Construction	Contractor
10. Traffic & Access			
Local Traffic Impacts	10.1 Review of the existing intersection treatment at Nuwarra Road and Balanda Avenue intersection shall be undertaken as part of the Detailed Design to allow for right and left turn movements.	Prior to finalisation of Detail Design	LCC
Access to private properties	10.2 Where possible, current traffic movements and property accesses are to be maintained during the workday. Any disturbance is to be minimised to prevent unnecessary traffic delays. 10.3 Where changes to access arrangements are necessary, LCC will advise owners and tenants and consult with them in advance regarding alternate access arrangements.	Prior to Construction Commencing/ During Construction	Contractor/LCC
Traffic/pedestrian impacts during construction	10.4 Where works would affect the free flow of traffic, a Road Occupancy Licence would be obtained from the Road Authority and a Traffic Control Plan would be prepared in accordance with the requirements of the Roads and Maritime's Traffic Control at Worksites Manual (2018) and Australian Standard (AS1743.3 Traffic Control Devices for Projects on Roads). 10.5 The Contractor would prepare a Traffic Management Plan in consultation with the relevant traffic authorities prior to the	Prior to Construction Commencing/ During Construction	Contractor/LCC

	commencement of construction works. 10.6 Appropriate signage (such as variable message signs) and supervision would be provided at all times to ensure that all work areas are controlled and that unauthorised personnel (e.g. pedestrians) are excluded from work areas. 10.7 Vehicle movement arrangements would be developed to limit impacts on other road users (including pedestrians, vehicles and cyclists) and the environment, with specific regard to other road works in the area, local traffic movement requirements and peak traffic volumes. 10.8 Appropriate pedestrian traffic controls must be set up to allow safe passage of pedestrians around the work site.		

11. Waste Generation			
Waste generation	11.1 A Waste Management Plan shall be prepared in accordance with the Waste Avoidance and Resource Recovery Act and include: • All waste generated during the course of the works will be reused or removed from the work areas as soon as practicable and disposed of in accordance with waste regulations; • Evidence of the lawful disposal or reuse of waste will be retained and provided to the LCC on request; • All vessels used for contaminated or hazardous waste should be sealed, labelled according to their contents, and stored within bunded areas until their removal from the work site; • Any fuel, lubricant or hydraulic fluid spillages will be collected using absorbent material and the contaminated material disposed of at a licensed waste facility; • The work site(s) will be left clean and free of weeds, debris and other rubbish at the end of works; • All hazardous wastes on site will be removed and disposed in accordance with the state and national regulations and guidelines and best practice for the removal of these materials. 11.2 Any concrete washout would be established in accordance with Best Practice Guidelines (Department of Environment and Conservation's Environmental Best Practice Management Guideline for Concreting Contractors).	Prior to Construction Commencing/ During Construction	Contractor

8.0 Conclusion

8.1 SUMMARY OF BENEFICIAL EFFECTS

The assessment undertaken for this REF has identified the following permanent and positive effects on the physical, biophysical and social environment through the construction and operation of the GMD upgrades:

- Increase mid-block road capacity on GMD and improved performance of the existing signalised intersection resulting in improved traffic efficiency for both freight and general traffic between Hume Highway and Newbridge Road. This consequently results in reduced travel times and associated environmental and social-economic benefits from this.
- Improve the freight network capacity and accessibility between industrial precincts in Warwick Farm, Chipping Norton, Moorebank and the WSA.
- Improve road safety at the Newbridge Road/GMD/Brickmakers Drive intersection and along the GMD road section between Newbridge and Alfred Road. This would reduce crashes at existing driveways and from right turn movements along GMD.
- Increase amenity for local residents with better traffic flow, enhanced road safety and better access between residential precincts and the arterial road network.
- The proposed landscaped central concrete median will prevent illegal truck parking, further promoting traffic and pedestrian safety.
- The road environment/amenity would improve with additional landscaping along the median. The proposed landscaping would also create barrier between industrial and residential developments.
- Jaywalking pedestrians could safely use the proposed median, where possible, to cross GMD in stages.

8.2 SUMMARY OF ADVERSE EFFECTS

The assessment undertaken for this REF has identified the following potential adverse effects on the physical, biophysical and social environment through the construction and operation of the GMD upgrades:

Construction

- Impact on existing land use and services.
- Impact on soil and/or water quality through erosion and sedimentation; disturbance of topsoils; potential exposure of acid sulphate soils; generation of additional pollutants.
- Impacts through potential weed/disease dispersal.
- Impact on air quality through dust generation, over-spray from line-marking paint and construction vehicle emissions.
- Increased use of fossil fuel burning construction vehicles.

- General construction related impacts on the surrounding visual catchment.
- Impact on noise and vibration amenity through construction vehicle use.
- Impact on traffic and transportation thorough increased construction vehicle movements to and from the site and potential road/lane closures.
- Impact on access to private properties.
- Additional construction based waste generation.

Ongoing Operation

- Impact on access to private properties including businesses through the removal of right turn movements.
- Impact on the local traffic environment through the removal of right turn movements.

8.3 SUMMARY

The following conclusions have been derived from undertaking this REF:

- Having regard to the safeguard measures proposed, the proposed infrastructure is unlikely to significantly affect the environment and therefore Division 5.1 of the EP&A Act provides that an EIS is not considered to be warranted;
- The proposed infrastructure would not affect a declared critical habitat; would not affect threatened species, populations or ecological communities or their habitats and it is therefore considered that a SIS is not required;
- The proposed infrastructure would not affect any Commonwealth Lands and would not have any impacts on matters of NES;
- The proposed infrastructure is central to the improved efficiency and safety of the traffic environment along GMD;
- The construction of the proposed infrastructure is considered to have some minor environmental impacts as discussed within Section 6 and summarised in Section 8.2. These are either temporary in nature, inconsequential in nature or are able to be avoided through mitigation methods;
- Some ongoing impacts would occur to private property access and the local traffic environment through the restriction of right turn movements along GMD. These will be reviewed as part of the community consultation process and as part of the Detailed Design. Should this review not result in changes to the proposed design, these impacts are considered to be outweighed by the above benefit;
- Overall, it is concluded that the minor environmental impacts are outweighed by the significant social and economic benefits of the proposed upgrades and the flow on effects this will have to the users of GMD.

Taking the above into consideration, the REF has examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposed activity and has concluded that the proposal warrants support.

9.0 Declaration

This Review of Environmental Factors provides a true and fair review of the activity in relation to its likely impact on the environment. It addresses to the fullest extent possible, all of the factors listed in Clause 228 of the Environmental Planning and Assessment Regulations (as amended) and the Commonwealth Environmental Protection and Biodiversity Conservation Act (as amended).

Signed: 

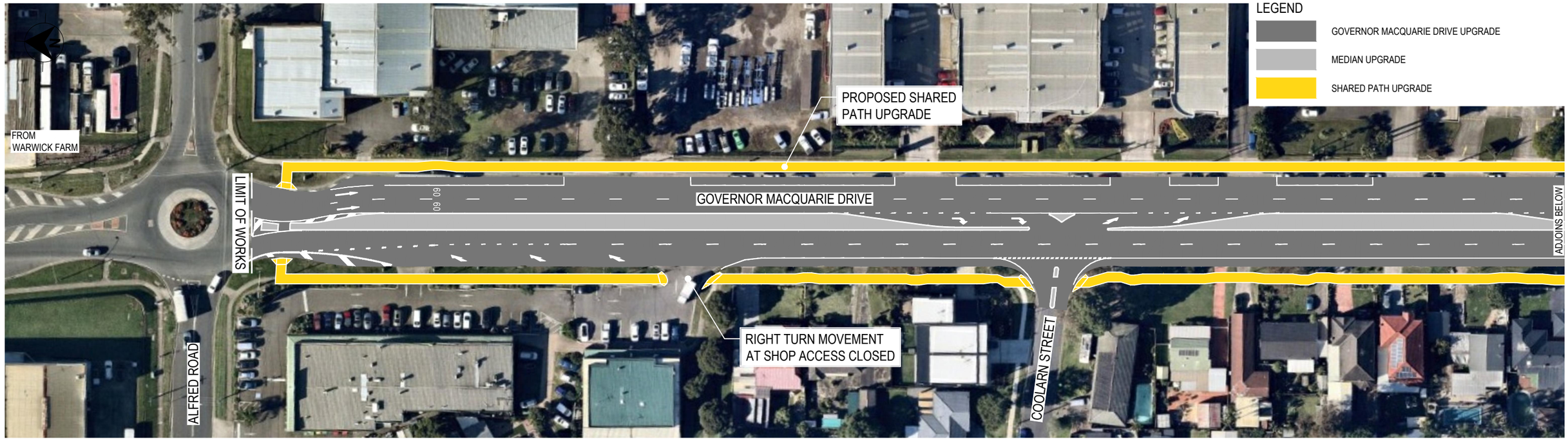
Name: Stephanie Van Dissel
Bachelor of Urban and Regional Planning (Honours)

Position: Senior Town Planner

Date: 19th October 2020

Appendix 1

PROPOSED GMD UPGRADE WORKS



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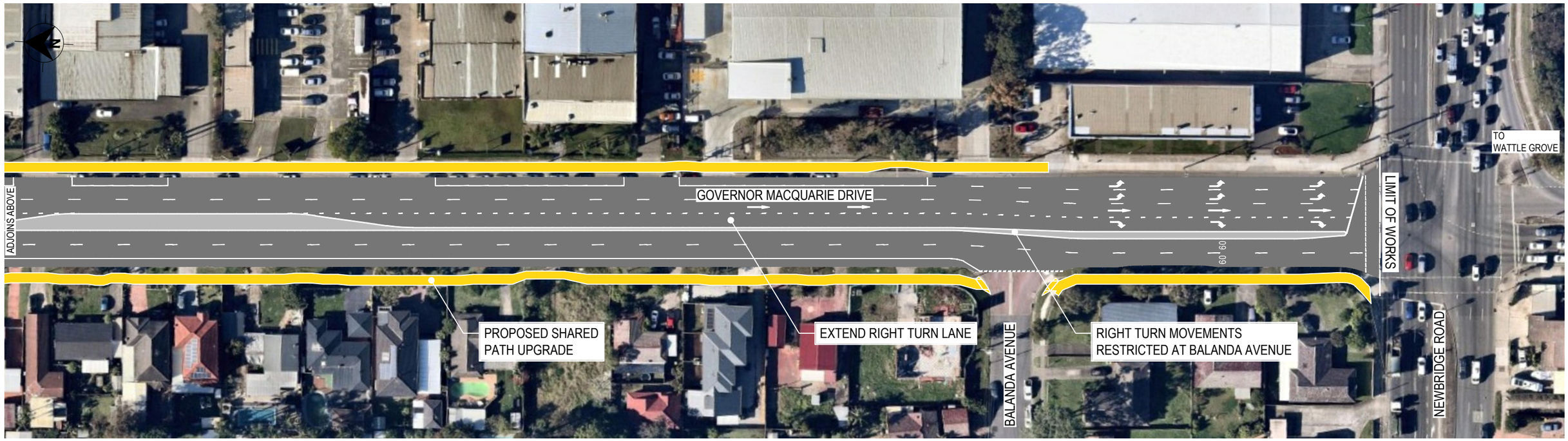

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CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD

DRAWINGS / DESIGN PREPARED BY
COMPANY NAME / LOGO

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	NAME	DATE
TITLE		
DRAWN	S.ZAMMIT	05.08.20
DRG CHECK	I.BROWN	05.08.20
DESIGN	N.WALL	05.08.20
DESIGN CHECK	I.BROWN	05.08.20
DESIGN MNGR	I.BROWN	05.08.20
PROJECT MNGR	I.BROWN	05.08.20

LIVERPOOL THE GREAT SOUTH WEST

LIVERPOOL CITY COUNCIL
GOVERNOR MACQUARIE DRIVE
ROAD UPGRADE WORKS
ALFRED ROAD TO NEWBRIDGE ROAD, CHIPPING NORTON
COMMUNITY CONSULTATION PLAN

A3

DESIGN PROJECT No.		PART
300239E		-
ISSUE STATUS	EDMS No.	SHEET No. / ISSUE
COMMUNITY CONSULTATION	-	COM-0001 / 0

Appendix 2

ECOLOGICAL ASSESSMENT REPORT

AEP
ECOLOGY | BIOBANKING | OFFSETS | BUSHFIRE

ECOLOGICAL ASSESSMENT REPORT

FOR

PROPOSED ROAD AND FOOTPATH UPGRADE, GOVERNOR MACQUARIE DRIVE, ALFRED ROAD TO NEWBRIDGE ROAD

CHIPPING NORTON, NSW

Prepared for: **Liverpool City Council**
c/- ADW Johnson Pty Ltd

24 July 2020

AEP Ref 2104

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EXECUTIVE SUMMARY

Anderson Environment & Planning was commissioned by Liverpool City Council, c/o ADW Johnson Pty Ltd (the client) to undertake an Ecological Assessment Report (EAR) and accompanying 5-part Test of Significance to support the production of a Review of Environmental Factors (REF) for the upgrade of a section of Governor Macquarie Drive and adjacent footpath between Alfred Road and Newbridge Road (Subject Site), Chipping Norton, NSW.

The upgrade to the section of road will include milling and re-sheeting the existing surface and adding medians lanes. The existing gutters on each side of the road will remain. In addition, existing footpaths will be upgraded.

The Office of Environment and Heritage (OEH) Biodiversity Values Map (BV Map) showed that the site is not mapped as Biodiversity Value (BV) land, as defined by the *Biodiversity Conservation Regulation 2017*.

The vegetation present within the Subject site consists of a nature strip made of a mix of native and exotic lawn species. The nature strip located on the eastern side of Governor Macquarie Drive is devoid of planted native species. Scattered native species of trees and shrubs have been planted on the nature strip on the western side of the road. Fauna species detected during site inspection were minimal and include cosmopolitan species of birds typical of highly modified urban environments.

A total of 79 threatened species have been recorded or modelled to occur within the locality including 3 amphibian, 2 gastropods, one insect, one reptile,23 bird, 15 mammal and 34 plant species.

The results of the EAR indicate that the Subject Site possesses minimal habitat value for potentially occurring threatened species and may only be used on an intermittent basis as part of a wider foraging range. Myrtaceous species planted within the Subject Suite may be used when in bloom by nectar feeding species.

Assessments under the BC Act and EPBC Act revealed that impacts on Threatened Species and Matters of National Environmental Significance are considered unlikely to occur from the proposed development due to the small amount of vegetation present. In addition, none of the native species planted within the nature strip will be impacted by the proposal.

General recommendations are included at the end of this report to minimise localised impacts on biodiversity as a result of the development of the site.

Contents

Tables

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1.0 Introduction

It is proposed that an upgrade to a section of Governor Macquarie Drive and adjacent footpaths be undertaken between Alfred Road and Newbridge Road by Liverpool City Council. This section of road, thereafter referred to as the Subject Site, is located within the Suburb of Chipping Norton, NSW.

At the request of ADW Johnson Pty Ltd on behalf of Liverpool City Council (the client), Anderson Environment & Planning (AEP) has undertaken the necessary investigations to inform the production of a 5-Part Test of significance to support a Review of Environmental Factors for the proposed activity.

This report is specifically intended to indicate the likelihood of the proposed activity having a significant impact on threatened species or ecological communities and/or triggering relevant BOS thresholds. In this regard, the report aims to recognise the relevant requirements of the *Environmental Planning & Assessment Act 1979*, the *Biodiversity Conservation Act 2016* (NSW) (BC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The purpose of this report is to:

- Describe the ecological values of the Subject Site;
- Explore the potential for threatened species to utilise the area; and
- Assess ecological impacts associated with the proposal against relevant legislation.

Potential ecological impacts on native species in general are also considered, as are recommendations for minimising any impacts within the scope of the activity.

For the purposes of referencing, this document should be referred to as:

> Anderson Environment & Planning (2020). *Ecological Assessment Report for Proposed Road and Footpath Upgrade, Governor Macquarie Drive, Alfred Road to Newbridge Road, Chipping Norton, NSW.* Unpublished report for Liverpool City Council, c/- ADW Johnson Pty Ltd. July, 2020.

2.0 Site Particulars

- **Address** – Governor Macquarie Drive, section located between Alfred Road and Newbridge Road, Chipping Norton NSW
- **LGA** – Liverpool City Council
- **Title Details** – N/A
- **Subject Site** – The Subject Site (site) comprises the section of Governor Macquarie Drive and adjacent footpaths located between Alfred Road and Newbridge Road, Chipping Norton, NSW.

  The site comprises the section of road and adjacent footpaths mentioned above and includes a nature strip planted with various native trees and shrubs along with exotic shrubs and lawn.
- **Current Land Use** – The Subject Site is a major arterial road.
- **Surrounding Land Use** – Under the *Liverpool Local Environment Plan (LEP 2008)*, land directly west and including the Subject Site is zoned R3 – Medium Density Residential. Land directly east is zoned IN – Light Industry.

Figure 1 depicts the extent of the Subject Site overlain on an aerial photograph of the locality.

AEP

Figure 1 - Site Location Date: July 2020

Location: Governor Macquarie Drive, Chipping Norton NSW

Client: Liverpool City Council AEP ref: 2104

3.0 Proposed Development

The upgrade to the section of road will include milling and re-sheeting the existing surface and adding median lanes. The existing gutters on each side of the road will remain. In addition, the existing footpaths will be upgraded to provide a shared path on each side. Note that the native trees and shrubs present within the nature strip will not be affected by the proposed activity as the shared pathway will meander as necessary around these.

4.0 Scope and Purpose

Investigations were carried out at the site and via literature and database searches to gather information required to adequately address the requirements of the *Biodiversity Conservation Regulation 2017* (BCR), to address BOS thresholds and to address Section 7.3 of the BC Act (known as the "5-part test").

Also afforded consideration were the Commonwealth EPBC Act, and relevant State Environmental Planning Policies (SEPPs).

The assessment approach was tailored to ensure that legislative requirements were met relating to threatened species and native species in general for the proposed specific development. This was achieved by background research and literature review, database searches, consultation, targeted ecological fieldwork and mapping, detailed habitat assessment, and ultimately impact assessment consideration against the type and form of development proposed.

Impact assessment was undertaken with due reference to the "*Threatened Species Assessment Guidelines*" (DECC, 2007).

Specifically, the scope of this study is to:

- Identify vascular plant species occurring within the site, including any threatened species listed under the BC Act or EPBC Act;
- Identify and map the extent of vegetation communities within the site, including any Endangered Ecological Communities (EECs) listed under the BC Act or EPBC Act;
- Identify any fauna species, including threatened and migratory species, and populations or their habitats, which occur within the site and are known to occur in the wider locality;
- Assess the potential of the proposed development to have a significant impact on any threatened species, populations or ecological communities (or their habitats) identified from the site; and
- Describe measures to be implemented to avoid, minimise, manage or monitor potential impacts of the proposal.

In addition to the survey work conducted within the site boundary and its immediate surrounds, consideration has been afforded to the wider locality, via database searches within 10km of the site and via appreciation of habitat areas that may be linked ecologically to the site.

Biodiversity Values Map

The Biodiversity Values Map (BV Map) identifies land with high biodiversity value, as defined by the BCR. The Biodiversity Offsets Scheme (BOS) applies to all local developments, major projects or the clearing of native vegetation where the State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017 applies. Any of these will require entry into the BOS if they occur on land mapped on the Biodiversity Values Map. Exempt and complying development or private native forestry are not subject to the Biodiversity Offsets Scheme.

Figure 2 - Biodiversity Values Map

The BV Map shows that the Subject Site is not mapped as containing BV Land. In addition, the proposal does not include the removal of any native species or vegetation communities. The Biodiversity Offset Scheme (BOS) does not apply to Part-5 Development. However, a Test significance has been prepared for the proposed activity.

5.0 Study Certification and Licencing

This report was written by Yann Buissiere BEnvMgt and Ian Benson BEng (Civil) GradDipSc (Ecology) of Anderson Environment & Planning.

Research was conducted under the following licences:

- NSW National Parks and Wildlife Service Scientific Investigation Licence SL101313;
- Animal Research Authority (Trim File No: 14/600(2)) issued by NSW Agriculture; and
- Animal Care and Ethics Committee Certificate of Approval (Trim File No: 14/600(2)) issued by NSW Agriculture.

Certification:

As the principal author, I, Ian Benson, make the following certification:

The results presented in the report are, in the opinion of the principal author and certifier, a true and accurate account of the species recorded, or considered likely to occur within the Survey Area;

Commonwealth, state and local government policies and guidelines formed the basis of project surveying methodology, unless specified departures from industry standard guidelines are justified for scientific and/or animal ethics reasons; and

All research workers have complied with relevant laws and codes relating to the conduct of flora and fauna research, including the Animal Research Act 1995, National Parks and Wildlife Act 1974 and the Australian Code of Practice for the Care and Use of Animals for Scientific Purposes.

Principal Author and Certifier:

Ian Benson
Principal Ecologist
Anderson Environment & Planning
BAAS: 18147
July 2020

6.0 Methodology

The size of the site, the type of native vegetation and habitats remaining, the status of existing and proposed surrounding land use and the level and type of habitat linkages to proximate bushland areas were considered in formulating the methodology employed and described below.

The assessment approach was tailored to undertake sufficient works to ensure that legislative requirements were met relating to threatened species and native species in general for the proposed specific development.

To ensure a robust impact assessment approach, where any potential doubt remained over species impact, presence within the site was assumed to ensure a conservative approach was employed.

6.1 Information Sources

Information and spatial data provided within this EAR has been compiled from various sources including:

- Aerial Photograph Interpretation (API) of the site and surrounding locality;
- *NSW Biodiversity Value Map* (2019);
- State survey guidelines (DEC 2004; DECC 2009; OEH 2016);
- OEH Threatened Species, Populations and Ecological Communities website (*https://www.environment.nsw.gov.au/AtlasApp/UI_Modules/TSM_/Default.aspx?a=1*) (2020); and

In addition, database searches were carried out, namely:

- Review of flora and fauna records held by the NSW Office of Environment & Heritage (OEH) Atlas of NSW Wildlife within a 10km radius of the site (July 2020); and
- Review of flora and fauna records held by the Commonwealth Department of Energy and Environment (DoEE) Protected Matters Search within a 5km radius of the Subject Site (July 2020).

6.2 Field Survey

6.2.1 Flora

Vegetation was surveyed utilising a variety of methods, as outlined below.

- Aerial Photo interpretation (API) to identify any notable variations within the site;
- Inspection of the site to identify all vascular plants present;
- Site coverage was systematic to ensure all key points of the study area were checked, and the Random Meander Technique (Cropper, 1993) was also utilised to maximise species encountered.

- A systematic approach to target threatened plants species at the site as per the NSW Guide to Surveying Threatened Plants (2016).

Consideration was given to the potential for the vegetation present to consist of remnant vegetation communities including Endangered Ecological Communities (EECs) as listed under the BC Act and/or EPBC Act. The floristic composition, geomorphological characteristics and geographical extent were important considerations in this process.

6.2.2 Habitat

An assessment of the relative habitat values present within the study area was carried out. This assessment focused primarily on the identification of specific habitat types and resources within the study area favoured by known threatened species from the region. The assessment also considered the potential value of the study area (and surrounding areas) for all major guilds of native flora and fauna.

The assessment was based on the specific habitat requirements of each threatened fauna species in regards to home range, feeding, roosting, breeding, movement patterns and corridor requirements. Consideration was given to contributing factors including topography, soil, light and hydrology for threatened flora and assemblages.

In particular, focus was put on documenting the presence of key habitat features such as tree hollows. Hollows are an important resource utilised by a variety of forest fauna, and are particularly relevant for several of the likely key threatened species in this locality. Vertebrate and invertebrate species use hollows as diurnal or nocturnal shelter sites, for rearing young, feeding, thermoregulation, and to facilitate ranging behaviour and dispersal.

Tree hollows were recorded and mapped within the Subject Site utilising the methodology of tree hollow identification set by OEH in the BioBanking field plot methodology (Feb 2009), namely:

> *"A hollow is only recorded if: (a) the entrance can be seen; (b) the minimum entrance width is at least 5 cm across; (c) the hollow appears to have depth (i.e. you cannot see solid wood beyond the entrance); and (d) the hollow is at least 1 m above the ground (this omits hollows in cut stumps or at the base of trees)".*

6.2.3 Incidental fauna observation and secondary indications

Fauna survey has been undertaken as an incidental record gathered during site inspection**.** Fauna survey work was undertaken with reference to relevant guidelines and to add additional information to the generated Expected Fauna Species List (**Appendix A**).

Incidental records of any fauna species observed during fieldwork were noted. This included opportunistic sightings of secondary indications (scratches, scats, diggings, tracks etc.) of any resident or migratory species. Searches were also conducted for whitewash, regurgitation pellets and prey remains from Owls, chewed *(Allo) Casuarina* cones from Black-Cockatoos, chewed fruit remains from frugivorous birds etc.

6.2.4 Survey Dates, Times & Activity

Table 1 - Field Survey Periods

Date	Time	Field Activity	No. of Persons on Site
07/07/2020	14:30 – 15:15	Flora survey, threatened flora search, habitat tree survey, habitat assessment and incidentals.	1

Given the highly modified nature of the Subject Site, the above survey effort is considered to provide sufficient understanding of the biodiversity values of the site and surroundings.

In addition, by applying rigorous habitat assessment to more mobile species identified in Bionet Atlas records within the locality, it was ensured that all possible uses of the Subject Site and surroundings by notable species were considered, and accommodated within subsequent biodiversity assessment and management recommendations.

AEP

Figure 3 - Survey Efforts Date: July 2020

Location: Governor Macquarie Drive, Chipping Norton NSW

Client: Liverpool City Council AEP ref: 2104

7.0 Results

7.1 Database Searches

Searches were undertaken of databases within a 10km radius of the Subject Site for BC Act listings and 5km radius for EPBC Act listings. Note that any records considered erroneous, historic only, or obviously of no relevance to the site in regards to habitat (e.g. seabirds, marine species etc.) were omitted.

The potential for listed threatened species to occur within the site is considered in **Table 2** below. Detailed ecological profiles of threatened species can be found at:

https://www.environment.nsw.gov.au/threatenedspeciesapp/

A total of 79 threatened species have been recorded or modelled to occur within the locality including 3 amphibian, 2 gastropods, one insect, one reptile, 23 bird, 15 mammal and 34 plant species.

Table 2 – Threatened Species Appraisal

Scientific Name (number of records)	Common Name	BC Act	EPBC Act	Likelihood of Occurrence
Amphibians				
Heleioporus australiacus	Giant Burrowing Frog	V	V	The species inhabits heath, woodland and open dry sclerophyll forest and generally restricted to sandstone geology, not associated with clay. There are no Atlas records in the locality and no suitable habitat present within the Subject Site; therefore, the species is unlikely to occur.
Litoria aurea (24)	Green and Golden Bell Frog	E	V	Inhabits marshes, dams and stream-sides, particularly those containing bullrushes (*Typha* spp.) or spikerushes (Eleocharis spp.) (OEH 2017). While there are Atlas record in the locality, there is no suitable habitat present within the Subject Site and the species is unlikely to occur.
Litoria raniformis	Southern Bell Frog	E	V	Usually found in or around permanent or ephemeral Black Box/Lignum/Nitre Goosefoot swamps, Lignum/Typha swamps and River Red Gum swamps or billabongs along floodplains and river valleys. They are also found in irrigated rice crops, particularly where there is no available natural habitat. There are no Atlas records in the locality and no suitable habitat present within the Subject Site; therefore, the species is unlikely to occur.
Gastropod				
Meridolum corneovirens (33)	Cumberland Plain Land Snail	E	-	Primarily inhabits Cumberland Plain Woodland (a critically endangered ecological community). This community is a grassy, open woodland with occasional dense patches of shrubs. It is also known from Shale Gravel Transition Forests, Castlereagh Swamp Woodlands and the margins of River-flat Eucalypt Forest, which are also listed communities. Due to the highly modified nature of the Subject Site, the species is unlikely to occur.
Pommerhelix duralensis	Dural Land Snail	E	E	The species has a strong affinity for communities in the interface region between shale-derived and sandstone-derived soils, with forested habitats that have good native cover and woody debris. There are no Atlas records in the locality and no suitable habitat present within the Subject Site; therefore, the species is unlikely to occur.
Insect				
Synemon plana	Golden Sun Moth	E	CE	Occurs in Natural Temperate Grasslands and grassy Box-Gum Woodlands in which groundlayer is dominated by wallaby grasses *Austrodanthonia* spp. There are no Atlas records in the locality and no suitable habitat present within the Subject Site; therefore, the species is unlikely to occur.
Reptiles				

Scientific Name (number of records)	Common Name	BC Act	EPBC Act	Likelihood of Occurrence
Hoplocephalus bungaroides	Broad-headed Snake	E	V	Shelters in rock crevices and under flat sandstone rocks on exposed cliff edges during autumn, winter and spring. There are no Atlas records in the locality and no suitable habitat present within the Subject Site; therefore, the species is unlikely to occur.
Birds				
Anthochaera Phrygia (6)	Regent Honeyeater	CE	CE	There is limited to no habitat and foraging availability present within the Subject Site. The species was not detected during field survey and it is unlikely that the species will occur on site. In addition, the Subject Site is not mapped as critical habitat for the species.
Artamus cyanopterus cyanopterus (22)	Dusky Woodswallow	V	-	While there are numerous records within the locality, it is considered unlikely the species would make use of the site in any notable way and as such, is unlikely to occur onsite.
Botaurus poiciloptilus (1)	Australasian Bittern	E	E	There is only one record of the species within the locality. There is no suitable habitat present and the species is unlikely to occur within the Subject Site.
Burhinus grallarius (1)	Bush Stone-curlew	E	-	The species inhabits open forests and woodlands with a sparse grassy ground layer and fallen timber (OEH 2017). There is no suitable habitat present within the Subject Site and the species unlikely to occur.
Callocephalon fimbriatum (1)	Gang-gang Cockatoo	V	-	The species is known to inhabit eucalypt forest and woodland and often found in urban areas (OEH 2017). There is only one record of the species within the locality. Due to highly modified nature of the Subject Site and the presence of only two Eucalyptus tree species, the Subject Site is only considered marginal foraging habitat and the species is unlikely to occur.
Calyptorhynchus lathami (5)	Glossy Black-Cockatoo	V	-	Inhabit open forest and woodlands of the coast and the Great Dividing Range where stands of she-oak occur and are dependent on large hollow-bearing eucalypts for nest sites. There is no roosting habitat available onsite and no *Allocasuarina* species present. Therefore, the species is unlikely to occur.
Circus assimilis (5)	Spotted Harrier	V	-	Occurs in grassy open woodland including *Acacia* and mallee remnants, inland riparian woodland, grassland and shrub steppe. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands. There is no suitable habitat present within the Subject Site and the species is unlikely to occur.
Daphoenositta chrysoptera (18)	Varied Sittella	V	-	Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and *Acacia* woodland. The species was not detected during fieldwork. 18 Atlas records exist within the locality. However, there is no suitable foraging habitat within the Subject Site. The species is unlikely to occur.

Scientific Name (number of records)	Common Name	BC Act	EPBC Act	Likelihood of Occurrence
Ephippiorhynchus asiaticus (2)	Black-necked Stork	E	-	There are only two records of the species within the locality. Given the requirements for nesting, foraging and habitat, the Subject Site is not likely to support this species.
Falco hypoleucos	Grey Falcon	E	-	There are no records of the species within the locality. Due to the urban and highly modified nature of the Subject Site, the site is not considered to provide suitable habitat and the species is unlikely to occur.
Glossopsitta pusilla (35)	Little Lorikeet	V	-	Forages primarily in the canopy of open Eucalyptus forest and woodland, yet also finds food in *Angophora*, *Melaleuca* and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. The species was not detected during field survey. Limited foraging is available onsite and with no hollows present, it is unlikely that it will occur onsite.
Grantiella picta	Painted Honeyeater	V	V	The species inhabits Boree/ Weeping Myall (*Acacia pendula*), Brigalow (*A. harpophylla*) and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. There is no suitable habitat present within the Subject Site, and the species is unlikely to occur.
Haliaeetus leucogaster (19)	White-bellied Sea-Eagle	V	-	The Subject Site does not provide any suitable nesting or foraging habitat and the species is unlikely to occur.
Hieraaetus morphnoides (13)	Little Eagle	V	-	The Subject Site does not provide any suitable nesting or foraging habitat and the species is unlikely to occur.
Hirundapus caudacutus (5)	White-throated Needletail	-	V	The species may aerially forage over the site but is unlikely to utilize the vegetation present.
Ixobrychus flavicollis (8)	Black Bittern	V	-	The species inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation. There is no suitable habitat for the species within the Subject Site and the species is unlikely to occur.
Lathamus discolor (12)	Swift Parrot	E	CE	Favoured feed trees include winter flowering species such as Swamp Mahogany (*Eucalyptus robusta)*, Spotted Gum (*Corymbia maculata)*, Red Bloodwood (*C. gummifera)*, Forest Red Gum (*E. tereticornis)*, Mugga Ironbark (*E. sideroxylon*), and White Box (*E. albens*). While there are several records within the locality, the species was not detected during field surveys and the Subject Site presents very limited foraging opportunities. Therefore, the species is unlikely to occur onsite.
Lophoictinia isura (2)	Square-tailed Kite	V	-	The species is found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. The Subject Site does not represent suitable habitat and the species is unlikely to occur.

Scientific Name (number of records)	Common Name	BC Act	EPBC Act	Likelihood of Occurrence
Melithreptus gularis gularis (3)	Black-chinned Honeyeater (eastern subspecies)	V	-	Occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially Mugga Ironbark (*Eucalyptus sideroxylon*), White Box (*E. albens*), Inland Grey Box (*E. microcarpa*), Yellow Box (*E. melliodora*), Blakely's Red Gum (*E. blakelyi*) and Forest Red Gum (*E. tereticornis*). The Subject Site does not represent suitable habitat and the species is unlikely to occur.
Ninox strenua (13)	Powerful Owl	V	-	There are no large hollows suitable for nesting present within the Subject Site. Due to highly modified nature of the Subject Site and very limited native vegetation present, the species is unlikely to occur.
Pandion cristatus (4)	Eastern Osprey	V	-	The species favour coastal areas, especially the mouths of large rivers, lagoons and lakes. There are several records within the locality. However, due to the highly modified nature of the vegetation present, the species is unlikely to occur onsite.
Petroica boodang (2)	Scarlet Robin	V	-	The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. There is no suitable habitat present within the Subject Site and the species is unlikely to occur.
Petroica phoenicea (3)	Flame Robin	V	-	The species prefers clearings or areas with open understoreys. The ground layer of the breeding habitat is dominated by native grasses and the shrub layer may be either sparse or dense. There are three records of the species within the locality. However, due to the urban and highly modified nature of the Subject Site, habitat present is not suitable and the species is unlikely to occur.
Mammals				
Cercartetus nanus (4)	Eastern Pygmy-possum	V	-	Due to the urban and highly modified nature of the Subject Site, only limited foraging resources and habitat are present and the species is unlikely to occur.
Chalinolobus dwyeri (3)	Large-eared Pied Bat	V	V	Atlas results show occurrences within the locality; however the Subject Site provides very limited habitat, roosting and foraging opportunities and the species is unlikely to occur onsite.
Dasyurus maculatus (1)	Spotted-tailed Quoll	V	E	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Due to the urban and highly modified nature of the Subject Site, the species is unlikely to occur.
Falsistrellus tasmaniensis (11)	Eastern False Pipistrelle	V	-	There are several records of the species within the locality. However, due to the urban and highly modified nature of the Subject Site, the species is unlikely to occur.

Scientific Name (number of records)	Common Name	BC Act	EPBC Act	Likelihood of Occurrence
Micronomus norfolkensis (6)	Eastern Coastal Free-tailed Bat	V	-	The species occur in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roost mainly in tree hollows but will also roost under bark or in man-made structures. Due to the urban and highly modified nature of the Subject Site, the species is unlikely to occur.
Miniopterus australis (7)	Little Bentwing-bat	V	-	There are several records of the species within the locality. However, due to the urban and highly modified nature of the Subject Site, the species is unlikely to utilize the site.
Miniopterus orianae oceanensis (14)	Eastern Bentwing-bat	V	-	There are several records of the species within the locality. However, due to the urban and highly modified nature of the Subject Site, the species is unlikely to utilize the site.
Myotis Macropus (10)	Southern Myotis	V	-	There are several records of the species within the locality. However, a lack of open water onsite limits foraging potential for this species and it is unlikely to occur within the Subject Site.
Phascolarctos cinereus (76)	Koala	V	V	Due to the urban and highly modified nature of the Subject Site, the species is unlikely to occur.
Petauroides volans	Greater Glider	-	V	There are no records of the species in the locality. There is limited to no foraging availability and no hollows present within the Subject Site. Due to the urban and highly modified nature of the Subject Site, the species is unlikely to occur.
Petrogale penicillata	Brush-tailed Rock-wallaby	-	V	No suitable habitat is present and there are no Atlas records in the local area. The species is unlikely to occur onsite.
Pseudomys novaehollandiae	New Holland Mouse	-	V	The species is known to inhabit open heathlands, woodlands and forests with a heathland understorey and vegetated sand dunes. Due to the urban and highly modified nature of the Subject Site, the species is unlikely to occur.
Pteropus poliocephalus (377)	Grey-headed Flying-fox	V	V	Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Due to the presence of Eucalyptus species, the Subject Site may provide potential foraging opportunities. However, foraging is very limited and the species is unlikely to occur.
Saccolaimus flaviventris (7)	Yellow-bellied Sheathtail-bat	V	-	There are several records of the species within the locality. However, due to the urban and highly modified nature of the Subject Site, the species is unlikely to utilize the site.
Scoteanax rueppellii (13)	Greater Broad-nosed Bat	V	-	There are several records of the species within the locality. However, due to the urban and highly modified nature of the Subject Site, the species is unlikely to utilize the site.

Scientific Name (number of records)	Common Name	BC Act	EPBC Act	Likelihood of Occurrence
Flora				
Acacia bynoeana (21)	Bynoe's Wattle	E	V	Occurs in heath or dry sclerophyll forest on sandy soils. The species was not detected during field surveys. Due to the urban and highly modified nature of the Subject Site, the species is unlikely to occur.
Acacia pubescens (3799)	Downy Wattle	V	V	Occurs on alluviums, shales and at the intergrade between shales and sandstones. The soils are characteristically gravely soils, often with ironstone. The species was not detected during field surveys. Due to the urban and highly modified nature of the Subject Site, the species is unlikely to occur.
Allocasuarina diminuta subsp. mimica (1)	*Allocasuarina diminuta subsp. mimica* population in the Sutherland Shire and Liverpool City local government areas	EP	-	The endangered population occurs along sandstone ridges and upper hillsides in the region northwest from Heathcote, towards Menai and Holsworthy, in heathy and low open woodland communities. It is restricted to the Local Government Areas listed in this instance (Sutherland and Liverpool). The species was not detected during field surveys. Due to the urban and highly modified nature of the Subject Site, the species is unlikely to occur.
Allocasuarina glareicola	-	E	E	Grows in Castlereagh woodland on lateritic soil. Found in open woodland with *Eucalyptus parramattensis*, *Eucalyptus fibrosa*, *Angophora bakeri*, *Eucalyptus sclerophylla* and *Melaleuca decora*. Common associated understorey species include *Melaleuca nodosa*, *Hakea dactyloides*, *Hakea sericea*, *Dillwynia tenuifolia*, *Micromyrtus minutiflora*, *Acacia elongata*, *Acacia brownei*, *Themeda australis* and *Xanthorrhoea minor*. The species was not detected during field surveys. There are no records of the species in the locality. Due to the urban and highly modified nature of the Subject Site, the species is unlikely to occur.
Deyeuxia appressa (1)	-	E	E	Given that *D. appressa* hasn't been seen in over 60 years, almost nothing is known of the species' habitat and ecology. The species was not detected during field surveys. Due to the urban and highly modified nature of the Subject Site, the species is unlikely to occur.
Caladenia tessellata	Thick Lip Spider Orchid	E	V	Found in grassy sclerophyll woodland on clay loam or sandy soils. There are no records in the locality. Due to the urban and highly modified nature of the Subject Site including original soil profile, the species is unlikely to occur.
Callistemon linearifolius (31)	Netted Bottle Brush	V	-	Grows in dry sclerophyll forest on the coast and adjacent ranges. The species was not detected during field surveys. Due to the urban and highly modified nature of the Subject Site, the species is unlikely to occur.
Cryptostylis hunteriana	Leafless Tongue Orchid	V	V	Does not appear to have well defined habitat preferences and is known from a range of communities, including swamp-heath and woodland. The larger populations typically occur in woodland dominated by Scribbly Gum (*Eucalyptus sclerophylla*), Silvertop Ash (*E. sieberi*), Red Bloodwood (*Corymbia gummifera*) and

Scientific Name (number of records)	Common Name	BC Act	EPBC Act	Likelihood of Occurrence
				Black Sheoak (*Allocasuarina littoralis*); appears to prefer open areas in the understorey of this community and is often found in association with the Large Tongue Orchid (*C. subulata*) and the Tartan Tongue Orchid (*C. erecta*). The species was not detected during field surveys. There are no records of the species in the locality. Due to the urban and highly modified nature of the Subject Site including original soil profile, the species is unlikely to occur.
Cynanchum elegans	White-flowered Wax Plant	E	E	The White-flowered Wax Plant usually occurs on the edge of dry rainforest vegetation. Other associated vegetation types include littoral rainforest; Coastal Tea-tree (*Leptospermum laevigatum)* – Coastal Banksia (*Banksia integrifolia* subsp. *integrifolia)* coastal scrub; Forest Red Gum (*Eucalyptus tereticornis)* aligned open forest and woodland; Spotted Gum (*Corymbia maculata)* aligned open forest and woodland; and Bracelet Honeymyrtle (*Melaleuca armillaris)* scrub to open scrub. There are no records of the species in the locality and the species was not detected during field surveys. Due to the urban and highly modified nature of the Subject Site, the species is unlikely to occur.
Epacris purpurascens var. purpurascens (5)	-	V	-	Found in a range of habitat types, most of which have a strong shale soil influence. The species was not recorded during survey effort and the closest record is located 6km south west of the site. Due to the disturbed nature of the site, it is considered unlikely to occur within the Subject Site. The species was not detected during field surveys. Due to the urban and highly modified nature of the Subject Site, the species is unlikely to occur.
Eucalyptus nicholii (2)	Narrow-leaved Black Peppermint	V	V	Typically grows in dry grassy woodland, on shallow soils of slopes and ridges. Found primarily on infertile soils derived from granite or metasedimentary rock. The species was not detected during field surveys. Due to the urban and highly modified nature of the Subject Site, the species is unlikely to occur.
Genoplesium baueri	Yellow Gnat-orchid	E	E	Grows in dry sclerophyll forest and moss gardens over sandstone. There are no records of the species in the locality. Due to the urban and highly modified nature of the Subject Site, the species is unlikely to occur.
Grevillea parviflora subsp. parviflora (1031)	Small-flower Grevillea	V	V	Grows in sandy or light clay soils usually over thin shales, often with lateritic ironstone gravels and nodules. Sydney region occurrences are usually on Tertiary sands and alluvium, and soils derived from the Mittagong Formation. Soil landscapes include Lucas Heights or Berkshire Park. Occurs in a range of vegetation types from heath and shrubby woodland to open forest. The species was not detected during field surveys and there are no records in the proximity of the Subject Site. Due to the highly disturbed nature of the Subject Site, it is considered unlikely to occur onsite
Hibbertia puberula (1156)	-	E	-	Occurs on sandy soil often associated with sandstone, or on clay. The species was not detected during field surveys. Due to the urban and highly modified nature of the Subject Site, the species is unlikely to occur.
Hibbertia sp. Bankstown (217)	-	CE	CE	This species is endemic to New South Wales and is currently known to occur in only one population at Bankstown Airport in Sydney's southern suburbs, in the Bankstown local government area. The species was

Scientific Name (number of records)	Common Name	BC Act	EPBC Act	Likelihood of Occurrence
				not detected during field surveys. Due to the urban and highly modified nature of the Subject Site, the species is unlikely to occur.
Leucopogon exolasius (3)	Woronora Beard-heath	V	V	The plant occurs in woodland on sandstone. The species was not detected during field surveys. Due to the urban and highly modified nature of the Subject Site, the species is unlikely to occur.
Marsdenia viridiflora subsp. viridiflora (336)	*Marsdenia viridiflora R. Br. subsp. viridiflora* population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas	EP	-	Grows in vine thickets and open shale woodland. The species was not detected during field surveys. Due to the urban and highly modified nature of the Subject Site, the species is unlikely to occur.
Melaleuca deanei	Deane's Melaleuca	V	V	The species occurs mostly in ridgetop woodland, with only 5% of sites in heath on sandstone. The species was not detected during field surveys. Due to the urban and highly modified nature of the Subject Site, the species is unlikely to occur.
Persicaria elatior	Tall Knotweed	V	V	This species normally grows in damp places, especially beside streams and lakes. Occasionally in swamp forest or associated with disturbance. There is no suitable habitat present onsite and the species is unlikely to occur.
Persoonia hirsuta (2)	Hairy Geebung	E	E	The Hairy Geebung is found in sandy soils in dry sclerophyll open forest, woodland and heath on sandstone. The species was not detected during field surveys. Due to the urban and highly modified nature of the Subject Site, the species is unlikely to occur.
Persoonia nutans (296)	Nodding Geebung	E	E	Northern populations are confined to aeolian and alluvial sediments and occur in a range of sclerophyll forest and woodland vegetation communities, with the majority of individuals occurring within Agnes Banks Woodland or Castlereagh Scribbly Gum Woodland and some in Cooks River / Castlereagh Ironbark Forests. Southern populations also occupy tertiary alluvium, but extend onto shale sandstone transition communities and into Cooks River / Castlereagh Ironbark Forest. The species was not detected during field surveys. Due to the urban and highly modified nature of the Subject Site, the species is unlikely to occur.
Pimelea curviflora var. curviflora	-	V	V	Occurs on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes amongst woodlands. Also recorded in Illawarra Lowland Grassy Woodland habitat at Albion Park on the Illawarra coastal plain. There are no records of the species in the locality. The species was not detected

Scientific Name (number of records)	Common Name	BC Act	EPBC Act	Likelihood of Occurrence
				during field surveys. Due to the urban and highly modified nature of the Subject Site, the species is unlikely to occur.
Pimelea spicata (320)	Spiked Rice-flower	E	E	On the Cumberland Plain sites, it is associated with Grey Box communities (particularly Cumberland Plain Woodland variants and Moist Shale Woodland) and in areas of ironbark. The species was not detected during field surveys. Due to the urban and highly modified nature of the Subject Site, the species is unlikely to occur. The species was not detected during field surveys. Due to the urban and highly modified nature of the Subject Site, the species is unlikely to occur.
Pomaderris prunifolia (3)	P. prunifolia in the Parramatta, Auburn, Strathfield and Bankstown Local Government Areas	EP	-	An isolated population of *Pomaderris prunifolia* occurred in the Parramatta, Auburn, Strathfield and Bankstown Local Government Areas, disjunct from other populations. The species was not detected during field surveys. Due to the urban and highly modified nature of the Subject Site, the species is unlikely to occur.
Pterostylis gibbosa	Illawarra Greenhood	E	E	All known populations grow in open forest or woodland, on flat or gently sloping land with poor drainage. There are no records of the species in the locality. Due to the urban and highly modified nature of the Subject Site including original soil profile, the species is unlikely to occur.
Pterostylis saxicola	Sydney Plains Greenhood	E	E	Most commonly found growing in small pockets of shallow soil in depressions on sandstone rock shelves above cliff lines. The vegetation communities above the shelves where *Pterostylis saxicola* occurs are sclerophyll forest or woodland on shale/sandstone transition soils or shale soils. There are no records of the species in the locality. Due to the urban and highly modified nature of the Subject Site including original soil profile, the species is unlikely to occur.
Pultenaea parviflora (2)	-	E	V	May be locally abundant, particularly within scrubby/dry heath areas within Castlereagh Ironbark Forest and Shale Gravel Transition Forest on tertiary alluvium or laterised clays. The species was not detected during field surveys. Due to the urban and highly modified nature of the Subject Site, the species is unlikely to occur.
Pultenaea pedunculata (7)	Matted Bush-pea	E	-	The Matted Bush-pea occurs in a range of habitats. NSW populations are generally among woodland vegetation but plants have also been found on road batters and coastal cliffs. It is largely confined to loamy soils in dry gullies in populations in the Windellama area. The species was not detected during field surveys. Due to the urban and highly modified nature of the Subject Site, the species is unlikely to occur.
Rhodamnia rubescens (1)	Scrub Turpentine	CE	-	Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils. There is no suitable habitat present onsite and the species is unlikely to occur

Scientific Name (number of records)	Common Name	BC Act	EPBC Act	Likelihood of Occurrence
Syzygium paniculatum (1)	Magenta Lilly Pilly	E	V	On the south coast the Magenta Lilly Pilly occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral (coastal) rainforest. The species was not detected during field surveys and there is no suitable habitat present onsite. Therefore, the species is unlikely to occur.
Thelymitra kangaloonica	Kangaloon Sun Orchid	CE	CE	It is found in swamps in sedgelands over grey silty grey loam soils. There are no records of the species in the locality. Due to the urban and highly modified nature of the Subject Site including original soil profile, the species is unlikely to occur.
Thesium australe	Australian Toadflax	V	V	Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast. There are no records of the species in the locality. Due to the urban and highly modified nature of the Subject Site including original soil profile, the species is unlikely to occur.
Wahlenbergia multicaulis (7)	Tadgell's Bluebell in the local government areas of Auburn, Bankstown, Baulkham Hills, Canterbury, Hornsby, Parramatta and Strathfield	EP	-	Found in disturbed sites and grows in a variety of habitats including forest, woodland, scrub, grassland and the edges of watercourses and wetlands. Typically occurs in damp, disturbed sites (with natural or human disturbance of various forms), typically amongst other herbs rather than in the open. The species was not detected during field surveys. Due to the urban and highly modified nature of the Subject Site, the species is unlikely to occur.
Wilsonia backhousei (3)	Narrow-leafed Wilsonia	V	-	This is a species of the margins of salt marshes and lakes. There is no suitable habitat present onsite and the species is unlikely to occur

(V) = Vulnerable Species listed under the BC Act 2016 EPBC Act 1999

(E) = Endangered Species listed under the BC Act 2016 EPBC Act 1999

(CE) = Critically Endangered Species listed under the BC Act 2016 EPBC Act 1999

(EP) = Endangered Population listed under the BC Act 2016

7.2 Vegetation

Fieldwork was conducted to produce a species list of flora present onsite, search for threatened plants potentially occurring within the locality and determine whether the vegetation present within the Subject Site represents a remnant of a native vegetation community or is commensurate with any threatened ecological communities.

Flora surveys have resulted in the identification of 20 species of vascular plants within the Subject Site. Of these 20 species, 12 are exotic species growing within the regularly mowed nature strip.

Plate 1 - *Melaleuca quinquenervia* planted within the nature strip

The vegetation present within the Subject site consists of a nature strip made of a mix of native and exotic lawn species such as *Cenchrus clandestinus* (Kikuyu Grass), *Stenotaphrum secundatum* (Buffalo Grass) and *Cynodon dactylon* (Couch). In addition, other exotic species are present including *Hypochaeris radicata* (Catsear), *Poa annua* (Winter Grass), *Trifolium repens* (White Clover) and *Medicago arabica* (Spotted Burr Medic). The nature strip located on the eastern side of Governor Macquarie Drive is devoid of native species. Scattered native species of trees and shrubs have been planted on the nature strip on the western side of the road and include several individuals of *Callistemon citrinus* (Crimson Bottlebrush), one *Eucalyptus sideroxylon* (Grey Ironbark), one *Eucalyptus amplifolia* (Cabbage Gum), one *Eucalyptus elata* (River Peppermint), one *Melaleuca quinquenervia* (Broad-leaved Paperbark) and one *Tristaniopsis laurina* (Water Gum).

Plate 2 - *Callistemon citrinus* planted within the nature strip

The native species of trees and shrubs were most likely planted as street trees and are not considered to constitute a remnant of a native vegetation community. A full list of flora species identified within the Subject Site is provided in **Table 3** below.

Table 3 - Flora Species List

No.	Family	Scientific Name	Common Name
1.	Apiaceae	*Daucus carota**	Wild carrot
2.	Asteraceae	*Taraxacum officinale**	Dandelion
3.	Asteraceae	*Hypochaeris radicata**	Catsear
4.	Convolvulaceae	*Dichondra repens*	Kidney Weed
5.	Fabaceae – Faboideae	*Trifolium repens**	White Clover
6.	Fabaceae – Faboideae	*Medicago arabica**	Spotted Burr Medic
7.	Lauraceae	*Cinnamomum camphora**	Camphor Laurel
8.	Malvaceae	*Modiola caroliniana**	Red-flowered Mallow
9.	Myrtaceae	*Callistemon citrinus*	Crimson Bottlebrush
10.	Myrtaceae	*Eucalyptus amplifolia*	Cabbage Gum
11.	Myrtaceae	*Eucalyptus elata*	River Peppermint
12.	Myrtaceae	*Eucalyptus siderophloia*	Grey Ironbark
13.	Myrtaceae	*Melaleuca quinquenervia*	Broad-leaved Paperbark
14.	Myrtaceae	*Tristaniopsis laurina*	Water Gum
15.	Plantaginaceae	*Plantago lanceolata**	Plantain
16.	Poaceae	*Cenchrus clandestinus**	Kikuyu Grass
17.	Poaceae	*Cynodon Dactylon*	Couch
18.	Poaceae	*Stenotaphrum secundatum**	Buffalo Grass
19.	Poaceae	*Poa annua**	Winter Grass
20.	Solanaceae	*Solanum nigrum**	Blackberry Nightshade

* Denotes an exotic species.

7.3 Habitat Assessment

The site offers very limited habitat features for native fauna as outlined below.

Vegetation – The native vegetation present onsite is limited to several individuals of myrtaceous species including *Eucalyptus*, *Melaleuca* and *Callistemon*. These plants, when in flower represent potential foraging opportunities for nectar feeding birds and Grey-headed Flying Fox.

Other habitat features – No hollow-bearing trees were detected within the Subject Site. There is no fallen timber and no bush rocks present.

Patch size / connectivity – There is a small pocket of bushland directly south of the Subject Site. However, a major road, Newbridge Road, represents a major obstacle to the movement of species.

In summary, the native vegetation within the site would provide limited foraging habitat for a range of species suited to highly disturbed and fragmented natural areas in an urban setting, including mobile (flying) threatened species. They are considered to potentially utilise the site on an intermittent basis as part of a larger home range.

7.4 Fauna

Incidental fauna sightings during site inspection have identified three bird species, typical of a highly modified urban setting:

- Rainbow lorikeet (*Trichoglossus moluccanus*);
- Noisy Miner (*Manorina melanocephala*); and
- Australian Magpie (*Cracticus tibicen*).

No threatened fauna species were recorded onsite

8.0 Key Species Considerations

Due to the highly modified nature of the Subject Site and its location within an urban landscape, isolated from larger tracts of bushland; the potential for threatened species to utilise the Subject Site as part of a broader foraging range is very limited. In addition, none of the planted native species will be affected by the proposed road and footpath upgrade. Nonetheless, a 5-Part test has been prepared considering indirect impacts to potentially occurring threatened species within the wider locality.

9.0 5-Part Test Assessment

Section 7.3 of the BC Act lists five factors that must be taken into account in determining the significance of potential impacts of proposed activities on threatened species, populations, ecological communities and/or their habitats as listed within the BC Act.

The 5-part test is used to determine whether there is likely to be a significant impact, and thus whether the Biodiversity Offsets Scheme (BOS) is triggered.

For the purposes of the 5-part test assessment, the Subject Site is the nature strip located between the footpath and then Governor Macquarie Drive.

(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction

The impact from the proposed development will be localised and may include the temporary fencing of the nature strip. No native trees and shrubs will be impacted as a result of the proposed development. Therefore, it is considered unlikely that that the proposed development will have an adverse effect on the life cycle of any species utilising the site where they would be placed at risk of localised extinction.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

- ***(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or***
- ***(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction***

No endangered ecological community is present onsite and potential for indirect impact on locally occurring endangered communities is not expected as a result of the proposed development.

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

No habitat of a threatened species or ecological community will be removed or modified as a result of the proposed development.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

No native vegetation will be removed as a result of the proposed development. The Subject Site is already isolated and restricted on all boundaries by roads as well as residential and industrial developments. The proposed development would not exacerbate the fragmentation or isolation of the vegetation present onsite from surrounding habitat.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality

The vegetation present within the Subject Site exists in a highly modified state and would only provide marginal habitat for the threatened species potentially utilizing it. This limited habitat is therefore not considered important to the survival of any threatened species or ecological communities in the locality. In addition, native trees and shrubs present will not be impacted by the proposal.

(d) Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)

No area of outstanding biodiversity value is present.

(e) Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process (KTP)

The proposed development will not impact any native vegetation and is unlikely to contribute to any KTPs.

10.0 SEPP CM Assessment

Investigations in accordance with the State Environmental Planning Policy Coastal Management (2018) found that the Subject Site is not identified within the Coastal Environment Area, or within any areas identified as Coastal Wetlands, Littoral Rainforests and / or Coastal Vulnerability Areas. As such, no further provision of the policy applies to the site.

11.0 SEPP (Koala Habitat Protection) 2019

State Environmental Planning Policy (Koala Habitat Protection) 2019 came into force on the 1st of March 2020, and repeals the previous State Environmental Planning Policy No. 44 – Koala Habitat Protection. This Policy aims to encourage the conservation and management of areas of natural vegetation that provide habitat for koalas, to support a permanent free-living population over their present range and reverse the current trend of koala population decline.

The SEPP (Koala Habitat Protection) 2019 does not apply to Part-5 developments. Therefore, no further assessment is required.

12.0 EPBC Act Assessment

A search was conducted in December 2019 of Matters of National Environmental Significance (MNES) as relevant to the *Environment Protection & Biodiversity Conservation Act 1999* (EPBC Act). The following MNES are considered in this assessment.

World Heritage Properties:

The site is not a World Heritage area and is not in close proximity to any such area.

National Heritage Places:

The site is not a National Heritage Place and does not contain any matters of national heritage.

Wetlands of International Significance (declared Ramsar wetlands):

The site is not proximate to any wetlands of international significance.

Great Barrier Reef Marine Park:

The site is not part of, or within close proximity to, the Great Barrier Reef Marine Park.

Commonwealth Marine Areas:

The site is not part of, or within close proximity to, any Commonwealth Marine Area.

Threatened Ecological Communities:

No threatened ecological community listed under the EPBC Act is present within the Subject Site or will be impacted by the proposal.

Threatened Species:

No threatened fauna or flora listed under the EPBC Act have been detected onsite. In addition, EPBC listed threatened fauna have very limited potential to utilize the site as part of a broader foraging range.

Migratory Species:

EPBC listed migratory species have very limited potential to utilize the vegetation present onsite and it is not considered that the development of this land as proposed is likely to significantly affect the availability of potential habitat for such mobile species, or disrupt migratory patterns.

EPBC Act Assessment Conclusion:

Consideration of the EPBC Act revealed that it is unlikely that significant impacts on Matters of National Environmental Significance will occur as a result of development.

13.0 Conclusion and Recommendations

No threatened species were detected during field surveys and the Subject Site provides very limited habitat value for any potentially occurring threatened species. The 5-Part Test of Significance concluded that no threatened species will be impacted by the proposal.

General recommendations are made for consideration to mitigate potential impacts on retained street trees as a result of the proposed road and footpath upgrade.

Protection and management of retained vegetation

- The native trees and shrubs to be retained should be fenced off and signs installed to notify workers of their sensitive nature;
- Pruning of native trees required in the scope of the proposed works should be undertaken by a qualified arborist;
- No machinery or material should be stored within the retained vegetation or within the dripline of retained trees;
- Equipment should be cleaned thoroughly and disinfected before entering and exiting site to prevent weed and disease introduction such as *Phytophthora cinnamomi* (Root-rot fungus), Myrtle Rust and others; and
- Effective weed control should be used on site, ensuring that appropriate methods are used to eliminate and dispose of highly competitive weeds.

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Appendix A – Author CV

Yann Buissiere
Curriculum Vitae

Yann works with AEP in the role of Ecologist. Over the past 10 years, he has developed extensive experience in restoration ecology and land management including flora and fauna pest management, fire hazard reduction and community engagement.

Qualifications

- Diploma of Conservation and Land Management, TAFE (2013)
- Bachelor of Resources and Environmental Management, Macquarie University (2008)

Further Education & Training (select summary)

- Advanced Plant Identification (University of New South Wales)
- NSW Class C Driver's Licence.
- Operate and Maintain a Four-Wheel Drive Vehicle and undertake Winch Recovery
- Work Health & Safety White Card
- First Aid Certificate
- Vertebrate Pest Control
- Local Control Authority Officer – Biosecurity Act 2015
- Working Safely at Heights

Fields of Special Competence

- Vegetation community and weed mapping.
- Ecological field surveys including habitat assessment, hollow bearing tree surveys, bird surveys and fauna trapping.
- Botanical surveys including vegetation monitoring, targeted threatened flora search and undertaking BAM plots.
- Bush regeneration and habitat restoration
- Planning and undertaking fire hazard reduction work
- Feral animal control

Relevant Employment History

2019 - Current	**Ecologist (botanist)** Anderson Environment & Planning, Newcastle
2018 - 2019	**Ecologist (botanist)** Kleinfelder, Newcastle
2015 - 2018	**Bushland Team Coordinator** Northern Beaches Council (formerly Manly Council)
2010 - 2015	**Project Manager/Team Leader** Australian Bushland Restoration, Sydney
2010 - 2013	**Bushcare Supervisor** Mosman Council
2008 - 2010	**Bush regenerator** Australian Bushland Restoration, Sydney

Appendix 3

CONSTRUCTION NOISE AND VIBRATION ASSESSMENT

Project No: 201948R

Construction Noise and Vibration Assessment
Proposed Road Upgrade
Governor Macquarie Drive
Chipping Norton, NSW

Prepared for:
Liverpool City Council
c/- ADW Johnson
5 Pioneer Avenue
Tuggerah, NSW 2259

Author:

Ross Hodge
B.Sc.(Hons), MAAS
Principal / Director

August 2020

CONTENTS

1.0 - INTRODUCTION

This construction noise assessment has been undertaken in relation to the proposed upgrade of the Alfred Road to Newbridge Road section of Governor Macquarie Drive (GMD), at Chipping Norton, NSW. The location of the works is shown in **Figure 1**.

Figure 1 – Road Works Site

The proposed works will involve upgrading GMD to a divided four lane road and extending the existing southbound turning lane by 80m

The assessment of potential construction noise impacts is undertaken in accordance with the *Interim Construction Noise Guideline* (ICNG, 2009) and *Assessing Vibration: A Technical Guideline* (AVTG, 2006). These guidelines are non-mandatory but are usually referred to by local councils and the NSW Department of Planning and Infrastructure (DP&I) when construction/demolition works require development approval.

The criteria in the ICNG cover all activities and machinery associated with construction on the site including, but not limited to, site preparation and any excavation work. It is designed to ensure noise emissions resulting from the construction are maintained to minimise potential impacts to nearby receivers.

2.0 - TERMS AND DEFINITIONS

Table 1 contains the definitions of commonly used acoustical terms and is presented as an aid to understanding this report.

TABLE 1
DEFINITION OF ACOUSTICAL TERMS

Term	Definition
dB(A)	The quantitative measure of sound heard by the human ear, measured by the A-Scale Weighting Network of a sound level meter expressed in decibels (dB).
SPL	Sound Pressure Level. The incremental variation of sound pressure above and below atmospheric pressure and expressed in decibels. The human ear responds to pressure fluctuations, resulting in sound being heard.
STL	Sound Transmission Loss. The ability of a partition to attenuate sound, in dB.
Lw	Sound Power Level radiated by a noise source per unit time re 1pW.
Leq	Equivalent Continuous Noise Level - taking into account the fluctuations of noise over time. The time-varying level is computed to give an equivalent dB(A) level that is equal to the energy content and time period.
L1	Average Peak Noise Level - the level exceeded for 1% of the monitoring period.
L10	Average Maximum Noise Level - the level exceeded for 10% of the monitoring period.
L90	Average Minimum Noise Level - the level exceeded for 90% of the monitoring period and recognised as the Background Noise Level. In this instance, the L90 percentile level is representative of the noise level generated by the surrounds of the residential area.

3.0 – APPLYING THE GUIDELINE

Section 1.5 of the ICNG outlines the steps for management of construction noise impacts as follows:

1. **identify sensitive land uses** that may be affected.
2. **identify hours** for the proposed construction works.
3. **identify impacts** at sensitive land uses.
4. **select and apply the best work practices** to minimise noise impacts.

Each of the above four points is assessed in detail in the following sections.

3.1. Surrounding Land Uses

The subject site is in an area of mixed suburban and commercial activity. There are residential receivers along the western side of the road and commercial/semi industrial receivers along the eastern side of the road.

Potential construction noise impacts at these receivers will require assessment.

3.2. Operating Hours

The recommended standard hours for construction works are shown in **Table 2** which is a reproduction of Table 1, section 2.2 of the ICNG.

TABLE 2
STANDARD CONSTRUCTION HOURS

Work Type	Recommended standard hours of work[1]
Normal construction	Monday to Friday 7 am to 6 pm Saturday 8 am to 1 pm No work on Sundays or public holidays
Blasting	Monday to Friday 9 am to 5 pm Saturday 9 am to 1 pm No blasting on Sundays or public holidays

1 The relevant authority (consent, determining or regulatory) may impose more or less stringent construction hours

Construction work outside the hours in Table 2 is normally only permissible for delivery of oversized structures, emergency works, public infrastructure works that are supported by the affected community or where the proponent demonstrates and justifies a need to work outside the recommended standard hours (ICNG, p9).

The proponent has advised that some works may occur outside of the typical hours (i.e. at night) to minimise disruption to the traffic flow on GMD.

3.3. Impacts at Sensitive Land Uses

The ICNG provides two assessment methodologies for construction noise impacts: a 'qualitative' assessment where works occur for less than three weeks and a 'quantitative' assessment for works of longer duration. As construction work will take longer than three weeks, the quantitative methodology is applicable.

Noise management Levels

Table 3 sets out noise management levels for construction works, (as reproduced from section 2.2 of the ICNG).

TABLE 3 NOISE AT RESIDENCES USING QUANTITATIVE ASSESSMENT		
Time of day	Management level Leq (15 min)	How to apply
Recommended standard hours: Monday to Friday 7 am to 6 pm Saturday 8 am to 1 pm No work on Sundays or public holidays	Noise affected RBL + 10 dB	The noise affected level represents the point above which there may be some community reaction to noise. • Where the predicted or measured $L_{Aeq\ (15\ min)}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. • The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise level and duration, as well as contact details.
	Highly noise affected 75 dB(A)	The highly noise affected level represents the point above which there may be strong community reaction to noise. • Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: 1. times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences 2. if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside recommended standard hours	Noise affected RBL + 5 dB	• A strong justification would typically be required for works outside the recommended standard hours. • The proponent should apply all feasible and reasonable work practices to meet the noise affected level. • Where all feasible and reasonable practices have been applied and noise is more than 5 dB(A) above the noise affected level, the proponent should negotiate with the community. • For guidance on negotiating agreements see section 7.2.2.

* Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5 m above ground level. If the property boundary is more than 30 m from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30 m of the residence. Noise levels may be higher at upper floors of the noise affected residence.

The ICNG also details the construction noise management levels at other potentially sensitive land uses. At industrial premises, the external noise management level is 75 dB(A) Leq (15 min). At offices and retail outlets the external noise management level is 70 dB(A) Leq (15 min).

Unattended noise logging was undertaken to quantify the existing acoustic environment of the area. An ARL EL-315 environmental noise logger was installed in the front yard of the residence at number 30 Governor Macquarie Drive between 2nd and 9th August, 2020.

Noise levels were measured at 15 minute statistical intervals with all measurements done in accordance with relevant OEH guidelines and AS 1055-2018 “Acoustics – Description and Measurement of Environmental Noise”. The noise logger used complies with the requirements of AS 1259.2-1990 “Acoustics – Sound Level Meters”, and has current NATA calibration certification.

The logger was programmed to continuously register environmental noise levels over the 15 minute intervals, with internal software calculating and storing Ln percentile noise levels for each sampling period. Calibration of the logger was performed as part of the instrument’s initialisation procedures, with calibration results being within the allowable ± 0.5 dB(A) range.

The logger data shows that ambient noise levels increase from early morning and stay elevated until early evening indicating the acoustic environment is dominated by noise from traffic on GMD and the nearby commercial activities.

Ambient Leq and background noise levels, obtained from the logger, are summarised in **Table 4** and shown graphically in **Appendix I**.

TABLE 4
MEASURED AMBIENT NOISE LEVELS dB(A)
30 GOVERNOR MACQUARIE DRIVE

Period	L90	Leq (15 min)
Day	59	68
Evening	46	65
Night	37	63

Based on the daytime background noise level (RBL) of 59 dB(A),L90 the daytime construction noise management level is **69 dB(A),Leq (15 min)**, at residential receivers along the roadside, in accordance with Table 2.

For any work during the evening (6pm to 10pm) the noise management level would be **51 dB(A) Leq (15 min)** whilst at night (10pm to 7am) the noise management level is **42 dB(A) Leq (15 min)**.

3.4 Work Practises and Noise Sources

Based on typical construction scenarios for similar type developments it is envisaged that the construction works would progress along the length of the upgrade with and initial excavation stage followed by preparation and repaving of the road surface. The proponent has indicated that the plant and equipment to be used on site will include;

- Rollers,
- Vibratory rollers,
- Compactors,

- Pavement mill,
- Asphalt paver,
- Excavator,
- Concrete trucks,
- Concrete pumps, and
- Semi-trailers.

Appendix B of the ICNG provides references for published databases of noise levels for construction equipment. Data for maximum noise emissions from the equipment typical of that to be used on site were provided in the *Roadway construction noise model user's guide*, Federal Highway Administration (FHWA), US Department of Transport, 2006 and the NSW RTA's Environmental Noise Management Manual (ENMM). Calculated Leq (15 min) sound power levels (Lw, dB(A)) based on the FHWA and ENMM data are summarised in **Table 5**.

Additional information has also been taken from the Spectrum Acoustics technical database which has been referenced to determine the sound power level most applicable to the actual operation of the equipment proposed to be used on the site. This level is also shown in Table 5.

TABLE 5
MEASURED EQUIPMENT NOISE LEVELS dB(A) Leq

Equipment	Range of Indicative Lw dB(A)	Range of Indicative Lp @ 10m dB(A)	Lw for Assessment as Leq (15 min)
Roller	98 - 107	70 - 79	104
Vibratory Roller	102 - 110	74 - 82	107
Compactor	91 - 106	63 - 78	103
Pavement Mill	110	82	110
Asphalt Paver	103 - 112	75 - 84	110
Excavator	97 - 117	69 - 89	102
Concrete Agitator	99 - 104	71 - 76	104
Concrete Pump	103 - 108	75 - 80	106
Dump Truck	112	84	103
Semi Trailer	107	79	100

During a full 15 minute period the machinery items to be used on site would operate at maximum sound power levels for only brief stages. At other times the machinery may produce lower sound levels whilst carrying out activities not requiring full power.

In addition to this, mobile machinery would likely move about during the 15 minutes, variously altering the distance from, and directivity of, the noise source with respect to individual receivers.

The logistics of typical road construction work would mean that all of the plant items shown in Table 5 could not operate at the same time. To give

a conservative (i.e. worst case) estimate of typical construction noise various configurations of machinery were considered.

To give an indication of potential impacts, construction noise levels have been predicted at a number of representative distances from the centre of the road works.

For the initial phases of construction up to four plant items (e.g. a vibratory roller, roller, concrete agitator and dump truck) were considered to be working in close proximity. Such a configuration of machinery would result in sound pressure levels of about 83 dB(A) at 10m (i.e. a combined sound power level of approximately 111 dB(A)).

Due to of the relatively short distance between the noise sources and receivers, the influence of differing meteorological conditions was not considered in the modelling. The calculations also do not take into account the variable screening effects of topography or intervening structures (e.g. sheds etc) between the noise sources and the receiver.

Table 6 show the results of a sample calculation of potential noise impacts at representative receiver distances from the site of works, as a result of the assessed, typical, road construction operations taking place at various distances from residences.

TABLE 6
ROAD CONSTRUCTION NOISE as dB(A) Leq (15 min)

	@ 10 m	@ 20 m	@ 40 m	@ 100 m	@ 250 m
Road Works Noise	111	111	111	111	111
Distance Loss to Receiver	28	34	40	48	56
Received Noise	83	77	71	63	55
Criterion (Management level)	69	69	69	69	69
Impact	14	8	2	0	0

The results in Table 6 show that, during the day, for the assessed initial phase of works the construction noise management level may be exceeded at residential receiver locations that are close the site of the works.

The predicted noise levels show that some residences which are close to parts of the road works may be in the “highly affected” zone, that is, levels exceeding 75 dB(A) Leq (15 min).

During the evening and night the noise management level may be exceeded for residences up to a few hundred metres from the site of the works.

Under such circumstances noise management practices should be implemented, as detailed in Section 4 of this report.

All of the commercial premises along the road are further removed from the edge of the pavement and, in many instances separated by car parking areas. The results in Table 6 show that external noise levels at the commercial premises closest to the road will exceed the management level. As detailed above, the noise management practises in Section 4 should be implemented.

4.0 - NOISE MANAGEMENT

The mechanisms available for control of construction noise are limited due to the necessary and mostly unchangeable location of the works and the size and type of plant and machinery which, by necessity, must be used.

Noise control, planning and management options are discussed below and applicable recommendations are included.

4.1 Noise Control

The best ways to minimise construction noise impacts are to employ quiet work practices and use the quietest available construction equipment.

There are four main methods of controlling noise. These are;

1. Controlling noise at the source. Examples are; sound proof covers, sound reducing mufflers on plant etc. Also included here is the substitution of processes or equipment with less noisy items,

2. Controlling the transmission of noise in its path. Examples are noise barriers (such as appropriate fencing) or portable barriers which may be used around static equipment like generators,

3. Controlling noise at the receiver. Examples are insulation on buildings and thicker glazing, and

4. In addition to the above noise mitigation can involve scheduling of the more noisy activities to less sensitive periods of the day or times of the year.

For the current construction works there is little scope for the feasible and reasonable application of methods in items 2 and 3.

With regard to item 1 several recommendations are made in **Section 4.3** of this report. In addition to this, **Section 4.2** details noise planning and management procedures to enable identification of particularly noise sensitive times.

4.2 Noise Planning

The proponent should undertake noise control planning as part of project pre-planning. This will identify potential noise problems and eliminate them in the planning phase prior to site works commencing.

Residents in streets adjacent to the construction site should be notified of the project. This would, typically, be done by a letterbox drop. Included in the notification should be a description of proposed works and an outline of the proposed time frame for the various stages of the works.

The letterbox drop should include, as a minimum, all residences and commercial premises within 250m of the edge of Governor Macquarie Drive and include residences in Governor Macquarie Drive, Balanada Avenue, Bungarra Crescent, Coolarn Street, Carcoola Avenue and Boolarong Avenue.

The contact name and phone number of a responsible person should be given out so that residents may comment on the works and indicate any particularly significant noise sensitive times.

The advice should also advise the name and phone number of the person responsible for accepting and dealing with complaints. All complaints or communications should be answered promptly and a record kept of all complaints, responses and actions.

The main contractor should plan to co-ordinate subcontractors so that there are no unnecessary cumulative impacts arising from the simultaneous activities of more than one subcontractor. That is, planning to avoid, if practical, having more than one noisy activity taking place in close proximity. It is good practice to appoint a single co-ordinator to oversee all significant noise producing activities.

4.3 Noise Management

All personnel working on the job including subcontractors and their employees must be made aware of their obligations and responsibilities with regard to minimising noise emissions.

Site inductions and toolbox meetings to all employees and subcontractors must include information about the need to minimise noise impacts to surrounding areas.

Contractors should familiarise themselves with methods of controlling noisy machines and alternative construction procedures. These are explained in AS2436-1981 “Guide to Noise Control on Construction, Maintenance and Demolition Sites”.

Any activities identified in in the risk assessment phase, that are known or have the potential to create excessive noise should, where possible, be scheduled to occur at times to cause least annoyance to the

community. Carrying out such work during early morning should be avoided. This includes start up and idling etc. of heavy machinery prior to commencement of work.

Mechanical plant should be silenced using best available control technology. Noise suppression devices should be maintained to manufacturer's specifications.

All equipment used on the site shall have exhaust systems that have been recommended by the manufacturer as having the lowest associated noise for that machine.

Machines which are used intermittently such as rollers or other earthmoving machinery should either be shut down in the intervening periods between use or throttled down to a minimum.

Any portable equipment with the potential to create high levels of noise e.g. compressors, generators etc. should only be selected for use if it incorporates effective noise control. This equipment should be located where practical so that site sheds, or previously erected structures are between it and the nearest potentially affected receivers. Where no such barriers are present this machinery should be located behind a portable screen or enclosure.

The effectiveness of a noise barrier or screen depends on its length, height and its position relative to the source and the receiver. A screen designed to reduce noise from a stationary source should, where possible, extend a distance of twice the length of the noise source beyond the direct line of sight between the source and the receiver.

Plant known to emit noise strongly in one direction, such as a concrete agitator, should, where possible, be oriented such that the noise is directed away from the closest or the most noise sensitive receivers.

Regular and effective maintenance of all equipment including vehicles moving on and off the site should be conducted. Prompt attention must be given to repair of loose or rattling parts and broken equipment. All maintenance work should only be carried out by qualified persons.

When selecting contractors and/or equipment for the job, preference must be given to those with capacities best suited to the task at hand. That is the use of larger machines with excess capacity should be avoided unless these can be shown to be quieter than smaller capacity machines.

Site access should be designed such that delivery vehicles, and other heavy vehicles moving through the site can do so with minimum need to reverse.

Where possible, loading and unloading of plant and materials should be carried out away from potentially affected receivers. No delivery of plant or materials should be accepted before 7 am Monday to Friday or 8 am on Saturday.

Care should be taken not to drop materials from height either into, or out of trucks or other rigid surfaces. The surface to which the materials are being moved should be covered by some resilient material. Particular care should be taken during the loading or unloading of any scaffolding.

5.0 - ADMINSITRATIVE PROCEDURES

5.1 Subcontractor Management

It is the responsibility of the main contractor to ensure that all subcontractors comply with site requirements as well as statutory requirements. No subcontractor should be allowed on site without being able to prove duty of care for the safety of their employees and bystanders with regard to noise emissions.

No subcontractor should be allowed on site without being able to provide adherence to the noise control measures that are relevant to their respective operations.

5.2 Action Plan

The main contractor should develop an Action Plan. This would be a document that will state responsibilities, actions, due dates and specific controls to be implemented.

6.0 – CONSTRUCTION VIBRATION

6.1 Vibration Criteria

Vibration from construction works, including continuous, intermittent or impulsive vibration from construction, but excluding blasting, is to be assessed in accordance with section 2.5 Short term works in the AVTG.

The AVTG defines the vibration associated with events such as road construction works as Intermittent.

The AVTG indicates that the assessment of intermittent vibration should be done using a vibration dose value (VDV), which is defines as the fourth root interval with respect to time of the acceleration after it has been weighted. The VDV is fully described in British Standard BS 6472: 1992 "*Evaluation of Human Exposure to Vibration in Buildings (1Hz to 80Hz)*".

Table 7 shows the acceptable VDV's for intermittent vibration taken from Table 2.4 of the AVTG.

TABLE 7 ACCEPTABLE VDV's FOR INTERMITTENT VIBRATION (m/s$^{1.75}$)		
Area, Time	Preferred Value	Maximum Value
Residential – Day	0.20	0.40
Residential – Night	0.13	0.26

Day time is between 7am and 10pm

The calculation of the individual vibration dose values (VDVi) are based on the equations detailed in Section 2.4.1 of the technical guideline. The calculations take into account vibration level and duration.

There are a number of Standards designed for the assessment of damage to building structures. One that is most frequently referred to is German Standard DIN 4150: Part 3-1986 *Structural Vibration in Buildings – Effects on Structures*.

DIN 4150 presents a series of "safe limit" values below which no damage due to vibration has been observed. Damage is specifically defined as including minor superficial cracking, the enlargement of existing cracks in cement render and the separation of partitions from load bearing walls.

A summary of the relevant sections from DIN 4150 is shown below in **Table 8**.

TABLE 8 STRUCTURAL DAMAGE - SAFETY LIMITS FOR BUILDING VIBRATION					
Group	Type of Source	Vibration Velocity in mm/s			
		At Foundations		Plane of Floor of Uppermost Story	
		Less than 10 Hz	10 Hz to 50 Hz	50 Hz to 100 Hz	All Freqs
1	Buildings used for commercial purposes, industrial buildings and buildings of similar design.	20	20 to 40	40 to 50	40
2	Dwellings and buildings of similar design or use.	5	5 to 15	15 to 20	15
3	Structures that because of their particular sensitivity to vibration, do not correspond to those listed in 1, or 2 and have intrinsic value (e.g. buildings that are under a preservation order)	3	3 to 8	8 to 10	8

A more recent standard than DIN 4150 for assessing building damage is British Standard BS 7385: Part 2 – 1993 *Evaluation and Measurement of Vibration in Building part 2*. This standard was developed following a full review of available data, including other international standards, publications, and a review of UK data. The standard concludes by

providing guidance for threshold values corresponding to the minimum risk of cosmetic damage from vibration.

A summary of the relevant sections from BS 7385 is shown below in **Table 9**.

TABLE 9
TRANSIENT VIBRATION LEVELS FOR COSMETIC DAMAGE

Line	Type of Building	Peak Particle Velocity	
		4 Hz to 15 Hz	Greater than 15 Hz
1	Reinforced or framed structures. Industrial or heavy commercial buildings	50 mm/s	50 mm/s
2	Un-reinforced or light framed commercial type buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above

The standard specifically notes:

- Historic buildings should not to be assumed to be more sensitive to vibration (unless structurally unsound); and
- Structures below ground are known to sustain higher levels of vibration and are very resistant to damage, unless in poor condition.

6.2 Vibration Impacts

Energy from construction equipment is transmitted into the ground and transformed into vibrations, which attenuates with distance. The attenuation of vibration through the ground is dependent upon site specific factors relating to the strata between the vibration source and receivers. In obtaining an initial indication of likely vibration levels, it can be assumed that the vibration level is inversely proportional to distance. That is, at double the distance from the source the vibration level will be halved.

Due to the above factors, there is inherent variability in ground vibration predictions without site-specific measurement data. The NSW Roads and Traffic Authority (RTA) *Environmental Noise Management Manual* (RTA 2001). provides typical construction equipment ground vibration levels at 10m. Typical vibration levels of construction plant items listed in **Table 10**. These levels have been used to determine potential impacts at nearby receivers.

TABLE 10
TYPICAL VIBRATION LEVELS – CONSTRUCTION EQUIPMENT

Item	Peak Particle Velocity at 10m (mm/sec)*
Vibratory Roller	7-8
Roller	5-6
Excavator	2-4

A worst case scenario was considered where a vibratory roller was working at approximately 20m from a residence for a period of 5m. The total vibration dose from this activity would be 0.7.

This indicates that, under the assessed conditions, the vibration dose may be exceeded at some receivers that are close to the site. As the vibration dose criteria are based on human comfort, they are only applicable when the residents are at home whilst the works are taking place.

Based on the typical vibration levels shown in Table 10 received vibration levels would be less than a peak particle velocity of 5 mm/s at distances of approximately 15m from a vibratory roller and less than 10m from a roller.

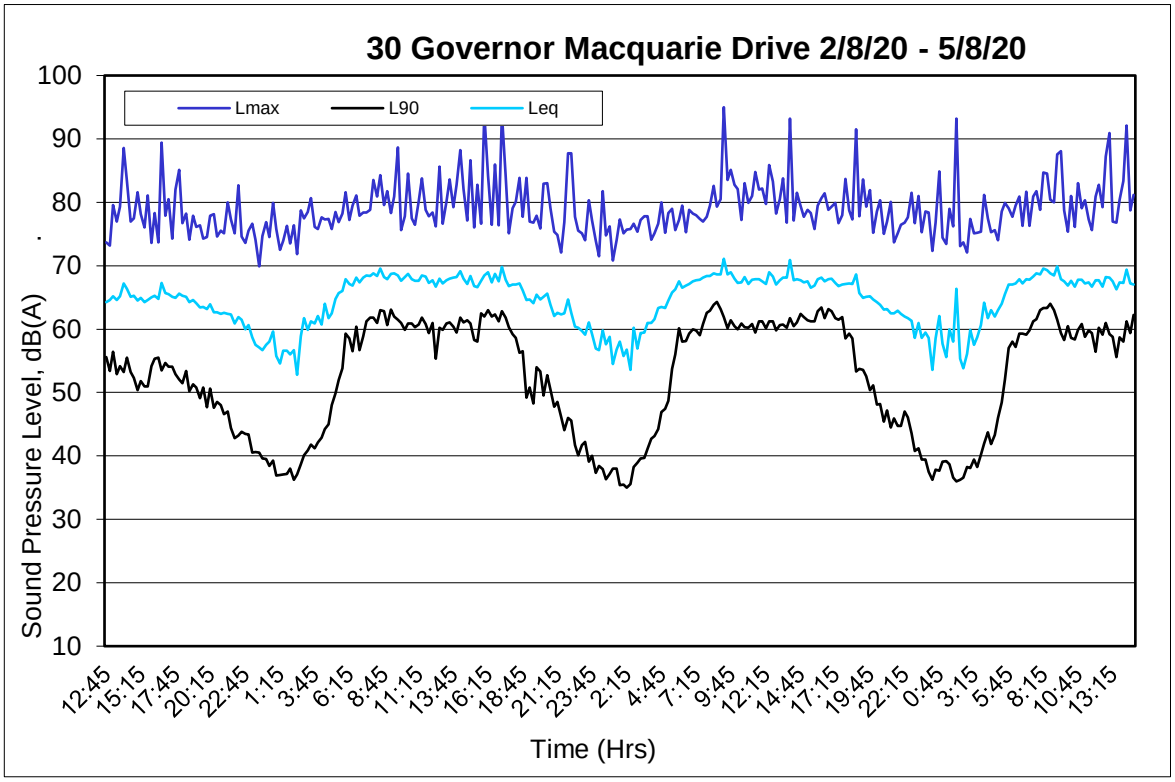
Based on the most stringent building damage criterion detailed in Table 8 (Group 2), this shows that there is little likelihood of damage to any buildings due to the proposed construction works.

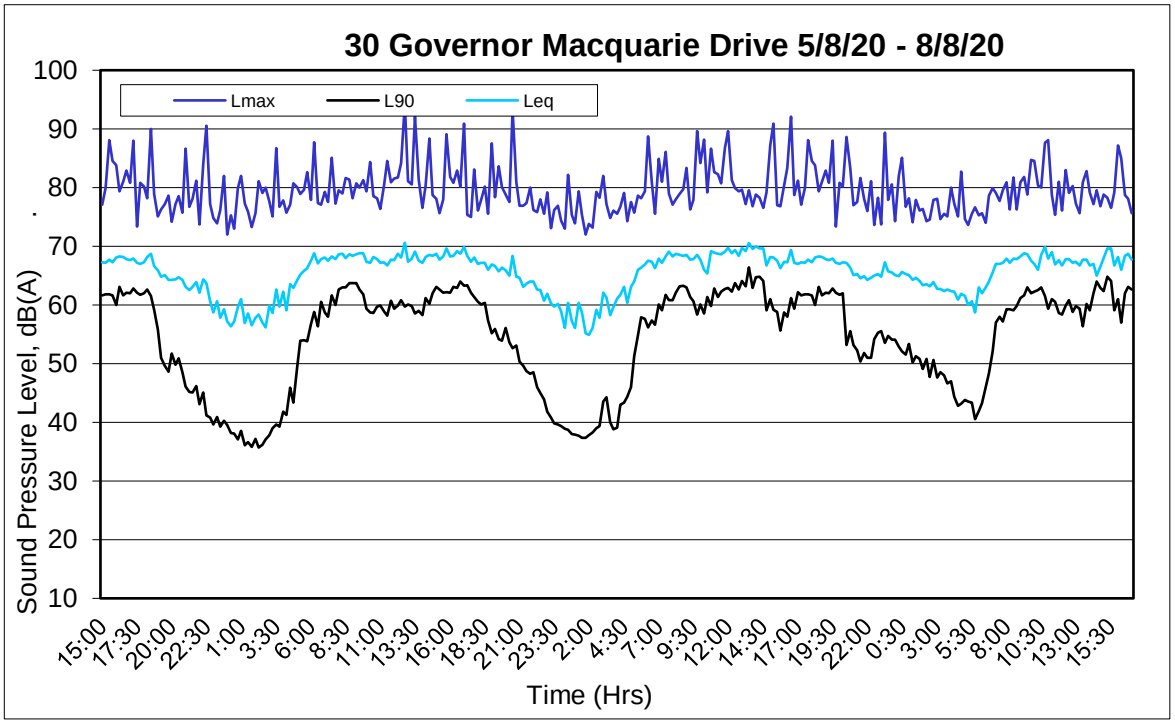
To ensure compliance with the criterion, it is recommended that where the construction machinery listed in Table 10 (or other potentially vibration inducing machinery or processes) is to be operated within 15m of an existing building vibration monitoring be undertaken during the first phases of the use of that machinery.

It is further recommended that, prior to any construction work being carried out, that consideration be given to undertaking a dilapidation survey be carried where the construction machinery listed above (or other potentially vibration inducing machinery or processes) is to be operated within 15m of an existing building.

APPENDIX A

NOISE LOGGER CHARTS





Logger Photo

Appendix 4

ABORIGINAL HERITAGE INFORMATION MANAGEMENT SYSTEM SEARCH

AHIMS Web Services (AWS)
Search Result

Purchase Order/Reference : 300239

Client Service ID : 522705

Stephanie Van Dissel

2 Bounty Close
Tuggerah New South Wales 2259

Attention: Stephanie Van Dissel

Email: stephaniev@adwjohnson.com.au

Date: 24 July 2020

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lat, Long From : -33.9296, 150.956 - Lat, Long To : -33.9221, 150.9678 with a Buffer of 0 meters, conducted by Stephanie Van Dissel on 24 July 2020.

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

A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

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

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

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

Important information about your AHIMS search

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

3 Marist Place, Parramatta NSW 2150
Locked Bag 5020 Parramatta NSW 2220
Tel: (02) 9585 6380 Fax: (02) 9873 8599

ABN 30 841 387 271
Email: ahims@environment.nsw.gov.au
Web: www.environment.nsw.gov.au

Appendix 5

CLAUSE 228 ASSESSMENT

Environmental Planning and Assessment Regulation 2000 - Assessment of Clause 228
a) Any environmental impact on a community.
Positive Impact/Permanent: The proposed works will benefit the community by providing a safer and more efficient traffic situation along GMD. Whilst some impacts are expected to the local traffic environment and access to commercial properties through the restriction of right turn movement, these are considered to be outweighed by the overall significant benefits listed above. A full assessment of benefits has been provided within Section 2 of the REF. **Minor Impacts/Temporary**: Minor constructional based impacts may be experienced by the local community; however, these are considered inconsequential given their temporary nature and would be managed through the safeguards proposed within Section 6 of the REF.
b) Any transformation of a locality.
Negligible: The proposed works will transform the arrangement of the existing GMD road corridor. The locality however, would generally remain the same.
c) Any environmental impact on the ecosystems of the locality.
No Impact/Permanent: The works area is clear of native vegetation and threatened species. The design of the works would avoid any tree removal. **Minor Impacts/Temporary**: Minor constructional based impacts may be experienced by the ecosystems of the locality; however, these are considered inconsequential given their temporary nature and would be managed through the safeguards proposed within Section 6 of the REF.
d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality.
Positive Impact/Permanent: The proposed works will result in improvements to the amenity and environmental quality of the locality through the introduction of landscaping along the proposed medians. It will also provide an improved pedestrian/cyclist experience along GMD through the introduction of shared pathways on each side of the road. **Minor Impacts/Temporary**: Minor constructional based impacts may occur to aesthetic, recreational, scientific and environmental quality of the locality; however, these are considered inconsequential given their temporary nature and would be managed through the safeguards proposed within Section 6 of the REF.
e) Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations.
Nil: The proposal would not have any adverse impacts on a locality, place or building with aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations. There are no known items of heritage or social significance at the locality. Environmental safeguards in Section 6 of the REF would be adopted to ensure that unexpected finds are managed appropriately.

f) Any impact on the habitat of protected fauna (within the meaning of the National Parks and Wildlife Act 1974)
Nil: The proposal would not impact on the habitat of any protected or endangered fauna.
g) Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air.
Nil: The proposal would not endanger any species of animal, plant or other form of life, whether living on land, in water or in the air as all the works would be contained within the road corridor, shoulder and reserve, and no tree removal would be required.
h) Any long-term effects on the environment.
Positive Impact/Permanent: The proposed works will provide a safer and more efficient traffic situation along GMD.
i) Any degradation of the quality of the environment.
Minor Impacts/Temporary: Minor constructional based impacts may temporarily degrade the quality of the environment; however, these are considered inconsequential given their temporary nature and would be managed through the safeguards proposed within Section 6 of the REF. **Positive Impact/Permanent**: The proposed works will improve the quality of the environment for the reason listed above and within Section 2 of the REF.
j) Any risk to the safety of the environment.
Minor Impacts/Temporary: Minor constructional based impacts may temporarily present a risk to the environment; however, these are considered inconsequential given their temporary nature and would be managed through the safeguards proposed within Section 6 of the REF. **Positive Impact/Permanent**: The proposed works will improve the safety of the traffic environment along GMD for the reason listed above and within Section 2 of the REF.
k) Any reduction in the range of beneficial uses of the environment.
Minor Impacts/Temporary: The proposal would cause a minor adjustment in the existing arrangement of the road at the site of the proposed works, as result of temporary disruption during construction, which would potentially increase travelling time for the road users in the short-term. These will be managed and reduced through the safeguards proposed within Section 6 of the REF. **Positive Impact/Permanent**: There would be no long-term reduction in the range of beneficial uses of the environment as a result of the proposed works, however the improved traffic safety and efficiency situation is considered to have a benefit to surrounding businesses.
l) Any pollution of the environment.
Minor Impacts/Temporary: Minor constructional based impacts may temporarily pollute the environment, in particular through noise, air quality and potential water degradation. These are considered inconsequential given their temporary nature and would be managed through the safeguards proposed within Section 6 of the REF.

m) Any environmental problems associated with the disposal of waste.
Nil: The construction stage will generate wastes which will be managed with specific measures provided within the CEMP. It is likely that the main waste will be excess dirt, weeds and other general construction-based waste. Waste will be disposed of at an appropriate facility or re-used where possible.
n) Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply.
Nil: Materials would be sourced locally where possible and it is unlikely that materials required are likely to become, in short supply.
o) Any cumulative environmental effect with other existing or likely future activities.
Minor Impacts/Temporary: Short term potential cumulative impacts associated with construction should other construction projects occur in the same locality at the same time. These are considered inconsequential given their temporary nature and would be managed through the safeguards proposed within Section 6 of the REF.
p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions.
Nil: The proposed works are not located within close proximity to any coastlines or areas potentially affected by climate change.