

Statement of Environmental Effects

Cargo Storage Facility, Mayfield



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Client: Port of Newcastle Operations Pty Ltd

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Abbreviations

Table 1 Abbreviations

Acronym	Abbreviation
AEP	Annual Exceedance Probability
CEMP	Construction Environmental Management Plan
CLM Act	<i>NSW Contaminated Land Management Act 1997</i>
CSMP	Contaminated Site Management Plan
DP&E	NSW Department of Planning and Environment
EP&A Act	<i>NSW Environmental Planning and Assessment Act 1979</i>
EPA	NSW Environment Protection Authority
EPBC Act	<i>Commonwealth Environment Protection and Biodiversity Conservation Act 1999</i>
EPL	Environment Protection Licence
HDC	Hunter Development Corporation
LEP	Local Environmental Plan
LHRS	Lower Hunter Regional Strategy
MCP	Mayfield Concept Plan
NCC	Newcastle City Council
NCIG	Newcastle Coal Infrastructure Group
NES	National Environmental Significance
NPC	Newcastle Port Corporation (former)
OEH	NSW Office of Environment and Heritage
OEMP	Operational Environmental Management Plan
OSOM	Oversize and/or Over mass
PMF	Probably Maximum Flood
POEO Act	<i>NSW Protection of the Environment Operations Act 1997</i>
PON	Port of Newcastle Operations
RMS	NSW Roads and Maritime Service
SEE	Statement of Environmental Effects
SEPP	State Environmental Planning Policy
SMS	Stormwater Management Strategy
TEU	Twenty-Foot Equivalent Unit
VOC	Volatile organic compounds

1.0 Introduction

1.1 Overview

This Statement of Environmental Effects (SEE) has been prepared by AECOM Australia Pty Ltd (AECOM) on behalf of the Port of Newcastle Operations Pty Ltd (PON) for the establishment and operation of an open air cargo storage facility (the Project) on part of the former BHP steelworks site at Mayfield, NSW.

PON has identified trade opportunities for the import of various types of cargos which are not suitable for import through traditional means, such as bulk handling or in containers. These cargos are typically large cargos requiring expansive handling areas due to their size. The proposed cargo storage area would be used for these large cargos on an as-needs basis by PON customers. The Project is permissible with consent pursuant to the relevant provisions of *State Environmental Planning Policy (Three Ports) 2013* (Three Ports SEPP).

1.2 Context of the Proposal

PON, and its predecessor, State Government owned Newcastle Port Corporation (NPC) have operated the Port of Newcastle as a commercial port focused on the movement and trade of goods. Most notably the Port of Newcastle is known for its trade in bulk commodity materials primarily coal. Coal currently makes up approximately 96% of trade through the Port annually. The Port of Newcastle is a major driver of economic activity for the Newcastle, NSW and Australia.

Whilst coal forms a major part of the Ports trade, a wide variety of other commodities and products are traded through the Port including alumina, grains, bulk fuels, mineral concentrates, steel, ammonium nitrate and fertilisers. Due to the availability of land adjacent to deep-water berths with access to a navigable channel, the Port has increasingly become a destination for break-bulk cargos that require significant landside space and ready access to state and national transport routes. For delivery of such cargos into NSW the Port provides advantages over alternative ports in NSW such as Port Botany which is space restricted and requires transport of such cargos through congested areas of the Sydney Metropolitan Area.

PON has therefore seen an increase in interest from parties looking to deliver project cargos in NSW. The Project therefore seeks to establish an area suitable for the receipt and temporary storage of such cargos prior to onward transport to their final destinations.

1.3 The Proponent

The Port of Newcastle is managed and developed by Port of Newcastle Investments (trading as PON) under a 98-year lease from the New South Wales Government which commenced on 30 May 2014. PON is responsible for various port functions including:

- Vessel scheduling;
- Trade development;
- Cruise ships;
- Dredging and survey, wharf and berth services;
- Planning and environmental management; and
- Property management, port development and maintenance of major port assets.

PON shareholders are, The Infrastructure Fund and China Merchants Group, each owning 50%. These shareholders have a strong, global track record in managing large infrastructure assets. PON is committed to the long-term development of the Port and works closely with stakeholders and employees to plan and bring to fruition projects such as the proposal.

The proponent of the Project is PON. PON would lease or license the site, or portions of it, to customers who are seeking to store project cargos in accordance with the requirements of PON and the recommendations of this SEE as applicable.

2.0 Project Area

2.1 Site Description

The area (the Site) for the proposed cargo storage facility is located within the suburb of Mayfield on the south arm of the Hunter River. The Site comprises:

- Part of Lot 45 DP 1191982; and
- Part of Lot 42, DP 1191982.

These lots have been leased to PON from its owner the Port of Newcastle Lessor Pty Ltd, a State owned Government entity.

This proposed cargo storage area is currently maintained as an existing hardstand area primarily within Lot 45 whilst access would be through Lot 42. This hardstand was installed following the completion of remediation works as described in **Section 2.2**. There are no other built structures or infrastructure within the Site.

Reference is made to **Figure 1** which shows the location of the site in a regional context and **Figure 2** which shows the existing site layout.

2.2 Site History

2.2.1 Steelworks Closure and Remediation

The BHP Steelworks operated on land with frontage to the south arm of the Hunter River from 1915 to 1999. In July 2002, ownership of that part of the former steelworks Site known as the Closure Area was transferred to the State Government. In March 2007, the Hunter Development Corporation (HDC) (formerly the Regional Land Management Corporation Pty Ltd) was created by the Government to manage the day-to-day activities of former BHP land and other Crown lands in the lower Hunter region, including remedial and redevelopment works for the Closure Area Site (SKM 2004).

On 14 June 2001, under former section 21 of the *Contaminated Land Management Act 1997* (CLM Act), the NSW Environment Protection Authority (EPA) declared the Closure Area Site to be a remediation site. A Remediation Action Plan was prepared by SKM (2004) to address legacy contamination issues associated with soils and groundwater. Voluntary Remediation Agreement No 26025 for the remediation of the Site was issued by the EPA on 30 August 2005. HDC undertook to fulfil these remediation commitments.

In March 2008, a Contaminated Site Management Plan (CSMP) for the Closure Area was prepared by HDC. The CSMP provided a common framework to be applied across the whole of the site for the design, implementation, completion, use and maintenance of remediation and project works. HDC completed the remediation works in two stages between 2008 and 2011. Following the completion of the remediation works, the Site was capped and returned to a hardstand area with minimal infrastructure in anticipation of future development for port and related industries.

Following a handover in ownership to the NPC, a Concept Plan application for the future strategic development of the former BHP steelworks site was approved by the Minister for Planning in July 2012. The Concept Plan Approval (09_0096) made provision for the future development of part of the former BHP steelworks site for a range of industrial and port related uses as described in **Section 2.2.2** below. A summary of surrounding developments in proximity to the Site either in or adjoining the Mayfield Concept Plan (MCP) area are detailed in **Section 2.2.3**.

2.2.2 Mayfield Concept Plan

Concept Plan (MP09_0096) was approved by the Minister under section 75M of the *Environmental Planning and Environment Act 1979* (EP&A Act) on 16 July 2012 to enable development within the remediated portion of the Closure Area. The MCP area covers 90 hectares of port-side land to be developed for land based port facilities serving a mix of cargo types. The Concept Plan also includes supporting road and rail infrastructure to service the port facilities.

2.2.3 Adjoining Development

The Site is surrounded by land which also forms part of the former BHP Steelworks and has been remediated. The surrounding land uses are described below.

North

To the immediate north of the site, and running parallel with the site northern boundary is the Koppers pipe gantry which provides a pipeline connection between BHP Berth No. 6 and the Koppers facility (located approximately 1km to the west). Beyond the Koppers gantry there is an additional 70m of hardstand beyond which lies the south arm of the Hunter River. The Hunter River is approximately 400m wide in this location. On the opposite side of the Hunter River, is coal loading facilities of the Newcastle Coal Infrastructure Group (NCIG).

South

To the immediate south of the proposed cargo storage area lies a vacant parcel of land known as the Intertrade Industrial Site and Intermodal Site which is managed by Property NSW. This area is predominately grassed open area with a sporadic tree covering. The southern section of the Intertrade site contains a number of buildings that were part of the former steelworks and are now primarily vacant. Various plans have been proposed for this site however there is currently no known plan for the redevelopment of this area.

East

To the east to the Site lies more open hardstand area that remains vacant following the completion of remediation works as described in **Section 2.2.1**, and Mayfield Berth No. 4.

Mayfield Berth No. 4 (M4) is located approximately 200m to the south-east of the proposed cargo storage area. M4 is a general purpose common user berth, is 265m in length and has an adjoining hardstand area on 10,000m². It is expected the large cargos being stored as part of the Project would be predominantly imported through M4.

M4 operates in accordance with the following development consent DA 293-08-00, as modified; and Environmental Protection Licence 13181 for shipping in bulk.

West

To the west of the site lies and then the Stolthaven Bulk Fuel terminal which currently stores approximately 130ML of combustible fuels. Beyond the fuel terminal is the OneSteel Industrial complex.



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3.0 Proposed Development

3.1 Overview of the Proposal

The Project is for the establishment and operation of an approximately 12 hectare open air cargo storage facility. The Project works are likely to include:

- Designation of a truck and vehicle parking area;
- Installation of an office and amenities building (if required by individual tenants); and
- Installation of temporary fencing or temporary lighting (if required by individual tenants) to delineate the area.

The Project would provide for the storage of a range of freight and cargo including (but not limited to) cargo such as:

- Wind turbine components;
- Large industrial and mining components;
- Luxury boats;
- Electrical transformers and related machinery;
- General cargo such as farm machinery, excavators, and construction machinery;
- Breakbulk such as steel or timber products; and
- Containerised cargo.

Freight would be unloaded via ship mounted cranes (ships gear) onto trucks at M4 berth or other berths within the Port, and transported to the storage area for unloading. Distribution of cargo would be via truck to its destination. Cargo may also be trucked from its point of origin, to the storage facility for consolidation and export via the M4 Berth or another berth within the Port. Whilst the site may be used for the storage of both incoming and outgoing cargos it is expected that the majority of cargos stored at the site would be stored for onward transport by road.

The Facility would operate 24 hours a day. Lighting would be installed on a temporary basis for night time operations. General day-to-day activities, such as moving or stacking of cargo is likely to occur during standard working hours. Plant and machinery to be used would include reach stackers and forklifts for unloading, moving, stacking and loading freight.

3.2 Proposed Site Operations

Due to the open nature of the site and the variable nature of the layouts different tenants may require to accommodate various cargos, this description of site operations is indicative only and has been developed by PON to represent how the site may typically operate. The following description of typical site operation has subsequently been used in the environmental assessment (refer **Section 7.0**) to determine the potential impact of the Project.

3.2.1 Site Layout

The site would generally remain in its current state (existing hardstand) while used for the storage of cargos. While the entire area has been nominated for potential storage of cargos, customers may lease or licence smaller portions of the Site as required by the type of cargos being transferred. While the final layout of the site would be subject to individual tenant requirements, a typical cargo storage operation would indicatively include:

- Jersey (concrete) barriers or similar used to define the Site and assist in the management of vehicle and plant movement. Individual tenants may utilise mobile lighting and security fencing around the perimeter of the Site (or portion of the Site in use) as required by individual security requirements. Security fencing would generally be temporary fencing erected for the period that

cargos are stored. A vehicular access point would be provided at the eastern end of the site to provide direct access to M4 and the internal road network;

- Amenities building. If an amenities building is required it would be placed near the proposed site entrance. Associated staff amenities may include portable toilets. Electricity would be provided to any amenities buildings with onsite generators; and
- Light vehicle parking for staff would be provided adjoining the amenities building. The size and layout of light vehicle parking area would be subject to the specific requirements of each tenant.

The Site layout would allow trucks to exit Industrial Drive onto George Street, then Selwyn Street, enter the site for loading and leave in a forward direction via the same route. Reference is made to **Figure 3** showing the typical site layout during a cargo storage operation.

3.2.2 Typical Operation

The following descriptions provide a summary of the process involved in a tenant obtaining approval from PON to operate from the Site:

- PON is contacted by a potential tenant who requires portside land for the storage of project cargoes following their unloading from ships, or prior to being loaded to ships for export;
- PON and tenant enter into a lease or licence agreement for the use of the cargo storage area;
- Tenants provide specific details of:
 - The required storage area (note not all tenants would use the entire storage area. This would be dependent on the size and nature of the cargoes);
 - The dates, times and duration which the tenants would require the storage area; and
 - Details of the proposed layout and use of the cargo area such as required barriers, security fencing, temporary/demountable buildings, staff amenities, parking, lighting.
- Tenants satisfy PON's lease or licence conditions and other requirements including the environmental management arrangements as detailed in this SEE and as required by the Mayfield Concept Plan conditions of approval where applicable.

Project Cargos

Project cargoes include, but are not limited to:

- Large pieces of mining or construction equipment, whether delivered to port whole or packages in component pieces for assemblage as its final destination; and
- Pieces of large equipment machinery or infrastructure for transport and installation as part of a separate project. E.g. windfarm components (blades, towers, turbines, nose cones and nacelles), tunnel construction components (tunnel boring machine parts etc.).

For clarity, the following cargoes generally fall outside of the types of cargo that could be stored at the site. PON does not propose to use the site for the storage of:

- Bulk commodities e.g. coal;
- Bulk liquids; and
- Roll-on roll-off.

Whilst the Project does generally not propose to use the site for containerised cargo it is noted that supporting components of project cargoes may include container elements. For example windfarm components may be accompanied by containers for the transportation of smaller supporting components.

The Project does not propose to use the storage area for any cargoes classified as dangerous or hazardous under the Australian Dangerous Goods Code. While M4 does currently accept cargoes of ammonium nitrate and combustible fuels, PON is not seeking approval to store these within the Site.

3.2.3 Staffing and Equipment

The total number of staff that may be required onsite at any given time would vary based on the tenant. The indicative staff numbers detailed in **Table 2** would be required during the various stages of cargo storage and transfer.

Table 2 Indicative Staff and Equipment Requirements

Project Stage	Staff
Cargo transfer (transfer of cargos from M4 or other berths to the Site)	<ul style="list-style-type: none"> • 5 x truck drivers (for transfer of cargo to the Site. • 6 x staff to manage loading and unloading of trucks/vehicles (reach stacker, boom lift or similar) • 2 x forklift operators • 1 x supervisor (light vehicle) • 1 x security (light vehicle)
Cargo storage	<ul style="list-style-type: none"> • 1 x security
Cargo transport (loading of trucks for transport of cargos from the Site to their destination)	<ul style="list-style-type: none"> • 1 x truck driver • 2 x forklift operators • 1 x supervisor • 1 x security

As detailed in **Table 2**, up to fifteen personnel may be required on site during operation. Staffing requirements peak around key events such as the arrival of a ship. Additional staff are required during ship unloading to allow for efficient unloading and to minimise time at berth. When the cargo is in storage a single security person would be required to monitor the cargo storage area. During cargo transport it is anticipated that trucks would enter the Site on a staggered basis for loading and then onward transport, therefore fewer staff would likely be required onsite.

In addition to the mobile plant listed in **Table 2**, other equipment may also be required by PON tenants including:

- Mobile lighting (day makers) for night works;
- Demountable or portable amenities or office building/shed;
- Portable generators;
- Portable toilets; and
- Lockable storage units for example a shipping container.

3.2.4 Operating Hours

Approval is being sought for operating the cargo storage facility 24 hour per day 7 days per week. This is necessary to allow the movement of large loads to be undertaken during night time hours as may be required by large load permits from the Roads and Maritime Service (RMS). These hours are consistent with the hours anticipated for future operations as part of the MCP, as well as the hours of operation of M4.

3.2.5 Transport and Access

Whilst the cargo storage facility could be utilised to store cargos bound for both import and export, it is anticipated that the facility would primarily be used for the temporary storage of cargos imported by ship prior to their onward transport by road to their required destinations. Generally cargos would be imported for storage at the site and then onward forwarding to sites in NSW however end point destinations may also occasionally be interstate.

Depending on the type of cargo, varying road based transport scenarios may eventuate. Based on discussions with potential tenants however PON consider that a worst case traffic scenario may be up to 100 trucks (200 truck movements) accessing the site per day. Due to the nature of the cargos, trucks would need to be progressively loaded before leaving site. This would mean that truck

movements would be staggered and are unlikely to be undertaken during a short concentrated period of time.

In the event that cargos require oversized vehicles for transportation, permits would be required from the RMS in accordance with the Oversize and/or Over mass (OSOM) vehicle permitting requirements, including:

- Having an RMS approved Traffic Management Plan in place;
- Having a signed, and RMS approved OSOM Load Declaration;
- Having the appropriate escort arrangements in place; and
- Meeting any specific requirements put in place by RMS as part of the permitting process.

In addition to the truck and large vehicle movements that may potentially be generated from the site light vehicles would also access the site on a daily basis during its use. Light vehicles would be used by staff and contractors. It is anticipated that up to 15 light vehicles (30 light vehicle movements) per day may be required.

Due to the proximity of the site to the rail line that traverses the MCP site there is also potential for tenants to transport cargos by rail. PON however considers use of rail to transport cargos associated with this Project as being unlikely. However, in order to allow assessment of potential worst case heavy vehicle movements, this SEE considers that all cargo will be transported by road.

3.2.6 Services

No service or utility connections are proposed as part of the Project. The site would remain as an open hardstand storage area. Should any tenants require power for demountable amenity buildings, lighting or other facilities, this would be provided by generators. Similarly any communications would be wireless as there are no established communications currently connected to the site. No water or waste water connections are proposed. If temporary amenities are required these will be supplied by tanked water brought to site with waste water held in temporary facilities (portable toilets) for subsequent removal by a licenced waste contractor.

As there would be no connections to any utilities or services as part of this Project, no further consideration of the MCP *Utilities Infrastructure Plan* (AECOM, 2015) is required.



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3.3 Need for the Proposal

Various industries such as the construction and mining industry are often required to import or export large pieces of equipment or machinery such as that described in **Section 3.2.2**.

In order to facilitate this, portside facilities such as the site, are required for the temporary storage of such cargos. These facilities require the following characteristics:

- Access to a deep water channel and berth;
- Access to a berth with landside design capacities to manage large and heavy loads;
- Available land adjoining the berth for use as a laydown area; and
- Connection to the arterial road network to enable land transportation.

The Mayfield location is able to satisfy all of these needs. It is therefore ideally suited for the land side storage and management of project cargos.

There is also an increasing demand in NSW for large cargos. This is driven by projects and industries including but not limited to:

- The growth of the wind power sector and the need to import related equipment and components. This generates the need of storage and laydowns areas site as the site to be made available;
- The ongoing operation of the mining sector particularly in the Hunter Valley; and
- The increase in large infrastructure projects in NSW including road and rail projects in Sydney and the Hunter region.

3.4 Consideration of Alternatives

3.4.1 Alternatives Ports

Potential alternative ports for the temporary storage of the proposed project cargos include:

- Sydney (Port Jackson or Port Botany);
- Port Kembla; and
- Port of Brisbane.

For the following reasons these ports are not considered to provide appropriate alternatives to the project for the following reasons:

- There are land availability constraints due to the large are of land required for the project cargos and the availability of such site at other ports;
- Transporting project cargos in metropolitan areas would cause issues with needing to transport project cargos through built-up and congested areas;
- Alternatives may be significant distances from end markets leading to potentially leading to increased transport costs.

3.4.2 Alternative Site

A number of alternative locations exist in and around the Port of Newcastle which could be used for the establishment of a cargo storage facility, for example at Carrington and on Kooragang Island. However, none of the alternative sites are able to provide the combination of access to a heavy lift berth and the deep-water channel, access to a significant area of established hardstand and access to key transport routes.

3.4.3 Do Nothing

The do nothing option would see the proposed cargo hardstand area use restricted to six months within a given year. As detailed in **Section 4.3.2**, pursuant to the provisions of the Three Ports SEPP, PON currently have the ability to utilise land for temporary purposes, such as the storage of certain

cargos, for a maximum of 182 day in any 12 month period, subject to meeting the requirement of the Three Ports SEPP.

Restricting such operations would not allow PON to meet the demand for the importation of project cargos which form an important economic driver for the State. It is therefore important that such a facility is available to manage this demand.

4.0 Statutory Planning

4.1 Local Matters

4.1.1 Newcastle Local Environmental Plan 2012

The site is located within the Newcastle local government area which is subject to the provisions of the *Newcastle Local Environmental Plan 2012* (LEP 2012). Despite this, the subject site is located within the Port of Newcastle Lease Area, as detailed in *State Environmental Planning Policy (Three Ports) 2013* (Three Ports SEPP). As the Three Ports SEPP applies to the port area, the LEP 2012 does not apply to the project and no further consideration of the LEP 2012 is required. Subsequently no further consideration of the Newcastle Development Control Plan 2012 is required.

4.2 Regional Matters

4.2.1 Hunter Regional Plan 2036

The Hunter Regional Plan 2036 was recently released by the Department of Planning and Environment (DP&E) to provide a vision to create a leading regional economy with a vibrant city at the heart. The Hunter Regional Plan 2036 provides a number of directions in regards to growing the local economy. The Project aligns with a number of these directions in particular Direction 2 – by enhancing global gateways to the Asia-pacific through providing enhanced import-export capabilities in the Port.

The Project also represents the use of available portside land for a port related development on a site that is specifically zoned for port related industries, in an existing industrially zoned area. The Project is therefore considered to be generally consistent with the Hunter Regional Plan 2036.

4.3 State Matters

4.3.1 Environmental Planning and Assessment Act 1979

The EP&A Act and the EP&A Regulation 2000 provide the framework for environmental planning in NSW and include provisions to ensure that proposals which have the potential to impact the environment are subject to detailed assessment and provide opportunity for public involvement. This development application would be assessed by DP&E under Part 4 of the Act.

Heads of Consideration

In determining the development application for a development under Part 4 of the EP&A Act, DP&E is required to consider the matters listed under section 79C. A summary of considerations under section 79C is provided in **Table 3**. Based on these considerations, the proposed facility is considered appropriate for approval.

Table 3 EP&A Act Section 79C Matters for Consideration

Head of Consideration	Consideration
The provision of any environmental planning instrument and any proposed instrument that is or has been the subject of public consultation.	The relevant provisions of applicable environmental planning instruments are considered in Section 4.0 . The proposal is generally consistent with the provisions of these instruments.
The provisions of any development control plan.	The Newcastle Development Control Plan is not applicable to this Project. Refer Section 4.1.1 .
The provisions of any planning agreement or draft planning agreement under section 93F.	No planning agreement or draft planning agreement is proposed under section 93F of the <i>Environmental Planning and Assessment Act 1979</i> .
The provisions of the <i>Environmental Planning and Assessment Regulation 2000</i>	In relation to the matters prescribed under clause 92 of the <i>Environmental Planning and Assessment Regulation 2000</i> , whilst the site is located within the coastal zone, by virtue for the site

Head of Consideration	Consideration
with respect to prescribed matters.	being located on port land within a working port many of the coastal policy requirements do not apply. The site is isolated from publically accessible foreshore areas and from areas of significant coastal environmental significance or sensitivity.
The likely impacts of the development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality.	Section 7.0 details the potential environmental impacts of the proposed facility and those mitigation measures proposed to minimise any impacts. The environmental impacts of the proposed development are considered acceptable and are able to be mitigated and managed within acceptable environmental and amenity limits.
The suitability of the site for the development.	The site is currently largely undeveloped. The site is zoned for port and industrial land uses and is surrounded by other industrial developments. There are no nearby sensitive receivers and the site is well serviced by road infrastructure.
Any submissions made in accordance with the <i>Environmental Assessment and Assessment Act 1979</i> .	If the development application is publically displayed and submissions received, the proponent would respond to any particular issues raised.
The public interest.	The proposal makes use of currently underutilised industrial land to support the storage of cargos used for projects that would support the local, regional and state economy, energy security and transport projects amongst others. It is therefore considered to be in the public interest.

Under the provisions of the EP&A Act there are a number of State Environmental Planning Policies (SEPPs) that may be considered relevant to the proposal. These are discussed in the following section.

4.3.2 State Environmental Planning Policies

State Environmental Planning Policies (Three Ports) 2013

Pursuant to the provision of the Three Ports SEPP the site is zoned SP1 Special Activities. As the Project is for the establishment and operation of a port facility for cargo storage it is permissible with consent in the SP1 zone. The Project is consistent with the zone objectives as it is for a cargo and freight premises that benefits from being located in close proximity to port facilities and transport routes.

Pursuant to clause 8 of the Three Ports SEPP the Minister is the consent authority for development on land within the Port lease area. Therefore the Minister would be the consent authority for this Project.

It is noted that pursuant to clause 35 Schedule 1, exempt development provides PON with the opportunity to temporarily use land, including for uses as proposed by this Project, for a period of 182 days (whether or not consecutive days) in any 12 month period. Whilst the total number of days for which the proposed cargo storage area would be utilised per year is not currently known, PON is seeking this approval should the need to use the proposed cargo storage area exceed 182 days per year.

State Environmental Planning Policies (SEPP) 55 – Remediation of Land

SEPP 55 provides a state-wide planning approach for the remediation of contaminated land. Clause 7 of the SEPP requires a consent authority to consider whether the land is contaminated and whether it is suitable (or can be made suitable) for the proposed development.

As detailed in **Section 2.2.1**, the Site has been subject to remediation works and following these works the site was capped. The Project does not propose to undertake any intrusive ground works or activities that would jeopardise the integrity of the capping.

State Environmental Planning Policies (SEPP) 33 – Hazardous and Offensive Development

SEPP 33 was designed to ensure that sufficient information is provided to consent authorities to determine whether a development is hazardous or offensive. Conditions can then be imposed on the development to reduce or minimise adverse impacts.

The proposed activities undertaken on the site are neither hazardous nor offensive as defined in the SEPP. Furthermore the Project does not propose to store potentially hazardous cargos or classified dangerous good as defined by the Australian Dangerous Good Code. Therefore SEPP 33 does not apply to this development.

State Environmental Planning Policy 71 – Coastal Protection (SEPP 71)

The Project would be located within the coastal zone as defined by SEPP 71 which makes provision regarding protection of coastal attributes, protection of natural and cultural heritage elements, coastal environmental protection, and the retention of foreshore public access. Clause 8 of the SEPP provides matters for consideration to be taken into account by a consent authority when determining an application to carry out development. As the Project would not impact on any coastal features, or access to these features, and as the Site and adjacent port land is not publically accessible, no further consideration of SEPP 71 is required.

4.3.3 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) prohibits any person from causing pollution of waters or air and provides for penalties for air, water and noise pollution offences. Schedule 1 of the POEO Act identifies 'scheduled activities' that are required to be licensed by the Office of Environment and Heritage (OEH).

PON currently operates M4 in accordance with Environment Protection Licence (EPL) 13181 for the scheduled activity *shipping in bulk*. Whilst M4 does not form part of the Site, cargos being stored in the Site would likely be imported, or possibly exported, through M4 in accordance with the requirements of EPL 13181. PON may also utilise other berth facilities within the Port of Newcastle for h transfer of cargos.

PON does not propose to undertake any activity as part of this Project that:

- Would be classified as a new scheduled activity; or
- Would exceed the scheduled activity thresholds as detailed in EPL 13181.

The storage of cargos within the proposed storage area does not represent a scheduled activity under the POEO Act and therefore no site specific EPL is required by the Project.

4.4 Commonwealth Matters

4.4.1 Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) requires the approval of the Commonwealth Minister Environment and Energy for actions that may have a significant impact on matters of National Environmental Significance (NES). Approval from the Commonwealth Minister is in addition to any approvals under NSW legislation.

The EPBC Act also provides for the identification, conservation and protection of places of national heritage significance and provides for the management of Commonwealth heritage places. The Act also establishes the Australian Heritage Council.

The EPBC Act lists eight matters of NES that must be addressed when assessing the environmental impacts of a proposal. These matters are:

- World heritage properties;
- National heritage places;
- Ramsar wetlands of international significance;
- Threatened species and ecological communities;

- Migratory species;
- Nuclear actions (including uranium mining);
- Commonwealth marine areas;
- Great Barrier Reef Marine Park; and
- A water resource in relation to coal seam gas development and large coal mining development.

Other matters protected under the EPBC Act include the protection of the environment where proposed activities are located on Commonwealth land. The Project would not impact on any matters NES matters and is not located on Commonwealth land. Therefore no further consideration of the EPBC Act is considered necessary.

4.5 Mayfield Concept Plan Approval 09_0096

The MCP (as modified) was approved under Part 3A (now repealed) of the EP&A Act by the Minister for Planning on 16 July 2012.

The SEE for the Project should address all relevant requirements of the MCP approval, specifically the conditions listed in **Table 4**.

Table 4 Relevant Conditions of the Mayfield Concept Plan

Condition	Response
2.1 Under section 75P(2)(c) of the Act, the following environmental assessment requirements apply with respect to future development that is subject to Part 4 (other than complying development) or Part 5 of the Act:	-
2.1 (c)	
c. details of the consultation process and outcomes with relevant stakeholders, including with (but not limited to):	-
i. Government authorities, such as DP&I, OEH, EPA, DPI, Transport for NSW, HDC and Council;	Refer to Section 5.0 . Consultation with DP&E and Council undertaken. Given the nature of the proposed activities, consultation with other listed authorities not deemed relevant.
ii. Service and infrastructure providers, such as ARTC, RMS, RailCorp, Ausgrid, Hunter Water Corporation and Jemena;	Refer to Section 5.0 . Consultation with RMS undertaken. Given the nature of the proposed activities, consultation with other listed infrastructure providers not deemed relevant.
iii. Special interest groups and the public, including adjoining and affected landowners;	PON has consulted with community members who have registered their interest in developments proposed within the Concept Plan Area and its Community Liaison Group which includes members of a range of specialist interest and residents groups. PON is the only directly impacted landowner as lessee of the Port.
2.1 (d)	
d. an updated environmental assessment of relevant statutory matters and Issue Specific requirements for construction and operation (including cumulative impacts of existing and approved development on the site and on adjoining sites) and the identification of relevant avoidance, mitigation and management measures to address associated impacts.	This SEE has been prepared to fulfil this requirement: <ul style="list-style-type: none"> • Construction and operation – refer Section 3.0; • Cumulative impacts – refer Section 7.6; and • Mitigation measures – refer Section 8.0.

Condition	Response
2.1 (e)	
e. a Transport Assessment that assesses the transport, access and traffic impacts from projects associated with this Concept Plan. The assessment shall:	-
i. consider the transport limits and objectives of the Concept Plan, including the objective of not exceeding the total truck movement limits identified in requirement 2.3 (Table 3);	Refer to Section 7.1 . Due to the limited level of development currently on the MCP Area the identified truck movement limits are not exceeded.
ii. consider freight volume forecasts and transport demand;	Refer to Section 7.1 .
iii. consider the Transport Infrastructure Strategy (if required) and identified infrastructure, service improvements or management measures (if identified);	Traffic does not currently exceed the thresholds listed in Table 2 of the Concept Plan approval that trigger the requirement for a Transport Infrastructure Strategy to be prepared and implemented. As detailed in Section 7.1 the Project would not trigger the exceedance of these thresholds.
iv. consider the traffic performance and functionality of the local, regional and State road network and site access, including the consideration of development within the vicinity of the Concept Plan site (including connecting road networks) and the cumulative impacts from adjoining development;	Refer to Section 7.1 .
v. consider rail impacts associated with the project, including: network capacity and the availability of rail access and paths, rail operations on the Port Waratah and Bullock Island loops, and rail access and interface agreements;	Whilst it is possible that some tenants may wish to transfer cargo by rail it is anticipated that road transport would typically be used in the majority of situations. Any rail traffic potentially generated by the Project would be minimal and likely to have a negligible impact on rail network capacity.
vi. consider the Transport Monitoring and Review results undertaken as a requirement of this approval;	Refer to Section 7.1 .
vii. identify rail and road infrastructure requirements, including those specified in this approval and the corresponding exceptions;	Refer to Section 7.1 .
viii. identify traffic management measures consistent with the requirements of the Traffic Management Plan required under this approval;	Refer to Section 7.1 .
ix. identify rail service and infrastructure changes and upgrades, and initiatives to facilitate an increased rail share of freight movements;	No rail infrastructure changes or upgrades would be generated by or required as a result of the Project.
x. consider construction traffic routes and associated traffic impacts, including capacity constraints, changes to access and safety impacts; and	Refer to Section 7.1 .
xi. include consideration of relevant road and rail design standards including but not limited to Austroads Guide to Road	No road or rail infrastructure is proposed to be constructed as part of this Project.

Condition	Response
Design 2009 (with RMS supplements) , Australian Standards, and Newcastle Development Control Plan 2005 – Element 4.11 (Subdivision).	

Where relevant, the various management plans prepared by PON in response to the requirements of the MCP Approval conditions are addressed in **Section 7.0** of this SEE.

5.0 Consultation

5.1 Department of Planning and Environment

PON briefed representatives from DP&E regarding the Project on 25 August 2016. The key points discussed were:

- PON provided DP&E with a detailed description of the Project as provided in **Section 3.0** of this report; and
- DP&E advised that the development application would need to be accompanied by an SEE (this document) that would need to address the following:
 - Detail potential environmental impacts and proposed mitigation measures (Refer **Section 7.0**); and
 - Address the relevant requirements of the MCP approval in particular the specific requirements as detailed in conditions 2.1(d) – (e), including assessments in regards to noise and vibration, traffic and transport, surface water and drainage (Refer **Section 7.0**).
- DP&E indicated that an appropriate level of stakeholder consultation would be required pursuant to the requirements of Condition 2.1(c) of the MCP approval, including consultation with the following agencies:
 - RMS (refer **Section 5.2**);
 - Newcastle City Council (Refer **Section 5.3**); and
 - PON's Community Liaison Group (Refer **Section 5.4**).

PON would continue to consult with DP&E during the assessment and determination of the Project.

5.2 Roads and Maritime Service

PON met with the RMS on 29 September 2016 to provide a Project briefing and allow RMS an opportunity to provide feedback for incorporation into the SEE. The key points of the discussion are outlined below.

In response to queries from RMS PON confirmed that:

- The storage area would principally be used for the storage of various types of project cargos, for example wind turbine components;
- The proposed development would utilise the internal M4 Berth Access Road and Selwyn Street, entering Industrial Drive at the George Street / Industrial Drive intersection. The development would not require any new or re-opening of dormant access points onto Industrial Road, or the alteration of any road or access infrastructure;
- The proposed storage area would not preclude the development of an internal link road between Ingall and Selwyn Streets in the future as required by Condition 2.6 of the MCP approval, as no permanent structures are proposed. Temporary fencing, lighting and amenities may be installed as required;
- The Traffic Assessment being prepared to accompany the DA should include consideration traffic generated by existing development e.g. existing M4, port traffic; and
- There would be no change required to current traffic light phasing to accommodate additional industrial traffic entering Industrial Drive from George Street.

Reference is made to **Section 7.1** which summarises the finding of the Traffic Impact Assessment and incorporates consideration of the points raised by the RMS.

5.3 Newcastle City Council

PON met with representatives from Newcastle City Council (NCC) on Thursday 15th September 2016. At this meeting PON provided a briefing of the Project. At the conclusion of the meeting PON offered Council with the opportunity to send any questions or comments to PON for consideration in the preparation of the SEE. No further feedback was received from NCC prior to the finalisation of this SEE.

5.4 Community

PON has utilised its established community consultation forums to update the local community regarding the proposed use of the site for large project cargos. PON also sends out regular quarterly updates to members of the community who have indicated their interest in proposed developments within the Mayfield Concept Plan area. In the latest quarterly updated, issued in October 2016, PON provided details of the proposed Project and contact details for any feedback and queries. No questions or feedback had been received at the date of this SEE's completion.

PON also operates a community enquiry hotline (02) 4908 8200 and has a community enquiry service on the PON Website. Community members can contact PON through these avenues should they have any questions about the Project.

6.0 Prioritisation of Issues

An assessment of potential environmental impacts associated with the Project has been undertaken based on existing data and knowledge of the site and preliminary desktop investigations. A risk analysis was undertaken to rank these issues according to the level of environmental risk or potential impact to the community. This was then used to inform the appropriate level of impact assessment undertaken in **Section 7.0**.

6.1 Risk Matrix

Potential impacts are ranked according to the risk matrix (refer to **Table 5**) as being High, Medium, Low or Very Low (negligible) risk to the environment. This risk assessment has been undertaken by undertaking a high level review of the potential unmitigated impacts of the project, therefore likelihood of occurrence and the consequences if they occurred. This rating is then used to determine the level of assessment for each environmental aspect.

Potential Consequences:

1. Broad scale environmental impact;
2. Regional environmental impact;
3. Local environmental impact;
4. Minor environmental impact; and
5. Insignificant environmental impact.

Likelihood of adverse impact:

- a. Almost certain;
- b. Likely;
- c. Possible;
- d. Unlikely; and
- e. Rare.

Table 5 Risk Matrix

		Likelihood of adverse impact				
		A	B	C	D	E
Potential Consequence	1	High	High	Medium	Low	Very Low
	2	High	High	Medium	Low	Very Low
	3	Medium	Medium	Medium	Low	Very Low
	4	Low	Low	Low	Low	Very Low
	5	Very Low	Very Low	Very Low	Very Low	Very Low

6.2 Risk Analysis

The rating and prioritisation of potential environmental effects related to the proposed project is provided in **Table 6**.

This rating allows the prioritisation of issues for assessment and does not consider the application of mitigation measures to manage environmental effects. In all cases, appropriate and proven mitigation measures would be used to minimise and manage potential impacts identified in this risk analyses. These measures are described throughout **Section 7.0** of this SEE.

Table 6 Project Risk Assessment

Environmental Aspect	Potential Environmental Issue	Consequence	Likelihood	Rating
Traffic	Traffic impacts on the road network due to truck movements generated the Project.	3	C	Medium
Noise	Noise impacts including noise generated during 24hour operations.	3	C	Medium
Surface Water	Impact to the Hunter River as a result of spills, leaks or other discharge of any materials to the catchment.	4	D	Low
Air Quality	Vehicle emissions during operation and potential for dust generation.	4	D	Low
Waste Management	Waste generation, management and disposal.	4	E	Very Low
Visual and Lighting	Visual impact and potential light spill from temporary lighting.	4	E	Very Low
Social and Economic	Impacts on the local community due to the operation of the site and potential flow on economic impact.	4	E	Very Low
Aviation Safety	The impact of cranes or other tall equipment.	5	E	Very Low

6.3 Key Matters

Based on the risk analysis presented above, the key factors and aspects requiring more detailed assessment within this SEE include:

- Traffic;
- Noise;
- Surface Water; and
- Air Quality.

Environmental aspects identified as having a medium to low potential of impacts are addressed in **Sections 7.1 to 7.4**. Other aspects predicted to have a very low impact are addressed in **Section 7.5**.

7.0 Environmental Impact Assessment

7.1 Traffic

7.1.1 Background

The site is situated east of Industrial Drive with vehicular access provided via a private road network from Selwyn Street, as shown in **Figure 4**.

The only traffic currently generated from PON land in the vicinity of the site is associated with the operation of Mayfield Berth No. 4 (M4). M4 is used for the periodic importation of a range of cargos including Project cargos, bulk liquids. Some other minor traffic is also generated on Selwyn Street by Port Waratah Coal Services (PWCS) who can use this street to access their own berthing operations to the south. It is noted however that the primary access for the PWCS Carrington Terminal is through Port Waratah Drive from Carrington therefore the majority of PWCS traffic does not travel on Selwyn Street.

The only other operation currently generating traffic movements from the MCP area is Stolthaven which is access via the Industrial Drive and Ingall Street intersection and Steelworks Road.

The strategic road network surrounding the site includes the following key elements as detailed on **Figure 4**:

Industrial Drive

Industrial Drive is a major four-lane, divided, classified road providing connections to the A1 Pacific Highway and to the wider classified road network. It is used as a major link between Maitland and Newcastle CBD providing access to the Honeysuckle Precinct and is the preferred alternative to the A1 Pacific Highway for southbound traffic. Industrial Drive is a B-Double approved vehicle route signed at 80km/h south bound and 70km/h north bound from the intersection with George Street. The road also operates as a public transport corridor for Bus Routes 104 and 118.

Tourle Street

Tourle Street is the continuation of Cormorant Road over the south arm of the Hunter River. Tourle Street provides a direct route between Newcastle, the industrial area and port facilities on Kooragang Island, Newcastle Airport (Williamstown) and Port Stephens. The new Tourle Street Bridge opened in May 2009, and consists of one lane in each direction, with 2m shoulders. Tourle Street has a speed limit of 60km/h in both directions. RMS is currently duplicating Tourle Street, between Industrial Drive and Egret Street on Kooragang Island. This includes construction of a second bridge over the Hunter River. Construction started in May 2016 and is expected to be completed in late 2018.

Selwyn Street

Selwyn Street is the local road connecting to George Street and provides access to the private roads within the PON site. It is a two-lane undivided road with a sign posted speed limit of 50 km/h. Selwyn Street is a B-Double approved vehicle route.

George Street

George Street is a four lane road with two traffic lanes and two parking lanes. To the east of the intersection George Street provides a link between Industrial Drive and Selwyn Street, which provides access to the private roads within the PON site.

Mayfield Concept Plan Area

The MCP anticipated a range of land uses would be developed across the Concept Plan area as detailed in **Section 2.2.2**. Traffic assessments undertaken as part of the Concept Plan development reviewed the potential impacts of traffic emanating from various developments within the Concept Plan would use the following primary access points being:

- The George Street and Industrial Drive Intersection in the south; and
- The Ingall Street and Industrial Drive Intersection in the north.

The southern portion of the MCP area in which the Project area is situated, is accessed via Selwyn Street which intersects at a signalised four-way intersection with Industrial Drive via George Street. Selwyn Street is owned and maintained by Newcastle City Council. From the eastern end of Selwyn Street PON operates an internal access road which provides access to M4 and the Project Area.

Currently, traffic on the internal PON access road and Selwyn Street is limited to traffic as may be generated from time to time by ships dropping cargo at M4. Vehicles accessing the PWCS operations at the Carrington Berths can also do so via Selwyn Street.

To date the only development that has been established on the MCP area is the Stolthaven Bulk Fuel Terminal. Traffic generated from Stolthaven's operation accesses the road network via the Ingall Street intersection with Industrial Drive and therefore does not interact with traffic from M4 or traffic on Selwyn Street.

As previously described, the Site is currently not in use therefore no traffic is currently generated from the project area.

Mayfield Concept Approval Requirements

Under the provisions of the MCP, PON has prepared the following documents:

- Condition 2.5: The MCP Traffic Management Plan (TMP) provides a framework for the coordinated management of traffic travel to and from within the site. This TMP is applicable to the Project since the site lies within the Mayfield Port Precinct; and
- Condition 2.10: The MCP Traffic Monitoring and Review Plan (TMRP) demonstrate how PON will meet the monitoring and review obligations, as identified in the conditions of consent. This TMRP will enable any non-compliance with the operational MCP TMP to be monitored, reported on and corrective actions undertaken.

All operations within the MCP area need to be operated in accordance with these documents.

Peak Hour Traffic Volumes

In order to establish background traffic level at the key intersection of Industrial Drive/ George Street, intersection counts were undertaken between 6am – 9am and 4pm – 6pm on 15 September 2016. This date is considered representative as it falls during a typical week day (Tuesday, Wednesday, Thursday) and does not occur on a public holiday or within the NSW school holiday periods. The full intersection counts can be found in **Appendix A**.

Analysis of the intersection counts showed the AM peak hour occurred between 7:45am – 8:45am and the PM peak hour occurred between 4:30pm – 5:30pm. A summary of turning movements at the signalised intersection during the AM and PM peak hour is shown in **Appendix A**.

Background Traffic Growth

Intersection counts at Industrial Drive / Ingall Street were conducted in 2012 as part of the Traffic Assessment produced by AECOM to support the Stolthaven Bulk Liquids Storage Facility modification. This Traffic Assessment is publically available on the DP&E Major Projects website. The intersection is located approximately 900m north of Industrial Drive / George Street.

A comparison between traffic volumes along Industrial Drive based on the intersection counts at Industrial Drive / Ingall Street (2012) and Industrial Drive / George Street (2016) was undertaken to determine a current annual growth rate. **Table 7** shows the westbound and eastbound traffic volumes along Industrial Drive.

Table 7 Annual Traffic Growth Rate on Industrial Drive

Peak period	Intersection counts – Year		Annual Growth Rate (2012 - 2016)
	2012	2016	
AM Peak	2,689	2,904	1.9%
PM Peak	2,675	2,937	2.4%

The data shows that between 2012 and 2016, there was an average yearly growth of 1.9 per cent and 2.4 per cent for the AM and PM peak periods respectively. To be conservative, the average annual growth rates determined by these intersection count comparisons were used to establish background traffic growth rates as part of this assessment. This is in comparison to the MCP Environmental Assessment which assumed a background annual traffic growth of 1%.

Current Intersection Performance

The existing intersection was modelled in SIDRA 7.0 as an at-grade signalised intersection. **Table 8** provides a summary of the intersection analysis for both AM and PM peak, while detailed outputs are provided in **Appendix A**.

Table 8 2016 Existing Traffic – Intersection Performance Summary

	Volume (veh/h)	Level of Service	Degree of Saturation	Average Delay (s)	95% back of queue (m)
2016 AM Peak					
Industrial Drive (S)	1,250	B	0.532	15.2	143
George Street (E)	40	D	0.131	45.0	11
Industrial Drive (N)	1,682	B	0.732	19.0	227
George Street (W)	218	D	0.591	49.1	54
Total	3,190	B	0.732	19.9	227
2016 PM Peak					
Industrial Drive (S)	1,737	A	0.629	10.7	188
George Street (E)	55	E	0.257	58.4	12
Industrial Drive (N)	1,227	A	0.441	10.1	108
George Street (W)	139	E	0.621	60.4	36
Total	3,158	A	0.629	13.5	188

Source: AECOM, 2016

The SIDRA modelling indicates the existing intersection operates at a satisfactory level at LoS B and LoS A during the AM and PM peak hour periods respectively, with minimal queuing and delays experienced. There is a significant amount of spare capacity at the intersection which will allow for additional traffic generated by the Project. Queues experienced along Industrial Drive does not impede upon nearby intersections.



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7.1.2 Impact Assessment

The Project is expected to generate additional traffic of up to 100 heavy vehicles (200 heavy vehicle movements) per day. For the purpose of this assessment it was assumed that 75 per cent of the traffic would occur during the daytime period of 7am - 6pm. Assuming a consistent profile, this results in seven heavy vehicles per hour (or 14 heavy vehicle movements per hour).

Based on the worst case scenario of an additional 15 employees on site during the peak periods, this equates to an additional 15 light vehicles moving to and from the site per day. That is 30 light vehicle movements.

In order to quantify time of day and direction of travel of these vehicles for the purposes of assessing the potential impact of the Project, the following trip distribution and assumptions were made:

- 7 Heavy vehicles – move in and out of the site within each peak hour;
- 50 per cent of light vehicle trips travel to / from the north and 50 per cent to / from the south along Industrial Drive; and
- 75 per cent of heavy vehicle trips travel to / from the north and 25 per cent to / from the south along Industrial Drive.

It was assumed operation would commence in 2017. The growth rate of 1.94 and 2.4 per cent per annum during the AM and PM peak hour respectively was applied to turning movements at the intersection to forecast traffic volumes at the intersection under to scenarios:

- 2017 – Year one operational scenario; and
- 2027 – Year ten operational scenario.

The results of each of these scenarios are detailed below.

Traffic Modelling

In order to assess the performance of the Industrial Drive/ George Street intersection SIDRA Intersection 7.0, a computer-based modelling package designed for calculating isolated intersection performance was used. The performance indicators for SIDRA 7.0 applicable to the Project are:

- Degree of Saturation (DoS) – measure of the ratio between traffic volumes and capacity of the intersection is used to measure the performance of isolated intersections. As DoS approaches 1.0, both queue length and delays increase rapidly. Satisfactory operations usually occur with a DoS of less than 0.9; and
- Average Delay – duration, in seconds, of the average vehicle waiting at an intersection, which corresponds to the Level of Service (LoS) – a measure of the overall performance of the intersection.

Further details regarding these performance measures are described in Section 3.2.4 of **Appendix A**.

Scenario 1 – First Year of Operation

The forecast 2017 traffic volumes at the intersection are shown in **Table 9**.

Table 9 2017 Operational Traffic – Intersection Performance Summary

Approach	Volume (veh/h)	Level of Service	Degree of Saturation	Average Delay (s)	95% back of queue (m)
2017 AM Peak with Project					
Industrial Drive (S)	1,284	B	0.543	15.7	148
George Street (E)	54	D	0.213	47.0	19
Industrial Drive (N)	1,733	B	0.753	19.2	231
George Street (W)	222	D	0.612	49.4	56
Total	3,293	B	0.753	20.3	231

Approach	Volume (veh/h)	Level of Service	Degree of Saturation	Average Delay (s)	95% back of queue (m)
2017 PM Peak with Project					
Industrial Drive (S)	1,781	A	0.645	10.9	197
George Street (E)	85	E	0.489	60.6	25
Industrial Drive (N)	1,268	A	0.453	10.2	112
George Street (W)	142	E	0.676	61.1	37
Total	3,276	A	0.676	14.1	197

Source: AECOM, 2016

The SIDRA modelling indicates that when additional traffic as a result of the Project is included, the intersection would perform at LoS B and LoS A during the AM and PM peak hour periods respectively. The DoS, queue lengths and average delay of the intersection are comparable with existing conditions as detail in **Table 8**. These results indicate that the Project traffic is likely to have a minimal impact on the intersection's operation.

The performance of the George Street (E) approach, which provides access to Selwyn Street, during the AM and PM peak, is comparable to the existing conditions. Queue lengths experienced on this approach does not impact the adjacent intersection of George Street / Selwyn Street.

Scenario 2 – Ten Years of Operation

In accordance with RMS requirements, a 10 year after opening scenario was tested. The same annual growth rate identified for the 2017 scenario was applied to generate background traffic at the intersection of Industrial Drive / George Street in 2027.

The performance summary of the intersection is shown in **Table 10**, with detailed outputs provided in **Appendix A**.

Table 10 2027 Operational Traffic – Intersection Performance Summary

Approach	Volume (veh/h)	Level of Service	Degree of Saturation	Average Delay (s)	95% back of queue (m)
2027 AM Peak with Project					
Industrial Drive (S)	1,554	B	0.667	17.1	204
George Street (E)	64	D	0.264	47.7	22
Industrial Drive (N)	2,096	C	0.915	36.0	412
George Street (W)	270	D	0.750	52.4	72
Total	3,984	C	0.915	29.9	412
2027 PM Peak with Project					
Industrial Drive (S)	2,247	A	0.827	13.4	320
George Street (E)	100	E	0.618	61.6	29
Industrial Drive (N)	1,598	A	0.590	11.4	161
George Street (W)	180	E	0.885	66.5	51
Total	4,125	B	0.885	16.1	320

The modelling indicates that 10 years after commencement of the Project, the intersection performs at a satisfactory LoS, operating at LoS C and LoS B during the AM and PM peak hour respectively. The intersection experiences increases in DoS, average delay and queue lengths along Industrial Drive, however the overall performance of the intersection is acceptable.

The performance of the George Street (East) approach, which provides access to Selwyn Street, during the AM and PM peak, is comparable to the existing conditions. Queue lengths experienced on this approach do not impact the adjacent intersection of George Street / Selwyn Street and are a result of background through traffic and not the Project.

When considering future traffic growth and potential impacts on Selwyn Street, due to the existing low levels of traffic, impacts on the mid-block capacity of these roads as a result of the Project is expected to be minimal.

Mayfield Concept Plan

As a result of the conditions of consent for the MCP approval, PON has prepared the following plans, which are required to be taken into consideration:

- MCP Traffic Management Plan (TMP) (AECOM, 2016); and
- MCP Traffic Monitoring and Review Plan (TMRP) (AECOM, 2016).

Measures of the TMP to be implemented by all Projects are discussed below:

- Restricting heavy vehicles to approved routes;
- Minimising truck movements during peak hours; and
- Reporting of truck movement numbers to PON by tenants.

The MCP also makes provision in Condition 2.3 for additional traffic monitoring to be implemented when total daily truck movements exceed 1,268 per day. The Project (200 movements per day) and the only other operation in the MCP area, Stolthaven (368 movement per day) equate to a total of 568 truck movement per day when operating at full capacity. This is well under the 1,268 threshold therefore no additional traffic monitoring or reporting is triggered by the Project. Again it should be acknowledged that M4 does not form part of this daily movement quota.

Again it should be noted that both Projects would use separate intersections to access Industrial Drive minimising potential for cumulative impacts at these intersections.

7.1.3 Conclusion

Conservatively, the Project has the potential to generate up to 200 additional heavy vehicle movements and 30 light vehicle movements per day. Intersection modelling indicates the Project would have a negligible impact on the future operation of the Industrial Drive and Selwyn Street intersection, performing similarly to existing conditions. As a result, no intersection upgrades would be required for the Industrial Drive/ George Street intersection. Similarly no triggering of the Transport Infrastructure Strategy as per Condition 2.4 of the MCP approach would be required as even with the Project operating, the cumulative total daily number of truck movements from the MCP would be below the trigger level.

There would be no interaction with existing traffic from within the MCP, notably from the Stolthaven Bulk Fuel Terminal as access to that operation is via a separate access point at Ingall Street.

The PON existing traffic management practices are considered suitable to continue managing operational traffic associated with the Project. Traffic management measures would be incorporated into an Operational Environmental Management Plan (OEMP) for the Project. This OEMP would include consideration of the requirements of the MCP *Traffic Management Plan* where applicable, including:

- Minimising heavy vehicle movements during peak times;
- Restricting heavy vehicle movements to approved routes and preventing movements through residential areas;
- Preventing heavy vehicle movements on residential streets; and
- Require that the appropriate permits are obtained for the haulage of oversized or over mass loads and that the requirements of these permits (e.g. vehicle escorts) are fully implemented.

PON's ongoing operation of the MCP *Traffic Monitoring and Review Plan* would also need to include details of the number of truck movements generated by each tenant to meet the monitoring and reporting requirements of the MCP approval.

7.2 Noise

7.2.1 Background

Existing Site Conditions

The Site is currently an empty hardstand area. There is currently no noise produced from the site. Despite this, the Site is situated in an area where the noise environment is dominated by industrial, transport and port related land uses. Surrounding land uses with the potential to generate noise includes:

- M4 – Ship and land transport generated noise;
- Stolthaven – truck and pump noise;
- Industrial Drive – traffic noise; and
- PWCS – Rail and bulk cargo handling noise.

Existing Mayfield Concept Plan Area Conditions

As the site is sited within the MCP area, consideration of the existing MCP noise environment, the previous MCP noise assessment and management requirements of the MCP approval are required. Currently the only other operation within the MCP area is the Stolthaven Bulk Fuel Terminal, which is located approximately 150m to the north-west of the Site. Other nearby noise sources include noise generated from M4 periodically during berthing and ships unloading/loading operations.

Pursuant to the requirements of the MCP approval (Condition 2.19), PON developed the MCP Site Noise Model which is to be used for the assessment of proposed projects in the MCP area. The development of the model was undertaken in consultation with the EPA and DP&E to provide a consistent approach to the noise assessment of project within the MCP area.

The Site Noise Model allows impacts from various projects to be assessed cumulatively and potential impacts to be assessed against the noise goals outlined in the MCP consent. To date the Stolthaven Fuel Terminal is the only project that has been assessed through this model.

The MCP Site Noise Model was developed and updated utilising a range of background monitoring and noise assessment studies including:

- *Mayfield Site Port-Related Activities Concept Plan EA*, Report No. 09077, Revision F, Wilkinson Murray, July 2010 by; and
- *Noise Impact Assessment, Modification of Project Approval 08_0129*, by AECOM referenced as 60306451, Rev 3, dated 13 November 2013.

The Project has been assessed utilising the MCP Site Noise Model to meet the requirements of the MCP and to be consistent with existing noise assessments undertaken within the MCP. Full details of how the background noise environment has been defined in accordance with the MCP approval are detailed in **Appendix B**.

Sensitive Receivers

The nearest residential area is located approximately 800m to the south-southwest in the suburb of Mayfield. The nearest resident in Stockton is located approximately 2000m to the east. The representative sensitive receivers identified for the Project are described in **Table 11**. These receivers are consistent with those receives used to determine baseline criteria and assess potential impacts in the MCP Site Noise Model. This will provide a consistent approach to the assessment of the Project under the MCP Site Noise Model.

Table 11 Representative Sensitive Receiver Locations

Receiver Number	MCP Receiver ¹	Address	Land Use Classification	Associated Receiver Area
R1	A	1 Arthur St, Mayfield	Residence - Urban	Mayfield
R2	B	2 Crebert St, Mayfield	Residence - Urban	Mayfield (Industrial Dr)
R3	-	24 Crebert St, Mayfield	Residence - Urban	Mayfield (Industrial Dr)
R4	C	32 Elizabeth St, Carrington	Residence - Urban	Carrington
R5	D	186 Fullerton Rd, Stockton	Residence - Suburban	Stockton
R6	-	Mayfield East Public School	School	-
R7	-	40 Industrial Dr, Mayfield	Commercial	-
R8	-	OneSteel Site (Lot 224 Steelworks Rd, Mayfield)	Industrial	-

Notes:

- Locations as defined in the MCP Approval (09_0096MOD 2)

7.2.2 Impact Assessment

Assessment Approach

Utilising the MCP Site Noise Model an operational noise impact assessment was undertaken for the Project. A copy of this report is attached at **Appendix B**. The noise impact assessment includes a description of the:

- MCP Site Noise Model;
- How background noise levels were determined utilising the data that fed into the MCP Site Noise Model;
- How Project specific noise criteria have been generated;
- Describes the typical worst case operational scenarios that were developed for the assessment, incorporating:
 - Sound power levels for typical noise generating equipment that may be used by the Project;
 - Estimated noise level from the handling of cargos, for example noise associated with moving empty containers (it is not proposed to store empty containers however they represent a high noise source from port operations on which to base a conservative assessment), operation of reach stackers and cranes (ship borne cranes would typically be used avoiding the need for additional land side cranes. Again these have been included in the assessment to increase conservativeness);
 - The operation of heavy vehicles; and
 - Assuming neutral (still) wind conditions, a 3 metres/second (measured at 10 metres above the ground level) and an assessment under Pasquill stability class F as required by the MCP to assess noise enhancing meteorological conditions.
- Provides an assessment of potential impact of the assessed scenarios against the MCP sensitive receivers as detailed in **Table 11** in regards to the following:
 - Assessment of potential *amenity* noise (noise criteria for various land uses as described in Table 2.1 of the NSW *Industrial Noise Policy* (EPA, 2000)) for the whole of day, evening and night periods;

- MCP noise quota level (whole of day, evening or night period) as developed as part of the MCP Site Noise Model in order to assess and manage potential cumulative noise impacts from the MCP area; and
- Assessment of potential *intrusive* noise (noise that intrudes about the background level by more than 5 decibels when assessed over a 15-minute noise averaging period) impacts in accordance with the NSW *Industrial Noise Policy* (EPA, 2000) for the whole of day, evening and night periods;

The outcomes of this assessment are described in detail in **Appendix B** and summarised in the following sections.

Construction noise

There would be no direct construction activities associated with the Project. It is proposed that all setup and establishment activities would be associated with the operations of the facility with temporary fencing and buildings brought in by a contractor for different storage activities if required. Site establishment would only be undertaken during standard working hours as detailed in the EPA's *Interim Construction Noise Guidelines (ICNG, 2009)*. Any site establishment noise is expected to be for limited duration and lower than operational noise and therefore compliance with operational noise criteria would indicate compliance with construction noise requirements. Standard reasonable and feasible noise management measures as detailed in the ICNG would be suitable for the management of potential site establishment noise.

Operational Noise

Amenity period noise assessment

The predicted noise levels presented in **Table 12** have been assessed against the EPA's *NSW Industrial Noise Policy* (INP, 2000) INP amenity criteria. Noise contour maps for the night-time period showing the predicted noise impacts under both neutral and the worst case prevailing meteorological conditions are presented in **Appendix B**.

Table 12 Predicted Noise Levels - Operational Amenity Assessment

Receiver	Criterion	Neutral		Temperature inversion (F-Class, 3°C/100 m)		3 m/s source to receiver wind	
		Predicted noise level, L _{Aeq} (Period), dB(A)	Exceedance	Predicted noise level, L _{Aeq} (Period), dB(A)	Exceedance	Predicted noise level, L _{Aeq} (Period), dB(A)	Exceedance
Daytime							
R1	60	26	-	N/A ²	N/A ²	31	-
R2	60	32	-	N/A ²	N/A ²	37	-
R3	60	32	-	N/A ²	N/A ²	37	-
R4	57	23	-	N/A ²	N/A ²	29	-
R5	52	22	-	N/A ²	N/A ²	28	-
R6 ¹	45	24	-	N/A ²	N/A ²	29	-
R7	65	31	-	N/A ²	N/A ²	36	-
R8	70	42	-	N/A ²	N/A ²	47	-
Evening							
R1	47	24	-	29	-	29	-
R2	55	30	-	34	-	34	-
R3	55	30	-	34	-	35	-
R4	44	22	-	26	-	27	-

Receiver	Criterion	Neutral		Temperature inversion (F-Class, 3°C/100 m)		3 m/s source to receiver wind	
		Predicted noise level, L _{Aeq} (Period), dB(A)	Exceedance	Predicted noise level, L _{Aeq} (Period), dB(A)	Exceedance	Predicted noise level, L _{Aeq} (Period), dB(A)	Exceedance
R5	42	20	-	26	-	26	-
R6 ¹	- ¹	21	-	25	-	26	-
R7	65	28	-	33	-	33	-
R8	70	39	-	43	-	44	-
Night							
R1	37	24	-	29	-	29	-
R2	52	30	-	34	-	34	-
R3	52	30	-	34	-	35	-
R4	37	22	-	26	-	27	-
R5	42	20	-	26	-	26	-
R6 ¹	- ¹	21	-	25	-	26	-
R7	65	28	-	33	-	33	-
R8	70	39	-	43	-	44	-

Notes:

1. In the INP the school classroom criteria is an internal noise level, with an acceptable noise level of 35 dB(A) and a recommended maximum of 40 dB(A). A 10 dB reduction has been assumed between external and internal noise levels based upon a window being open for adequate natural ventilation. The noise impacts on schools are to be assessed only during school hours.
2. Temperature inversions are not a prevailing meteorological conditions during the daytime period.

Mayfield Concept Plan Noise Quotas Assessment

As the Project lies within the MCP site, the Project site is required to demonstrate compliance with the requirements of the MCP approval. The MCP approval aims to address cumulative noise impacts from all sites that make up the entire MCP area, with the objective of addressing cumulative noise impacts as the area is developed over time.

PON has developed for implementation, a Cumulative Environmental Noise Management Tool (CENMT) for the MCP. The CENMT provides a method for the allocation of noise quotas for different developments based on their proposed activities and the area of the MCP area they will cover. Further detail regarding the development of project assessment quotas is provided in **Appendix B**.

Table 13 presents the predicted noise levels against the MCP noise quota for the proposed Project. It should be noted that these noise levels do not include shipping operations, or noise from associated facilities such as the M4 Berth as this site has a separate operational approval.

These noise quotas have been assessed under winds of up to 3 metres/second (measured at 10 metres above the ground level) and Pasquill stability class from A to F as required by the MCP Approval (09_0096MOD 2). As such, the highest predicted noise level out of these conditions has been included in **Table 13**, which is with a 3 m/s source to receiver wind.

As can be seen in **Table 13**, the noise modelling has indicated that there would be no exceedances of the MCP noise quotas as a result of the Project.

Table 13 Reasonable Worst Case Amenity Scenario – Worst Case Meteorological Conditions

Period	Day					Evening					Night				
	Predicted noise level, L _{Aeq} (Day), dB(A)	MCP noise quota, dB(A)	Exceedance	MCP overall noise goals, dB(A)	Exceedance	Predicted noise level, L _{Aeq} (Evening), dB(A)	MCP noise quota, dB(A)	Exceedance	MCP overall noise goals, dB(A)	Exceedance	Predicted noise level, L _{Aeq} (Night), dB(A)	MCP noise quota, dB(A)	Exceedance	MCP overall noise goals, dB(A)	Exceedance
MCP Receiver															
Assessed Meteorological Condition: 3 m/s Source to Receiver Wind															
A	31	51	-	60	-	29	40	-	49	-	29	34	-	43	-
B	37	51	-	60	-	34	41	-	50	-	34	34	-	43	-
C	29	46	-	57	-	27	33	-	44	-	27	34	-	45	-
D	28	45	-	55	-	26	27	-	37	-	26	27	-	37	-

Notes

1. These cumulative amenity noise quota levels are subject to approval by PON and DP&E.

Intrusiveness period noise assessment

The following are the modelled results for the reasonable worst case intrusiveness scenario (15 minute period). In accordance with the INP, the intrusive assessment only applies to residential receiver locations (R1 to R5). The modelling scenarios and results are presented in **Table 14**.

Table 14 Predicted Noise Levels - Operational Scenarios Intrusive Assessment

Receiver	Criterion	Neutral		Temperature inversion (F-Class, 3°C/100 m)		3 m/s source to receiver wind	
		Predicted noise level, L _{Aeq} (15min), dB(A)	Exceedance	Predicted noise level, L _{Aeq} (15min), dB(A)	Exceedance	Predicted noise level, L _{Aeq} (15min), dB(A)	Exceedance
Daytime							
R1	48	29	-	N/A ¹	N/A ¹	34	-
R2	48	35	-	N/A ¹	N/A ¹	39	-
R3	48	35	-	N/A ¹	N/A ¹	40	-
R4	49	25	-	N/A ¹	N/A ¹	30	-
R5	52	23	-	N/A ¹	N/A ¹	29	-
Evening							
R1	43	28	-	33	-	33	-
R2	43	34	-	38	-	39	-
R3	43	34	-	38	-	39	-
R4	48	24	-	29	-	29	-
R5	51	22	-	28	-	28	-
Night							
R1	42	28	-	33	-	33	-
R2	42	34	-	38	-	39	-
R3	42	34	-	38	-	39	-
R4	44	24	-	29	-	29	-
R5	51	22	-	28	-	28	-

Notes:

1. Temperature inversions are not a prevailing meteorological conditions during the daytime period.

As detailed in **Table 14** the Project is not expected to result in any exceedances of the Project specific intrusive noise criteria.

Discussion and recommendations from the operational noise assessment

Compliance has been predicted for all assessments. This is based upon the assumed operations and sound powers levels of the equipment presented in **Appendix B**.

Due to the nature of the Project the specific operations of the Project may vary on a day to day basis. This may result in different unloading and loading equipment, different storage locations around the site, different freight and cargo with different load or unload durations etc. All of which have different noise sources, that would operate for different durations when on site.

As such, the assessment focused upon a reasonable worst case operating scenario, which has considered cargo handling operations which involve high levels of impact noise when a reach stacker remove containers from trucks, and then place them onto the ground/hard stand. Having demonstrated that this reasonable worst case operating scenario complies with the Project noise

criteria, it is considered that other types of cargo handling activities that may be undertaken at the site are likely to also comply.

The noise sources in the assessment has been modelled in the location closest to the nearest residential receiver to the site (see **Appendix B**), and it has been conservatively assumed that all operations will occur in this location. This is will not commonly occur as operations will:

- Take place at other locations within the Project site;
- Operate for smaller durations than modelled; and/or
- Likely operate with sound power levels less than modelled.

As a result the noise impacts predicted at nearby receiver locations are conservative and in reality operational noise levels are likely to be less than those presented in the assessment.

In addition, it is recommended that all trucks and equipment using the facility are fitted with broadband reversing alarms where practical. Where this is not possible as the trucks operating through the facility are not controlled by PON, a management protocol should be developed for truck movements during the night-time period with the aim of minimising the use of tonal reversing alarms.

7.2.3 Conclusion

The assessment of potential noise impacts has been undertaken to review the potential operational and construction environmental noise and vibration impacts that may be generated by the Project, and recommends mitigation measures, where necessary.

The following outlines the findings of this assessment.

Site Establishment Noise

Due to the lack of any significant construction activities, any noise from site establishment is expected to be minimal and of limited duration. Regardless the following measures would be implemented to manage potential noise generation:

- Site establishment activities would only be undertaken during standard working hours as detailed in the EPA's *Interim Construction Noise Guidelines* (ICNG, 2009); and
- Standard reasonable and feasible noise management measures as detailed in the ICNG would be suitable for the management of potential site establishment noise.

Such measures would be incorporated into each tenants plan for the use of the site.

Operational environmental noise emissions

The operational environmental noise emissions from the site are required to be assessed against the relevant INP and MCP requirements using a reasonable worst case set of operational assumptions.

The operational noise impact assessment indicates compliance can be achieved under neutral and prevailing meteorological conditions at all assessment locations during the daytime, evening and night-time periods for the EPA INP intrusive and amenity period assessments.

As part of the MCP Cumulative Environmental Noise Management Tool (CENMT) noise quotas have been prepared by PON for sites proposed within the MCP, in order to address future cumulative noise from all sites. The operational noise impact assessment indicates that compliance with these quota levels can be achieved.

Despite the modelling indicating compliance, where practical equipment associated with the Project should be fitted with broadband reversing alarms.

Such measures would be incorporated into each tenants plan for the use of the site as appropriate.

Cumulative noise impacts

The aim of the MCP CENMT is to control the cumulative noise impacts from developments within the MCP. The Project is predicted to comply with the MCP allocated provisional noise quota.

7.3 Surface Water

7.3.1 Background

The site is currently a fully sealed hardstand area with runoff sheet flowing into an existing onsite stormwater management system. Runoff is directed via overland flow to the MCP drainage system that was installed as part of the remediation works. In order to prevent infiltration of water into the soils beneath the MCP area, the remediation project capped the site with hardstand of very low permeability, and directed flow to a series of trunk drains located around the MCP area. The existing site grades, and therefore the direction of overland flow of runoff are shown on **Figure 5**.

The majority of the site drains to a culvert located along the northern boundary of the site. Runoff entering this culvert is then transferred by an underground pipe and discharged directly into the Hunter River. A small portion of the site also drains towards the west and sheet flow into the MCP Western Truck Drain which then connects directly to the Hunter River.

The Project area is currently sealed with impermeable hardstand and all runoff generated during storm events is drained to the Hunter River.

7.3.2 Impact Assessment

Due to the nature of the Project there will be no disturbance of soils as a result of construction or operation therefore there is no potential for exposed soils that would require the implementation for water quality control measures (sediment and erosion controls).

As the site is currently entirely impermeable sealed hardstand, the introduction of the Project would not result in an increase in impermeable surface or runoff generation. Therefore there would be no change to runoff quantities or peak storm loading that would require a review of the capacity of the existing stormwater management system.

As described in **Section 3.0** operations would consist of the storage of project cargos. As these would typically be large pieces of plant, machinery or other equipment, potential for impacting water quality would be limited. Importantly no bulk cargos, such as stockpiles materials that could be mobilised by water, are proposed as part of the Project. Nor are any bulk liquids to be stored that could cause large spills.

With the use of vehicles, plant and machinery however there is potential for leaks and spills of hydrocarbons to occur, for example from hydraulic line breaks or fuel spills during refilling operations. In order to manage these potential risks PON would require tenants to provide spill kits of a type and number suitable for their proposed operations. If onsite refuelling is to occur it would be undertaken in a dedicated refuelling bunded area.

The MCP Stormwater Management Strategy (SMS) (AECOM, 2015) provides a high level overview of the existing drainage network of the MCP Area. The SMS provides details of the site grades and drainage locations and has been used as the basis for **Figure 5** of this SEE.

As detailed in the SMS, individual operations within the MCP area are required to prepare Construction Environmental Management Plans (CEMP) for their construction activities. As construction activities would be limited to the site establishment of temporary facilities (e.g. portable toilets, demountable crib building) there will be no construction works resulting in disturbed soils or impacting established runoff regimes. Tenants would however be required to provide to PON a proposed site layout detailing location of proposed site amenities, spill kit, temporary refuelling bunds or similar prior to implementation.

As detailed in the SMS, individual operations within the MCP area, such as the proposed Project, would be required to prepare operational management plans for their specific operations. The SMS indicated that operational management plans may consist of:

- Soil and Water Management Plan;
- Spill Management Plan; and
- Emergency Response Plan.

As detailed in the SMS, the Project Area is not subject to flooding from either an oceanic flooding event, or Hunter River Flooding under with the 1% Annual Exceedance Probability (AEP), or Probably Maximum Flood (PMF) scenarios. Therefore no consideration of the potential mobilisation of project cargos as a result of flooding is required.

7.3.3 Conclusion

Runoff is proposed to be directed to the established MCP drainage network. Due to the types of cargos proposed to be stored by the Project there is limited potential for water quality impacts to occur. Despite this PON would ensure measures are implemented to

- Ensuring tenants do not store bulk liquids or other bulk materials in the Project Area that could become waterborne and threaten the quality of the Hunter River receiving catchment;
- Requiring tenants to provide spill kits to manage potential leaks or spill from site plant or equipment;
- Wastewater from amenities to be contained in portable toilets if required and removed from the site for disposal by a licensed contractor; and
- If plant refuelling is required, only doing so inside a bunded refuelling area.

Specific details required by each tenant will be provided in an OEMP for approval by PON prior to use of the site.



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7.4 Air Quality

7.4.1 Background

The site is currently maintained as an open hardstand area. Therefore no air emissions are currently generated from the Site. The wider port area is typified by a range of port and industrial uses. Importantly bulk cargo (coal) handling and related activities generate particulate matter. Other key impacting land uses on air quality include transport (road and rail) and impacts from sea spray. These factors combine to generate a relatively high level of background particulate matter in Newcastle.

As the site is located within the MCP area consideration is required of the:

- MCP Site Air Quality Model; and
- MCP Air Quality Monitoring Program.

These plans require consideration of existing air quality emissions not only from the Site but also the wider MCP area. To date the only other source of emissions from the MCP area are emissions associated with the Stolthaven Bulk Fuel Terminal.

As a result of the former remediation works undertaken across the site eight vapour sampling wells were established on the site to monitor potential for BTEX (Benzene, Toluene, Ethylbenzene, and Xylene) vapours to escape the capped area and potential present an occupational exposure hazard for workers on the site. PON undertaken periodic monitoring of these wells to determine hazard potential. The results of the most recent monitoring are detailed in Robert Carr and Associates Pty Ltd. (RCA) *Report Compiled for Port of Newcastle Operations Detailing Benzene Vapour Sampling October 2016*. The monitoring results indicated that BTEX levels were below the limit of reporting for all BTEX elements.

7.4.2 Impact Assessment

Due to the nature of the Project the primary source of emissions generated would be combustion emissions from trucks, vehicles and plant such as forklifts. These emissions include both products of combustions such as oxides of carbon and nitrogen, as well as particulate matter. Due to the relatively small numbers of plant and equipment that would be required onsite and the periodic nature they will be used any such emissions would be relatively small and are unlikely to have any observable impacts. Maintaining plant and machinery in good working order to minimise any such emissions.

Consideration of cumulative emissions from the entire MCP area is also required. The only other operation in the MCP area is the Stolthaven Bulk Fuel Terminal. The primary source of emissions from this operation are volatile organic compounds (VOCs). As the project would not be a source of VOC's no cumulative impacts are anticipated to occur.

As the Site is currently a sealed hardstand area and would remain so for the duration of the Project, no dust generation from exposed soils would occur.

Due to the nature of the Project there are no significant emissions sources proposed. As there is limited potential for air emissions to occur there would be no benefit from modelling Project emissions through the *Mayfield Concept Plan Site Air Quality Model*. Similarly no additional monitoring requirements would be required as part of the *Mayfield Concept Plan Air Quality Monitoring Program*.

In regards to BTEX vapours from ground monitoring wells, due to the negligible level of vapours found to be being emitted from the wells potential risk to workers would also be negligible.

7.4.3 Conclusion

The Project would see the Site used for the import of large pieces of project cargo which has limited potential to generate dust either through movement to or from site, or during static storage. The use of vehicles, plant and machinery for the handling and transport of cargos has the potential to generate combustion emissions. All vehicles required by the operation will be maintained in good working order to minimise the potential for excess emission. Where plant or equipment that is idling for prolonged periods it should be switched off. The Project would not trigger the need for any additional monitoring or management measures to be incorporated into the MCP operational site management required under the *Mayfield Concept Plan Air Quality Monitoring Program*.

7.5 Other Matters

Other matters considered to be low potential to be impacted by the Project are detailed in **Table 15**.

Table 15 Other Environmental Impact Considerations

Environmental Matter	Impact Assessment
Visual and lighting	<p>The existing Site is a sealed hardstand area with no distinguishing features, building or infrastructure. The Site is surrounded by port and industrial related activities and visually screened from potentially sensitive (residential) areas by other industrial buildings/facilities and roadside vegetation on Industrial Drive. Similarly the site currently has no formal lighting arrangements. In particular the nearest residential receivers located to the southwest are visual screened from the site by vegetation along the Industrial Drive corridor and business premises.</p> <p>Due to the offset distances to the nearest sensitive receivers and visual buffer provided by surrounding development and vegetation there are no visual corridors to or through the site which the Project may impact upon. There would be no permanent infrastructure or tall structures which form part of the Project that would result in significant visual impacts.</p> <p>As part of the Project there may be a need to established temporary lighting to aid night-time operations. Any such lighting would only be in use during the hours and nights when operations are proposed and therefore would be operated infrequently. Temporary lighting would be comparable to other floodlighting in the vicinity (e.g. M4 lighting) which has negligible impact on residents. Despite this the following measures would be implemented to control potential light spill:</p> <ul style="list-style-type: none"> • Lighting would be temporary and only operated on an as needs basis during operations; • Lighting equipment would be located at the periphery of the site and directed inwards and downwards; and • Where relevant lighting would be operated in accordance with <i>Australian Standard 4282 Control of the Obtrusive effects of outdoor lighting</i>.
Waste	<p>Waste generation would be dependent on the type of cargos being stored on site. Generally speaking there will be no significant waste generation from the storage of cargos. Dunnage (materials used to securely pack cargos into ship holds) may be unpacked from ships following the import of cargos. (Dunnage is generally pieces of wood or similar materials used to provide packing between cargo and ships hulls or bulkheads to prevent the movement of cargo while in transit).</p> <p>Dunnage material could subsequently be used for supporting or resting cargos while stored on land. PON would require tenants to remove dunnage material from site when removing cargos.</p> <p>If amenities buildings are required PON tenants would be required to provide waste receptacles for staff generated wastes to the satisfaction of PON. Waste receptacles would be provided buy a licenced waste contractor and disposed of at a licensed waste disposal facility as required. Details of individual tenants waste storage and disposal requirements would be provided to PON by tenants prior to operations.</p>
Hazard and Risk	<p>No hazardous or dangerous materials as classified by the Australian Dangerous Goods Code are proposed to be stored or transferred as part of the Project. No specific assessment of potential hazards or risk is therefore required under DP&Es Hazardous Industry Planning Advisory Papers (HIPAPs).</p>
Social and Economic	<p>The Project would see currently underutilised Port side land utilised for a port related purpose. The Project would support the importation of a range of project cargos that would be utilised by a variety of projects across NSW and potentially Australia such as wind farm developments, mining and infrastructure projects.</p>

Environmental Matter	Impact Assessment
	<p>The Project would also generate new economic benefits to the local area with new employment opportunities to be created and expenditure in the local economy during operation. In the absence of the Project, tenants may seek alternative import options for Project cargos, including interstate Port options therefore reducing the overall economic and resulting benefits for the people of NSW. Imports made via alternative ports would see a loss of economic benefits to the local economy.</p> <p>As detailed in this SEE the Project can be undertaken within minimal impact to the environment or community so overall the Project is considered to have a positive social and economic outcome.</p>
Aviation Safety	<p>The Project Area is located within the 15km buffer area from the Newcastle (Williamtown) Airport. In accordance with the Civil Aviation Safety Authority (CASA) Advisory Circular <i>AC139-08(0)-Reporting of Tall Structure</i>, any permanent or temporary structure 30m or taller within 15km of the airport requires reporting and approval from the airport.</p> <p>Whilst considered unlikely, should any temporary cranes be required for the movement of Project cargos on site that are greater than 30m in height, PON would comply with the CASA reporting requirements.</p>

7.6 Cumulative Impacts

Due to the Project seeking to utilise an existing hardstand area for the storage of project cargos and there being no proposed permanent buildings, infrastructure or activities, the potential for cumulative impacts to occur is limited. Due to the size of the site there is potential for it to be used by multiple customers each using a portion of the site. This SEE has sought to assess the potential impacts of the whole of site being in use at a given time to capture potential cumulative impacts from multiple customers operating across the site.

The noise assessment undertaken as detailed in **Section 7.2** utilised the MCP site noise model which includes other noise sources from within the MCP area and identified the Project would operate within both Project specific and MCP noise criteria.

There were also some potential cumulative traffic impacts to occur due to interactions with existing traffic particularly on Industrial Drive. As part of the traffic assessment as detailed in **Section 7.1**, traffic count of the Industrial rive – George Street intersection where undertaken to determine current traffic loadings. This was then used to examine the potential impacts of the Project. This assessment found that the intersection would be operating with acceptable Levels of Service under a worst case traffic scenario. Given that the Project Area would only be used periodically any impacts would be further reduced.

Potential cumulative impact in regards to other environmental aspects are all considered to be negligible due to the lack of construction activities, periodic use of the Site and nature of the Project.

8.0 Summary of Mitigation Measures

8.1 Summary of Mitigation Measures

Provided below is a summary of mitigation and management measures that will be incorporated into the operational activities by each tenant on a case by case basis to mitigate against any potential impact to the environment.

Table 16 Mitigation Measures

Environmental Matter	Proposed Management Measures
Traffic	<ul style="list-style-type: none"> Minimise heavy vehicle movements during peak times. Require heavy vehicle movements to occur on approved routes to prevent movements through residential areas. Prevent heavy vehicle movements on residential streets. Require that the appropriate permits are obtained for the haulage of oversized or over mass loads and that the requirements of these permits (e.g. vehicle escorts) are fully implemented. Undertake reporting as required by the MCP <i>Traffic Monitoring and Review Plan</i>.
Noise	<ul style="list-style-type: none"> Site establishment activities will only be undertaken during standard working hours as detailed in the EPA's <i>Interim Construction Noise Guidelines</i> (ICNG, 2009). Standard reasonable and feasible noise management measures as detailed in the ICNG will be suitable for the management of potential site establishment noise. Equipment will be fitted with broadband reversing alarms where practical.
Surface Water	<ul style="list-style-type: none"> No storage of bulk liquids or other bulk materials in the Project Area that could become waterborne and threaten the quality of the Hunter River receiving catchment. Spill kits will be provided to manage potential leaks or spill from site plant or equipment. Wastewater from amenities will be contained in portable toilets if required and removed from the site for disposal by a licenced contractor. Plant refuelling will only be undertaken within a bunded refuelling area.
Air Quality	<ul style="list-style-type: none"> All vehicles required by the operation will be maintained in good working order to minimise the potential for excess emissions. Where plant or equipment that is idling for prolonged periods it should be switched off.
Visual and lighting	<ul style="list-style-type: none"> Lighting will be temporary and only operated on an as needs basis during operations. Lighting equipment will be located at the periphery of the site and directed inwards and downwards. Where relevant lighting will be operated in accordance with <i>Australian Standard 4282 Control of the Obtrusive effects of outdoor lighting</i>.
Waste	<ul style="list-style-type: none"> All other wastes from site will be stored in appropriate receptacles and disposed of via a licenced waste contractor for disposal at a licensed waste management facility.
Hazard and Risk	<ul style="list-style-type: none"> No hazardous materials or dangerous goods as defined by the Australian Dangerous Goods Code will be allowed to be transferred through, or stored in the Site in bulk as part of this Project.
Aviation Safety	<ul style="list-style-type: none"> Compliance with requirements of CASA Reporting of Tall Structures for any structures (cranes) that may operate beyond 30m above ground level.

8.2 Operational Environmental Management Plan

The management measures detailed in **Section 7.0** and summarised in **Table 16** would be implemented in an Operational Environmental Management Plan to be prepared by PON.

9.0 Conclusion

PON is seeking to establish a project cargo laydown and storage area in the Port of Newcastle. The site is situated within the Mayfield Concept Plan Area which is an existing hardstand area directly adjoining the south arm of the Hunter River. The site was historically used for heavy industrial purposes such as steelmaking. Following closure of the BHP Steelworks in 1999 the site was remediated and is currently managed as an open hardstand area.

The site has a hardstand area with a large amount of available space in close proximity to a berth (Mayfield Berth No. 4) with deep channel access. As a result it provides PON an excellent opportunity to establish a project cargo storage area.

Pursuant to *State Environmental Planning Policy (Three Ports) 2013* PON can currently use the site for the proposed purpose for up to 182 days per year as exempt development. Approval is required for storage use beyond 182 days per year to ensure PON can meet potential customer requirements for storage. By seeking approval for the Project PON is ensuring the appropriate consideration of the requirements of the MCP approval will be incorporated into the site operation and management.

This SEE has demonstrated that that the Project can be undertaken with very minor impact to the community or environment. The key issues of traffic and noise have been assessed and shown to be suitably managed through the use of standard and proven management measures. The use of the site would have social and economic benefits as it is currently vacant unused land and the Project would see the Site used for a higher economic purpose as well as supporting a range of other projects across NSW.

10.0 References

PON (2016) *Mayfield Concept Plan Traffic Management Plan*.

PON (2016) *Mayfield Concept Traffic Monitoring and Review Plan*.

PON (2015) *Mayfield Concept Plan Stormwater Management Strategy*.

PON (2015) *Mayfield Concept Plan Site Air Quality Model*.

PON (2015) *Mayfield Concept Plan Air Quality Monitoring Program*.

Robert Carr and Associates Pty Ltd. (2016) *Report Compiled for Port of Newcastle Operations Detailing Benzene Vapour Sampling October 2016*.



Appendix A

Traffic Impact Assessment

Appendix A Traffic Impact Assessment



Appendix B

Noise Impact Assessment

Appendix B Noise Impact Assessment

Noise and Vibration Impact Assessment

Cargo Storage Facility, Mayfield

Noise and Vibration Impact Assessment

Cargo Storage Facility, Mayfield

Prepared for

Port of Newcastle Operation Pty Ltd

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1.0 Introduction

1.1 Overview

AECOM Australia Pty Ltd (AECOM) has been engaged by Port of Newcastle Operations Pty Ltd (PON) to undertake an assessment of the potential construction and operational noise and vibration impacts associated with a proposed Cargo Storage Facility, Mayfield (the Project) operated by PON at Mayfield, NSW.

This noise and vibration impact assessment has been prepared by AECOM to support the Statement of Environmental Effects (SEE) to support the Development Application (DA) for the proposed facility.

The nearest residential areas to the site are located to the south-west of the Project site at Mayfield, with the closest receptors in Crebert Street, approximately 800 m from the nearest boundary of the Project site. To the south-east there are residential receivers located in Carrington, approximately 2 km away.

The environmental noise emissions impact assessment has been carried out in accordance with the NSW Environment Protection Authority's (EPA) *NSW Industrial Noise Policy* (INP, 2000) and associated application notes, the *NSW Road Noise Policy* (RNP, 2011) and *Assessing Vibration: a technical guideline*, (DECCW, 2006).

As the Project lies within the Mayfield Concept Plan (MCP) approval area, it requires noise emissions from the site to be consistent with the environmental assessment requirements of the MCP Approval (09_0096MOD 2). Consistency with the MCP Approval requirements has also been addressed in this report.

This report is technical in content. A glossary of acoustic terminology can be found in **Appendix A**.

1.2 Project description

The Project is located on the former BHP steelworks site in Mayfield North, adjacent to the Hunter River, approximately 5 km north-west of Newcastle CBD.

The proposed development is for the establishment and operation of an approximately 12 hectare port storage facility in the Mayfield Port Precinct. The facility would provide for the storage of a range of freight and cargo including (but not limited to) project cargo such as wind turbine components, large industrial components, luxury boats, electrical transformers and machinery, general cargo such as farm machinery, excavators, and construction machinery, breakbulk such as steel or timber products, and containerised cargo.

Freight would be unloaded via 'ships gear' (ship mounted cranes and cargo handling equipment) onto trucks at Mayfield No.4 Berth (M4) or other berths within the Port, and transported to the Storage Area for unloading. Distribution of cargo would be via truck to its destination. Cargo may also be trucked from its point of origin, to the storage facility for consolidation and export via M4 Berth or another berth within the Port.

The Project is proposed to operate 24 hours a day. If lighting is required, would be brought in on a temporary basis for evening and night-time operations. General day to day activities, such as moving or stacking of cargo will occur in daylight hours. Plant and machinery to be used would include reach stackers and forklifts for unloading, moving, stacking and loading cargo.

The Project could generate up to 100 trucks per day. Vehicle access would be via Selwyn Street, and then internal MCP roads. Up to 15 employees could be on site at any given time as part of operations.

The Project location, MCP boundary, noise monitoring locations and key sensitive receivers are shown in **Figure 1**

1.3 Surrounding receivers

The locations of the Project and nearby sensitive receivers and the MCP assessment receivers are shown in **Figure 1**. The representative receiver locations and the associated receiver areas for

assessment purposes, along with the land use classification (as defined in the INP) of each receiver are presented in **Table 1**.

Table 1 Representative sensitive receiver locations

Receiver number	MCP receiver ¹	Address	Land use classification	Associated receiver area
R1	A	1 Arthur St, Mayfield	Residence - Urban	Mayfield
R2	B	2 Crebert St, Mayfield	Residence - Urban	Mayfield (Industrial Dr)
R3	-	24 Crebert St, Mayfield	Residence - Urban	Mayfield (Industrial Dr)
R4	C	32 Elizabeth St, Carrington	Residence - Urban	Carrington
R5	D	186 Fullerton Rd, Stockton	Residence - Suburban	Stockton
R6	-	Mayfield East Public School	School	-
R7	-	40 Industrial Dr, Mayfield	Commercial	-
R8	-	OneSteel Site (Lot 224 Steelworks Rd, Mayfield)	Industrial	-

Notes:

1. Locations as defined in the MCP Approval (09_0096MOD 2)



Project location, Mayfield Concept Plan boundary, receiver locations, and measurement locations

■ Truck - Internal MCP access road
● Noise assessment location
▲ Attended measurement location
 Project Area
 Mayfield Concept Plan area
 Associated operational area (Mayfield Berth 4)

■ Unattended ambient noise measurement
● Noise assessment location
▲ Attended measurement location

0 250 500 1,000 m

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Fig. 1

2.0 Existing noise environment

In order to establish the existing noise environment adjacent to the Project area, and for consistency with previous assessments for sites within the MCP, ambient noise monitoring results presented in other noise assessment that incorporate the Project area have been reviewed in addition to attended and unattended measurements undertaken by AECOM in vicinity to the Project area.

2.1.1 Instrumentation

The attended and unattended noise logging was undertaken using the instruments presented in **Appendix B**.

These measurements were conducted using sound level meters and noise loggers which are designated as a Type 1 instrument having an accuracy suitable for field measurements.

All the acoustic instrumentation employed during the noise measurements comply with the requirements of "AS IEC 61672.1-2004 Electroacoustics - Sound level meters - Specifications". The instrumentation was calibrated before and after the measurements with no drift in calibration exceeding ± 0.5 dB, and had valid calibration certificates during their use.

2.1.2 Background noise monitoring

A noise logger measures the noise level over the sample period and then determines L_{A1} , L_{A10} , L_{A90} , L_{Amax} and L_{Aeq} levels of the noise environment. The L_{A1} , L_{A10} and L_{A90} levels are the noise levels exceeded for 1%, 10% and 90% of the sample period respectively. The L_{Amax} is indicative of maximum noise levels due to individual noise events. The L_{A90} is taken as the background noise level.

The assessment background level (ABL) is established by determining the lowest tenth-percentile level of the L_{A90} noise data acquired over each of the day, evening and night periods. The background noise level or rating background level (RBL) representing the day, evening and night-time assessment periods is based on the median of individual ABLs determined over each period for the entire monitoring duration.

Ambient noise logging was undertaken at several locations deemed to be representative of noise sensitive receivers in the residential areas surrounding the MCP site, which encompasses the Project site. The logger locations, and attended measurement locations and the representative receiver locations are shown in **Figure 1**.

Full details of the noise logging results for the Mayfield site including the daily ABLs, and L_{Aeq} ambient noise levels, the equipment used to undertake the measurements and graphical representations of the logged noise levels are included in **Appendix B**. A summary of the results are presented in **Table 2**.

Table 2 Summary of existing noise environment noise measurements

Location	Noise level descriptor	Measured noise level, dB(A)		
		Day 7 am – 6 pm	Evening 6 pm – 10 pm	Night 10 pm – 7 am
Mayfield	L_{A90}	43	38	37
	L_{Aeq}	58	46	47
Carrington ¹	L_{A90}	44 ¹	43 ¹	39 ¹
	L_{Aeq}	57 ¹	54 ¹	46 ¹
Stockton ²	L_{A90}	47 ²	46 ²	46 ²
	L_{Aeq}	58 ²	54 ²	54 ²

Notes:

1. Mayfield Site Port-Related Activities Concept Plan EA", Revision F, July 2010 by Wilkinson Murray.
2. 218 Fullerton Road, Stockton from AECOM report *Noise Impact Assessment, Modification of Project Approval 08_0129*, referenced as 60306451, Rev 3, dated 13 November 2013, with measurements undertaken from 20 May 2013 until 28 May 2013.

2.1.2.1 Existing noise environment – Additional studies

The following noise assessments have been referenced in this assessment.

- “*Mayfield Site Port-Related Activities Concept Plan EA*”, Report No. 09077, Revision F, July 2010 by Wilkinson Murray’.
- *Noise Impact Assessment, Modification of Project Approval 08_0129*, by AECOM referenced as 60306451, Rev 3, dated 13 November 2013.

The project background noise levels have been established to be consistent with ambient noise data used for other sites within the MCP in order for consistency, and so for this assessment adopting these noise measurements is considered appropriate.

Long term noise monitoring was undertaken at 32 Elizabeth Street, Carrington in order to represent the residential receivers of Carrington. This was undertaken from 18 to 26 March 2009 by Wilkinson Murray as part of the establishment of the assessment of the Mayfield Concept Plan. The results of the noise monitoring are presented in the study “*Mayfield Site Port-Related Activities Concept Plan EA*”, Revision F, July 2010 by Wilkinson Murray.

Long term noise monitoring was undertaken at 218 Fullerton Road, Stockton between 9 to 19 March 2012 by Atkins Acoustics in the vicinity Stockton residential receivers. This was sourced from *Noise Impact Assessment, Modification of Project Approval 08_0129*, by AECOM referenced as 60306451, Rev 3, dated 13 November 2013.

Based upon recent attended measurements presented in **Section 2.1.3** and **Appendix D** by AECOM the background noise levels and industrial noise levels are found to be still valid or conservative for each of the receiver areas, and so are appropriate for this assessment.

Details of the noise monitoring and a summary of the results are presented **Appendix B**.

2.1.3 Attended noise monitoring

Attended noise monitoring has been undertaken at a number of relevant receiver locations including at all the long term noise logger locations over recent years by AECOM. The full details of these attended measurements are shown in **Appendix D**. The attended noise monitoring locations are shown in **Figure 1**. The attended measurements were made to assist in quantifying the contributing noise sources at the different monitoring locations, for validation of the long term noise monitoring data, validating the noise modelling and site noise contributions and to validate the estimated industrial contributions and their consistency over time. A summary of the estimated industrial contributions is included in **Table 3**. This information has been used to derive the amenity criteria in **Section 3.3**.

Table 3 Summary of estimated industrial contributions

Location	Measured noise level, dB(A)		
	Day 7 am – 6 pm	Evening 6 pm – 10 pm	Night 10 pm – 7 am
Mayfield (Industrial Drive)	49 ⁶	49 ⁶	49 ⁷
Mayfield	48 ⁴	47 ⁵	45 ³
Carrington	57 ¹	54 ¹	47 ²
Stockton ³	52 ²	52 ²	52 ²

Notes:

1. Mayfield Site Port-Related Activities Concept Plan EA”, Revision F, July 2010 by Wilkinson Murray. However, long term $L_{Aeq\ 15\ minute}$ measurements were not presented as part of this assessment.
2. AECOM attended measurement on 28 July 2014, which was also confirmed on 29 September 2015, and it has been assumed that the night time industrial contribution estimation from measurements is applicable for all periods.
3. AECOM attended measurement, 16 January 2012 (85 Margaret Street, Mayfield).
4. AECOM attended measurement, 15 September 2011 (85 Margaret Street, Mayfield).

5. This industrial contribution has been based upon the evening Mayfield industrial contribution presented in *"Noise Impact Assessment, Stothaven Terminals Newcastle, Mayfield (BHP) Site, NSW"*, 2008 by Spectrum Acoustics.
6. AECOM attended measurement, 1 September 2013. (The evening measurement has been used to estimate the day levels).
7. AECOM attended measurement, 29 July 2014, with similar levels measured on 1 September 2013 and 7 November 2014.

2.1.4 Road traffic noise monitoring adjacent to Industrial Drive, Mayfield

Ambient noise logging was undertaken at a location deemed to be representative of noise sensitive receivers in the area of Mayfield, adjacent to Industrial Drive.

Existing road traffic noise levels along Industrial Drive, Mayfield were measured at 118 Woodstock Street, Mayfield.

The a summary of the measured road traffic noise levels with and without façade correction in accordance with the EPA RNP are presented in **Table 4**. It is to be noted that the measured traffic noise levels exceed the recommended criteria presented in **Table 4**. As such, the assessment will determine if traffic noise from the development is predicted to increase the traffic noise impacts on residential receiver locations in Mayfield by more than 2 dB(A).

Full details of the noise logging results including the daily ABLs, and L_{Aeq} ambient noise levels, the equipment used to undertake the measurements and graphical representations of the logged noise levels are included in **Appendix C**.

Table 4 Measured road traffic noise levels – Industrial Drive, Mayfield

Period	Parameter	Measured sound pressure level (Free field), dB(A)	Traffic noise levels (Façade reflected), dB(A)
Industrial Drive, Mayfield			
Day (7:00 am – 10:00 pm)	L_{Aeq} , (15 hour)	68	70
	L_{Aeq} , (Worst 1 hour)	70	72
Night (10:00 pm – 7:00 am)	L_{Aeq} , (9 hour)	64	66
	L_{Aeq} , (Worst 1 hour)	69	71

3.0 Operational noise criteria

In NSW the EPA NSW Industrial Noise Policy (INP) has been specifically developed to assess noise emissions from industrial noise sources scheduled under the POEO Act.

The INP provides guidance and recommendations on the assessment of noise impacts from industrial and commercial facilities.

The assessment procedure for industrial noise sources has two components that must be satisfied:

- Controlling **intrusive noise** impacts in the short term for residences; and
- Maintaining **noise level amenity** for residences and other land uses.

Any noise generated within the Project site boundary, and within the Port of Newcastle operating boundary associated with the Project, including noise from plant, truck movements and associated with site buildings has been assessed in accordance with the INP.

3.1 Intrusive noise impacts

The INP states that the noise from any single source should not intrude greatly above the prevailing background noise level. Industrial noises are generally considered acceptable if the equivalent continuous (energy-average) A-weighted level of noise from the source (L_{Aeq}), measured over a 15 minute period, does not exceed the background noise level measured in the absence of the source by more than 5 dB(A). This is termed the *Intrusiveness Criterion*. The *Rating Background Level* (RBL) is the background noise level to be used for assessment purposes and is determined by the methods given in Section 3.1 of the INP. Adjustments are to be applied to the level of noise produced if the noise at the receiver contains potentially annoying characteristics such as tonality or impulsiveness. The project intrusive noise criteria levels are shown in **Table 5**.

Table 5 Intrusive noise criteria, $L_{Aeq, 15 \text{ minute}}$

Receiver area	Time of day	RBL ($L_{A90, 15 \text{ minute}}$)	Intrusive criterion RBL + 5 ($L_{Aeq, 15 \text{ minute}}$)
Mayfield	Day	43	48
	Evening	38	43
	Night	37	42
Carrington	Day	44	49
	Evening	43	48
	Night	39	44
Stockton	Day	47	52
	Evening	46	51
	Night	46	51

3.2 Protecting noise amenity

To limit continuing increases in noise levels, the maximum ambient noise level resulting from industrial noise sources should not normally exceed the acceptable noise levels specified in *Table 2.1* of the INP. That is, the industrial noise level should not exceed the level appropriate for the particular locality and land use. This is termed the Amenity criterion.

For a residential receiver in an urban or suburban area, the amenity criteria are shown in **Table 6**.

Table 6 Amenity noise criteria, $L_{Aeq, period}$

Type of receiver	Indicative noise amenity area	Time of day	Recommended L_{Aeq} noise level, dB(A)	
			Acceptable	Recommended maximum
Residence	Urban	Day	60	65
		Evening	50	55
		Night	45	50
Residence	Suburban	Day	55	60
		Evening	45	50
		Night	40	45

The INP application notes state:

Where the ambient noise levels are below the Acceptable Noise Level (ANL), then ideally the measurement of the existing level of noise should include only noise from industrial sources. In these situations, however, it may be acceptable to include noise from other sources (for example, roads, and neighbourhood). The reasons for this are that:

- *including noise from other sources typically results in assessing the worst case for impacts on amenity; and*
- *strictly excluding noise from sources other than industry can be difficult and costly and may not be necessary if the development meets the criteria.*

As it was possible to determine the contribution from existing industrial sources, the factors in Table 2.2 in the INP have been applied when determining the final environmental noise criteria. The amenity criteria for the residential receivers are as shown in **Table 8**.

Furthermore, the application notes go on to state:

Where the predicted amenity noise level is lower than the intrusive level for the proposed development, the proponent needs to ensure that both levels will be satisfied. In this situation, noise limits specified in the licence conditions will include both the intrusive and amenity noise levels predicted to be achieved by the proposal to ensure that the community is protected from intrusive noise impacts at all times.

3.2.1 Assessments in areas of high traffic noise

Section 2.2.3 of the INP and the INP Application note “*Amenity criteria in high traffic noise areas*” are applicable when receiver locations are exposed to road traffic noise that:

1. Dominates the noise at the receiver location;
2. Is 10 dB or more above the Acceptable Noise Level for the receiver type; and
3. It is highly unlikely that the road traffic noise level would decrease in the future.

Existing traffic noise levels along Industrial Drive, Mayfield were measured at 118 Woodstock Street, Mayfield. A noise logger was used to continuously monitor noise levels between 29 July 2014 and 4 August 2014.

Further details of the traffic noise measurements are presented in **Section 2.1.4**.

As such, receiver locations that are adjacent to Industrial Drive have been reviewed accordingly to determine if they are considered to have high traffic noise levels for the purposes of deriving the INP amenity criterion. This assessment is presented in **Table 7**.

Table 7 Mayfield receivers located along Industrial Drive measured road traffic noise levels and amenity criterion derivation

Period	Measured sound pressure level, dB(A), $L_{Aeq, (Period)}$	Acceptable noise level (ANL) (Table 2.1 INP), $L_{Aeq, (Period)}$	High traffic noise levels (>10dB ANL)	Project specific acceptable noise level ¹ , $L_{Aeq, (Period)}$	Industrial contribution, ($L_{Aeq, 15 \text{ minute}}$)	Amenity criterion ² ($L_{Aeq, Period}$)
Mayfield receiver locations along Industrial Drive						
Day (7:00 am – 6:00 pm)	68	60	No	60	49	60
Evening (6:00 pm - 10:00 pm)	65	50	Yes	55	49	54
Night (10:00 pm – 7:00 am)	64	45	Yes	54	49	52

Notes:

1. Refer to Section 2.2.3 of the INP, and the INP Application notes "Amenity criteria in high traffic noise areas" for derivation of the Project Specific Acceptable Noise Level
2. The amenity criterion has been modified in accordance with the industrial contribution adjustment in Table 2.2 of the INP.

3.3 Environmental noise criteria for residential receivers

A summary of the environmental noise criteria in accordance with the EPA INP for residential receivers for the Project is given in **Table 8**. The Project Specific Noise Levels for each residential receiver area have been highlighted.

Table 8 Project specific noise levels (residential receivers)

Receiver area	Period	RBL ($L_{A90, 15}$ minute)	Intrusive criterion RBL + 5 ($L_{Aeq, 15}$ minute)	Ambient noise level ($L_{Aeq, period}$)	Industrial contributio n ¹ ($L_{Aeq, 15}$ minute)	Amenity criterion ² ($L_{Aeq, Period}$)
Mayfield (Industrial Drive) ³	Day	43	48	58	49	60
	Evening	38	43	46	49	54
	Night	37	42	47	49	52
Mayfield	Day	43	48	58	48	60
	Evening	38	43	46	47	47
	Night	37	42	47	45	37
Carrington	Day	44	49	57	57	57
	Evening	43	48	54	54	44
	Night	39	44	46	47	37
Stockton	Day	47	52	58	52	52
	Evening	46	51	54	52	42
	Night	46	51	54	52	42

Notes:

1. Refer to Section 2.1.3 for further details.
2. The amenity criterion has been modified in accordance with the industrial contribution adjustment in Table 2.2 of the INP.
3. Refer to Section 3.2.1 and Table 7 for full amenity criterion derivation.

3.3.1 Environmental noise criteria for non-residential receivers

The INP specifies the following noise criteria for non-residential land uses as detailed in **Table 9**.

Table 9 Non-residential receiver amenity noise criteria

Type of receiver	Indicative noise amenity area	Time of day	Recommended L_{Aeq} noise level, dB(A)	
			Acceptable	Recommended maximum
School classroom - Internal	Noisiest 1- hour period when in use	When in use	35 ¹	40 ¹
Commercial Premises	All	When in use	65	70
Industrial Premises	All	When in use	70	75

Notes:

1. In the INP, the school classroom criteria is an internal noise level, with an acceptable noise level of 35 dB(A) and a recommended maximum of 40 dB(A). A 10 dB reduction has been assumed between external and internal noise levels based upon a window being open for adequate natural ventilation when undertaking the assessment to an external receiver location.

3.4 Mayfield Concept Plan noise limits

As the Project is located within the Mayfield Concept Plan (MCP) area, it is also subject to the noise requirements of the concept approval MCP Approval (09_0096MOD 2) (MCP approval).

Conditions 2.16 – 2.20 of the MCP approval outlines the operational noise and vibration requirements related to projects sites that are situated with the MCP area.

Condition 2.17 sets out noise limits for the cumulative noise impact of all projects associated with MCP. The MCP approval aims to address the cumulative noise impacts from all sites that will operate within the MCP area. It aims to prevent any individual site being designed to use up all of the MCP approval noise limits, which will then result in all other developments having overly stringent noise requirements, and development other areas of the MCP constrained.

PON have developed an approach for addressing the cumulative noise impacts by allocating noise quota to individual sites with the MCP area, in order for the entire site once fully developed to meet the overall noise limits set out in the MCP Approval. These overall noise criteria for the entire MCP site are presented in **Table 10**, and the provisional quota for the Project is outlined in **Section 3.4.1**. The MCP overall noise limits and quotas apply over the amenity assessment periods.

PON has developed a Cumulative Environmental Noise Management Tool (CENMT), which includes the development of a Site Noise Model as required by Condition 2.16 to address those matters listed in Condition 2.19. A copy of this master site model has been used as the basis to undertake the noise modelling for this assessment.

Provisional quotas for the purposes of this assessment have been provided by PON. These quotas have been derived using the *MCP noise quota distribution tool (GIS Budget model)* which was developed for assessment of proposed sites within the MCP.

PON has developed a 'User guide' (reference AECOM report 60289391.RPT01.01, latest version dated 15 July 2015) that provides guidance to future proponents on how to assess noise impacts from Project site that fall within the MCP area. The methodology for assessing sites against these noise quotas is still to be finalised, and so these quotas and the method of assessment are provisional and may be subject to review and updating by either PON or DP&E.

The quotas are finalised in consultation with PON following a review and approval of the noise impact assessment.

Table 10 Mayfield Concept Plan amenity noise goals

Location	Project specific noise goals, (dB(A)) $L_{Aeq(period)}$		
	Day (7.00 am to 6.00 pm)	Evening (6.00 pm to 10.00 pm)	Night (10.00 pm to 7.00 am)
A – 1 Arthur Street, Mayfield (Urban)	60	49	43
B – 2 Crebert Street, Mayfield (Urban)	60	50	43
C – 32 Elizabeth Street, Carrington (Urban)	57	44	45
D – Stockton (Suburban)	55	37	37

3.4.1 Cargo Storage Facility, Mayfield (the Project) specific MCP requirements

MCP Open Storage Area specific provisional cumulative amenity noise quota derived using the MCP CENMT is presented in **Table 11**. The quotas are based upon the Project area presented in **Figure 2**.

Figure 2 Site operational area for derivation of Cargo Storage Facility, Mayfield (the Project) noise quota



Table 11 Summary of provisional MCP noise quotas for Cargo Storage Facility, Mayfield (the Project)

Receiver	Applicable project specific MCP noise quota, $L_{Aeq, period}$ dB(A)		
	Day (7.00 am to 6.00 pm)	Evening (6.00 pm to 10.00 pm)	Night (10.00 pm to 7.00 am)
A – 1 Arthur Street, Mayfield	51	40	34
B – 2 Crebert Street, Mayfield	51	41	34
C – 32 Elizabeth Street, Carrington	46	33	34
D – 186 Fullerton Road, Stockton	45	27	27

Notes

- These cumulative amenity noise quota levels are subject to approval by PON and DP&E, and are to be reviewed as part of the review of this noise assessment.

3.5 Tonality and INP modifying factors

The INP provides additional guidance and criteria for assessing noise emission from sources defined as 'tonal' in nature. Penalties of up to 5 dB(A) may be applied where the subject noise emission is tonal in character at the receiver.

A penalty is applied when the level of a one-third octave band exceeds the level of each adjacent band by:

- 5 dB(A) or more if the frequency band containing the tone is above 400 Hz;

- 8 dB(A) or more if the frequency band containing the tone is below 400 Hz and above 160 Hz inclusive; and
- 15 dB(A) or more if the frequency band containing the tone is below 160 Hz.

As part of this assessment, a 'screening test' to determine the potential for tonality has been conducted, to assess if the sources have the potential to generate tonal noise.

Additionally the INP provides guidance on applying penalties if the noise source contains characteristics such as impulsiveness, intermittency, irregularity or dominant low-frequency content. These have reviewed in operational noise assessment.

3.6 Sleep disturbance criteria

The INP was updated in June 2013 with application notes which discuss sleep disturbance and its objective assessment. To minimise the risk of sleep disturbance as a result of industrial type operations during the night-time period, the INP application notes reference the RNP.

The guidance provided in the RNP for assessing the potential for sleep disturbance recommends that to minimise the risk of sleep disturbance during the night-time period (10.00 pm to 7.00 am), the $L_{A1(1 \text{ minute})}$ noise level outside a bedroom window should not exceed the $L_{A90(15 \text{ minute})}$ background noise level by more than 15 dB(A). The EPA considers it appropriate to use this metric as a screening criterion to assess the likelihood of sleep disturbance. If this screening criterion is found to be exceeded then a more detailed analysis must be undertaken and include the extent that the maximum noise level exceeds the background noise level and the number of times this is likely to happen during the night-time period.

The RNP contains a review of research into sleep disturbance which represents NSW EPA advice on the subject of sleep disturbance due to noise events. It concludes that having considered the results of research to date that, '*Maximum internal noise levels below 50-55 dB(A) are unlikely to cause awakening reactions*'. Therefore, given that an open window provides approximately 10 dB(A) in noise attenuation from outside to inside, external noise levels of 60-65 dB(A) are unlikely to result in awakening reactions.

Based on the measured background noise levels during the night, the sleep disturbance criteria for the nearest noise sensitive residential receivers are presented in **Table 12**.

Table 12 Night-time sleep disturbance criteria

Location	Measured RBL $L_{A90, 15 \text{ minute}}$ dB(A)	Sleep disturbance criteria $L_{A1(1 \text{ minute})}$ dB(A)	
		Screening criterion	Awakening reaction
Mayfield	37	52	60 - 65
Carrington	39	54	60 - 65
Stockton	46	61	60 - 65

3.7 Road traffic noise criteria

The RNP has been used to assess the noise arising from operational traffic generated by the Project.

Access to the Project site would be via George Street/Selwyn Street, off Industrial Drive. These roads would be classified as a sub-arterial roads, as Industrial Drive provides connection between arterial roads and local roads, and Selwyn Street serves as access to the traffic generating developments of the Port of Newcastle.

The criteria applicable to noise arising from traffic generated by the proposed development on existing roads is presented in **Table 13**.

Table 13 RNP external traffic noise criteria

Road category	Type of project/land use	Assessment criteria, dB(A)	
		Day (7 am to 10 pm)	Night (10 pm to 7 am)
Arterial and Sub-arterial Roads	Existing residences affected by additional traffic on existing roads generated by land use developments	$L_{Aeq,(15\text{ hour})}$ 60	$L_{Aeq,(9\text{ hour})}$ 55

Note that where the criteria are already exceeded, the EPA recommends that:

“Where existing traffic noise levels are above the noise assessment criteria, the primary objective is to reduce these through feasible and reasonable measures to meet the assessment criteria. A secondary objective is to protect against excessive decreases in amenity as the result of the project by applying the relative increase criteria.

In assessing feasible and reasonable mitigation measures, an increase of up to 2 dB represents a minor impact that is considered barely perceptible to the average person.

...

For existing residences and other sensitive land uses affected by additional traffic on existing roads generated by land use developments, any increase in the total traffic noise level should be limited to 2 dB above that of the corresponding ‘no build option’.”

4.0 Construction noise criteria and assessment

In July 2009 the NSW Department of Environment, Climate Change and Water (DECCW) (now EPA) published the *Interim Construction Noise Guidelines (ICNG, 2009)* for use in construction noise assessments.

The *ICNG* recommends that a quantitative assessment is carried out for all 'major construction projects that are typically subject to the EIA process'. However, for this Project, AECOM understands that there would be no direct construction activities associated with the proposal. It is proposed that all setup and establishment activities would be associated with the operations of the facility with temporary fencing and possible demountable buildings brought in by any contractor during different storage activities, for example to provide temporary amenities for site staff. There would be no construction of any permanent buildings or infrastructure and no installation of utilities.

As such, during these site establishment activities noise management methods should be incorporated into management plans for setup and establishment activities as part of the Project site operations. All significant noise generating activities associated with the setup and establishment should be limited to the INP daytime period (7 am to 6 pm) where feasible and reasonable.

5.0 Vibration criteria (operational and construction) and assessment

Unlike the criteria applicable to noise emissions, vibration criteria are the same for both the construction and operational phases of this project. EPA's '*Assessing Vibration: a technical guideline*', (DECCW, 2006) has been designed to be used in evaluating and assessing the effects on amenity of vibration emissions from industry, transportation and machinery. The guideline is used in assessments of vibration impacts caused by the construction and operation of new developments.

Vibration criteria are set primarily according to whether the particular activities of interest are continuous in nature or intermittent, whether they occur during the daytime or night-time and the type of receiver to be assessed e.g. commercial or residential.

The effects of vibration in buildings can be divided into three main categories:

- Those in which the occupants or users of the building are inconvenienced or possibly disturbed, i.e. human disturbance or discomfort;
- Those in which the integrity of the building or the structure itself may be prejudiced; and
- Those where the building contents may be affected.

Therefore, vibration levels at sensitive receiver locations must be controlled so as to prevent discomfort and regenerated noise, and in some extreme cases, structural damage.

The nearest residential receivers (vibration sensitive) are located approximately 800 m from Project site. Existing nearby industrial developments are located approximately 50 m from the Project site, and are neither noise nor vibration sensitive.

At such distances, the risk of discomfort, regenerated noise and structural damage impacting receivers is extremely low and needs not to be considered further for either operational or construction activities.

Vibration levels on residential receivers due to additional traffic generated by the Project during the either construction or operational phases, is considered insignificant. This is due to the relatively small number of proposed operational truck numbers.

Therefore, from a vibration perspective, the issue of impacts caused by the operations or construction of the Project need not be considered further.

6.0 Operational noise assessment

6.1 Modelling methodology

Noise levels due to the operational activities shown in **Section 6.2** have been predicted to nearby noise sensitive receivers using SoundPLAN 7.3 (industry standard) noise modelling software.

As the site is located within the MCP, noise modelling is to be undertaken in accordance with the MCP Cumulative Noise Modelling User Guide (reference issue AECOM report- 60289391 RPT01.01 MCP Noise User Guide, dated 15 July 2015) (the MCP Modelling User-guide).

The modelling has been based upon the *MCP SoundPLAN Master Model*, which is the base SoundPlan model for the MCP which is used to develop the site specific SoundPlan noise models for the purposes of assessing noise emissions from any proposed developments within the MCP area.

The MCP Modelling User-guide requires use of the CONCAWE method, which was originally developed for predicting the long-distance propagation of noise from petrochemical complexes. It is especially suited to predicting noise propagation over large distances because it accounts for a range of atmospheric conditions that can significantly influence the propagation of noise over large distances.

The modelling includes the following:

- Buildings and structures throughout the assessment area;
- All noise sources behave as point or moving point sources;
- All noise sources containing octave band spectrum data based upon attended noise measurements of sources, or provided manufactures data; and
- The locations of modelled noise sources and on-site buildings and structures are presented in **Figure 3** and **Figure 4**.

It can be expected that there may be differences between the predicted and measured noise levels due to variations in instantaneous operating conditions, plant in operation during the measurement and also the location of the plant and equipment within the site. The modelling has been undertaken to predict a reasonable worst case set of operations for the Project site.

All assessment scenarios were modelled using the meteorological conditions requirements outlined in the MCP Modelling User-guide. These have been based upon an assessment of prevailing meteorological conditions at the EPA Newcastle Automatic Weather Station (AWS) in accordance with the requirements of the INP. The noise levels have been predicted at the noise sensitive receptors based on:

1. Neutral atmospheric conditions i.e. relatively calm, no temperature inversion;
2. Adverse atmospheric conditions i.e. F-Class temperature inversion (3°C/100 m); and
3. Adverse wind conditions i.e. 3 m/s source to receiver wind.

6.2 Modelled operations

6.2.1 Operational noise source levels

Noise sources levels are based upon measurements undertaken by AECOM at similar facilities, such M4 Berth, which operates with similar equipment to that proposed for this Project.

Based upon the attended measurements and observations of M4 Berth and similar types of sites, a 'reasonable' worst case operational scenario has been established and modelled for the operations during the day, evening and night assessment periods.

The modelled sound power levels are included in **Table 14**, which have been adjusted, for duration and frequency of operations in accordance with the corresponding operations, in the noise model to determine the noise impacts. The full modelled scenarios are outlined in **Section 6.2.3**.

Table 14 Modelled plant and equipment sound power levels

Plant item/operation	Sound power level, dB(A)
L_{Aeq} Sound power levels	
Forklift loading/unloading/dropping onto dock	109 ¹
Reach stacker/forklift (unmitigated)	108 ¹
Reach stacker/forklift (mitigated)	100 ¹
Containers hitting dock when being unloaded (2 impacts for the joining/attaching and the base impact) (Adjusted for 15 minute period)	89 ¹
Truck Idle	97 ²
Truck airbrake event	107 ³
Truck accelerating	105 ⁴
Lighting tower	85 ⁵
Temporary office plant (individual item)	70
L_{A1} Sound power levels	
Full Container Bang	117 ⁶
Empty Container Bang	119 ⁶
Trucks approaching/leaving site - Accelerating	106 ⁷
Truck airbrake event	116 ⁷

Notes:

1. Based upon AECOM attended measurements at Mayfield No. 4 Berth.
2. The truck noise levels are based upon previous measurements undertaken of by AECOM of B-Double haul trucks in 2015. As the type of trucks that attend site vary, these measured levels are considered suitable for use in this assessment.
3. This has been based upon an 8 second measurement, and has been modelled accordingly.
4. This value has then been used to model a dB(A)/m value for the truck movements.
5. This has been limited based upon the results of the noise impact assessment.
6. Based upon AECOM attended measurements at Port Botany on 9 December 2014.
7. Based upon AECOM attended measurements at Stolthaven Terminal, Mayfield on 28/29 September 2015.

6.2.2 Recommendations and discussion of noise source levels**Reach stackers/forklifts**

Measurements of unmitigated reach stackers or forklifts by AECOM have shown the SWLs can be up to 108 dB(A). As the reach stackers or forklifts are key operational noise sources for the Project, maximum sound power levels have been assumed for the operation of this equipment, to achieve a compliant solution using reasonable acoustic mitigation.

It is recommended that all reach stackers, forklifts or other unloading equipment that are selected for use as part of operations within the Project area, are selected with a maximum SWL of 100 dB(A). This will often require the incorporation of residential mufflers fitted to the exhaust system, or similar. This has been the basis of the noise modelling in this assessment.

Lighting towers

Temporary lighting towers may be brought in for night-time operations. As these may be operating continuously throughout the evening or night period they are also considered a key noise source on-site, following a review of the noise model. It is recommended that the temporary lighting towers are selected with a maximum SWL of 85 dB(A). This has been the basis of the noise modelling in this assessment.

6.2.3 Reasonable worst case operational scenarios

The following are the modelled operating scenarios which have been developed to represent a reasonable worst case operational scenario for each of the assessment periods. All noise sources in the model were assumed to operate as per the points below. The locations of the noise sources are shown in **Figure 3** and **Figure 4**.

Table 15 Operational assumptions for 'reasonable' worst case assessments

Operation	Day period	Evening period	Night period
Amenity			
Trucks movements through the facility	88 trucks ¹	16 trucks ²	36 trucks ²
	Trucks approaching and leaving the site via MCP internal roads and Selwyn Street at approximately 40 km/h.		
	Each truck idles for a total of 1 minute on site at gate.		
	Air-break releases occur when the trucks arrive on-site and are stopped prior entering at the gate and after moving to the unloading location (worst case – north west corner of the site).		
	Each truck takes 10 minutes to unload, and idles throughout the unloading period.		
Unloading/loading operations	Each truck is associated with an unloading operation of the reach stacker/forklift operation.		
	Reach stacker/forklifts will operate throughout the day, even when trucks are not present moving freight and cargo.	For each truck the reach stacker/forklift will operate up to 10 minutes for each truck movement.	
Other	-	During the evening and night periods it is assumed that up to six (6) day makers are located along the north-western boundary operating continuously throughout the assessment period.	
Office plant	Office plant is operating throughout period, 3 condenser units located on the northern façade of the demountable office building.		
Intrusive			
Trucks through the facility	2 trucks arrive 2 trucks leave 4 trucks waiting onsite 4 trucks unloaded in site	1 truck arrive 1 truck leave 2 trucks waiting onsite 2 trucks unloaded onsite	1 trucks arrive 1 trucks leave 2 trucks waiting onsite 2 trucks unloaded in site
	Trucks approaching and leaving the site via MCP internal roads and Selwyn Street at approximately 40 km/h.		
	Each truck idles for a total of 1 minute on site at gate.		
	Air-break releases occur when the trucks arrive on-site and are stopped prior entering at the gate, and also when they stopped at the unloading location (worst case – north west corner of the site).		
	Trucks that have arrive wait 10 minutes idling for a previous truck to move on		
	Each truck takes approximately 15 minutes to unload, and idles throughout the unloading period.		

Operation	Day period	Evening period	Night period
Unloading/ loading operations	Both reach stackers/forklifts will operate for the entire 15 minutes loading or unloading		
Other	-	During the evening and night periods it is assumed that up to six day makers are located along the north-western boundary operating continuously throughout the assessment period.	
Office plant	Office plant is operating throughout the entire period, 3 condenser units located on the northern façade of the demountable office building.		

Notes:

1. Based upon 8 trucks per hour throughout the assessment period.
2. Based upon 4 trucks per hour throughout the assessment period.



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Bulk Cargo Import and Storage Facility, Mayfield
Locations of Modelled Noise Sources (On-site)

- Reacher stacker/forklift
- Forklift loading/unloading/dropping onto dock
- Truck - Airbrake
- Truck - Idling
- Condenser Unit
- Container banging
- Lighting tower
- On-site building
- Truck - On-site
- Truck - Internal MCP access road
- Project Area
- Mayfield Concept Plan area



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Fig. 3



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Bulk Cargo Import and Storage Facility, Mayfield
Locations of Modelled Noise Sources (Mayfield Concept Plan area)



- ◆ Reacher stacker/forklift
- Forklift loading/unloading/dropping onto dock
- Truck - Airbrake
- Truck - Idling
- Condenser Unit
- ▲ Container banging
- Lighting tower
- On-site building
- Truck - On-site
- Truck - Internal MCP access road
- Project Area
- Mayfield Concept Plan area
- Noise assessment location

Fig. 4

6.3 Operational noise assessment

This section presents the predicted environmental noise emissions to the nearby representative assessment locations, with consideration of the prevailing meteorological conditions, for each of the three assessments:

1. INP amenity assessment (whole of day, evening or night period);
2. MCP noise quota level (whole of day, evening or night period); and
3. INP intrusive assessment (15-minute period).

6.3.1 Amenity period noise assessment

The predicted noise levels presented in **Table 16** have been assessed against the INP amenity criteria. Noise contour maps for the night-time period showing the predicted noise impacts under both neutral and the worst case prevailing meteorological conditions are presented in **Appendix E**.

Table 16 Predicted noise levels reasonable worst case operational scenarios amenity assessment

Receiver	Criterion	Neutral		Temperature inversion (F-Class, 3°C/100 m)		3 m/s source to receiver wind	
		Predicted noise level, L _{Aeq} (Period), dB(A)	Exceedance	Predicted noise level, L _{Aeq} (Period), dB(A)	Exceedance	Predicted noise level, L _{Aeq} (Period), dB(A)	Exceedance
Daytime							
R1	60	26	-	N/A ²	N/A ²	31	-
R2	60	32	-	N/A ²	N/A ²	37	-
R3	60	32	-	N/A ²	N/A ²	37	-
R4	57	23	-	N/A ²	N/A ²	29	-
R5	52	22	-	N/A ²	N/A ²	28	-
R6 ¹	45	24	-	N/A ²	N/A ²	29	-
R7	65	31	-	N/A ²	N/A ²	36	-
R8	70	42	-	N/A ²	N/A ²	47	-
Evening							
R1	47	24	-	29	-	29	-
R2	55	30	-	34	-	34	-
R3	55	30	-	34	-	35	-
R4	44	22	-	26	-	27	-
R5	42	20	-	26	-	26	-
R6 ¹	- ¹	21	-	25	-	26	-
R7	65	28	-	33	-	33	-
R8	70	39	-	43	-	44	-
Night							
R1	37	24	-	29	-	29	-
R2	52	30	-	34	-	34	-

Receiver	Criterion	Neutral		Temperature inversion (F-Class, 3°C/100 m)		3 m/s source to receiver wind	
		Predicted noise level, L _{Aeq} (Period), dB(A)	Exceedance	Predicted noise level, L _{Aeq} (Period), dB(A)	Exceedance	Predicted noise level, L _{Aeq} (Period), dB(A)	Exceedance
R3	52	30	-	34	-	35	-
R4	37	22	-	26	-	27	-
R5	42	20	-	26	-	26	-
R6 ¹	- ¹	21	-	25	-	26	-
R7	65	28	-	33	-	33	-
R8	70	39	-	43	-	44	-

Notes:

1. In the INP the school classroom criteria is an internal noise level, with an acceptable noise level of 35 dB(A) and a recommended maximum of 40 dB(A). A 10 dB reduction has been assumed between external and internal noise levels based upon a window being open for adequate natural ventilation. The noise impacts on schools are to be assessed only during school hours.
2. Temperature inversions are not a prevailing meteorological conditions during the daytime period.

6.3.2 Mayfield Concept Plan noise quotas assessment

As outlined in **Section 3.4**, as the Project lies within the MCP site, the Project site is required to demonstrate compliance with the requirements of the MCP approval. The MCP approval aims to address cumulative noise impacts from all sites that make up the entire MCP area, with a purpose of addressing cumulative noise impacts as the concept area is developed over time.

PON has developed a Cumulative Environmental Noise Management Tool (CENMT) for the MCP, as such the assessment quotas provided in **Table 11** are for assessment purposes only. Additionally, following the assessment, PON will review this noise impact assessment, and finalise the site noise quotas.

Table 17 presents the predicted noise levels against the MCP noise quota. It should be noted that these noise levels do not include shipping operations, or noise from associated facilities such a M4 Berth as this site has a separate operational approval, as in accordance with the Mayfield Concept Plan approval MP 09_0096MOD 2.

These noise quotas have been assessed under winds of up to 3 metres/second (measured at 10 metres above the ground level) and Pasquill stability class from A to F as required by the MCP Approval (09_0096MOD 2). As such the highest predicted noise level out of these conditions has been included in **Table 17**, which is with a 3 m/s source to receiver wind.

Table 17 Reasonable worst case amenity scenario – Worst case meteorological conditions

Period	Day					Evening					Night						
	L _{Aeq (Day)} , dB(A)	MCP noise quota, dB(A)	Exceedance	MCP overall noise goals, dB(A)	Exceedance	L _{Aeq (Evening)} , dB(A)	Predicted noise level, dB(A)	MCP noise quota, dB(A)	Exceedance	MCP overall noise goals, dB(A)	Exceedance	L _{Aeq (Night)} , dB(A)	Predicted noise level, dB(A)	MCP noise quota, dB(A)	Exceedance	MCP overall noise goals, dB(A)	Exceedance
MCP Receiver																	
Assessed Meteorological Condition: 3 m/s Source to Receiver Wind																	
A	31	51	-	60	-	29	40	40	-	49	-	29	29	34	-	43	-
B	37	51	-	60	-	34	41	41	-	50	-	34	34	34	-	43	-
C	29	46	-	57	-	27	33	33	-	44	-	27	27	34	-	45	-
D	28	45	-	55	-	26	27	27	-	37	-	26	26	27	-	37	-

Notes

- These cumulative amenity noise quota levels are subject to approval by PON and DP&E.

6.3.3 Intrusiveness period noise assessment

The following are the modelled results for the reasonable worst case intrusiveness scenario (15 minute period). The intrusive assessment only applies to residential receiver locations. The modelling scenarios are presented in **Section 6.2**.

Table 18 Predicted noise levels reasonable worst case operational scenarios intrusive assessment

Receiver	Criterion	Neutral		Temperature inversion (F-Class, 3°C/100 m)		3 m/s source to receiver wind	
		Predicted noise level, L_{Aeq} (15min), dB(A)	Exceedance	Predicted noise level, L_{Aeq} (15min), dB(A)	Exceedance	Predicted noise level, L_{Aeq} (15min), dB(A)	Exceedance
Daytime							
R1	48	29	-	N/A ¹	N/A ¹	34	-
R2	48	35	-	N/A ¹	N/A ¹	39	-
R3	48	35	-	N/A ¹	N/A ¹	40	-
R4	49	25	-	N/A ¹	N/A ¹	30	-
R5	52	23	-	N/A ¹	N/A ¹	29	-
Evening							
R1	43	28	-	33	-	33	-
R2	43	34	-	38	-	39	-
R3	43	34	-	38	-	39	-
R4	48	24	-	29	-	29	-
R5	51	22	-	28	-	28	-
Night							
R1	42	28	-	33	-	33	-
R2	42	34	-	38	-	39	-
R3	42	34	-	38	-	39	-
R4	44	24	-	29	-	29	-
R5	51	22	-	28	-	28	-

Notes:

1. Temperature inversions are not a prevailing meteorological conditions during the daytime period.

6.3.4 Tonality and INP modifying factors

The a potential sources of tonal or short term/intermittent noise is from the use of tonal reversing beepers as part of the operations of on mobile equipment and trucks.

6.4 Discussion and recommendations from the operational noise assessment

This section presents the predicted operational industrial noise levels for the three types of required assessments:

1. INP amenity assessment (whole of day, evening or night period) (**Section 6.3.1**);
2. MCP noise quota level (whole of day, evening or night period) (**Section 6.3.2**); and
3. INP intrusive assessment (15-minute period) (**Section 6.3.3**)

Compliance has been predicted for all assessments, based upon the assumed operations and sound powers levels of the equipment presented in **Section 6.2**.

The specific operations of the Project site may vary on a day to day basis as the facility is to be used for storage of a range of freight and cargo. This may result in different unloading and loading equipment, different storage locations around the site, different freight and cargo with different load or unload durations, along with different numbers of trucks. All of which have different noise sources, that will operate for different durations when on site.

As such, the assessment has focused upon a reasonable worst case operating scenario, which has considered container handling operations which involve high levels of impact noise when the reach stacker remove the containers from trucks, and then place them onto the ground/hard stand. This has been done so that is this reasonable worst case operating scenario complies with the noise requirements, other operations are likely to also comply. Nominal truck numbers have been assumed (**Table 15**) for the assessments on the basis that the majority of truck movements will generally take place during the day time, but will vary day to day.

The noise sources in the assessments have been modelled in the location closest to the nearest residential receiver to the site (see **Figure 3**), and assumed all operations will occur in this location. This is will not commonly occur, and in the case operations take place;

- At other locations within the Project site;
- Operate for smaller durations than modelled; and/or
- The equipment operate with sound power levels less than modelled;

then the noise impacts at nearby receiver locations will likely be less than those presented in the assessment.

Where possible, for freight or cargo with the potential to generate high noise levels from its handling (i.e. dropping or clanging of steel bars), is transported and stored within the Project site during the daytime period. It is recommended that broadband reversing alarms are fitted to all equipment associated with operations within the Project site where practical. In addition, it is recommended that trucks using the facility are fitted with broadband reversing alarms. Where this is not possible as the trucks operating through the facility are not controlled by PON, a management method should be developed for truck movements during the night-time period with the aim of minimising the use of tonal reversing alarms by planning the access and existing routes from the facility.

6.5 Cumulative operational noise impacts

PON has developed the CENMT, which includes the development of a Site Noise Model as required by Condition 2.16 the MCP Concept Approval, to take into consideration all existing and future developments to determine the applicable noise quotas for individual sites within the MCP area.

The purpose of the CENMT is to control the cumulative noise impacts from developments within the MCP, by providing noise quotas to individual sites. This is so that when the MCP is fully developed, the cumulative noise impacts from all MCP sites meet the MCP noise limits. As such, by achieving the noise quota levels (**Section 6.3.2**) cumulative noise from within the MCP is addressed.

The overall MCP noise limits are EPA INP amenity criteria, which already takes into account existing industrial noise levels outside of the MCP, and the criteria has been developed to consider these existing industrial noise levels. As such, by assessing the site in accordance with the MCP requirements, the cumulative noise impact from the facility is controlled in a way to deal with cumulative industrial noise impacts as required by the INP.

6.6 Cumulative noise impacts from associated shipping operations

The operations of container and bulk goods handling along with associated ship/tankers operates at M4 Berth are controlled by the DP&E Consent Condition DA-293-08-00 MOD 9, dated 29 August 2013. Accordingly, assessment of noise from ship operations when at berth should be undertaken against this condition.

AECOM understands that M4 Berth has demonstrated over a number years consistent compliance with the noise requirements of DP&E Consent Condition DA-293-08-00 MOD 9, for container and bulk goods handling operations similar those proposed associated with the Project site activities.

The following operational noise compliance assessments over a period of three years confirmed consistent compliance from the operations of M4 Berth in the following assessments:

1. Mayfield No. 4 Berth, Operational Noise Compliance Assessment, 60223483.RPT02.01, dated 7 October 2011.
2. Mayfield No. 4 Berth, Operational Noise Compliance Assessment, 60223483.RPT03.02, dated 21 December 2012.
3. Mayfield No. 4 Berth, Operational Noise Compliance Assessment, 60223483.RPT04.01, dated 17 September 2013.

The associated criteria for DP&E Consent Condition DA-293-08-00 MOD 9 is an $L_{Aeq\ 15\text{-minute}}$ assessment criteria, and as such reasonable worst case 15-minute operations at M4 Berth associated with the Project would be similar to the current M4 operations. As such, there are no expected changes in the reasonable worst case 15-minute operations and so there should be no changes in associated noise emissions for M4 Berth operations.

6.7 Sleep disturbance

The application notes for the EPA *Industrial Noise Policy* (2000) recommend that sleep disturbance is assessed based on the emergence of the $L_{A1\ (1\ \text{minute})}$ noise level over the corresponding $L_{A90\ (15\ \text{minute})}$ noise level.

The following screening criterion for sleep disturbance is recommended for the assessment of sleep disturbance:

$$L_{A1\ (1\ \text{minute})} < L_{A90\ (15\ \text{minute})} + 15\ \text{dB(A)}$$

The noise sources with the greatest potential for causing sleep disturbance are the operations of the trucks airbrakes, truck reversing alarms, and the dropping of containers and cargo onto the storage area and/or trucks. These noise source levels are shown in **Section 6.2.1**, and have been included in the noise modelling.

Truck reversing alarms are addressed in **Section 6.4**.

The results of this assessment are shown in **Table 19**, which demonstrates that the recommended screening criterion is not exceeded at any residential receiver location. A noise contour map is provided in **Appendix E**.

The night-time sleep disturbance assessment has been undertaken against the most stringent meteorological condition. As such predicted noise levels for 3 m/s source to receiver winds and F-Class temperature inversion have been predicted for all receiver locations and as the noise levels are generally higher for the 3 m/s source to receiver winds situation, only these results have been presented.

The 800 m separation between the site and the nearest residential receivers means that the maximum external noise levels are not predicted to exceed 52 dB(A) due to the night-time operations of the Project.

Table 19 L_{A1} (1 minute) predicted noise levels at representative sensitive receiver locations during night-time operations

Receiver	Criterion	Predicted L_{A1} (1 minute) with 3 m/s source to receiver winds	Exceedance
R1	52	46	-
R2	52	51	-
R3	52	52	-
R4	54	41	-
R5	61	40	-

Notes:

1. Only residential receivers require assessment for sleep disturbance.

6.8 Operational road traffic noise assessment

It is proposed that the site will generate a maximum of 100 trucks per day. Potential maximum traffic generation from the site is presented in **Table 20**, while the most recent existing traffic movements on Industrial Drive, Mayfield are presented in **Table 21**. Traffic on surrounding roads would be altered as detailed in **Table 23** as a result of the Project.

Table 20 Predicted traffic generation from the Project

Cargo Storage Facility	Adopted rates and movements per day	
	Vehicle movements	Vehicles
Trucks	200	100
Staff/Visitor (Light vehicles)	30	15
Total vehicles	230	115

Table 21 Roads and Maritime traffic count for Industrial Drive, Mayfield (RMS, 2005)

Station number	Location	1995	1998	2001	2004	2010
05.953	Industrial Drive, Mayfield North-West Of Woodstock Street	29,746	29,549	30,334	30,717	-
05.979	Industrial Drive, Mayfield West (90 m West of Werribi Street, Mayfield West)	-	-	-	-	30,903

The existing traffic flows were determined from the most recent published Roads and Maritime Service permanent and sample count station data for Industrial Drive.

The impacts of the resulting traffic on surrounding roads are as detailed in **Table 22**.

To breakdown the existing traffic numbers into 15 hour (7:00 am – 10:00 pm) and 9 hour (10:00 pm – 7:00 am) periods, a breakdown traffic counts provided by the Roads and Maritime has been used, and is presented in **Table 22**. The traffic counts were undertaken by Roads and Maritime at Industrial Drive, Mayfield, 150 m North of George Street between the period of 2 September 2011 and 20 September 2011. The total average weekday (Monday – Friday) traffic count over this measurement period was 29,856 vehicles.

Table 22 Industrial Drive, Mayfield day/night traffic breakdown, Roads and Maritime, period of 2 September 2011 and 20 September 2011

Period	Average period weekday traffic count	Percentage of daily traffic number, %
150 m North Of George Street, Industrial Drive, Mayfield		
Day (7:00 am – 10:00 pm)	26,238	87.9
Night (10:00 pm – 7:00 am)	3,618	12.1

Considering the worst case where all potential vehicle movements could occur during either the evening or night period, and so up to 230 movements could occur, this worst case maximum increase has been assessed in **Table 23**.

Table 23 Summary of increase in road traffic noise

Location	Existing traffic numbers ¹	Existing traffic noise levels ³	Calculated existing traffic numbers breakdown ⁴	Worst case increase from project	Known other projects to be approved/ submitted for review ⁵	Worst case future traffic numbers breakdown ²	% Increase	Increase in noise levels, dB(A)
Industrial Drive, Mayfield West Station No. 05.979	30,903	DAY 70 dB(A) L _{Aeq} (15hr)	27,158	230	393	27,781	2.3	0.1
		NIGHT 66 dB(A) L _{Aeq} (9hr)	3,745	230	165	4,140	10.5	0.4

Notes:

- Traffic numbers are based upon the Traffic Volume Data for Hunter and Northern Regions 2004, produced by the Roads and Maritime.
- This is the worst case scenario where all traffic movements from the site head in the same direction from the site along Industrial Drive, Mayfield, and this is based upon the 2010 annual average traffic flow numbers on Industrial Drive in proximity of the site.
- Measured by AECOM at 118 Woodstock Street, Mayfield between 29 July 2014 and 4 August 2014.
- Breakdown calculated based upon the percentages presented in **Table 22**.
- Based upon the noise impact assessment for the Stothaven Mayfield Bulk Fuel Terminal - SSD_7056 noise and vibration impact Assessment (AECOM report 60326869-RPNV-03, dated 19 February 2016).

Predicted traffic noise increases on the surrounding road network are predicted to be less than 1 dB(A) for the maximum truck movements associated with the Project. Even though the existing traffic noise levels exceed the recommended traffic noise criteria in accordance with the RNP, the increase in traffic noise as a result of traffic from the Project site would not have a noticeable impact on sensitive receivers adjacent to Industrial Drive, Mayfield, and it would not be reasonable or feasible to provide noise mitigation measures as the worst case traffic noise increase from the Project site would not be noticeable to nearby receiver locations.

6.9 Noise management, mitigation and monitoring

As the Project site is located within the MCP, it would be required to assess performance following the commencement of operations in accordance with the Noise Verification Monitoring Plan (AECOM Report: reference 60437494, dated 15 October 2015) (NVMP) in accordance with the requirements of Condition 2.1(g) of the MCP Approval (09_0096MOD 2).

It is recommended that the MCP noise emission requirements be incorporated into the projects Operational Environmental Management Plan.

7.0 Conclusion

This report presents the results of an assessment of the potential noise and vibration impacts of the proposed the Cargo Storage Facility, Mayfield (the Project) operated by PON at Mayfield, NSW.

AECOM has prepared this noise and vibration impact assessment to support the Statement of Environmental Effects prepared on behalf of the PON to support the Development Application for the proposed facility.

The proposed development is for the construction and operation of an approximately 12 hectare port storage facility in the Mayfield Port Precinct. The facility would provide for the storage of a range of freight and cargo including (but not limited to) project cargo such as wind turbine components, large industrial components, luxury boats, electrical transformers and machinery, general cargo such as farm machinery, excavators, and construction machinery, breakbulk such as steel or timber products, and containerised cargo.

This assessment has been undertaken to review the potential operational and construction environmental noise and vibration impacts that may be generated by the Project, and recommends mitigation measures, where necessary.

The following outlines the findings of this assessment.

Operational environmental noise emissions

The operational environmental noise emissions from the site are required to be assessed against three set of criterion –

1. INP amenity assessment (whole of day, evening or night period);
2. MCP noise quota level (whole of day, evening or night period); and
3. INP intrusive assessment (15-minute period).

A reasonable worst case set of operations, in the worst case location on the site have been assessed in order to determine the noise impacts against the recommended criterion.

The operational noise impact assessment indicates compliance can be achieved under neutral and prevailing meteorological conditions at all assessment locations during the daytime, evening and night-time periods for the EPA INP intrusive and amenity period assessments.

As part of the MCP Cumulative Environmental Noise Management Tool (CENMT) noise quotas are issued for sites proposed within the MCP, in order to address future cumulative noise from all sites within the MCP. The operational noise impact assessment indicates compliance with these quota levels can be achieved.

The results of these assessments assume that the equipment installed produce noise levels similar or less than those shown in **Section 6.2.1**. Specific consideration to the maximum sound power levels has been noted to the selection of temporary lighting towers, and the selection of material handling plant (i.e. forklifts or reach stackers) which may require the incorporation of acoustic mitigation to achieve the maximum operating sound power levels.

Additionally, it is recommended that equipment associated with the Project should be fitted with broadband reversing alarms and where this is not possible for visiting trucks, potential noise impacts should be managed.

Sleep disturbance

A sleep disturbance assessment has been conducted, and indicates compliance with the screening criterion at all assessment locations during the night-time period.

Cumulative noise impacts

The aim of the MCP CENMT is to control the cumulative noise impacts from developments within the Mayfield Concept Plan. The site is predicted to comply with the MCP allocated provisional noise quota. The basis of the overall MCP noise limits is the EPA INP amenity criterion which takes into consideration existing industrial noise levels, by demonstrating compliance with the MCP noise quota levels, cumulative noise is sufficiently addressed for the Project.

Construction noise

AECOM understands that there would be no direct construction activities associated with the proposal. It is proposed that all setup and establishment activities would be associated with the operations of the facility with temporary fencing and buildings brought in by any contractor during different storage activities. Recommendations have been provided for managing any setup and establishment noise emissions.

Vibration

The Project site has large buffer distance between the Project site and nearby residential receivers, in addition to no vibration intensive activities are proposed as part of the sites operations. As such the risk of discomfort, regenerated noise and structural damage impacting on receivers is extremely low.

Road traffic noise

An operational road traffic noise assessment was conducted in accordance with EPA's RNP guideline. The road traffic noise assessment associated with operations of the Project indicates compliance with RNP acoustic criteria.



Appendix A

Acoustic terminology

Appendix A Acoustic terminology

The following is a brief description of acoustic terminology used in this report.

Sound power level	Sound power level is the total sound energy produced by a sound source.																						
Sound pressure level	Sound pressure level is the portion of sound energy at a point a distance from the sound source.																						
Decibel [dB]	The measurement unit of sound																						
A Weighted decibels [dB(A)]	The A weighting is a frequency filter applied to measured noise levels to represent how humans hear sounds. The A-weighting filter emphasises frequencies in the speech range (between 1kHz and 4 kHz) which the human ear is most sensitive to, and places less emphasis on low frequencies at which the human ear is not so sensitive. When an overall sound level is A-weighted it is expressed in units of dB(A).																						
Decibel scale	<p>The decibel scale is logarithmic in order to produce a better representation of the response of the human ear. A 3 dB increase in the sound pressure level corresponds to a doubling in the sound energy. A 10 dB increase in the sound pressure level corresponds to a perceived doubling in volume. Examples of decibel levels of common sounds are as follows:</p> <table border="0"> <tr> <td>0dB(A)</td> <td>Threshold of human hearing</td> </tr> <tr> <td>30dB(A)</td> <td>A quiet country park</td> </tr> <tr> <td>40dB(A)</td> <td>Whisper in a library</td> </tr> <tr> <td>50dB(A)</td> <td>Open office space</td> </tr> <tr> <td>70dB(A)</td> <td>Inside a car on a freeway</td> </tr> <tr> <td>80dB(A)</td> <td>Outboard motor</td> </tr> <tr> <td>90dB(A)</td> <td>Heavy truck pass-by</td> </tr> <tr> <td>100dB(A)</td> <td>Jackhammer/Subway train</td> </tr> <tr> <td>110 dB(A)</td> <td>Rock Concert</td> </tr> <tr> <td>115dB(A)</td> <td>Limit of sound permitted in industry</td> </tr> <tr> <td>120dB(A)</td> <td>747 take off at 250 metres</td> </tr> </table>	0dB(A)	Threshold of human hearing	30dB(A)	A quiet country park	40dB(A)	Whisper in a library	50dB(A)	Open office space	70dB(A)	Inside a car on a freeway	80dB(A)	Outboard motor	90dB(A)	Heavy truck pass-by	100dB(A)	Jackhammer/Subway train	110 dB(A)	Rock Concert	115dB(A)	Limit of sound permitted in industry	120dB(A)	747 take off at 250 metres
0dB(A)	Threshold of human hearing																						
30dB(A)	A quiet country park																						
40dB(A)	Whisper in a library																						
50dB(A)	Open office space																						
70dB(A)	Inside a car on a freeway																						
80dB(A)	Outboard motor																						
90dB(A)	Heavy truck pass-by																						
100dB(A)	Jackhammer/Subway train																						
110 dB(A)	Rock Concert																						
115dB(A)	Limit of sound permitted in industry																						
120dB(A)	747 take off at 250 metres																						
Frequency [f]	The repetition rate of the cycle measured in Hertz (Hz). The frequency corresponds to the pitch of the sound. A high frequency corresponds to a high pitched sound and a low frequency to a low pitched sound.																						
Equivalent continuous sound level [L _{eq}]	The constant sound level which, when occurring over the same period of time, would result in the receiver experiencing the same amount of sound energy.																						
L _{max}	The maximum sound pressure level measured over the measurement period																						
L _{min}	The minimum sound pressure level measured over the measurement period																						
L ₁₀	The sound pressure level exceeded for 10% of the measurement period. For 10% of the measurement period it was louder than the L ₁₀ .																						

L ₉₀	The sound pressure level exceeded for 90% of the measurement period. For 90% of the measurement period it was louder than the L ₉₀ .
Ambient noise	The all-encompassing noise at a point composed of sound from all sources near and far.
Background noise	The underlying level of noise present in the ambient noise when extraneous noise (such as transient traffic and dogs barking) is removed. The L ₉₀ sound pressure level is used to quantify background noise.
Traffic noise	The total noise resulting from road traffic. The L _{eq} sound pressure level is used to quantify traffic noise.
Day	The period from 0700 to 1800 h Monday to Saturday and 0800 to 1800 h Sundays and Public Holidays.
Evening	The period from 1800 to 2200 h Monday to Sunday and Public Holidays.
Night	The period from 2200 to 0700 h Monday to Saturday and 2200 to 0800 h Sundays and Public Holidays.
Assessment background level [ABL]	The overall background level for each day, evening and night period for each day of the noise monitoring.
Rating background level [RBL]	The overall background level for each day, evening and night period for the entire length of noise monitoring.

*Definitions of a number of terms have been adapted from Australian Standard AS1633:1985 "Acoustics – Glossary of terms and related symbols", the EPA's NSW Industrial Noise Policy and the EPA's Road Noise Policy.



Appendix B

Unattended ambient
noise monitoring

Appendix B Unattended ambient noise monitoring

Mayfield

81 Margaret Street, Mayfield East

A noise logger was used to continuously monitor background noise levels between 7 September 2011 and 15 September 2011, the measurement details are provided in **Table 24**.

Table 24 Ambient noise monitoring locations

Location Duration	Instrumentation	Comments
81 Margaret St, Mayfield Start: 07 Sept 11 Finish: 15 Sept 11	ARL-315 Noise Logger S/N: 15-199-414	Noise sensitive residential receiver. Assessment location to determine noise levels impacting on residential receivers in the Mayfield area. Noise logger located approximately 1.5 m above ground level.

Ambient noise monitoring results at this location are presented in **Table 25**.

Table 25 Ambient noise monitoring results

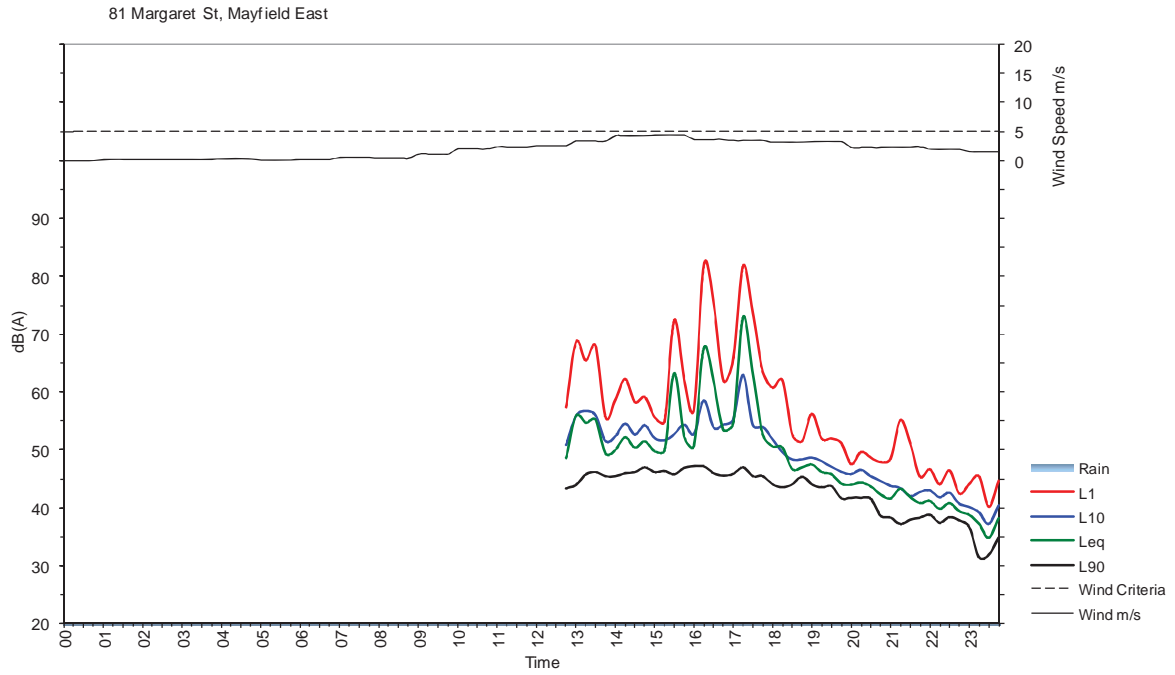
Logger Location	Day		Evening		Night	
Sensitive Receiver Catchment - Mayfield						
81 Margaret Street, Mayfield East	L_{A90}	L_{Aeq}	L_{A90}	L_{Aeq}	L_{A90}	L_{Aeq}
Wednesday, 7 September 2011			38	46	33	45
Thursday, 8 September 2011	41	57	36	48	37	47
Friday, 9 September 2011	43	54	37	44	37	44
Saturday, 10 September 2011	42	60	40	45	37	47
Sunday, 11 September 2011	40	52	35	42	34	53
Monday, 12 September 2011	44	55	43	47	42	49
Tuesday, 13 September 2011	43	62	41	47	39	46
Wednesday, 14 September 2011	*	*	*	*	*	*
Thursday, 15 September 2011	*	*				
RBL	43		38		37	
Log Average L_{Aeq}		58		46		47

Notes:

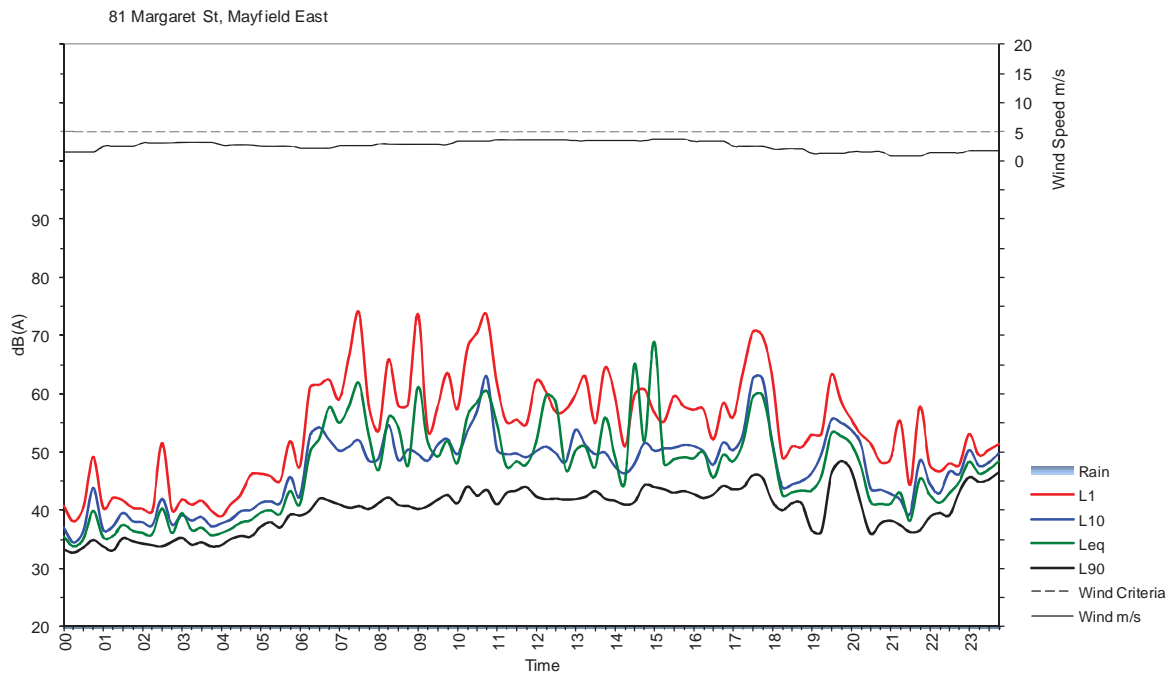
- Fields marked with (*) in **Table 25** are periods that were affected by adverse weather conditions such as rain, excessive wind speeds or extraneous noise events.
- Day is defined as 7:00 am to 6:00 pm, Monday to Saturday and 8:00 am to 6:00 pm Sundays and Public Holidays. Evening is defined as 6:00 pm to 10:00 pm, Monday to Sunday and Public Holidays. Night is defined as 10:00 pm to 7:00 am, Monday to Saturday and 10:00 pm to 8:00 am Sundays & Public Holidays.
- RBL - Rating Background Noise Level (RBL) is representative of the average minimum background sound level (in the absence of the source under consideration), or simply the background level L_{A90}. The RBL is based on the median of the individual daily background noise levels during each assessment period over the entire monitoring period.
- The L_{Aeq} level is the equivalent continuous sound level and has the same sound energy over the sample period as the actual noise environment with fluctuating sound levels. The overall representative L_{Aeq} noise level is determined by logarithmically averaging each assessment period for the entire monitoring period.

81 Margaret Street, Mayfield East

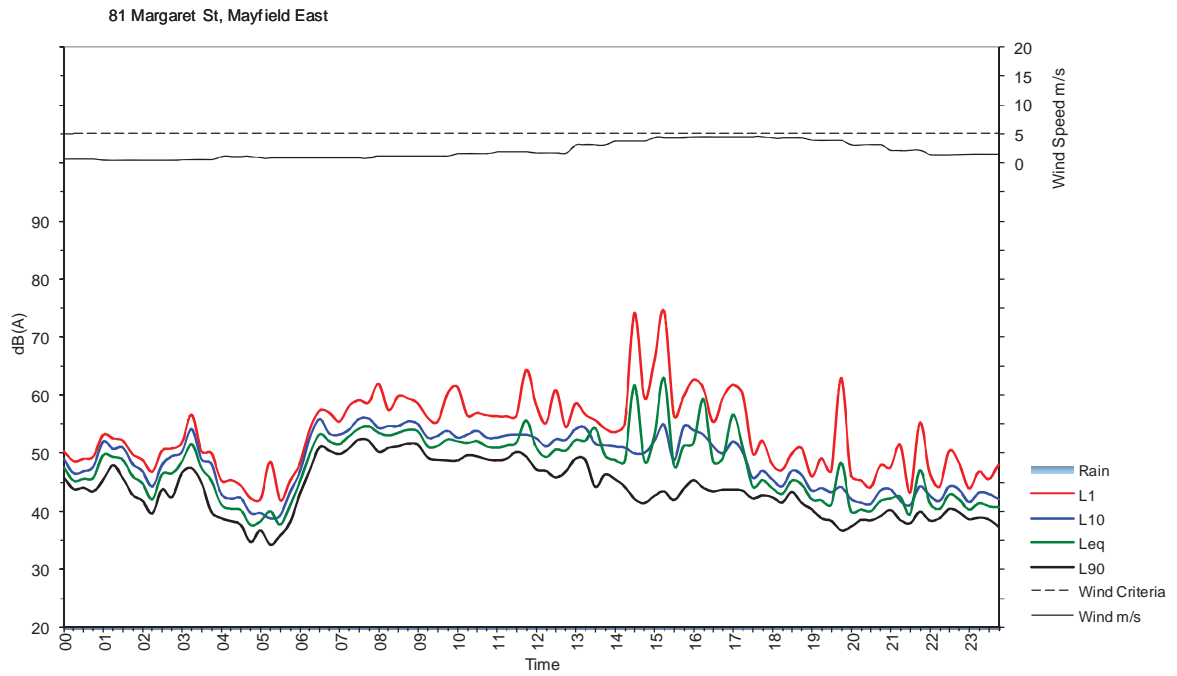
Wednesday 07 September 2011



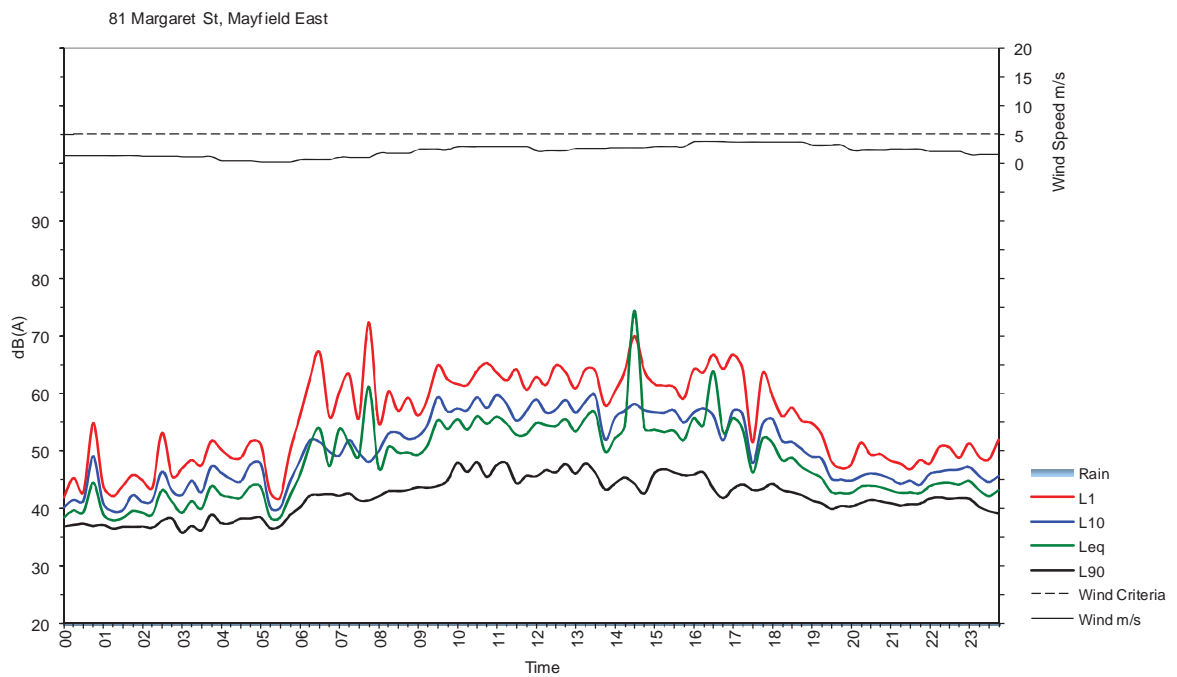
Thursday 08 September 2011

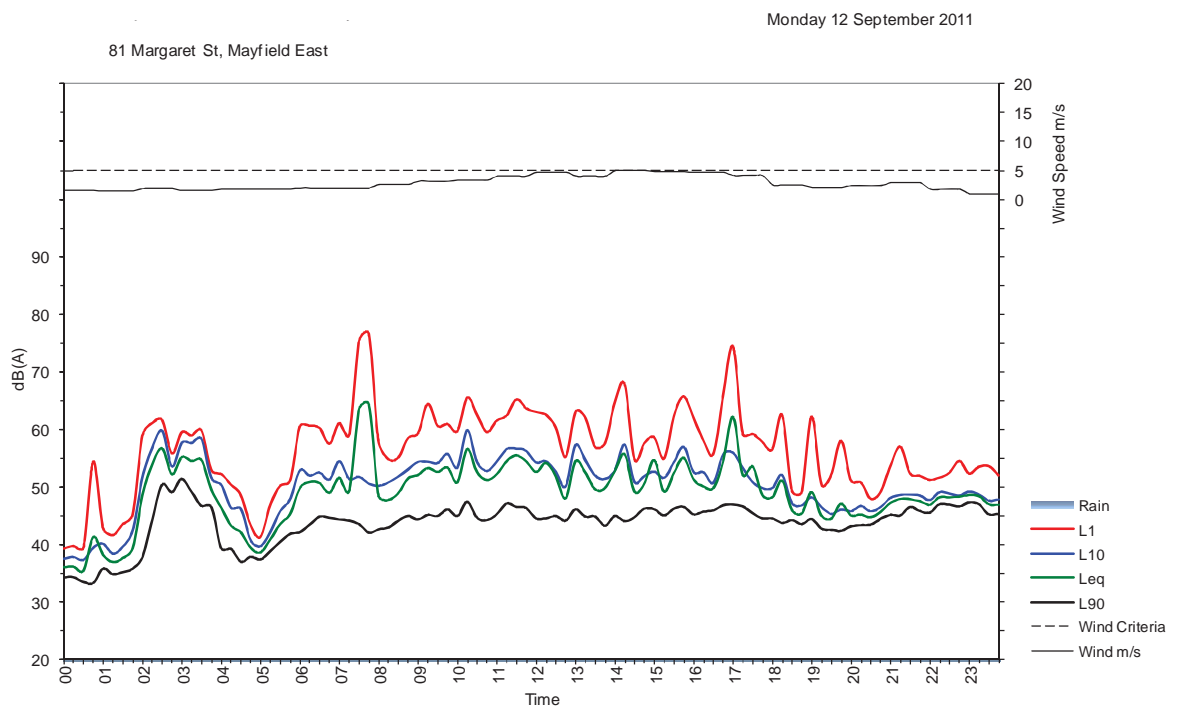
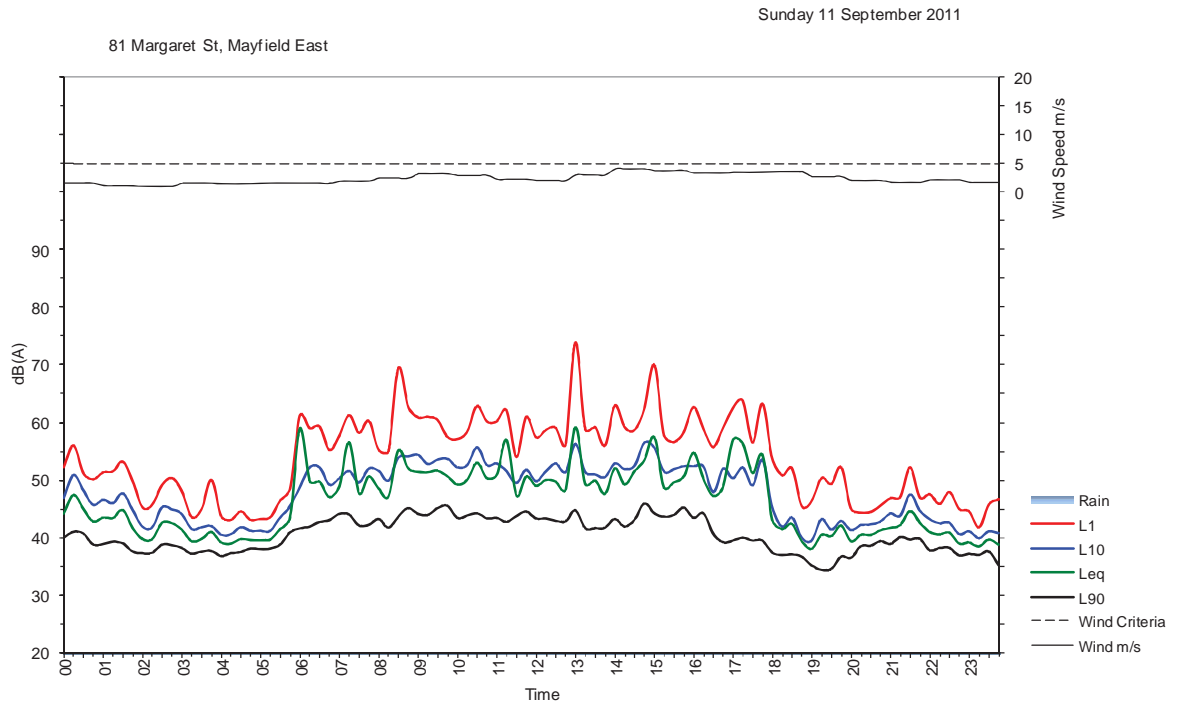


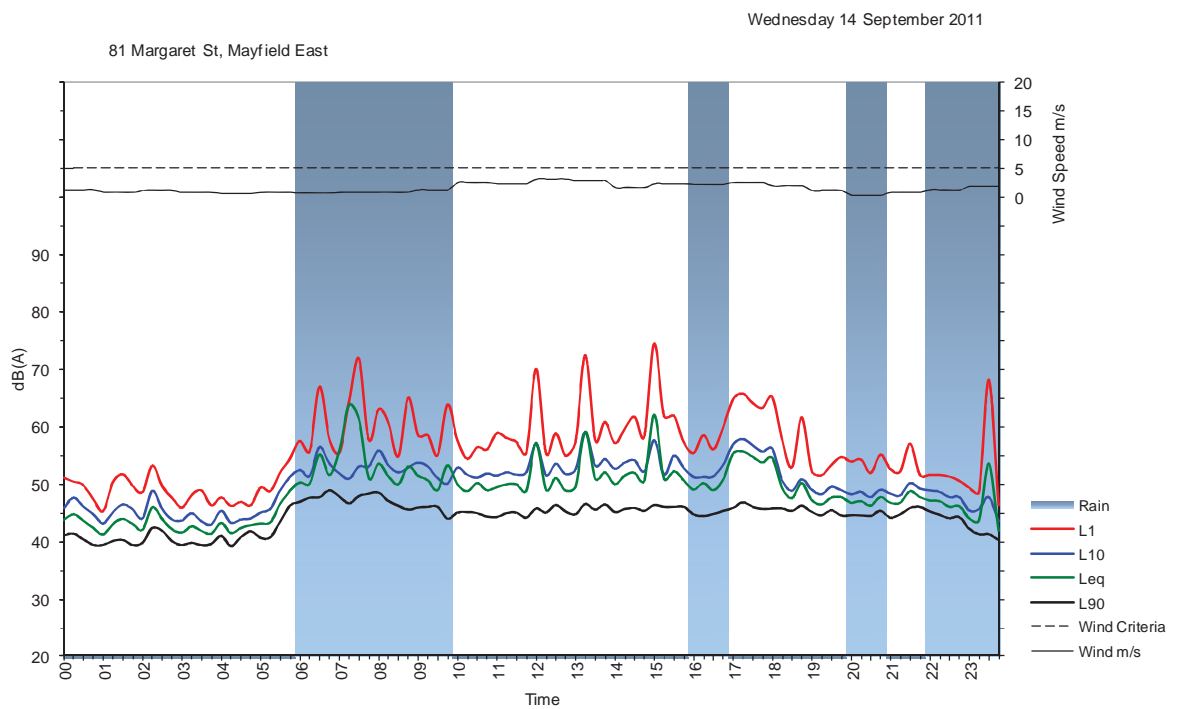
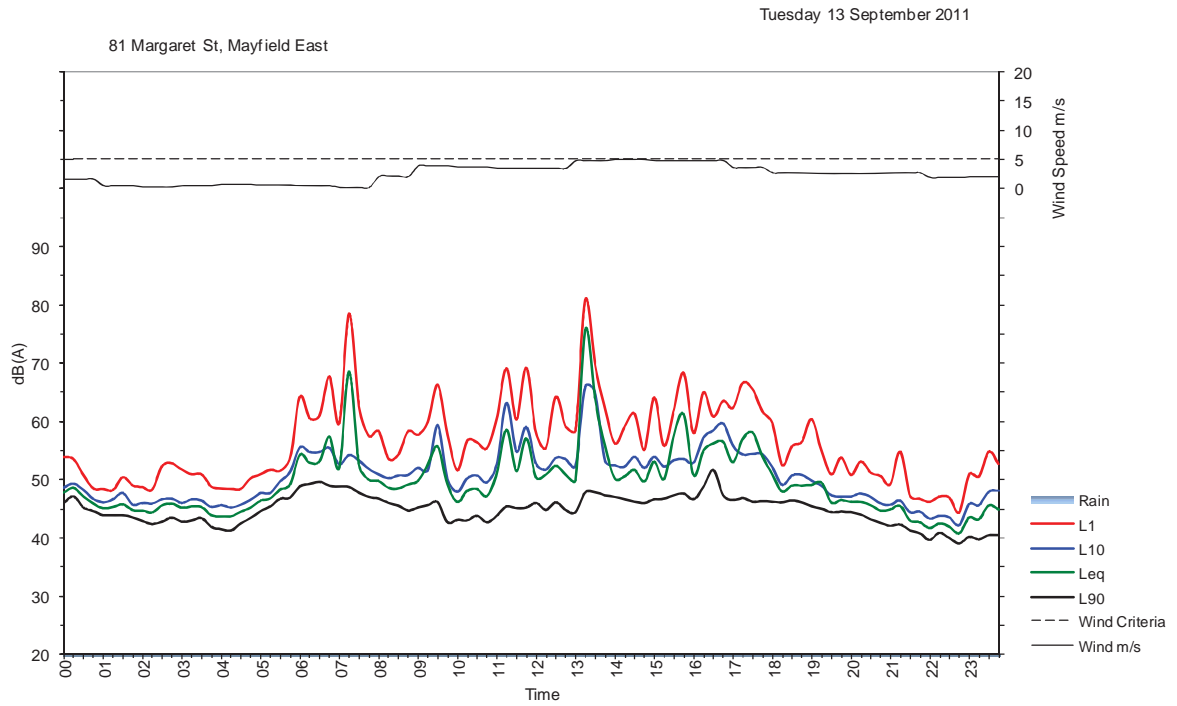
Friday 09 September 2011

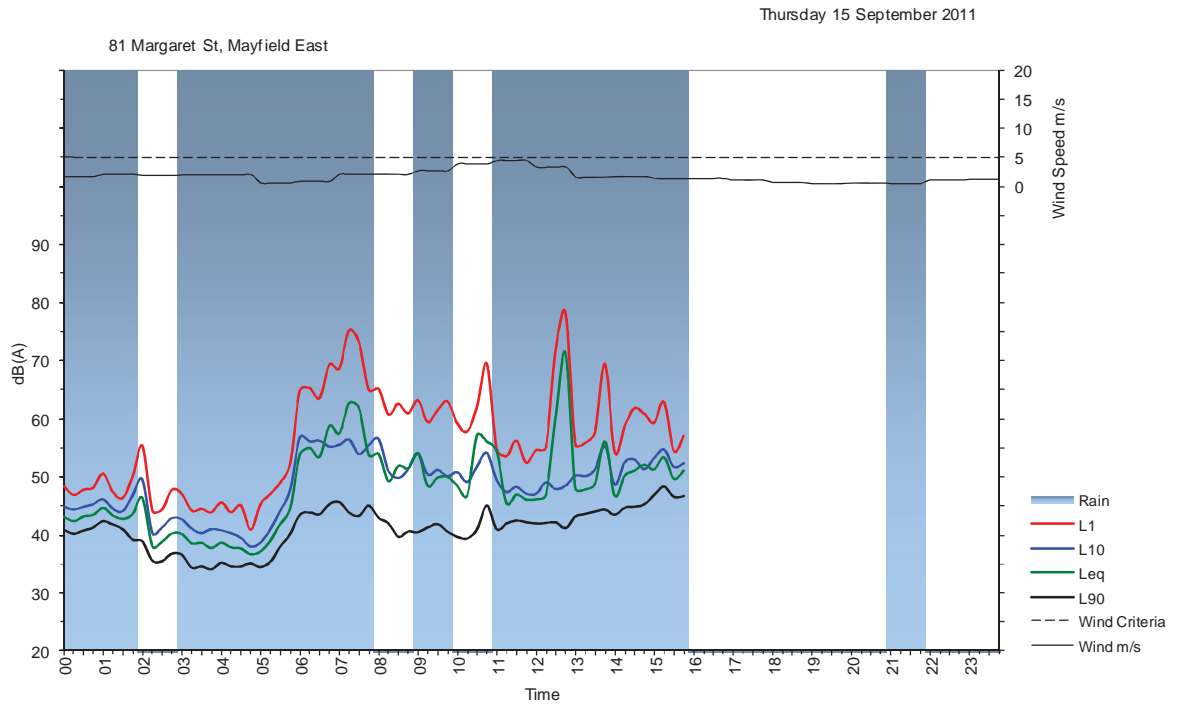


Saturday 10 September 2011









Carrington

32 Elizabeth Street, Carrington

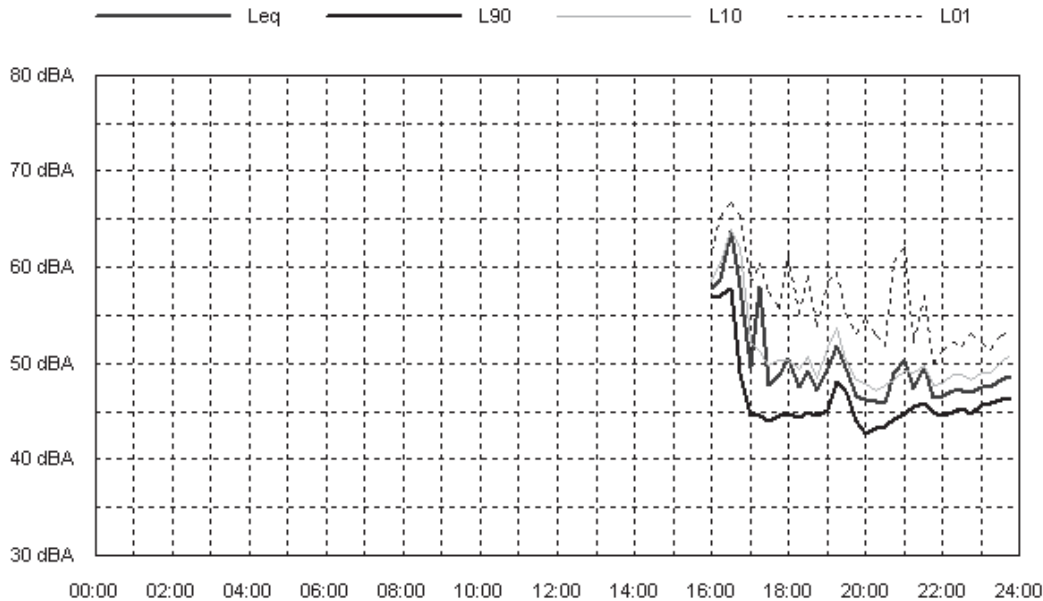
Long term noise monitoring in the vicinity of the residential receivers of Carrington was undertaken from 18 to 26 March 2009 by Wilkinson Murray. The results of the noise monitoring are presented in the study "*Mayfield Site Port-Related Activities Concept Plan EA*", Revision F, July 2010 by Wilkinson Murray.

- "*Mayfield Site Port-Related Activities Concept Plan EA*", Report No. 09077, Revision F, July 2010 by Wilkinson Murray'.

Location: 32 Elizabeth Street Carrington

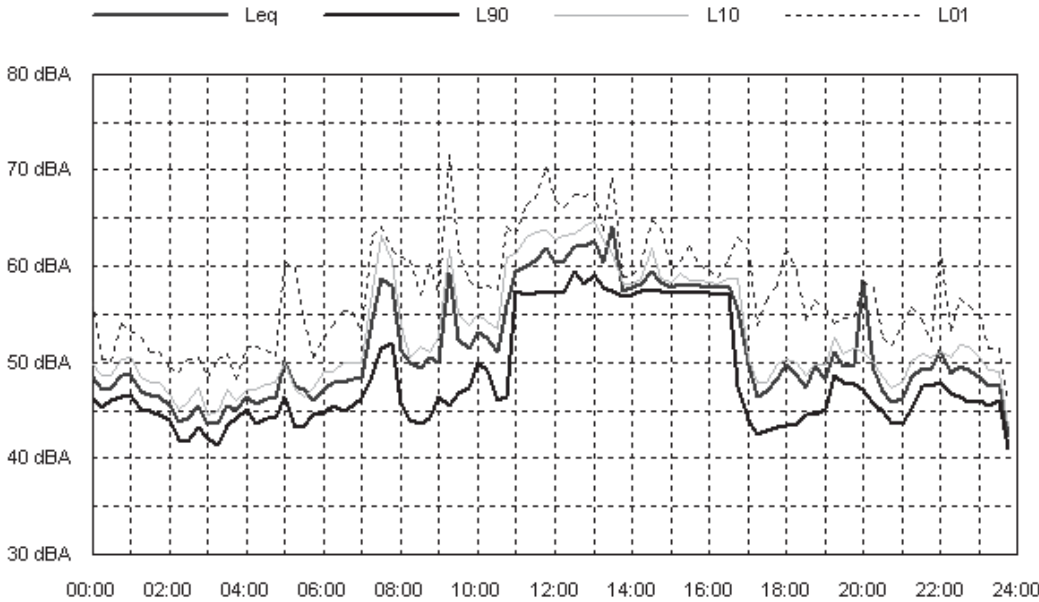


Wed 18 Mar 09

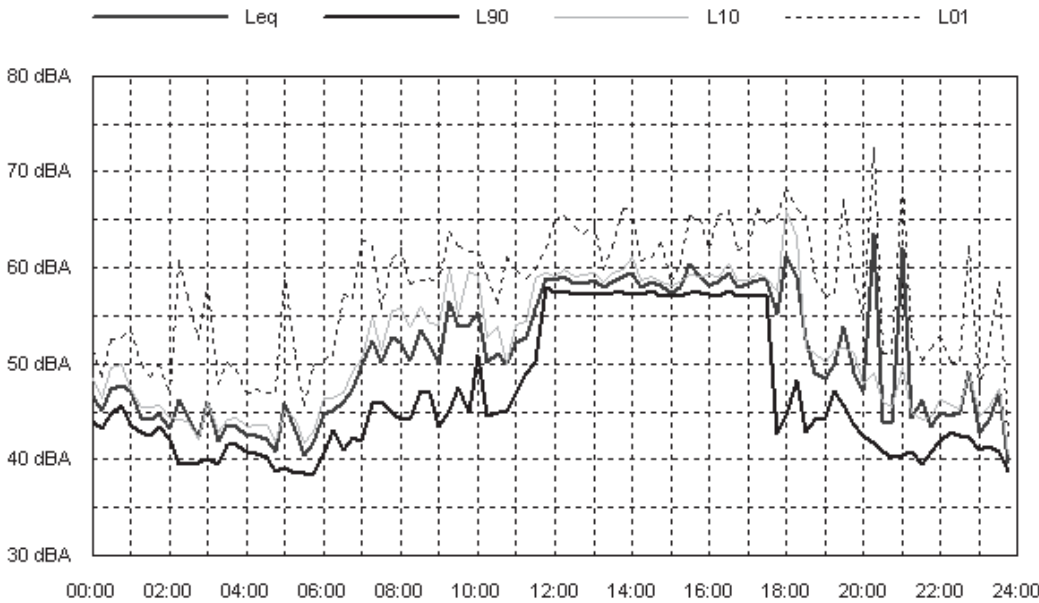


Location: 32 Elizabeth Street Carrington

Thu 19 Mar 09

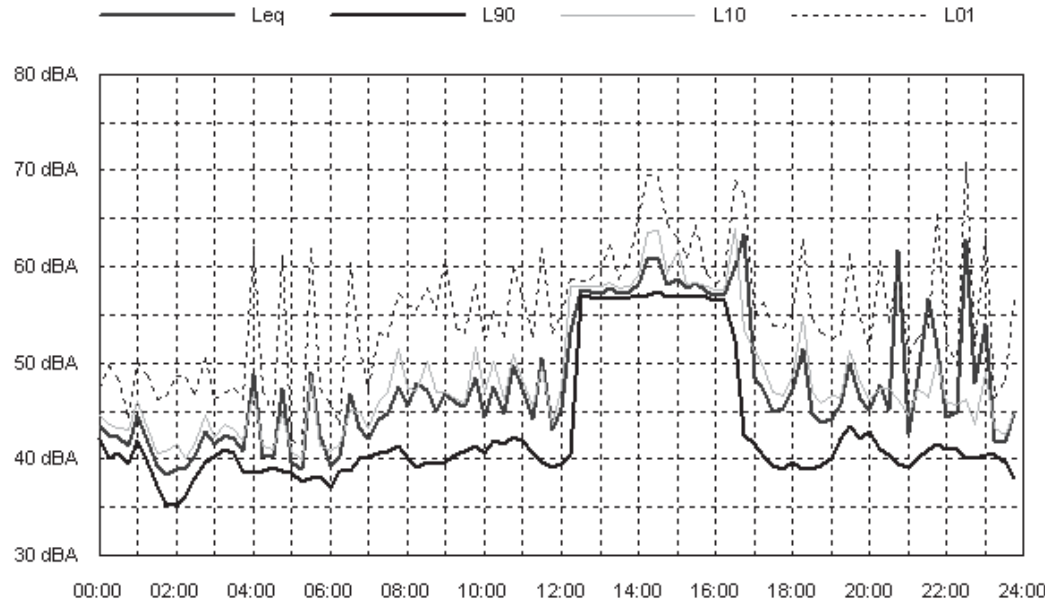


Fri 20 Mar 09

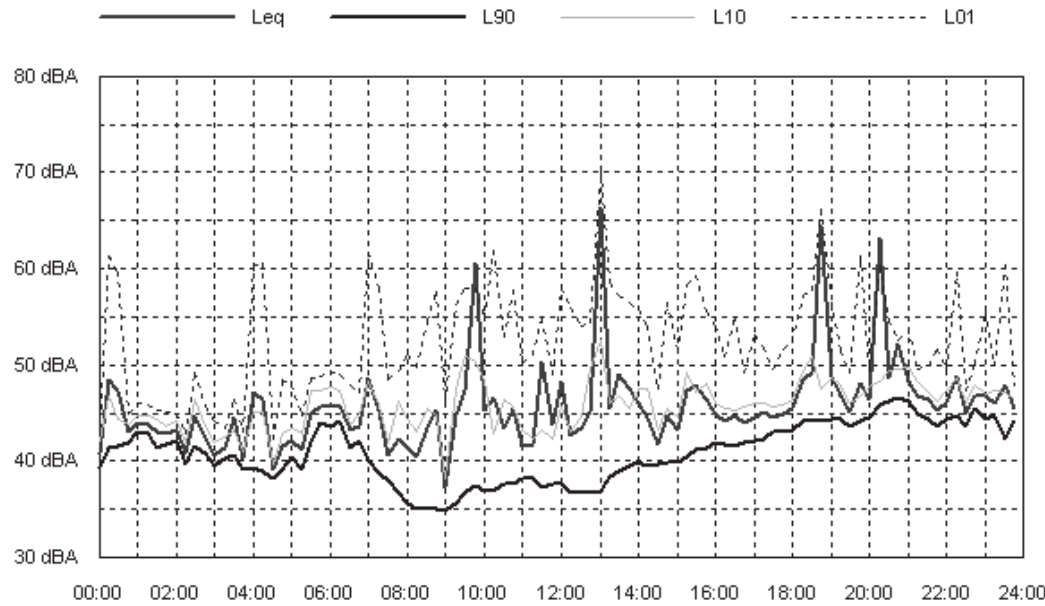


Location: 32 Elizabeth Street Carrington

Sat 21 Mar 09

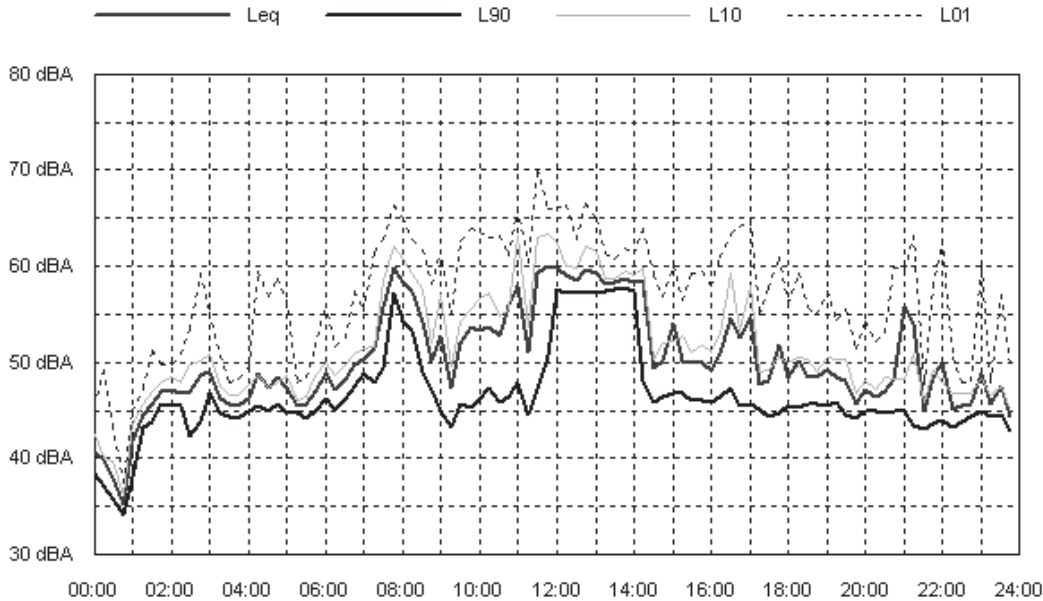


Sun 22 Mar 09

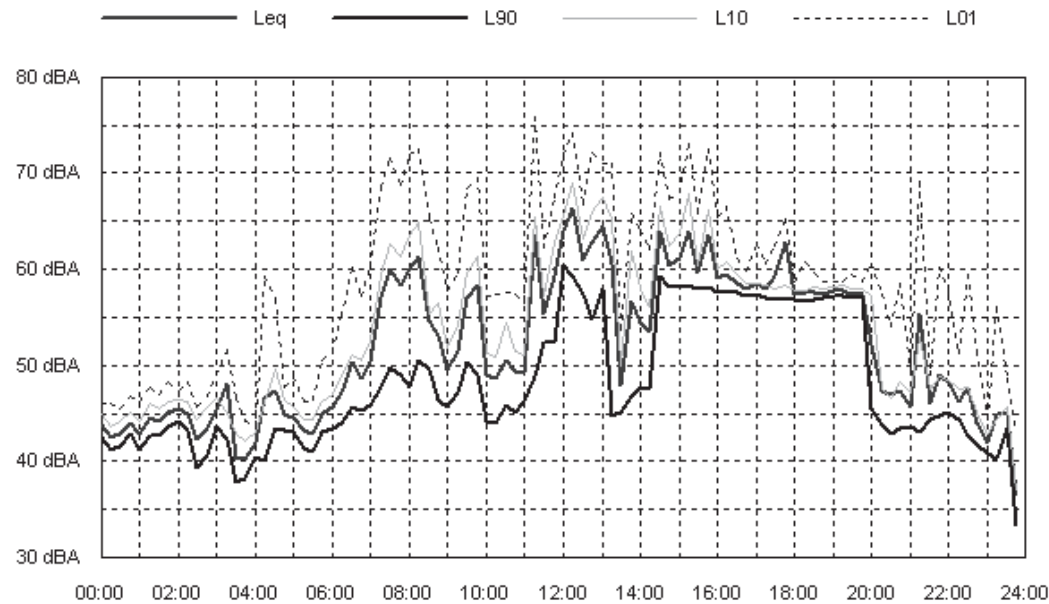


Location: 32 Elizabeth Street Carrington

Mon 23 Mar 09

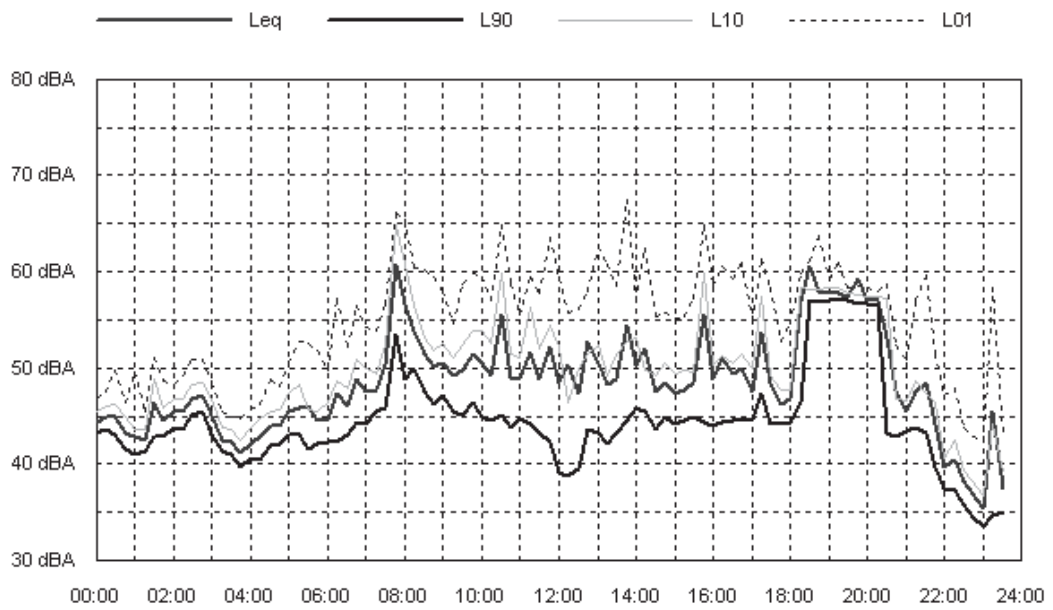


Tue 24 Mar 09

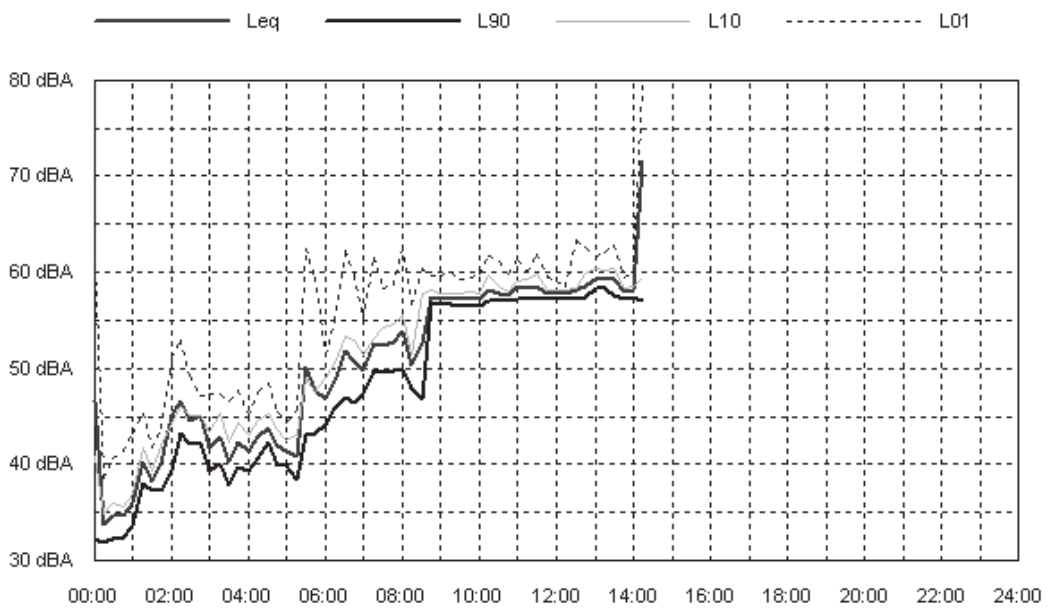


Location: 32 Elizabeth Street Carrington

Wed 25 Mar 09



Thu 26 Mar 09





Appendix C

Road traffic noise monitoring

Appendix C Road traffic noise monitoring

A noise logger was used to continuously monitor background noise levels between 29 July 2014 and 4 August 2014 in order to determine traffic noise levels at residence adjacent to Industrial Drive, Mayfield, NSW.

Provided in **Table 26** are details of the measurement location.

Table 26 Ambient noise monitoring locations

Location duration	Instrumentation	Comments
118 Woodstock Street, Mayfield Start: 29 July 14 Finish: 4 Aug 14	SVAN 957 Noise Logger S/N: 27540	Noise sensitive residential receiver. Assessment location to determine traffic noise levels impacting on residential receivers in the Mayfield adjacent to Industrial Drive. Noise logger located approximately 1.5 m above ground level, free field. A correction for façade reflection in accordance with the EPA RNP has been applied to the results for use in the traffic assessment.

Ambient noise monitoring results at this location are presented in **Table 27**.

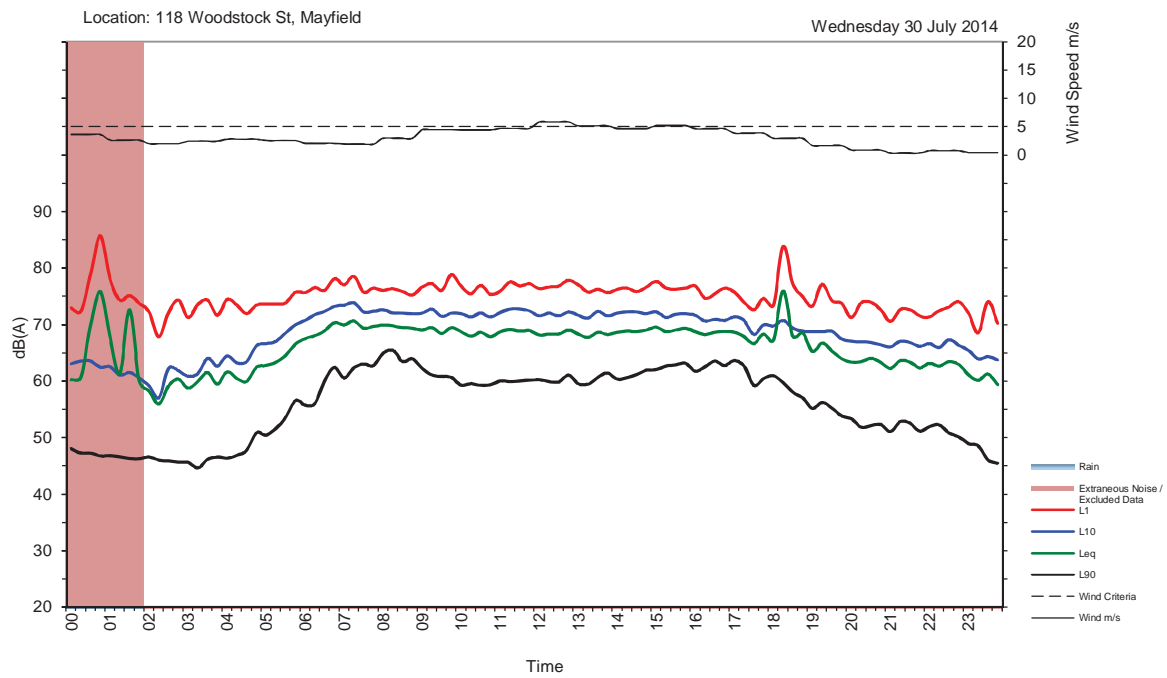
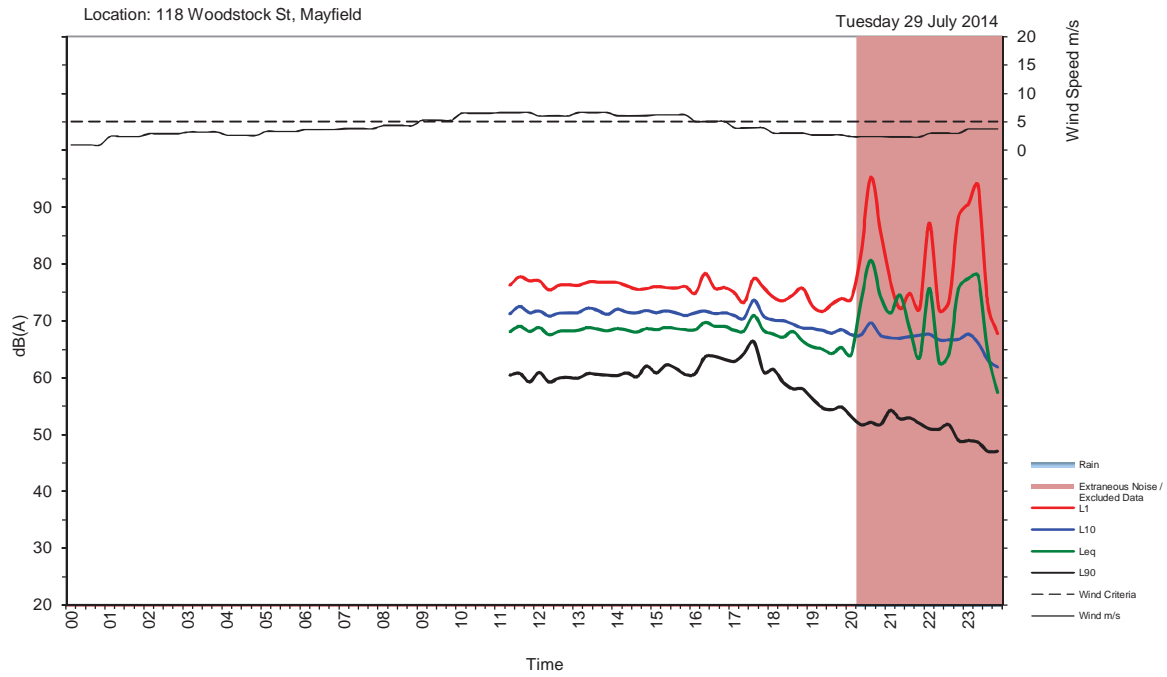
Table 27 Ambient noise monitoring results - 118 Woodstock Street, Mayfield

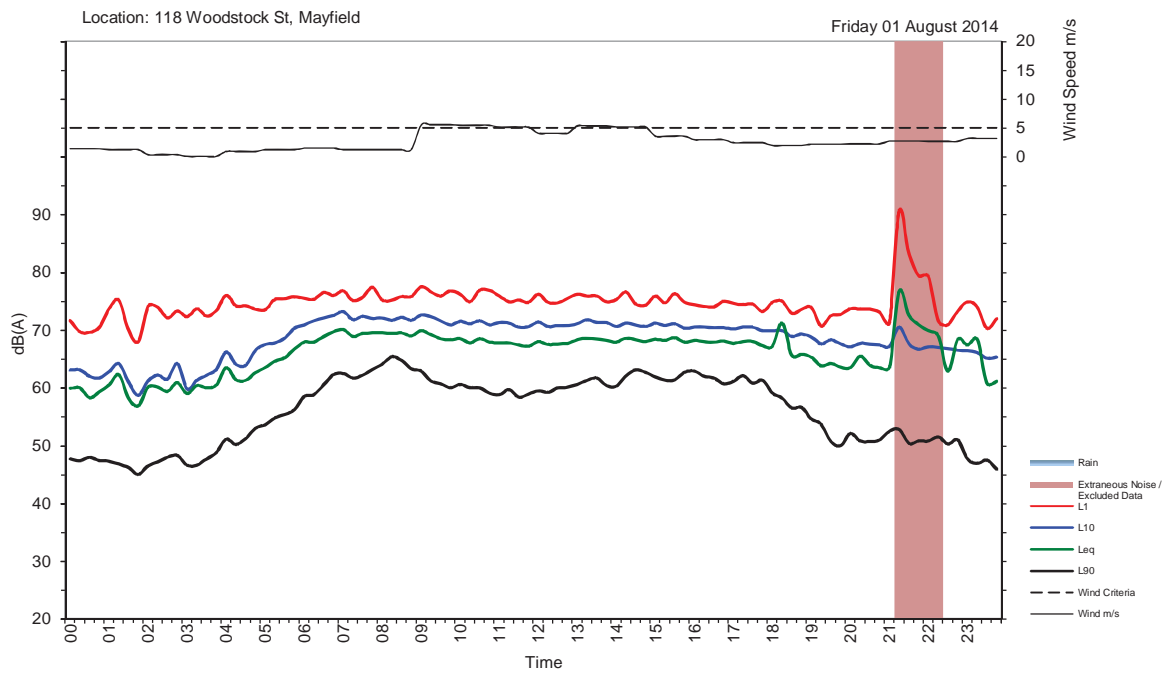
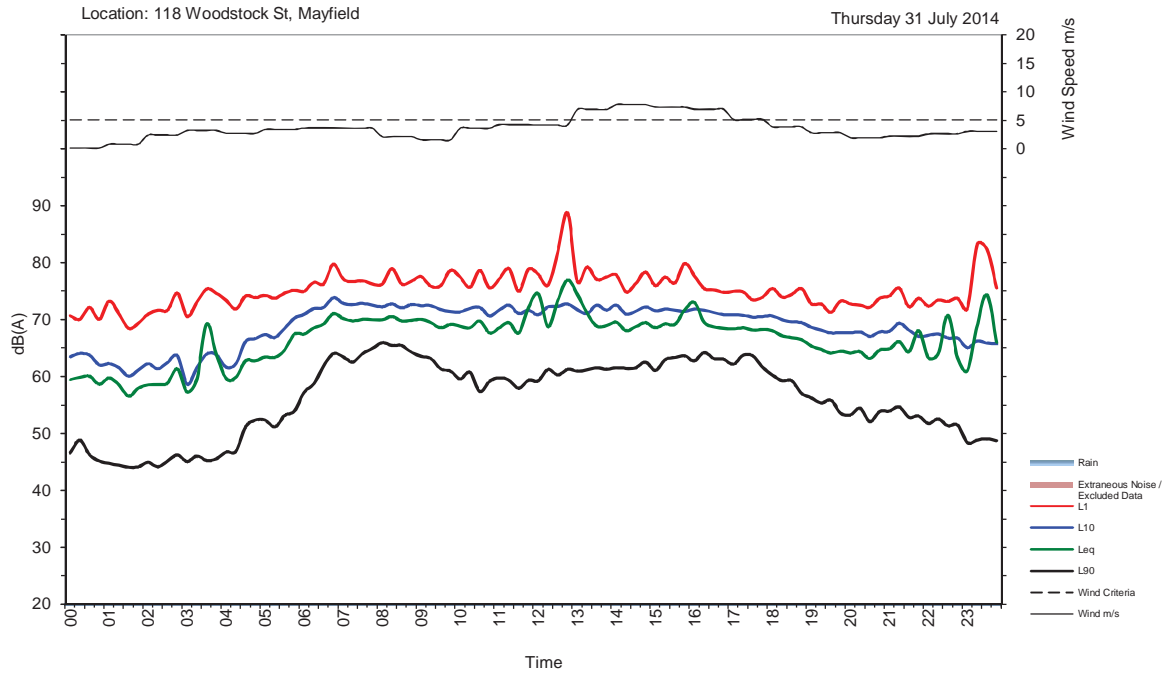
Logger location	Day		Evening		Night	
Industrial Drive receiver locations, Mayfield						
118 Woodstock Street, Mayfield	L_{A90}	L_{Aeq}	L_{A90}	L_{Aeq}	L_{A90}	L_{Aeq}
Tuesday 29 July, 2014	-	-	-*	-*	-*	-*
Wednesday 30 July, 2014	-*	-*	51	67	44	64
Thursday 31 July, 2014	-*	-*	53	66	47	65
Friday 01 August, 2014	-*	-*	-*	-*	44	63
Saturday 02 August, 2014	55	67	48	63	42	63
Sunday 03 August, 2014	53	66	50	63	48	63
Monday 04 August, 2014	58	71	-	-	-	-
RBL	55	-	51	-	44	-
Log average L_{Aeq}	-	68	-	65	-	64

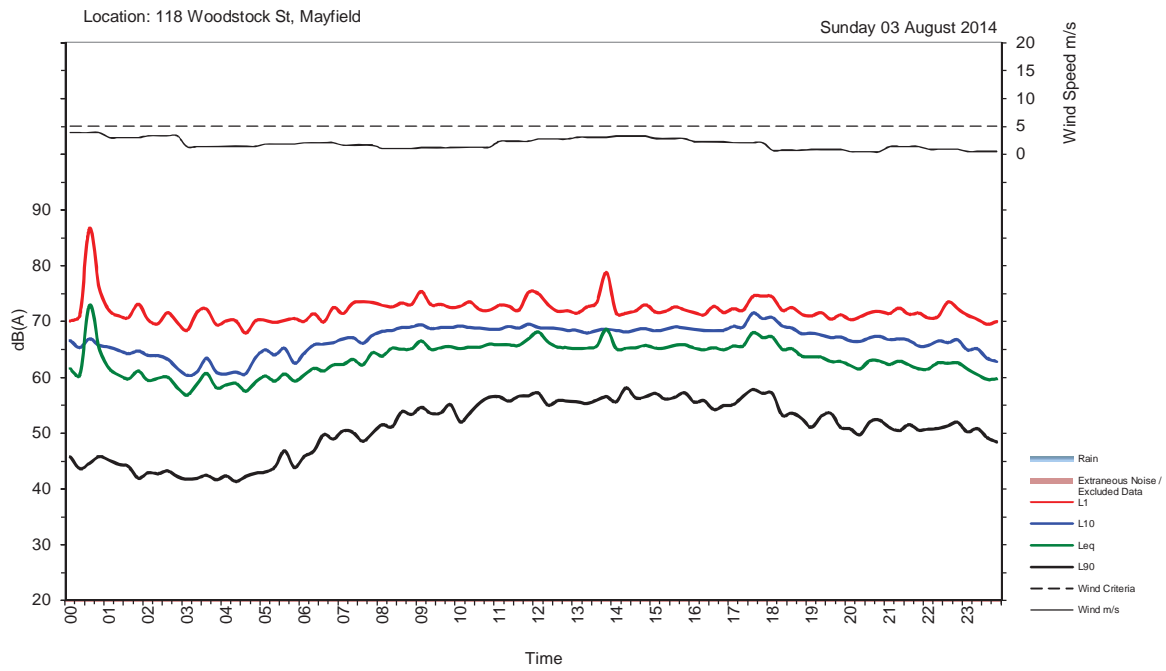
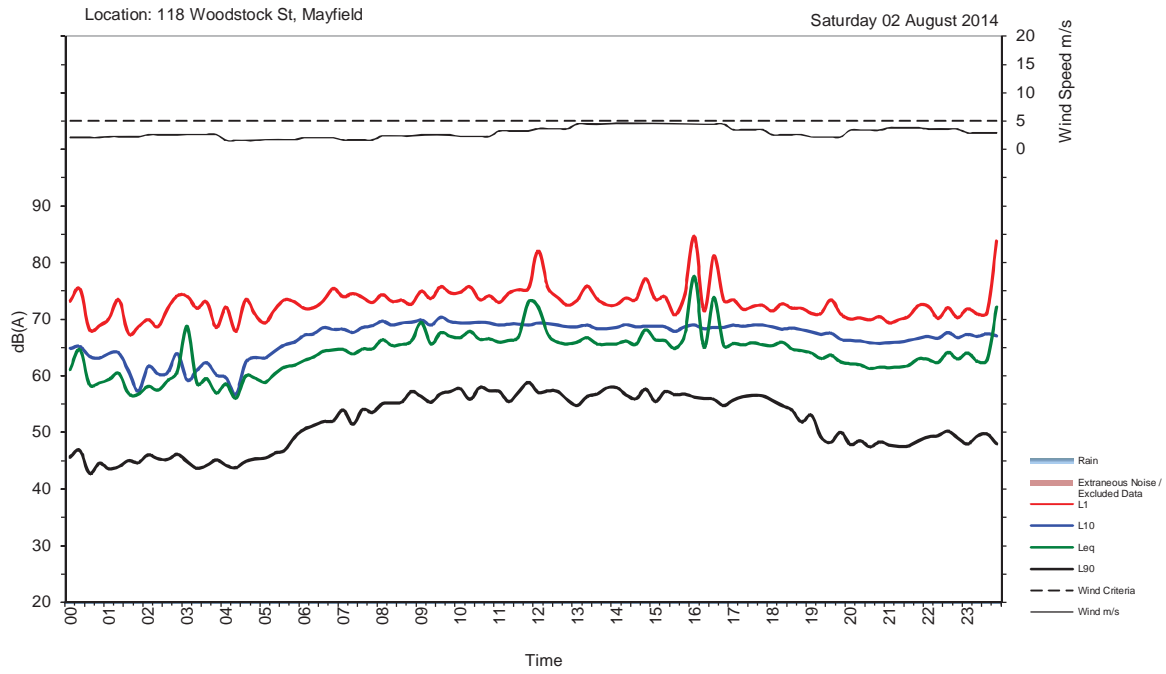
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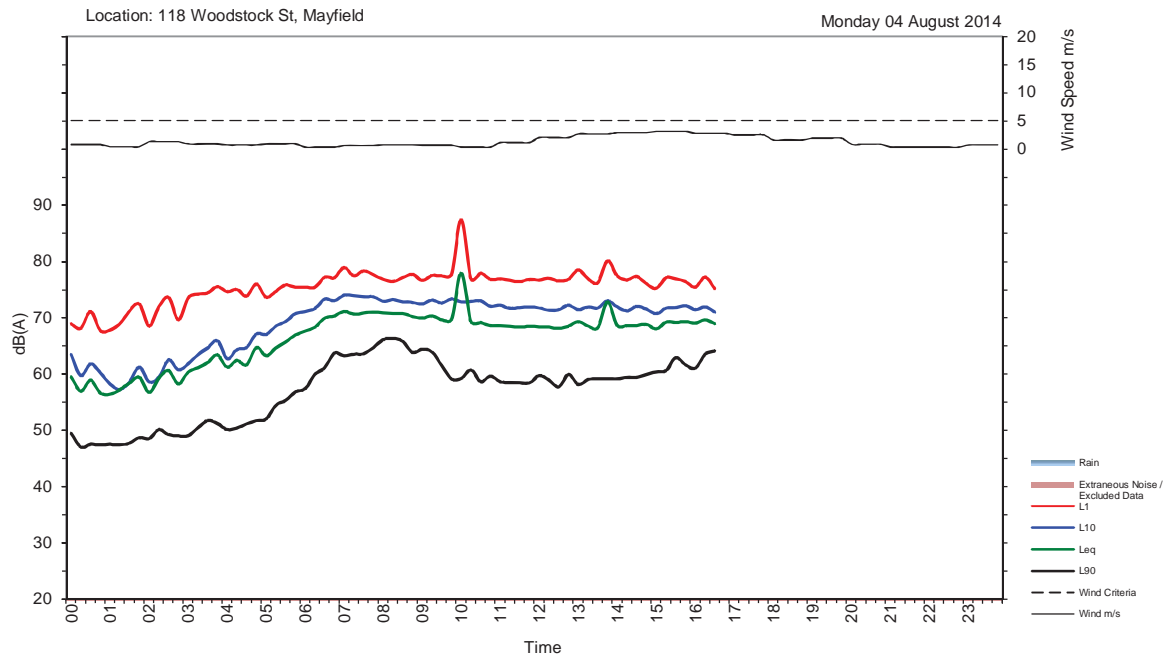
- Fields marked with (*) in Table 27 are periods that were affected by adverse weather conditions such as rain, excessive wind speeds or extraneous noise events.
- Day is defined as 7:00 am to 6:00 pm, Monday to Saturday and 8:00 am to 6:00 pm Sundays and Public Holidays. Evening is defined as 6:00 pm to 10:00 pm, Monday to Sunday and Public Holidays. Night is defined as 10:00 pm to 7:00 am, Monday to Saturday and 10:00 pm to 8:00 am Sundays & Public Holidays.
- RBL - Rating Background Noise Level (RBL) is representative of the average minimum background sound level (in the absence of the source under consideration), or simply the background level L_{A90}. The RBL is based on the median of the individual daily background noise levels during each assessment period over the entire monitoring period.
- The L_{Aeq} level is the equivalent continuous sound level and has the same sound energy over the sample period as the actual noise environment with fluctuating sound levels. The overall representative L_{Aeq} noise level is determined by logarithmically averaging each assessment period for the entire monitoring period.

118 Woodstock Street, Mayfield











Appendix D

Attended noise
measurements

Appendix D Attended noise measurements

Table 28 Attended noise monitoring results summary at logging locations

Monitoring location	Date of measurement	Time of measurement	$L_{Aeq, 15min}$	Industrial contribution, dB(A)	$L_{A90, 15min}$ (Background Noise Level)	Existing noise environment
85 Margaret St, Mayfield	15 September 2011	4:00 pm	58	48	46	Traffic noise dominant along Industrial Drive. Birds and dogs also noted. Industrial noise practically inaudible
85 Margaret St, Mayfield	16 January 2012	12:52 am	45	45	44	Industrial noise dominant coming from N-NE direction. Intermittent horns & alarms sounding. Bat noise also noticeable, sporadic traffic
2 Crebert St, Mayfield	29 July 2014	1:21 am	63	48/50	49	INDUSTRIAL CONTRIBUTION: Background constant broadband industrial hum at ~340-10 deg, ~48/50 dB(A). Distant train movement, ~280deg, ~50/51 dB(A). Quite a few events which sound like banging of metal up to ~57-60 dB(A) at ~340 deg. Faint but audible warning alarms to north. Distant train movement, ~240deg, ~45/46 dB(A). No distinguishable sources in the direction of the Stolthaven Facility. TRAFFIC CONTRIBUTION: Intermittent traffic on Industrial Drive in the main noise source other than the background industrial hum from the north, with traffic around ~68 – 72 dB(A), truck pass-bys up to ~77-85 dB(A). <i>Average Wind – 0.9 m/s, NW</i>
21 Crebert St, Mayfield	1 September 2013	7:07 pm	62	49	50	Background industrial noise hum to E/NE around 50 dB(A), no individual industry noise sources distinguishable, road traffic noise contribution from Industrial Drive lifting the L_{Aeq}

Monitoring location	Date of measurement	Time of measurement	L _{Aeq, 15min}	Industrial contribution, dB(A)	L _{A90, 15min} (Background Noise Level)	Existing noise environment
21 Crebert St, Mayfield	7 November 2014	11:08 pm	67	47	49	INDUSTRIAL CONTRIBUTION: Background constant broadband industrial hum at ~0 deg-40 deg, ~46/47 dB(A). TRAFFIC CONTRIBUTION: Intermittent traffic on Industrial Drive was the main noise source other than the background industrial hum from the north-north-west, with traffic around ~65 – 70 dB(A) <i>Average Wind – Calm, Scattered Cloud</i>
32 Elizabeth St, Carrington	28 July 2014	10:32 pm	47	46/47	45	INDUSTRIAL CONTRIBUTION: Background constant broadband industrial hum at ~290-350deg ~46 dB(A), faint but audible warning alarms in similar direction. Rail car shunting/banging from ~300deg to 350deg, instantaneous levels up to ~53-62 dB(A) TRAFFIC CONTRIBUTION: None directly contributing <i>Average Wind – 1.3 m/s, W</i>
32 Elizabeth St, Carrington	29 September 2015	2:09 am	49	47/49	47	INDUSTRIAL CONTRIBUTION: Background constant broadband industrial hum at ~320-20 deg, ~49 dB(A) (controls background). Industrial hum from train yard, ~distinguishable to the east, estimated ~44/45 dB(A). Train break squeal and air release occasionally from the train yard to the north. No distinguishable sources in the direction of the Stolthaven Facility. TRAFFIC CONTRIBUTION: Occasional trucks moving along nearby local roads, to the west <i>Average Wind – Calm, Clear Sky</i>
186 Fullerton St, Stockton	28 July 2014	11:27 pm	56	52/55	52	INDUSTRIAL CONTRIBUTION: Strong constant broadband industrial hum from Kooragang Island ~53/54 dB(A) up to 55/56 dB(A), ranging over ~290-330deg. Nearby water treatment plant faintly audible ~45/46 dB(A). TRAFFIC CONTRIBUTION: Occasional car pass-by on Fullerton St. <i>Average Wind – 1.1 m/s, WNW</i>

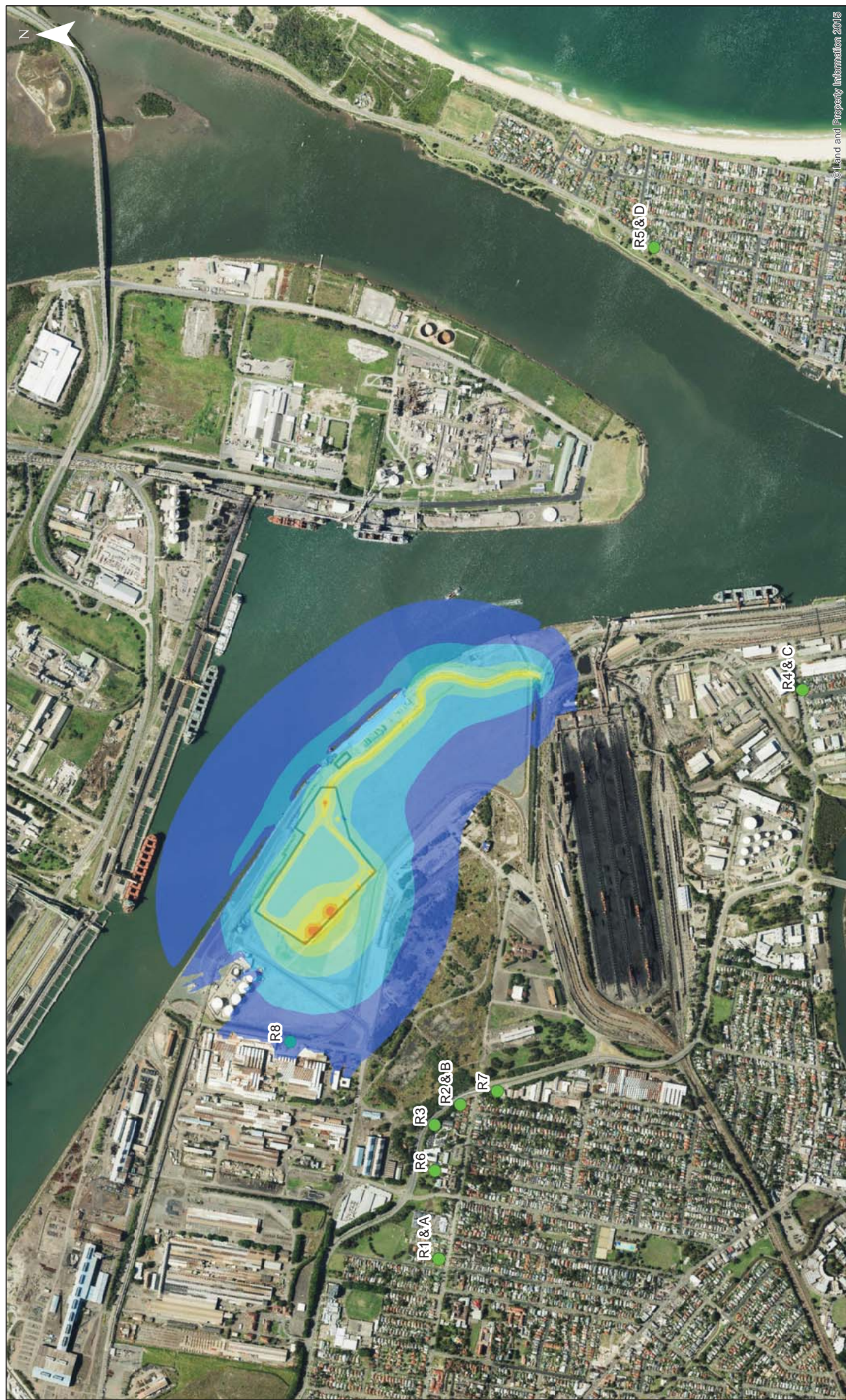
Monitoring location	Date of measurement	Time of measurement	L _{Aeq} , 15min	Industrial contribution, dB(A)	L _{A90} , 15min (Background Noise Level)	Existing noise environment
186 Fullerton St, Stockton	29 September 2015	1:37 am	52	51	51	<p>INDUSTRIAL CONTRIBUTION: Strong constant broadband industrial hum from Kooragang Island ~51/52 dB(A (controls background), ranging over ~280-310 deg. Nearby water treatment plant faintly audible. No distinguishable sources in the direction of the Stolthaven Facility</p> <p>TRAFFIC CONTRIBUTION: Local movements on Fullerton St excluded. <i>Average Wind – Calm to 0.7 m/s, SSW, Clear Sky.</i></p>



Appendix E

Operational noise
contour maps

Appendix E Operational noise contour maps



OPERATIONAL NOISE - NIGHT - NEUTRAL METEOROLOGICAL CONDITIONS - AMENITY CRITERIA

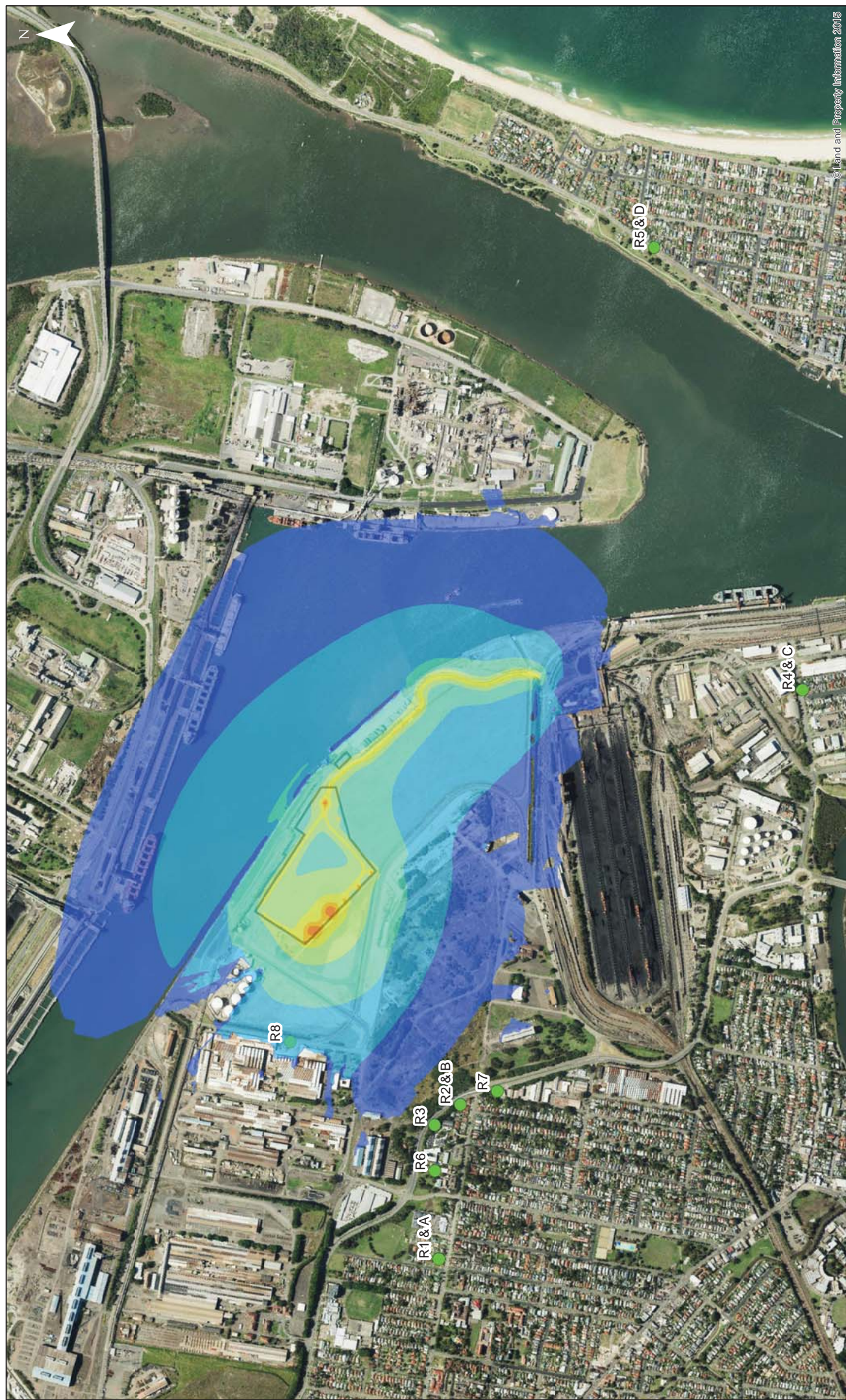
Bulk Cargo Import and Storage Facility, Mayfield
 60518192

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0 250 500 1,000 m

Fig. E-1

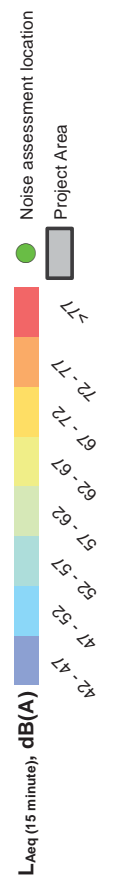
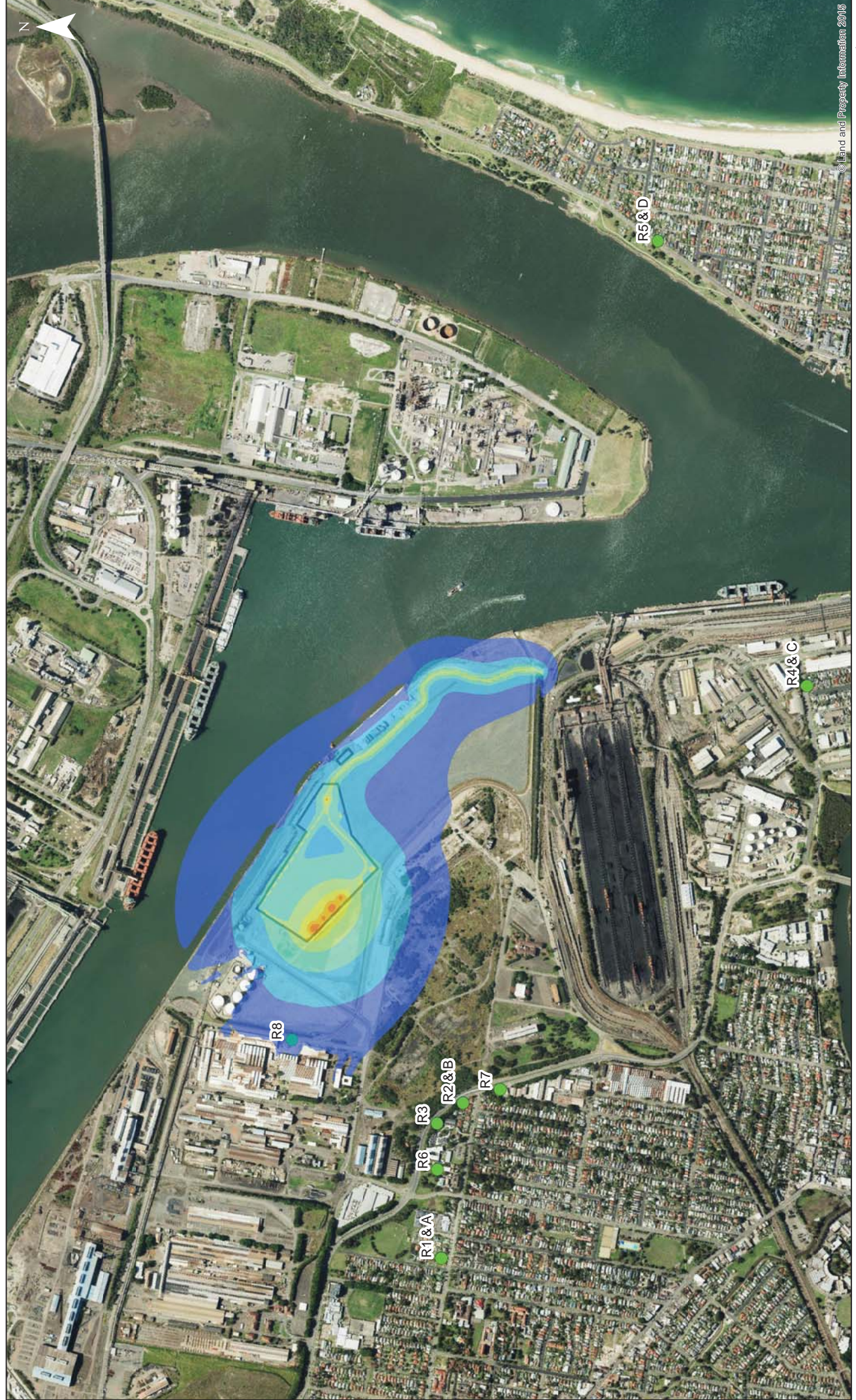


OPERATIONAL NOISE - NIGHT - 3m/s SOURCE TO RECEIVER WIND - AMENITY CRITERIA

0 250 500 1,000 m

Bulk Cargo Import and Storage Facility, Mayfield
 60518192

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OPERATIONAL NOISE - NIGHT - NEUTRAL METEOROLOGICAL CONDITIONS - INTRUSIVENESS CRITERIA

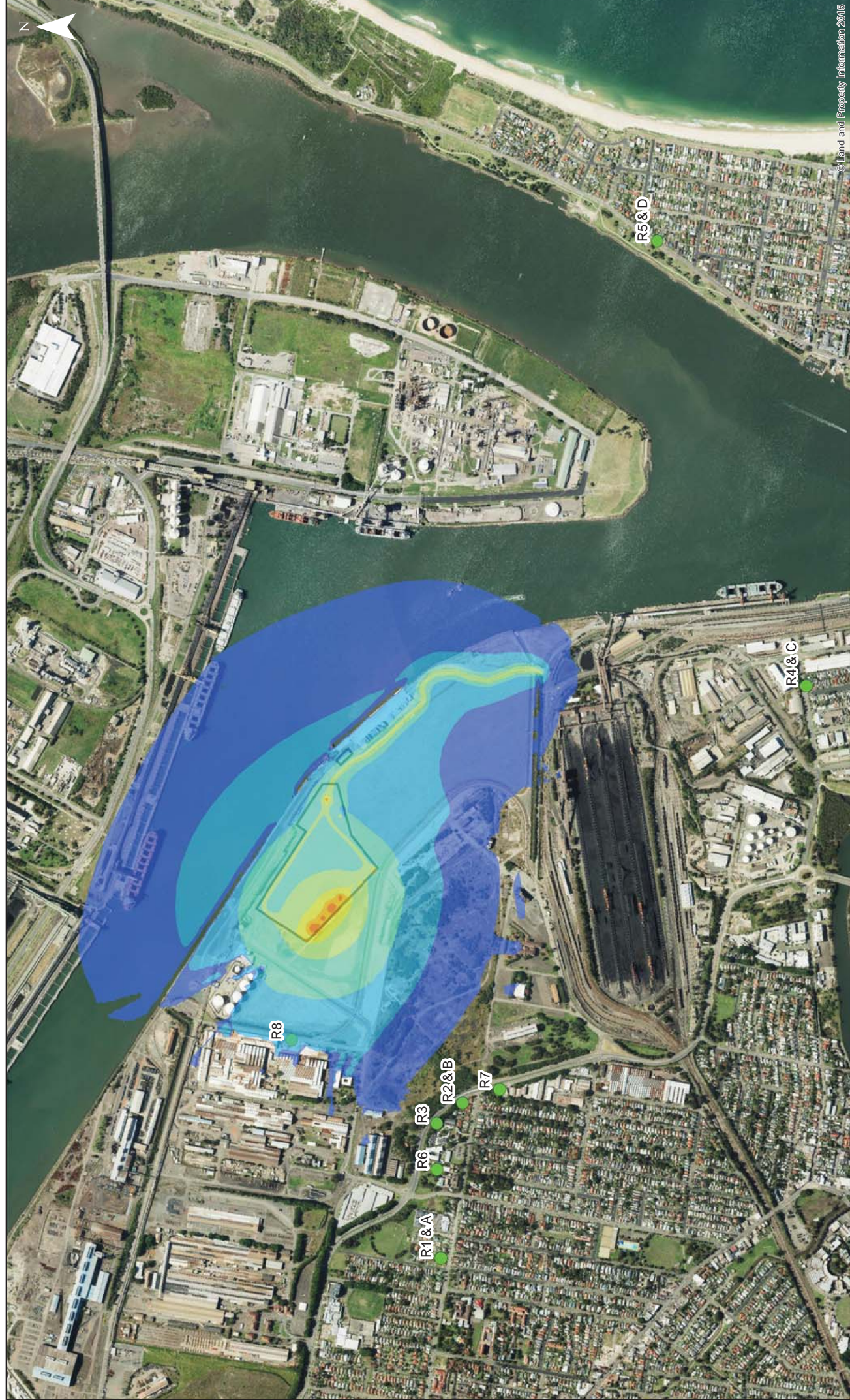
Nov 2016
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Fig. E-3



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Bulk Cargo Import and Storage Facility, Mayfield



OPERATIONAL NOISE - NIGHT - 3m/s SOURCE TO RECEIVER WIND - INTRUSIVENESS CRITERIA

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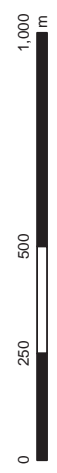
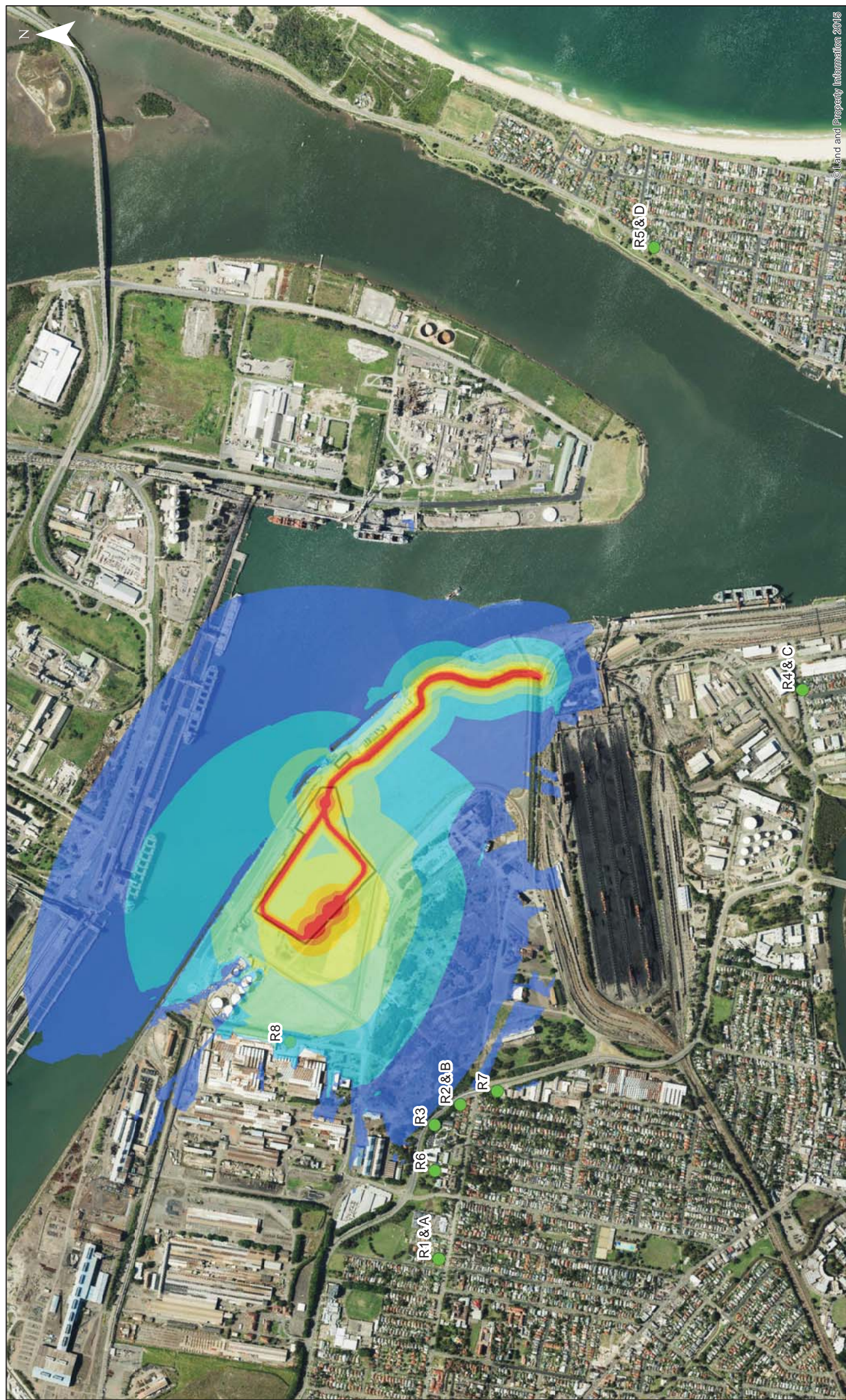


Fig. E-4

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OPERATIONAL NOISE - NIGHT - 3 m/s SOURCE TO RECEIVER WIND - SLEEP DISTURBANCE ASSESSMENT

L_{A1} (1 minute), dB(A)

- Noise assessment location
- ▭ Project Area

Traffic Impact Assessment

Cargo Storage Facility, Mayfield

Traffic Impact Assessment

Cargo Storage Facility, Mayfield

Client: Port of Newcastle Operations Pty Ltd

ABN: 97 539 122 070

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Reviewed by Marcel Cruz /Nick Bernard

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			Name/Position	Signature
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1.0 Introduction

1.1 Background and Scope

Port of Newcastle (PON) has identified trade opportunities for the import and storage of various freight and cargo within the Mayfield Port Precinct. To facilitate this trade, PON is proposing to construct and operate a 10.8 hectare open air cargo storage facility (the Project) on the former BHP steelworks site at Mayfield, NSW.

The site is currently subject to the Mayfield Concept Approval (09_0096MOD 2) which provides for the redevelopment of port-side land for port related activities, however does not permit the construction or operation of any project.

PON commissioned AECOM to prepare a Traffic Impact Assessment (TIA) for the Project. The TIA was prepared to support the Development Application (DA) of the Project.

The TIA includes:

- A review of the existing road conditions, in particular at the Industrial Drive/George Street intersection, which provides vehicular access to the site from the strategic road network;
- An assessment of future operational traffic impacts during the AM and PM peak hour for 2017 and 2027;
- A summary of relevant documents related to the Mayfield Concept Plan, including the Traffic Management Plan and the Traffic Monitoring and Review Plan; and
- Consideration of measures to mitigate traffic impacts, if required.

The TIA has only assessed impacts on the road network in the AM and PM peak hour of a typical weekday as these generally represent the worst case for traffic impacts.

1.2 Structure of Report

The report is structured as follows:

- **Section 1** provides an introduction to the Project;
- **Section 2** provides the methodology used to assess the Project;
- **Section 3** summarises the existing traffic conditions in the area surrounding the site;
- **Section 4** summarises the impacts of the proposed development;
- **Section 5** assesses the operational traffic impact of the Project;
- **Section 6** summarises the relevant documents in the Mayfield Concept Plan; and
- **Section 7** provides the study conclusions and any mitigation measures.

2.0 Methodology

An overview of the methodology for the TIA is summarised below and was prepared in accordance with the Roads and Maritime Service (RMS) *Guide to Traffic Generating Developments* (2002):

- Review of existing traffic conditions at the site and surrounding road network.
- Traffic survey at the Industrial Drive / George Street intersection to determine existing flows and assess the current operational performance of the intersection, using the criteria set out in the RMS *Guide to Traffic Generating Developments* (2002);
- Analysis of historical traffic data close to the site and/or comparison with publicly available traffic data to understand the background traffic growth. This included 2012 intersection counts for the Industrial Drive / Ingall Street intersection contained in the Stolthaven Bulk Liquids Storage Facility modification report and obtained from the Department of Planning and Environment (DP&E) Major Projects website;
- Review of the proposed development and its potential traffic generation;
- Intersection performance analysis of the Industrial Drive / George Street intersection as a result of proposed development traffic in 2017 and 2027;
- Review of traffic Conditions of Consent for the Mayfield Concept Plan; and
- Study conclusions and any mitigation measures.

3.0 Existing Conditions

3.1 Existing Site

The site of the Project is located within Lot 45, DP 1191982, Mayfield, within the Hunter Region of New South Wales. It is approximately 5km north-west of the Newcastle CBD as shown on **Figure 1**.

As the site is located within the Port of Newcastle (PON), the area surrounding the proposed facility is characterised by a mixture of port related activities and industrial uses, with residential and commercial areas nearby. Lot 45 is currently maintained as an existing hardstand, as shown on **Figure 2**.

3.2 Existing Traffic Conditions

3.2.1 Surrounding Road Network

The site is situated east of Industrial Drive with vehicular access provided via a private road network from Selwyn Street, as shown in **Figure 2**. The strategic road network surrounding the site includes Tourle Street and Industrial Drive.

The only traffic currently generated from PON land in the vicinity of the site is associated with the operation of Mayfield Berth No. 4 (M4). M4 is used for the periodic importation of a range of cargos including project cargos, bulk liquids. Some other minor traffic is also generated on Selwyn Street by Port Waratah Coal Services (PWCS) who can use this street to access their own berthing operations to the south.

Industrial Drive

Industrial Drive is a major four-lane, divided, classified road providing connections to the A1 Pacific Highway and to the wider classified road network. It is used as a major link between Maitland and Newcastle CBD providing access to the Honeysuckle Precinct and is the preferred alternative to the A1 Pacific Highway for southbound traffic. Industrial Drive is a B-Double approved vehicle route signed at 80km/h south bound and 70km/h north bound from the intersection with George Street. The road also operates as a public transport corridor for Bus Routes 104 and 118.

Tourle Street

Tourle Street is the continuation of Cormorant Road over the south arm of the Hunter River. Tourle Street provides a direct route between Newcastle, the industrial area and industrial and port facilities on Kooragang Island, Newcastle Airport (Williamstown) and Port Stephens. The new Tourle Street Bridge opened in May 2009, and consists of one lane in each direction, with 2m shoulders. Tourle Street has a speed limit of 60km/h in both directions. Roads and Maritime Services is currently duplicating Tourle Street, between Industrial Drive and Egret Street, which includes construction of a second bridge over the Hunter River. Construction started in May 2016 and is expected to be completed in late 2018.

Selwyn Street

Selwyn Street is the local road continuing from George Street and provides access to the private roads within the PON site. It is a two-lane undivided road with a sign posted speed limit of 50 km/h. Selwyn Street is a B-Double approved vehicle route.

George Street

George Street is a four lane road with two traffic lanes and two parking lanes. To the east of the intersection George Street provides a link between Industrial Drive and Selwyn Street, which provides access to the private roads within the PON site.



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3.2.2 Daily Traffic Volumes

Traffic volume data was obtained to determine the historical traffic growth and current mid-block traffic on Industrial Drive. **Table 1** shows historical Average Annual Daily Traffic (AADT) volumes at two Roads and Maritime Services (RMS) traffic stations in the vicinity of the site.

Table 1: Average Annual Daily Traffic (AADT) on Adjacent Road Network

Station Number	Station Location	AADT Volumes - Year				Annual Growth Rate (1995 – 2004)
		1995	1998	2001	2004	
5.953	Industrial Drive – North of Woodstock Street	29,746	29,549	30,334	30,717	0.36%
5.979	Industrial Drive – West of Werribi Street	22,952	21,608	21,559	23,339	0.19%

Source: RMS Traffic Volume Data for Hunter and Northern Regions 2004

The data shows that between 1995 and 2004, there was an average yearly growth rate of 0.27% in the surrounding area. Given the age of the available data, a growth rate of one per cent was specified by RMS in the Port Terminal Facilities Mayfield Concept Plan assessment. Background traffic growth is discussed further in **Section 5.1**.

3.2.3 Peak Hour Traffic Volumes

Intersection counts were undertaken at the intersection of Industrial Drive/ George Street between 6am – 9am and 4pm – 6pm on 15 September 2016. This date is considered appropriate as it falls during a typical week day (Tuesday, Wednesday, Thursday) and does not occur on a public holiday or within the NSW school holiday periods. The full intersection counts can be found in **Appendix A**.

Analysis of the intersection counts showed the AM peak hour occurred between 7:45am – 8:45am and the PM peak hour occurred between 4:30pm – 5:30pm. A summary of turning movements at the signalised intersection during the AM and PM peak hour is shown on **Figure 4** and **Figure 5**.

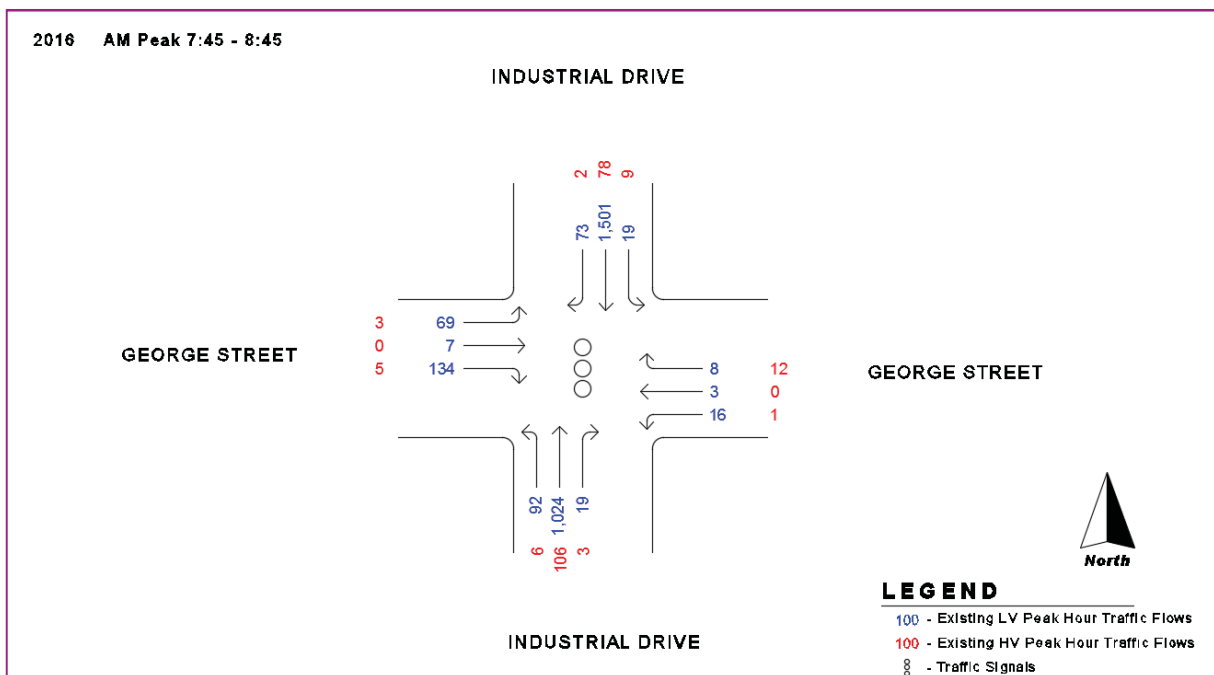


Figure 3 2016 Traffic Volumes at the Industrial Drive/ George Street Intersection – Morning Peak

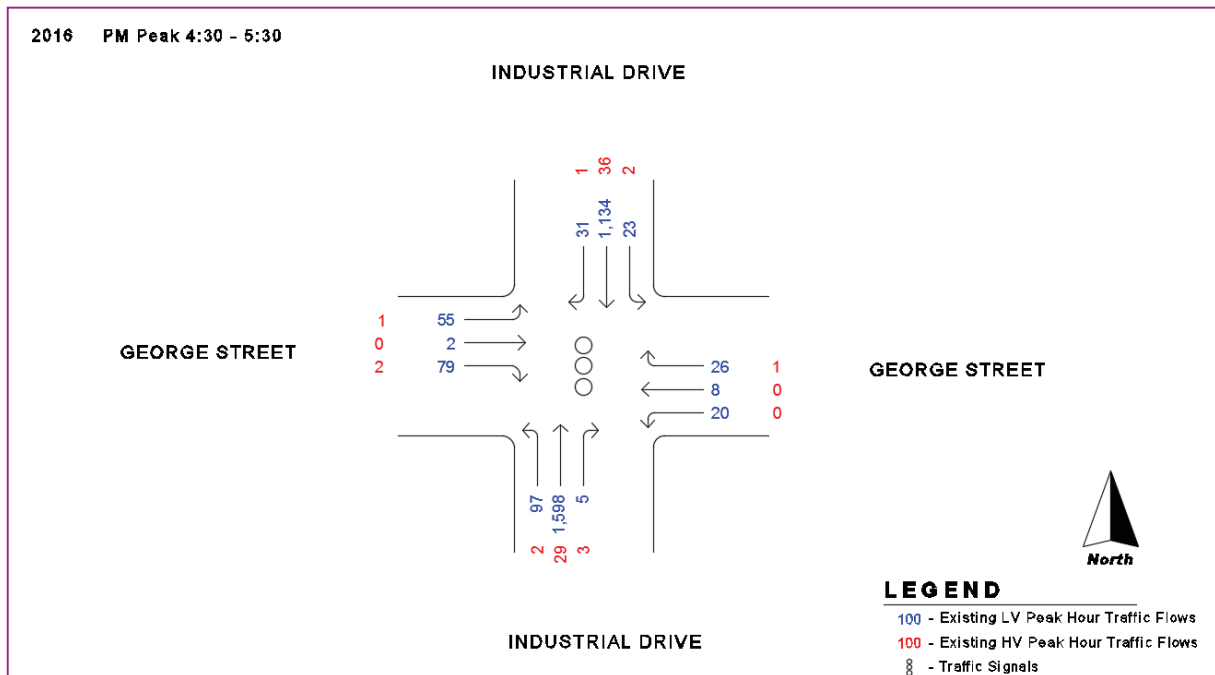


Figure 4 2016 Traffic Volumes at the Industrial Drive/ George Street Intersection – Afternoon Peak

3.2.4 Existing Intersection Performance

Measure of Performance

The performance of the Industrial Drive/ George Street intersection was evaluated using SIDRA Intersection 7.0, a computer-based modelling package designed for calculating isolated intersection performance. The performance indicators for SIDRA 7.0 applicable to the Project are:

- Degree of Saturation (DoS) – measure of the ratio between traffic volumes and capacity of the intersection is used to measure the performance of isolated intersections. As DoS approaches 1.0, both queue length and delays increase rapidly. Satisfactory operations usually occur with a DoS of less than 0.9; and
- Average Delay – duration, in seconds, of the average vehicle waiting at an intersection, which corresponds to the Level of Service (LoS) – a measure of the overall performance of the intersection (this is explained further in **Table 2**).

Table 2 Performance Criteria for Intersections

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

Source: Guide to Traffic Generating Developments, RTA, 2002

Intersection Performance

The existing intersection was modelled in SIDRA 7.0 as an at-grade signalised intersection. A schematic of the modelled current layout is illustrated in **Figure 5**. **Table 3** provides a summary of the intersection analysis for both AM and PM peak, while detailed outputs are provided in **Appendix A**.

Table 3 2016 Existing Traffic – Intersection Performance Summary

	Volume (veh/h)	Level of Service	Degree of Saturation	Average Delay (s)	95% back of queue (m)
2016 AM Peak					
Industrial Drive (S)	1,250	B	0.532	15.2	143
George Street (E)	40	D	0.131	45.0	11
Industrial Drive (N)	1,682	B	0.732	19.0	227
George Street (W)	218	D	0.591	49.1	54
Total	3,190	B	0.732	19.9	227
2016 PM Peak					
Industrial Drive (S)	1,737	A	0.629	10.7	188
George Street (E)	55	E	0.257	58.4	12
Industrial Drive (N)	1,227	A	0.441	10.1	108
George Street (W)	139	E	0.621	60.4	36
Total	3,158	A	0.629	13.5	188

Source: AECOM, 2016

The SIDRA modelling indicates the existing intersection operates at a satisfactory level at LoS B and LoS A during the AM and PM peak hour periods respectively, with minimal queuing and delays experienced. There is a significant amount of spare capacity at the intersection which will allow for additional traffic generated by the Project. Queues experienced along Industrial Drive does not impede upon nearby intersections.

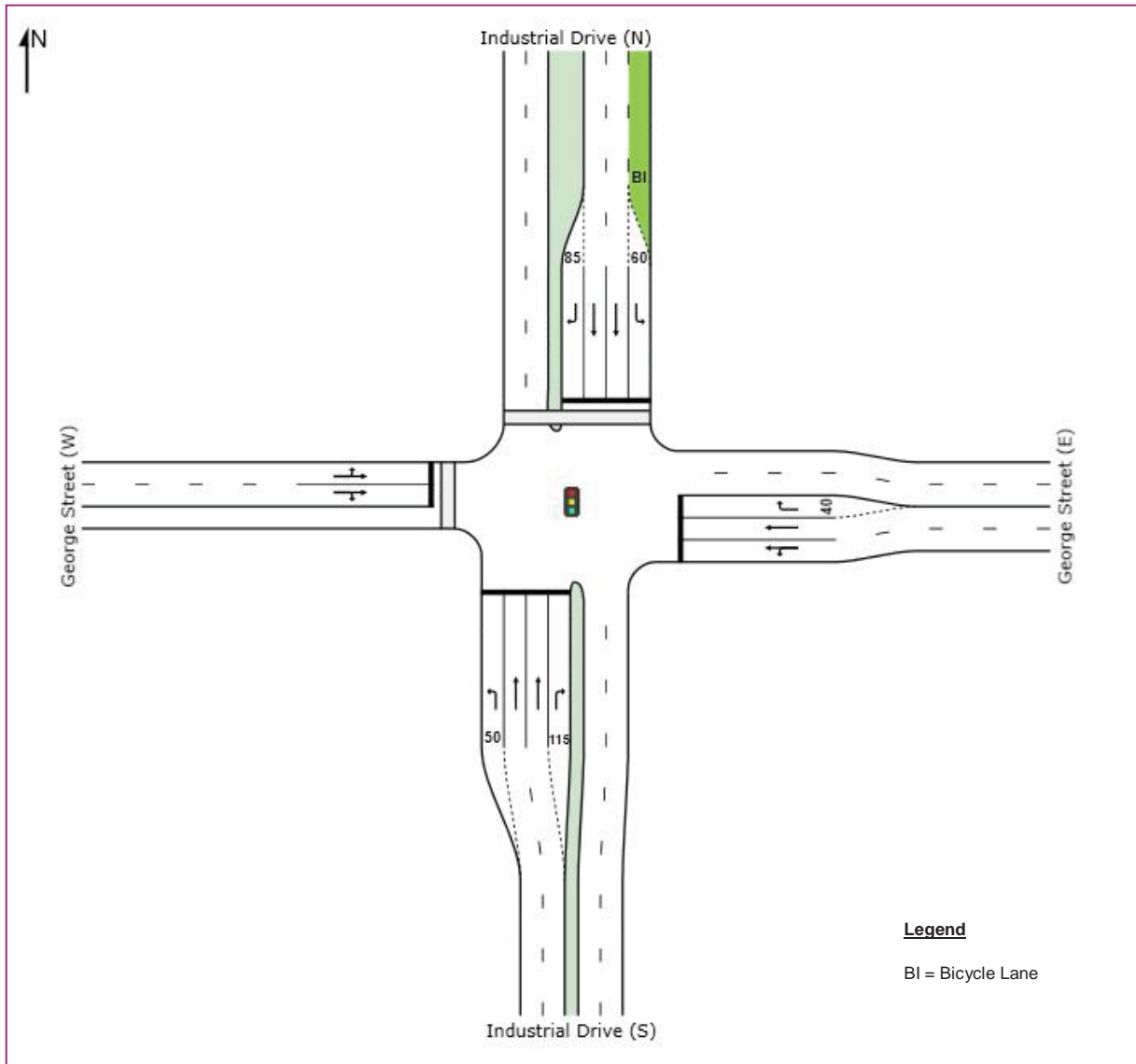


Figure 5 Existing layout of Industrial Drive and George Street intersection

4.0 Proposed Development

4.1 Nature of project

PON is seeking development approval for the construction and operation of a cargo laydown and storage facility. The Project would occupy an area of approximately 12 hectares with the Mayfield Port Precinct. In summary it is understood the Project would operate as follows:

- Ships carrying cargo would berth at Mayfield Berth No. 4 (M4), or other suitable berths within the Port, and cargos would be unloaded by ships gear;
- Cargo would then be transferred to the cargo storage area by truck or other appropriate plant for temporary storage;
- Cargo management would require a staff of up to 12 – 15 employees in roles including plant operators, supervisors, security and transport contractors;
- From storage, cargo would be transferred to road trucks for transportation to the relevant offsite locations:
 - Estimated traffic generation of up to 100 heavy vehicle (trucks) per day;
 - Up to 15 light vehicles per day, based on a maximum of 15 site personnel;
 - All traffic movement associated with the Project would be via the Selwyn Street entrance and via the existing access road i.e. no cumulative traffic impacts associated with the Ingall Street / Industrial Drive Intersection; and
 - No movement of freight via rail is currently proposed.

It is understood that there would be effectively no construction involved in the development of the proposed cargo storage facility. Port customers may establish a demountable crib room or office, portable toilets or similar according to individual requirements, however there would be no construction of any permanent buildings, infrastructure or service connections. Given the scope of these site establishment activities, it is expected that this generation would be less than the operational cargo transfers. It is therefore deemed that an operational traffic assessment is adequate and would cater for the worst case scenario.

Typical access arrangement and key transport infrastructure that may be utilised by the Project is shown on **Figure 6**.

4.1.1 Oversize or Overmass Vehicles and Loads

Oversize or overmass (OSOM) vehicles and loads require permits to be obtained by the RMS prior to the transportation of vehicles that are above certain weight or dimension criteria. The Project would likely facilitate the importation of project cargos that require OSOM permits. OSOM permits would typically be obtained by the haulage company engaged to transport the project cargos. OSOM permit requirements include specific conditions regarding escort requirements and time of day travel restrictions.

For the purposes of this TIA, assessment has been made of typical worst case truck movements during peak times and only considers trucks which do not require OSOM permits as these would not be permitted during peak times. Specific assessment of OSOM would be undertaken by RMS during the permitting process for individual loads and appropriate conditions applied accordingly.

4.2 Hours and workforce

Operational activity would take place 24 hours a day, 7 days a week. Up to an additional 12 to 15 employees could be on site at any given time as a result of the Project. Given the nature of the Project onsite workforce numbers would typically be low and spread across any given 24 hour period to accommodate shipping movements and permissible large vehicle travel times.



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5.0 Traffic Impact Assessment

5.1 Background Traffic

As identified in **Section 3.2.2**, the average annual growth rate between 1995 and 2004 on Industrial Drive in the vicinity of the study area is 0.27 per cent. However, a growth rate of one per cent was specified by RMS in the Port Terminal Facilities Mayfield Concept Plan assessment.

Intersection counts at Industrial Drive / Ingall Street were conducted in 2012 as part of the TIA produced by AECOM to support the Stolthaven Bulk Liquids Storage Facility modification and is publically available on the DP&E Major Projects website. The intersection is located approximately 900m north of Industrial Drive / George Street.

Since the average annual growth rate determined from the 1995 to 2004 flows is outdated, a comparison between traffic volumes along Industrial Drive based on the intersection counts at Industrial Drive / Ingall Street (2012) and Industrial Drive / George Street (2016) was undertaken to determine a more recent annual growth rate. **Table 4** shows the westbound and eastbound traffic volumes along Industrial Drive.

Table 4 Growth Rate On Industrial Drive

Peak period	Intersection counts – Year		Annual Growth Rate (2012 - 2016)
	2012	2016	
AM Peak	2,689	2,904	1.9%
PM Peak	2,675	2,937	2.4%

Source: AECOM, 2016

The data shows that between 2012 and 2016, there was an average yearly growth of 1.9 per cent and 2.4 per cent for the AM and PM peak periods respectively. To be conservative, the average annual growth rates determined by these intersection count comparisons were used as part of this assessment.

5.2 Future Operation Traffic Impact

The Project is expected to generate additional traffic of up to 100 heavy vehicles (200 heavy vehicle movements) per day. For the purposed of this assessment it was assumed that 75 per cent of the traffic would occur during the daytime period of 7am - 6pm. Assuming a consistent profile, this results in seven heavy vehicles per hour (or 14 heavy vehicle movements per hour).

Based on the worst case scenario of an additional 15 employees on site during the peak periods, this equates to an additional 30 light vehicle movements occurring to and from the site per day.

The following trip distribution and assignment assumptions were made:

- 7 Heavy vehicles – move in and out of the site within each peak hour;
- 50 per cent of light vehicle trips travel to / from the north and 50 per cent to / from the south along Industrial Drive; and
- 75 per cent of heavy vehicle trips travel to / from the north and 25 per cent to / from the south along Industrial Drive.

It was assumed operation would commence in 2017. The growth rate of 1.94 and 2.4 per cent per annum during the AM and PM peak hour respectively was applied to turning movements at the intersection to forecast the 2017 traffic volumes at the intersection.

The forecasted 2017 traffic volumes at the intersection are shown on **Figure 7** for the morning peak and **Figure 8** for the afternoon peak. The performance summary of the intersection is shown in **Table 5**, with detailed outputs provided in **Appendix B**.

Table 5 2017 Operational Traffic – Intersection Performance Summary

Approach	Volume (veh/h)	Level of Service	Degree of Saturation	Average Delay (s)	95% back of queue (m)
2017 AM Peak with Project					
Industrial Drive (S)	1,284	B	0.543	15.7	148
George Street (E)	54	D	0.213	47.0	19
Industrial Drive (N)	1,733	B	0.753	19.2	231
George Street (W)	222	D	0.612	49.4	56
Total	3,293	B	0.753	20.3	231
2017 PM Peak with Project					
Industrial Drive (S)	1,781	A	0.645	10.9	197
George Street (E)	85	E	0.489	60.6	25
Industrial Drive (N)	1,268	A	0.453	10.2	112
George Street (W)	142	E	0.676	61.1	37
Total	3,276	A	0.676	14.1	197

Source: AECOM, 2016

SIDRA modelling indicates that when affected by additional traffic as a result of the Project, the intersection would perform at LoS B and LoS A during the AM and PM peak hour periods respectively. The DoS, queue lengths and average delay of the intersection are comparable with existing conditions. These results indicate that the Project’s operational traffic is likely to have a minimal impact on the intersections operation.

The performance of the George Street (E) approach, which provides access to Selwyn Street, during the AM and PM peak, is comparable to the existing conditions. Queue lengths experienced on this approach does not impact the adjacent intersection of George Street / Selwyn Street.

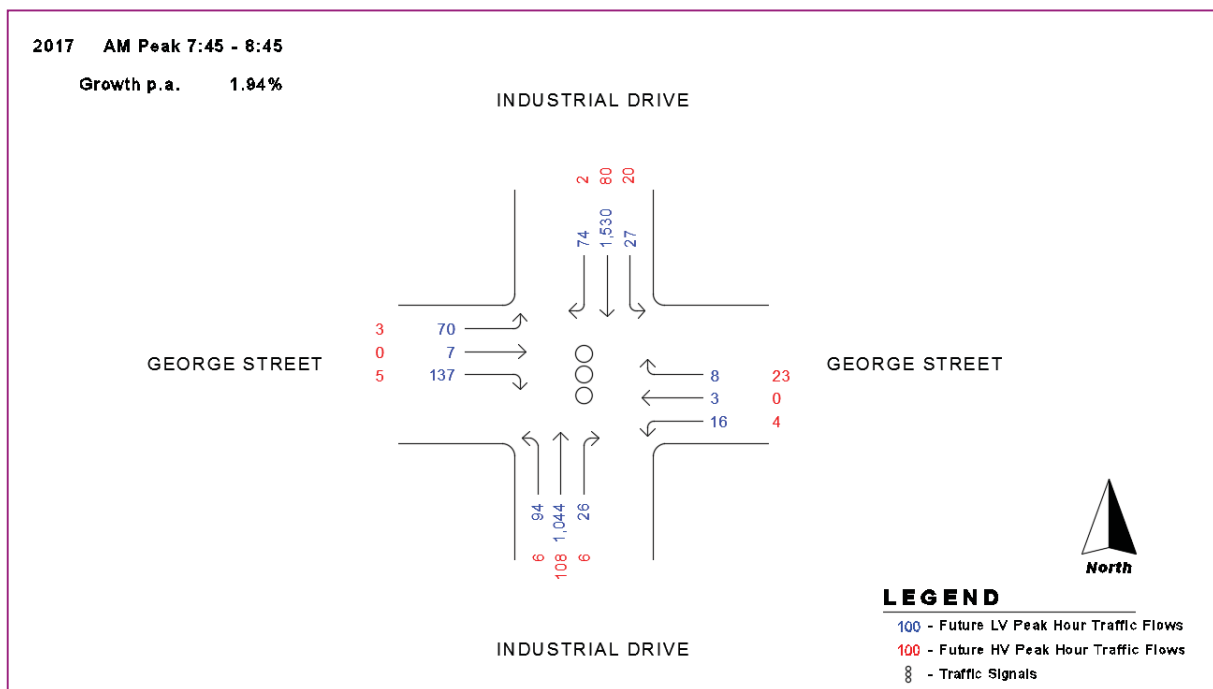


Figure 7 2017 Future Operation Traffic Volumes at Industrial Drive / George Street – Morning Peak

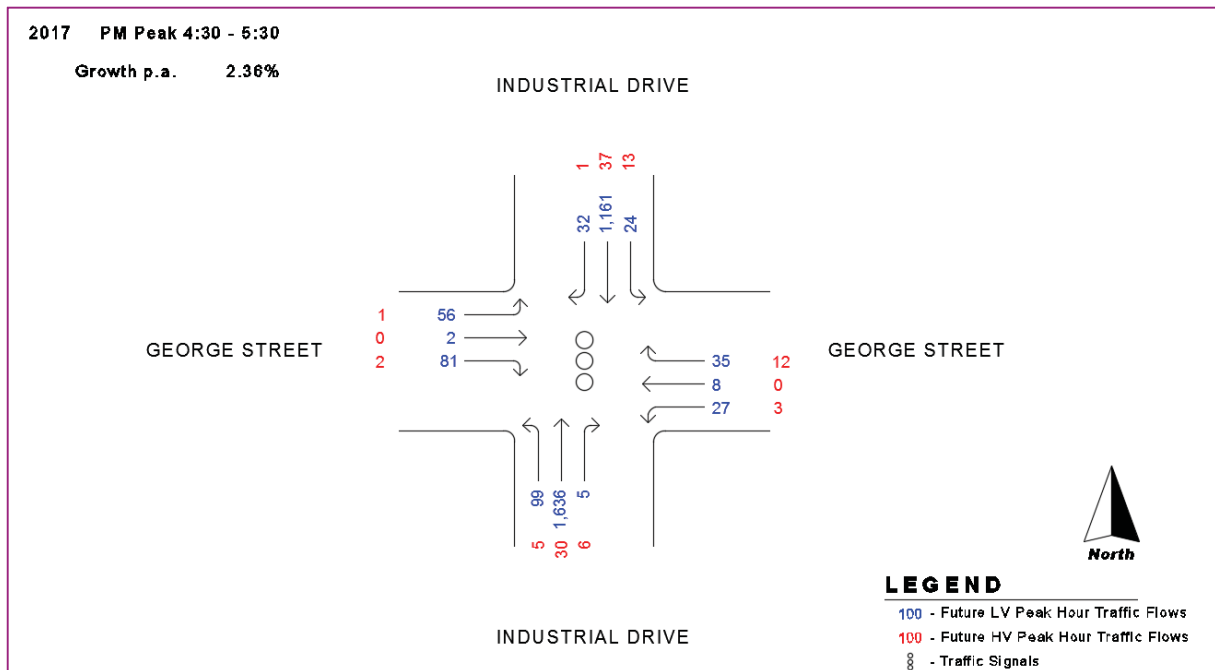


Figure 8 2017 Future Operation Traffic Volumes at Industrial Drive / George Street – Afternoon Peak

5.3 Future Operation Impact (+ 10 years)

In accordance with RMS requirements, a 10 year after opening scenario was tested. The same annual growth rate identified in Section 5.1 was applied to generate background traffic at the intersection of Industrial Drive / George Street in 2027.

The forecasted 2027 traffic volumes at the intersection are shown in Figure 9 for the morning peak, and Figure 10 for the afternoon peak. The performance summary of the intersection is shown in Table 6, with detailed outputs provided in Appendix C.

Table 6 2027 Operational Traffic – Intersection Performance Summary

Approach	Volume (veh/h)	Level of Service	Degree of Saturation	Average Delay (s)	95% back of queue (m)
2027 AM Peak with Project					
Industrial Drive (S)	1,554	B	0.667	17.1	204
George Street (E)	64	D	0.264	47.7	22
Industrial Drive (N)	2,096	C	0.915	36.0	412
George Street (W)	270	D	0.750	52.4	72
Total	3,984	C	0.915	29.9	412
2027 PM Peak with Project					
Industrial Drive (S)	2,247	A	0.827	13.4	320
George Street (E)	100	E	0.618	61.6	29
Industrial Drive (N)	1,598	A	0.590	11.4	161
George Street (W)	180	E	0.885	66.5	51
Total	4,125	B	0.885	16.1	320

SIDRA modelling indicates that 10 years after commencement of the Project, the intersection performs at a satisfactory LoS, operating at LoS C and LoS B during the AM and PM peak hour respectively.

The intersection experiences increases in DoS, average delay and queue lengths along Industrial Drive, however the overall performance of the intersection is acceptable.

The performance of the George Street (E) approach, which provides access to Selwyn Street, during the AM and PM peak is comparable to the existing conditions. Queue lengths experienced on this approach do not impact the adjacent intersection of George Street / Selwyn Street.

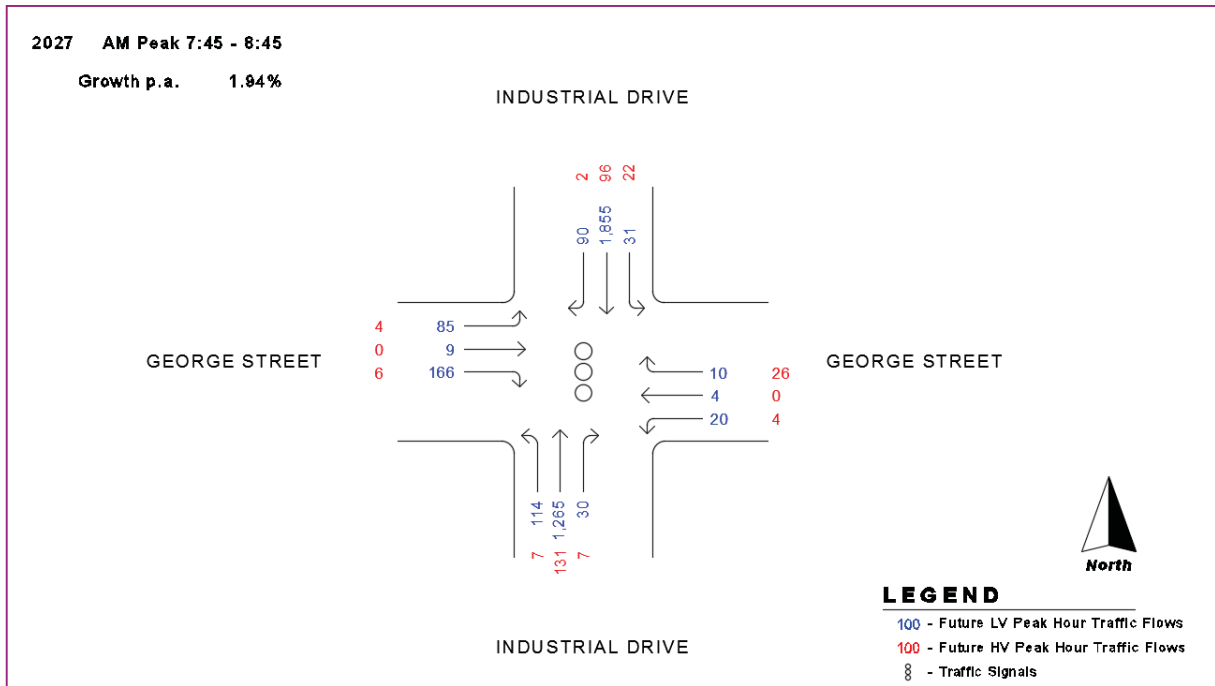


Figure 9 2027 Future Operation Traffic Volumes at Industrial Drive / George Street – Morning Peak

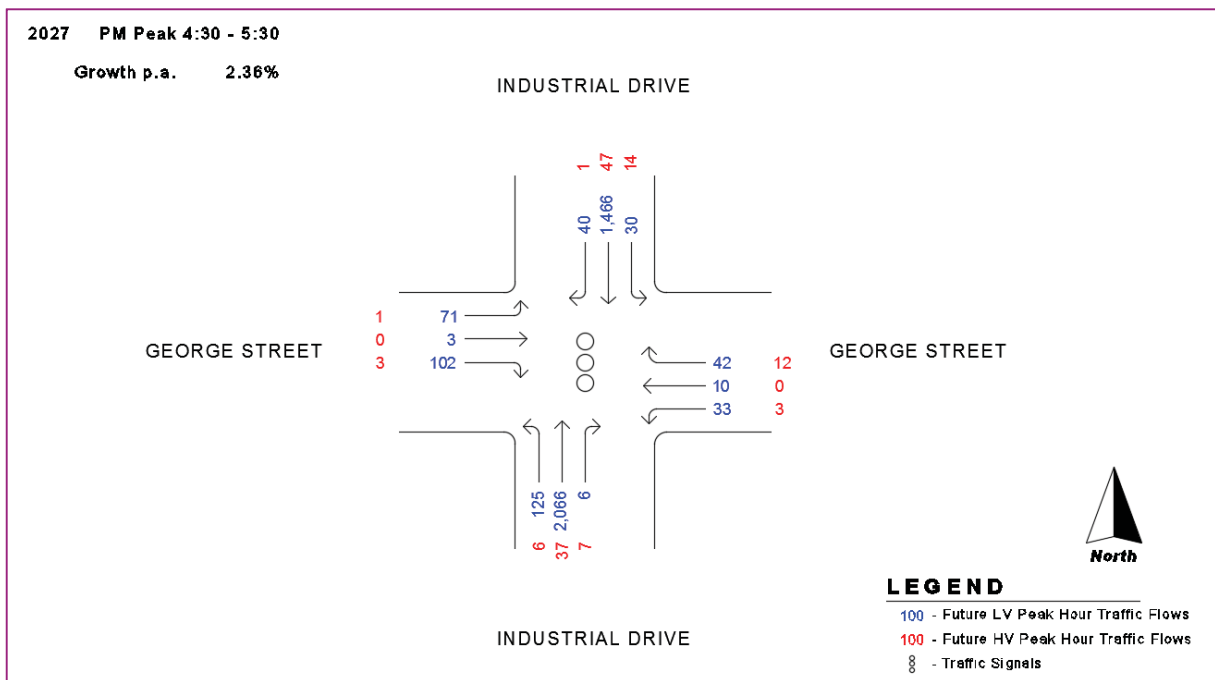


Figure 10 2027 Future Operation Traffic Volumes at Industrial Drive / George Street – Afternoon Peak

6.0 Mayfield Concept Plan

6.1 Traffic Management Plan

The Mayfield Concept Plan Traffic Management Plan (TMP) provides a framework for the coordinated management of traffic travel to and from within the site. This TMP is applicable to the Project since the site lies within the Mayfield Port Precinct. The condition 2.5 (Transport Management Plan) is as follows:

The Plan shall include traffic management devices and measures to facilitate the orderly movement of port related traffic movement to/from the road network, and shall include but not necessarily be limited to:

- a. measures to ensure heavy vehicle access to and from the site will be primarily along the routes shown in Attachment A to this approval;*
- b. measures to minimise port freight movements inside am and pm peak traffic periods;*
- c. measures to encourage the equal distribution of truck movements between the Industrial Drive/George Street and Industrial Drive/Ingall Street intersections;*
- d. measures to prevent heavy vehicles accessing residential streets and areas within the vicinity of the site and to maintain the residential amenity of the local community; and*
- e. measures to encourage staff access to the site by means other than private vehicles.*

The Plan shall be prepared and implemented prior to the operation of any projects associated with this Concept Plan approval and shall be updated prior to the commencement of any subsequent project approvals associated with this Concept Plan approval.

The Mayfield Concept Plan TMP would need to be implemented which requires each operator/tenant and PON in the Mayfield Concept Plan area to:

- Monitor / survey for evidence of non-compliances in accordance with the specific approval requirements for each individual operation;
- Each operator/tenant is to maintain a register of complaints or non-compliances. This is to be made available to PON on request and be included in the periodical compliance reports required to be provided to PON;
- All incidents must be reported to PON and other relevant agencies or stakeholders immediately along with specific details of the incident and planned response; and
- An incident report which details corrective actions would be provided to PON by the operator/tenant within one month of the incident.

6.2 Traffic Monitoring and Review Plan

The Mayfield Concept Plan Traffic Monitoring and Review Plan (TMRP) demonstrates how PON will meet the monitoring and review obligations, as identified in the Conditions of Consent. This TMRP will enable any non-compliance with the operational Mayfield Concept Plan TMP to be monitored, reported on and have corrective actions undertaken. The condition 2.10 (Transport Monitoring and Review) is as follows and are addressed in the TMRP:

- a. The monitoring and review shall report on freight volumes, types and movements (road and rail) resulting from projects associated with this Concept Plan, including origin and destination surveys;*
- b. assess the performance of the road network, including the performance of the Industrial Drive/Ingall Street and Industrial Drive/George Street intersections and the mid-block capacity of nominated heavy vehicle routes at a local and regional level;*
- c. assess the effectiveness of distributing heavy vehicle movements outside of peak traffic periods and the effectiveness of management measures to minimise heavy vehicles accessing residential areas;*

- d. *assess the effectiveness of measures to improve non-vehicular employee access to the site and links to external networks;*
- e. *assess the performance of utilised rail networks, and the use of available train paths; and*
- f. *inform the timing of necessary road and rail infrastructure upgrades, service provision and management measures.*

Should the monitoring and review identify a substantial non-compliance with this Concept Plan Approval, and/or subsequent project approvals, the Proponent shall identify measures to be implemented to address the non-compliance.

Individual operators/tenants would need to provide the results of the monitoring in a report to PON within 2 months of undertaking the monitoring at each of the required monitoring periods. Traffic data can then be used for consideration in the development of other operations within the Mayfield Concept Plan area to allow cumulative traffic impacts to be determined. As the Project represents the first project in the Mayfield Concept Plan area generating traffic through the Industrial Drive – George Street intersection there is no cumulative assessment required under this TMP. Regardless this TIA has considered potential cumulative impacts from other none Mayfield Concept Plan sources including the M4 berth and PWCS. This has been done by undertaking traffic count data at this intersection that would have included traffic counts from these sources, and then incorporating them into this assessment.

7.0 Conclusion

The analysis shows that the proposed future operation of the site is likely to have a minor impact on the operation of the intersection of Industrial Drive / George Street, the main intersection from the strategic road network to the site. Results show the intersection continues to operate at existing levels of service when 2017 future operational flows are applied. The intersection slightly worsens from LoS B to LoS C and LoS A to LoS B during the AM and PM peak respectively when traffic generation and background traffic growth is applied over an additional ten years. Despite the reduction in LoS, the performance of the intersection continues to operate at a satisfactory level.

Table 7 Summary of SIDRA Results for Industrial Drive / George Street

Scenario	Volume (veh/h)	Level of Service	Degree of Saturation	Average Delay (s)	95% back of queue (m)
2016 – existing condition					
AM peak	3,190	B	0.732	19.9	227
PM peak	3,158	A	0.629	13.5	188
2017 – future operation					
AM peak	3,293	B	0.753	20.3	231
PM peak	3,276	A	0.676	14.1	197
2027 – future operation (+10 years)					
AM peak	3,984	C	0.915	29.9	412
PM peak	4,125	B	0.885	16.1	320

The ongoing operation of the facilities existing traffic management practices are considered suitable to continue managing operational traffic following the implementation of the proposed Project.

Conservatively, the Project has the potential to generate up to 200 additional heavy vehicle movements and 30 light vehicle movements per day. Intersection modelling indicates the Project has a negligible impact on the future operation of the intersection, performing similarly to existing conditions as shown in **Table 7**. As a result no intersection upgrades are identified for the Industrial Drive/ George Street intersection.

Whilst no specific infrastructure requirements are generated by the Project, PON or its tenants would undertake the following measures during operations to manage traffic:

- Any oversized or overmass loads would seek the required permits from RMS prior to the transport of any such loads to or from the Project site;

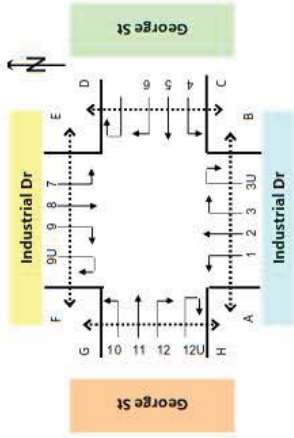


Appendix A

Intersection Counts for
Industrial Dr / George St

Appendix A Intersection Counts for Industrial Dr / George St

Job No. : N2658
 Client : AECOM
 Suburb : Mayfield East
 Location : Industrial Dr / George St
 Day/Date : Thu, 15th Sep 2016
 Weather : Fine
 Description : Classified Intersection Count
 : Hourly Summary



Approach		Industrial Dr						George St																												
Direction	Time Period	Direction 1 (Left Turn)		Direction 2 (Through)		Direction 3 (Right Turn)		Direction 4 (Left Turn)		Direction 5 (Through)		Direction 6 (Right Turn)		Direction 6U (U Turn)																						
		Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total																				
0:00 to 7:00		81	1	82	709	47	756	21	0	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0								
0:15 to 7:15		86	5	91	795	58	853	21	0	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
0:30 to 7:30		88	5	93	843	63	906	15	1	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
0:45 to 7:45		78	7	85	933	72	1,005	15	1	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
7:00 to 8:00		85	8	93	1,008	82	1,090	9	1	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
7:15 to 8:15		79	5	84	1,017	92	1,109	11	2	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
7:30 to 8:30		79	5	84	1,059	105	1,144	16	1	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
7:45 to 8:45		92	6	98	1,024	106	1,130	19	3	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
8:00 to 9:00		87	5	92	959	110	1,069	24	5	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
AM Totals		253	14	267	2,676	239	2,915	54	6	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
15:00 to 16:00		95	1	96	1,282	79	1,361	14	1	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
15:15 to 16:15		79	2	81	1,305	69	1,374	11	1	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
15:30 to 16:30		79	2	81	1,377	57	1,434	12	1	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
15:45 to 16:45		87	2	89	1,387	45	1,432	7	1	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
16:00 to 17:00		96	2	98	1,443	35	1,478	7	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
16:15 to 17:15		108	2	110	1,554	31	1,585	6	1	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
16:30 to 17:30		97	2	99	1,598	29	1,627	5	3	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
16:45 to 17:45		95	1	96	1,577	30	1,607	3	3	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
17:00 to 18:00		97	1	98	1,406	30	1,436	5	3	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM Totals		288	4	292	4,131	144	4,275	26	4	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Approach Direction	Industrial Dr												George St												Crossing Pedestrians					
	Direction 7 (Left Turn)		Direction 8 (Through)		Direction 9 (Right Turn)		Direction 9U (U Turn)		Direction 10 (Left Turn)		Direction 11 (Through)		Direction 12 (Right Turn)		Direction 12U (U Turn)		A	B	C	D	E	F	G	H	Total					
	Lights	Heavies	Lights	Heavies	Lights	Heavies	Lights	Heavies	Lights	Heavies	Lights	Heavies	Lights	Heavies	Lights	Heavies										Total				
6:00 to 7:00	16	4	20	730	71	821	33	2	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
6:15 to 7:15	17	5	22	921	79	1,000	32	2	34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
6:30 to 7:30	13	4	17	1,036	78	1,114	34	1	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
6:45 to 7:45	14	5	19	1,191	88	1,279	40	2	48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
7:00 to 8:00	16	6	22	1,298	76	1,374	53	2	55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
7:15 to 8:15	16	5	21	1,413	83	1,496	60	2	62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
7:30 to 8:30	16	8	24	1,501	83	1,584	73	2	75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
7:45 to 8:45	19	9	28	1,501	78	1,579	73	2	75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
8:00 to 9:00	18	8	26	1,458	88	1,546	67	1	68	1	1	2	73	3	76	8	1	9	138	4	142	0	0	0	0	0				
AM Totals	50	18	68	3,506	235	3,741	153	5	158	1	1	2	196	6	202	25	1	26	294	12	300	0	0	0	0	0				
13:00 to 14:00	22	3	25	774	71	845	26	1	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
13:15 to 14:15	19	3	22	848	64	912	33	3	36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
13:30 to 14:30	15	2	17	960	60	1,020	26	2	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
13:45 to 14:45	12	0	12	1,073	54	1,127	27	2	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
14:00 to 17:00	15	0	15	1,099	47	1,146	29	2	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
16:15 to 17:15	16	1	17	1,145	41	1,186	26	1	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
16:30 to 17:30	23	2	25	1,134	36	1,170	31	1	32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
16:45 to 17:45	23	3	26	1,164	30	1,194	29	1	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
17:00 to 18:00	23	3	26	1,142	27	1,169	27	1	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
PM Totals	60	6	66	3,015	145	3,160	82	4	86	0	0	0	171	7	178	6	0	6	235	7	242	0	0	0	0	0				



Appendix B

2016 Existing Conditions
SIDRA Results

Appendix B 2016 Existing Conditions SIDRA Results

Industrial Drive / George Street 2016 AM Peak

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Industrial Drive (S)											
1	L2	98	6.1	0.092	16.8	LOS B	2.3	16.8	0.45	0.70	49.8
2	T1	1130	9.4	0.532	14.2	LOS B	18.9	142.8	0.63	0.57	55.1
3	R2	22	13.6	0.148	60.5	LOS E	1.2	9.2	0.96	0.71	30.8
Approach		1250	9.2	0.532	15.2	LOS B	18.9	142.8	0.62	0.58	53.9
East: George Street (E)											
4	L2	17	5.9	0.032	34.7	LOS C	0.7	4.9	0.73	0.67	33.7
5	T1	3	0.0	0.010	43.2	LOS D	0.1	1.0	0.86	0.55	31.5
6	R2	20	60.0	0.131	54.1	LOS D	1.0	10.9	0.92	0.71	28.6
Approach		40	32.5	0.131	45.0	LOS D	1.0	10.9	0.83	0.68	30.8
North: Industrial Drive (N)											
7	L2	28	32.1	0.031	17.5	LOS B	0.6	5.6	0.43	0.68	48.5
8	T1	1579	4.9	0.732	16.9	LOS B	31.1	226.6	0.75	0.69	58.4
9	R2	75	2.7	0.469	62.9	LOS E	4.2	29.8	0.99	0.77	32.5
Approach		1682	5.3	0.732	19.0	LOS B	31.1	226.6	0.76	0.69	56.3
West: George Street (W)											
10	L2	72	4.2	0.173	40.3	LOS D	3.4	24.8	0.82	0.73	32.1
11	T1	7	0.0	0.173	35.7	LOS D	3.4	24.8	0.82	0.73	32.4
12	R2	139	3.6	0.591	54.3	LOS D	7.4	53.7	0.98	0.81	28.7
Approach		218	3.7	0.591	49.1	LOS D	7.4	53.7	0.92	0.78	29.8
All Vehicles		3190	7.1	0.732	19.9	LOS B	31.1	226.6	0.72	0.65	51.7

Source: AECOM, 2016

Industrial Drive / George Street 2016 PM Peak

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Industrial Drive (S)											
1	L2	102	4.9	0.082	11.9	LOS B	1.9	13.8	0.34	0.66	48.9
2	T1	1627	1.8	0.629	10.3	LOS B	26.4	187.8	0.56	0.53	51.3
3	R2	8	37.5	0.073	64.6	LOS E	0.5	4.2	0.96	0.67	28.5
Approach		1737	2.1	0.629	10.7	LOS B	26.4	187.8	0.56	0.54	51.0
East: George Street (E)											
4	L2	20	0.0	0.052	46.8	LOS D	0.9	6.6	0.83	0.70	33.4
5	T1	8	0.0	0.050	56.2	LOS E	0.4	3.1	0.95	0.63	31.3
6	R2	27	3.7	0.257	67.8	LOS E	1.6	11.7	0.99	0.72	28.2
Approach		55	1.8	0.257	58.4	LOS E	1.6	11.7	0.93	0.70	30.4
North: Industrial Drive (N)											
7	L2	25	8.0	0.020	11.6	LOS B	0.4	3.3	0.32	0.63	49.0
8	T1	1170	3.1	0.441	8.6	LOS A	14.9	107.1	0.48	0.43	52.6
9	R2	32	3.1	0.237	65.0	LOS E	1.9	13.4	0.96	0.72	28.6
Approach		1227	3.2	0.441	10.1	LOS B	14.9	107.1	0.49	0.44	51.4
West: George Street (W)											
10	L2	56	1.8	0.167	49.9	LOS D	2.9	20.5	0.87	0.74	32.5
11	T1	2	0.0	0.167	44.4	LOS D	2.9	20.5	0.87	0.74	33.0
12	R2	81	2.5	0.621	68.0	LOS E	5.0	35.4	1.00	0.80	28.1
Approach		139	2.2	0.621	60.4	LOS E	5.0	35.4	0.95	0.77	29.8
All Vehicles		3158	2.5	0.629	13.5	LOS B	26.4	187.8	0.56	0.51	49.0

Source: AECOM, 2016



Appendix C

2017 Future Operation
SIDRA Results

Appendix C 2017 Future Operation SIDRA Results

Industrial Drive / George Street 2017 AM Peak

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Industrial Drive (S)											
1	L2	100	6.0	0.094	16.8	LOS B	2.3	17.1	0.45	0.70	49.8
2	T1	1152	9.4	0.543	14.3	LOS B	19.5	147.2	0.63	0.57	55.0
3	R2	32	18.8	0.223	61.2	LOS E	1.7	14.1	0.96	0.73	30.2
Approach		1284	9.3	0.543	15.7	LOS B	19.5	147.2	0.63	0.59	53.4
East: George Street (E)											
4	L2	20	20.0	0.041	35.0	LOS D	0.8	6.4	0.74	0.68	33.5
5	T1	3	0.0	0.010	43.2	LOS D	0.1	1.0	0.86	0.55	31.5
6	R2	31	74.2	0.213	55.1	LOS E	1.6	18.5	0.93	0.73	28.4
Approach		54	50.0	0.213	47.0	LOS D	1.6	18.5	0.85	0.70	30.2
North: Industrial Drive (N)											
7	L2	47	42.6	0.055	17.8	LOS B	1.1	10.2	0.44	0.70	46.5
8	T1	1610	5.0	0.753	17.2	LOS B	31.6	230.6	0.76	0.70	58.2
9	R2	76	2.6	0.475	62.9	LOS E	4.2	30.2	0.99	0.77	32.5
Approach		1733	5.9	0.753	19.2	LOS B	31.6	230.6	0.76	0.70	55.9
West: George Street (W)											
10	L2	73	4.1	0.175	40.3	LOS D	3.5	25.1	0.82	0.73	32.1
11	T1	7	0.0	0.175	35.7	LOS D	3.5	25.1	0.82	0.73	32.4
12	R2	142	3.5	0.612	54.7	LOS D	7.7	55.2	0.98	0.81	28.6
Approach		222	3.6	0.612	49.4	LOS D	7.7	55.2	0.92	0.78	29.8
All Vehicles		3293	7.8	0.753	20.3	LOS C	31.6	230.6	0.72	0.66	51.2

Source: AECOM, 2016

Industrial Drive / George Street 2017 PM Peak

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Industrial Drive (S)											
1	L2	104	4.8	0.083	11.9	LOS B	1.9	14.1	0.34	0.66	48.9
2	T1	1666	1.8	0.645	10.5	LOS B	27.6	196.4	0.59	0.54	51.2
3	R2	11	54.5	0.111	65.5	LOS E	0.6	6.6	0.96	0.69	28.1
Approach		1781	2.3	0.645	10.9	LOS B	27.6	196.4	0.57	0.55	50.8
East: George Street (E)											
4	L2	30	10.0	0.084	47.4	LOS D	1.4	10.9	0.84	0.71	33.1
5	T1	8	0.0	0.050	56.2	LOS E	0.4	3.1	0.95	0.63	31.3
6	R2	47	25.5	0.489	69.8	LOS E	2.9	24.7	1.00	0.74	27.6
Approach		85	17.6	0.489	60.6	LOS E	2.9	24.7	0.94	0.72	29.7
North: Industrial Drive (N)											
7	L2	37	35.1	0.036	12.0	LOS B	0.7	6.1	0.33	0.64	48.0
8	T1	1198	3.1	0.453	8.7	LOS A	15.5	111.2	0.48	0.44	52.5
9	R2	33	3.0	0.244	65.0	LOS E	1.9	13.8	0.98	0.73	28.6
Approach		1268	4.0	0.453	10.2	LOS B	15.5	111.2	0.49	0.45	51.3
West: George Street (W)											
10	L2	57	1.8	0.169	50.0	LOS D	2.9	20.8	0.87	0.74	32.5
11	T1	2	0.0	0.169	44.4	LOS D	2.9	20.8	0.87	0.74	33.0
12	R2	83	2.4	0.676	69.2	LOS E	5.2	36.8	1.00	0.82	27.9
Approach		142	2.1	0.676	61.1	LOS E	5.2	36.8	0.95	0.79	29.6
All Vehicles		3276	3.4	0.676	14.1	LOS B	27.6	196.4	0.57	0.53	48.6

Source: AECOM, 2016



Appendix D

2027 Future Operation
SIDRA Results

Appendix D 2027 Future Operation SIDRA Results

Industrial Drive / George Street 2017 AM Peak

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Industrial Drive (S)											
1	L2	121	5.8	0.114	16.9	LOS B	2.8	20.9	0.46	0.71	49.8
2	T1	1396	9.4	0.667	15.9	LOS B	26.9	203.4	0.71	0.64	53.7
3	R2	37	18.9	0.258	61.5	LOS E	2.0	16.4	0.97	0.73	30.1
Approach		1554	9.3	0.667	17.1	LOS B	26.9	203.4	0.69	0.65	52.4
East: George Street (E)											
4	L2	24	16.7	0.048	35.1	LOS D	0.9	7.5	0.74	0.68	33.5
5	T1	4	0.0	0.013	43.3	LOS D	0.2	1.3	0.87	0.56	31.5
6	R2	36	72.2	0.264	56.6	LOS E	1.9	21.7	0.94	0.74	28.0
Approach		64	46.9	0.264	47.7	LOS D	1.9	21.7	0.86	0.71	30.1
North: Industrial Drive (N)											
7	L2	53	41.5	0.062	17.9	LOS B	1.2	11.5	0.44	0.70	46.7
8	T1	1951	4.9	0.915	35.2	LOS D	56.4	411.6	0.91	0.96	45.3
9	R2	92	2.2	0.573	63.6	LOS E	5.2	36.9	1.00	0.78	32.3
Approach		2096	5.7	0.915	36.0	LOS D	56.4	411.6	0.90	0.95	44.5
West: George Street (W)											
10	L2	89	4.5	0.216	40.8	LOS D	4.3	31.2	0.83	0.74	32.0
11	T1	9	0.0	0.216	36.2	LOS D	4.3	31.2	0.83	0.74	32.2
12	R2	172	3.5	0.750	59.2	LOS E	9.9	71.4	1.00	0.89	27.6
Approach		270	3.7	0.750	52.4	LOS D	9.9	71.4	0.94	0.84	29.1
All Vehicles		3984	7.7	0.915	29.9	LOS C	56.4	411.6	0.82	0.82	45.2

Source: AECOM, 2016

Industrial Drive / George Street 2017 PM Peak

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Industrial Drive (S)											
1	L2	131	4.6	0.105	12.0	LOS B	2.5	18.1	0.35	0.66	48.9
2	T1	2103	1.8	0.827	13.2	LOS B	45.0	319.4	0.74	0.69	49.4
3	R2	13	53.8	0.130	65.7	LOS E	0.8	7.8	0.96	0.69	28.1
Approach		2247	2.2	0.827	13.4	LOS B	45.0	319.4	0.72	0.69	49.1
East: George Street (E)											
4	L2	36	8.3	0.099	47.5	LOS D	1.7	12.9	0.84	0.72	33.1
5	T1	10	0.0	0.062	56.4	LOS E	0.6	3.9	0.95	0.64	31.3
6	R2	54	22.2	0.618	72.0	LOS E	3.4	28.4	1.00	0.78	27.2
Approach		100	15.0	0.618	61.6	LOS E	3.4	28.4	0.94	0.75	29.5
North: Industrial Drive (N)											
7	L2	44	31.8	0.042	12.0	LOS B	0.8	7.1	0.33	0.64	48.1
8	T1	1513	3.1	0.590	9.9	LOS A	22.4	161.0	0.55	0.50	51.7
9	R2	41	2.4	0.302	65.4	LOS E	2.4	17.2	0.98	0.74	28.5
Approach		1598	3.9	0.590	11.4	LOS B	22.4	161.0	0.55	0.51	50.5
West: George Street (W)											
10	L2	72	1.4	0.218	50.5	LOS D	3.8	26.7	0.88	0.75	32.4
11	T1	3	0.0	0.218	44.9	LOS D	3.8	26.7	0.88	0.75	32.9
12	R2	105	2.9	0.885	78.0	LOS E	7.1	50.9	1.00	0.97	26.1
Approach		180	2.2	0.885	66.5	LOS E	7.1	50.9	0.95	0.88	28.4
All Vehicles		4125	3.2	0.885	16.1	LOS B	45.0	319.4	0.67	0.63	47.3

Source: AECOM, 2016