global environmental solutions

Enfield Intermodal Logistics Centre

Noise and Vibration Impact Assessment

MOD 14

Report Number 610.16722.00500

31 May 2018

Goodman Property Services (Aust) Pty Limited

Level 17, 60 Castlereagh St

SYDNEY NSW 2000

Version: v1.3

Enfield Intermodal Logistics Centre

Noise and Vibration Impact Assessment

MOD 14

PREPARED BY:

SLR Consulting Australia Pty Ltd
ABN 29 001 584 612
2 Lincoln Street
Lane Cove NSW 2066 Australia
(PO Box 176 Lane Cove NSW 1595 Australia)
+61 2 9427 8100 +61 2 9427 8200
sydney@slrconsulting.com www.slrconsulting.com

DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
610.16722.00500-R05-v1.3	31 May 2018	Yang Liu	John Sleeman	Yang Liu

Executive Summary

SLR Consulting Australia Pty Ltd (SLR) has been engaged by Goodman Property Services (Aust) Pty Limited (The Proponent) to undertake a noise impact assessment in support of an application to the Department of Planning and Environment (DP&E) to modify the project approval. The proposed changes for MOD 14 apply to the warehouse sites within the Enfield ILC situated around the intermodal terminal. The Proponent has engaged with a number of potential customers for Enfield ILC including transport operators, freight forwarders and smaller users who have a requirement for the smaller sites comprises approximately 40% of the Enfield ILC vacant industrial land. Market engagement suggests that operational and built form restrictions imposed by the Approval are discouraging importers from considering the Enfield ILC a viable alternative to their current freight transportation arrangements. Small-scale operators in particular noted the value of rail-to-rail transfers is limited due to low TEU throughput with some, such as local manufacturers, not utilising containers at all.

The assessment has considered predicted noise of the proposed operations against the maximum allowable operational noise contributions prescribed under the Project Approval (Condition 2.17). The findings are summarised below:

Construction Noise

The worst-case construction noise levels from MOD 14 construction activities are predicted as up to 81 dBA during standard working hours, which is the same as the predicted construction noise levels predicted in the EA (2005). The construction noise levels associated with MOD 14 are likely to exceed the CNML by up to 30 dBA at assessment locations and the HNAL are likely to be exceeded by up to 6 dBA only at location A5.

Operational Noise

During daytime period, the predicted $L_{Aeq(15minute)}$ intrusive noise levels comply with the Project Approval Condition 2.17 at all assessment locations under neutral weather conditions. Under enhanced weather conditions, minor noise exceedance of up to 2 dBA were found at assessment location A5. Compliance of the MCoA 2.17 daytime external amenity $L_{Aeq(period)}$ criteria was achieved under both neutral and enhanced weather conditions.

During evening period, the predicted operational intrusive noise levels $L_{Aeq(15minute)}$ and amenity noise levels $L_{Aeq(period)}$ comply with the Project Approval Condition 2.17 at all assessment locations under both neutral and enhanced weather conditions.

During night-time period, the predicted operational intrusive noise levels $L_{Aeq(15minute)}$ are likely to exceed the MCoA 2.17 noise criteria by up to 2 dBA at assessment location A1 under neutral weather conditions, and up to 5 dBA, 2 dBA and 3 dBA at assessment location A1, A3 and A5 under enhanced weather conditions. Minor amenity $L_{Aeq(period)}$ exceedance of up to 3 dBA were found at assessment location A1 under enhanced weather conditions. Minor night-time sleep disturbance $L_{A1(1minute)}$ noise exceedance of up to 4 dBA were found at location A1 under neutral weather conditions. Under enhanced weather conditions, minor night-time sleep disturbance $L_{A1(1minute)}$ noise exceedance of up to 4 dBA and 3 dBA were found at location A1 and A5.

The incremental change in noise level has been examined compared to MOD 12 operations, and the net MOD14 impacts summarised as follows.

- The $L_{Aeq(15minute)}$ intrusive noise levels are expected to increase by the minor amount of up to 0.8 dBA during daytime and evening periods and up to 0.4 dBA during night-time period.
- The $L_{Aeq(period)}$ amenity noise levels are expected to increase by the minor amount of up to 0.6 dBA during the daytime and evening periods and up to 0.9 dBA during night-time period.

Executive Summary

Noise management measures have been recommended and described in **Section 8.3.5** of this report to minimise predicted noise impacts. These are considered to be the extent of reasonable and feasible options at this time. It has been recommended to undertake operator-attended noise measurements to validate the noise predictions following commencement of site operation. With implementation of the recommended mitigation measures, it is unlikely that there would be any exceedance of the noise limits identified in the existing conditions of approval.

Road Traffic Noise

The existing 2016 traffic noise levels without the ILC operation exceed the NSW RNP daytime or night-time noise criteria at the assessment locations. The 2 dB allowance has been applied to the existing 2016 traffic noise level as the "Allowable Traffic Noise Level". The traffic noise increases are predicted in the range of 0.1 dB to 0.3 dB at the assessment locations due to the additional traffic generated by the proposed MOD 14 operation. Therefore, the traffic noise from the proposed Enfield ILC MOD 14 operation complies with the NSW RNP. The predicted MOD 14 traffic noise levels at the assessment locations will remain the same or below the approved traffic noise levels presented in the original EA (2005) during the daytime period and likely to be increased by up to 0.2 dB during the night-time period. Given a 2 dBA change in noise level is 'just' noticeable by most people, a 0.2 dB change will not be noticeable.

Vibration

Ground vibration is unlikely to cause any significant effect to the nearest residential properties.

Table of Contents

TABLES

Table of Contents

FIGURES

APPENDICES

1 INTRODUCTION

SLR Consulting Australia Pty Ltd (SLR) has been engaged by Goodman Property Services (Aust) Pty Limited (The Proponent) to undertake a noise impact assessment in support of an application to the Department of Planning and Environment (DP&E) to modify the project approval. The original project approval (Application No. 05-0147) was granted by the Minister for Planning on the 5 September 2007 under Part 3A of the Environmental Planning and Assessment Act 1979 (EP&A Act) for the development of the Enfield Intermodal Logistic Centre (ILC) (MP 05_0147). The proposed changes for MOD 14 are summarised below and listed in **Section 6** of this assessment.

The purpose of the proposed modification is to provide operational flexibility and built form outcomes better suited to the needs of prospective tenants and operators. This will encourage uptake of spare capacity at the Enfield ILC by smaller users, facilitating the continued growth of container volumes and ensuring the commercial viability of the intermodal terminal. The long-term objective is to ensure rail freight volumes grow to become the predominant transport mode at the Enfield ILC.

The modification entails changing the built form parameters including the site layout and building footprints to create 13 buildings encompassing 126,440 sqm as well as approval to increase the building heights to a maximum of 13.7 metres.

Also proposed are modifications to operational parameters within select lots in response to market feedback received during consultation with potential tenants interested in leasing warehouse space, and using the rail service at Enfield ILC. Feedback suggests that further flexibility is required for the Enfield ILC to be a viable freight solution for prospective tenants. In summary these include:

- Permit warehouse and distribution uses;
- Allow truck-to-truck freight movements for smaller sites with no direct interface with rail sidings
- Extend 24/7 operating hours to specific sites.

2 SECRETARY'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS

This noise assessment has been prepared as part of the Environmental Impact Statement (EIS) for proposed MOD14 operation. The Secretary's Environmental Assessment Requirements (SEARs) has been issued by NSW Department of Planning and Environment (DPE) in November 2017. The objective of this report is to assess the potential noise and vibration impacts of the modified Enfield ILC site in accordance with relevant state and federal guidelines and regulations, and to address the SEARs relevant to noise and vibration, as shown in **Table 1**.

Table 1 Secretary's Environmental Assessment Requirements – Enfield ILC (MOD 14)

Key Issue	Assessment Requirement	Addressed in Section
Noise and Vibration	Assessment of construction and operational noise and vibration impacts in accordance with relevant NSW noise and vibration guidelines. The assessment must include consideration to sensitive receivers including residential premises, consideration of sleep disturbance and, as relevant, the characteristics of noise and vibration (e.g. low frequency noise); and	**Section 7** **Section 8** **Section 9**
	The assessment should be conducted in accordance with, but not limited to, Assessing Vibration: a technical guideline (DEC 2006), Interim Construction Noise Guideline (EPA, 2013), NSW Road Noise Policy (DECCW, 2011), Noise Policy for Industry (EPA, 2017), Development Near Rail Corridors and Busy Roads – Interim Guideline (DoP, 2008) and any other relevant guidance.	**Section 7** **Section 8** **Section 9**

Source: SEARs for application number MP05_0147 MOD 14, 9 November 2017.

3 REPORT OBJECTIVES

The purpose of the study is to assess the proposed modifications (MOD 14) to the Enfield ILC approved design operation to ensure that noise emissions at the site continue to satisfy the noise emission criteria in the current Project Approval (Condition 2.17).

Previous acoustic assessments carried out for the Enfield ILC include:

- ILC at Enfield Environmental Assessment (SKM, 2005): Appendix E - Noise and Vibration Assessment (Renzo Tonin);
- ILC at Enfield Preferred Project Report (SKM, 2006): Noise Technical Memorandum (Renzo Tonin, April 2006);
- ILC at Enfield Modification Application No. 4 (Sydney Ports, Aug 2009): Appendix A - Detailed Design Acoustic Assessment. Document No 60051533 (AECOM, 2009);
- ILC at Enfield Modification Application No. 4 - Response to Stakeholders (Sydney Ports, Nov 2009): Appendix B - Noise Memorandum (AECOM, Nov 2009);
- ILC at Enfield Modification Application No. 4 - Supporting Information (Sydney Ports, March 2010): Appendix A - Noise Memorandum (AECOM, March 2010);
- ILC at Enfield Modification Application No. 5 - On Site Management of Unsuitable Engineering Fill (Sydney Ports, May 2011): Appendix A - Noise Impact Assessment (SLR, May 2011);
- ILC at Enfield Modification Application No. 6 - Early Contractor Involvement Detailed Design Adjustment (Sydney Ports, April 2012): Appendix A - Acoustic Memo (AECOM, April 2012); and
- ILC at Enfield Modification Application No. 6 - ECI Detailed Design Adjustments and Subdivision - Response to Submissions (Sydney Ports, July 2012): Appendix B - Acoustic Design (AECOM, July 2012).
- ILC at Enfield Modification Application No. 12 – Noise Impact Assessment (SLR Consulting, November 2016).

Specific acoustic terminology is used within this assessment. An explanation of standard acoustic terms is included as **Appendix A**.

4 APPROVED PROJECT

A project application under Part 3A of the EP&A Act for the construction and operation of the Enfield ILC was submitted to the Department of Planning in December 2005. The proposal involved the following key elements:

- Demolition, relocation or removal of former railway buildings and structures;
- Earthworks and drainage including the levelling of the site, formation of landscape mounds and detention basins and removal of unsuitable materials, as required;
- Construction and operation of:
    - An intermodal terminal for the loading and unloading of containers between road and rail and the short term storage of containers, with a capacity to handle 300,000 TEU per annum;
    - Rail sidings, railway lines and associated works to connect to the existing freight line;
    - Warehousing for the packing and unpacking of containers and the short-term storage of cargo;
    - Empty container storage facilities, for the storage of empty containers to be later packed or transferred back to the port by rail;
    - Light industrial/commercial area fronting Cosgrove Road complementary to operations at the site;

- Access works including the construction of a road bridge over the new marshalling yards for access to Wentworth Street and an upgrade of the entrance to the site from Cosgrove Road; and
- Internal roads, administration buildings, diesel and LPG storage and fuelling facilities, container wash down area, vehicle maintenance shed, and installation of site services (all utilities, stormwater and sewerage).

On 5 September 2007, the Minister for Planning granted approval of the project under Section 75J of the EP&A Act (MP05_0147).

The approval has been modified on eight occasions, as outlined in **Table 2**.

Table 2 Approved Modifications of Project Approval MP05_0147

Modification Number	Description	Approval date
MOD 1	Amendment of conditions relating to construction dust monitoring	2 October 2008
MOD 2	Amendment of conditions to enable staged construction and operation and modified timing of submission of Site Audit Statements	30 March 2009
MOD 4	Amendment of conditions relating to noise walls, internal roads, stormwater detention, development areas and site layout.	27 May 2010
MOD 5	Relocation and reuse of unsuitable material to Mount Enfield	10 November 2011
MOD 6	Incorporation of former Toll Site into project site and subdivision of site into 22 allotments	11 December 2012
MOD 8	Amendment of subdivision layout into 23 allotments to facilitate commercial leasing, development and operation of the site	27 November 2013
MOD 11	Establish an additional warehouse (Warehouse G) in the southern portion of Area G (Lot 23).	8 February 2017
MOD 12	Approval to extend two existing rail sidings and an existing office building.	7 March 2017

Note: Enfield ILC MOD 10 Operation has been lodged to DP&E but is currently on-hold.

5 SITE OVERVIEW

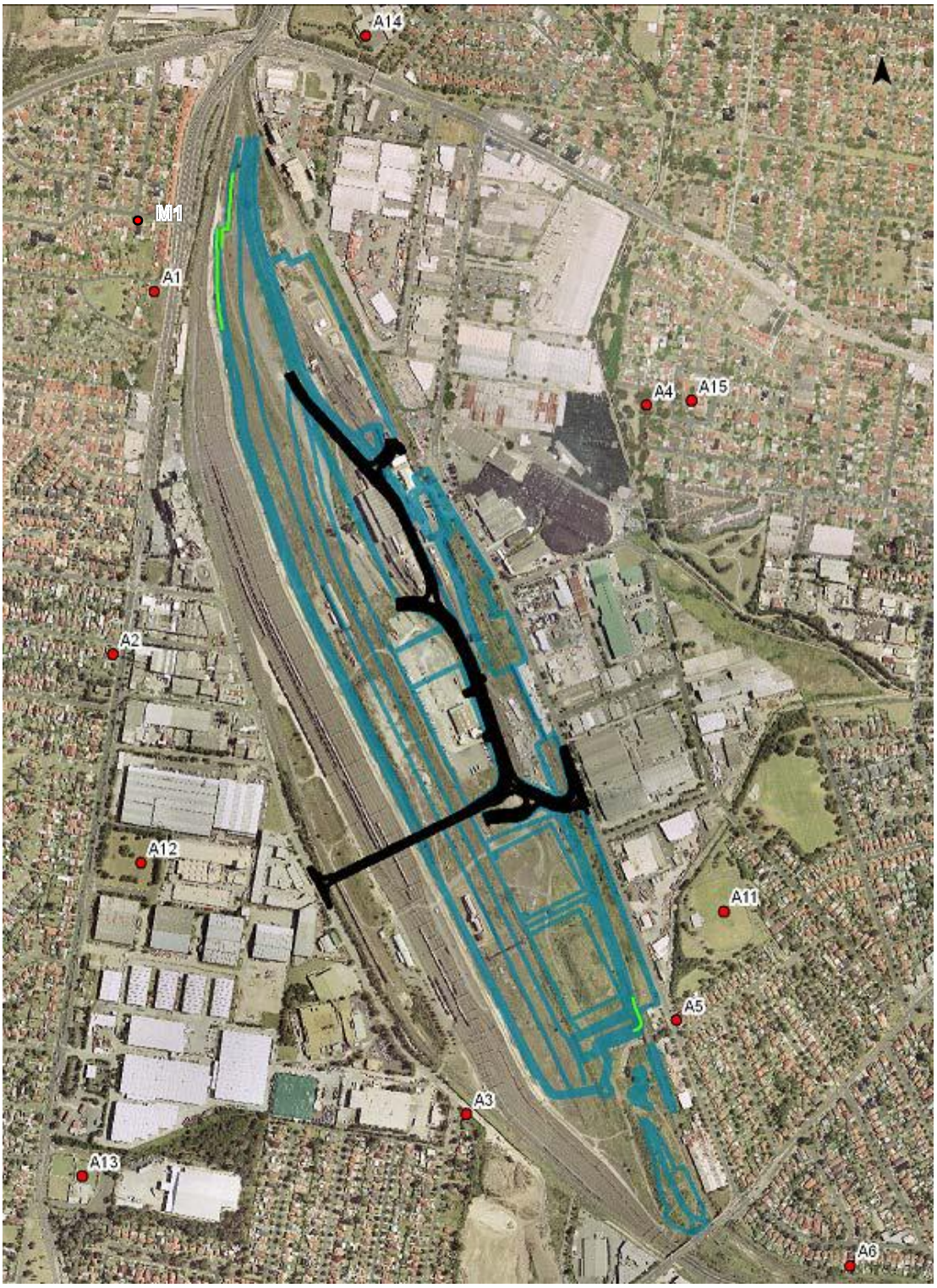
Industrial land adjoins the site to the east and west, with mixed industrial / residential land to the south, and residential to the north-west. The approved site layout is shown in **Figure 1**.

Figure 1 Approved Site Layout Plan[1]

Note 1: Approved Site Layout Plan under Modification 12
Source: NSW Ports

The noise monitoring and assessment locations are shown in **Figure 2**.

Figure 2 Enfield ILC Site Showing Assessment Locations

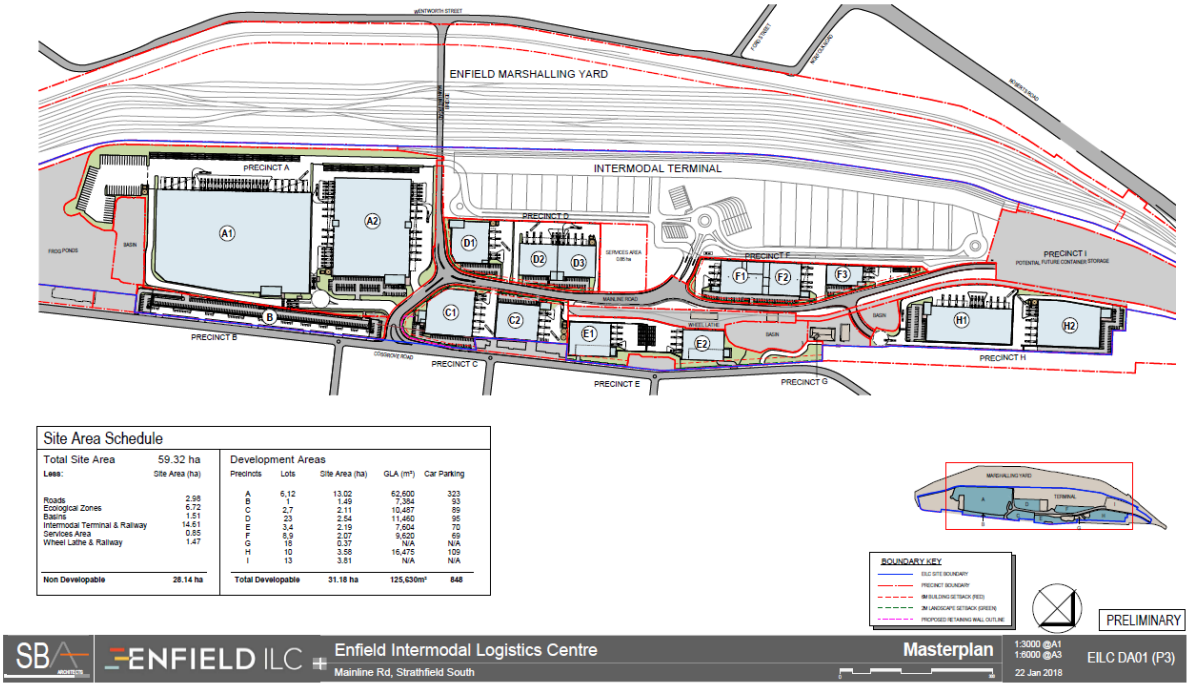


Note: Figure from NSW Ports *Enfield ILC Construction Environmental Management Plan*

6 PROPOSED MODIFICATION

The proposed modification (MOD 14) applies to the warehouse sites within the Enfield ILC situated around the intermodal terminal. The Proponent has engaged with a number of potential customers for Enfield ILC including transport operators, freight forwarders and smaller users who have a requirement for the smaller sites comprises approximately 40% of the Enfield ILC vacant industrial land. Market analysis engagement suggests that operational and built form restrictions imposed by the Approval are discouraging importers from considering the Enfield ILC a viable alternative to their current freight transportation arrangements. Small-scale operators in particular noted the value of rail-to-rail transfers is limited due to low TEU throughput with some, such as local manufacturers, not utilising containers at all. The masterplan for the proposed Enfield ILC MOD 14 operation is shown in **Figure 3** below.

Figure 3 Masterplan of Enfield ILC MOD 14 Operation



The objectives of this proposal are to redress this situation and can be briefly summarised as follows:

- Introduce greater operational flexibility within the Enfield ILC by:
  - extending 24/7 operational hours; and
  - removing the restriction on rail-to-rail and truck-to-truck transfers on smaller sites

  to better service the needs and expectations of importers in the short term;
- Encourage a modal switch toward intermodal freight transportation in the medium to long term to service Greater Sydney's 24/7 port supply chain and alleviate road congestion.
- Implement a masterplan that provides the built form and site layout requirements of prospective commercial tenants and operators.

Road Traffic Assessments for the existing environment and the proposed modification has been conducted the Ason Group (Reference Number 0440r03). The predicted peak hourly heavy vehicle movement and overall "worse case" daily heavy vehicle movement are presented within this assessment. Notably, the traffic assessment has shown overall traffic volumes to be consistent with the existing Project Approval.

6.1 Operating hours

The existing hours of operation for the Intermodal terminal, warehousing and container yards are 24 hours 7 days per week. The existing hours of operation for the Light Industrial and Commercial Areas are 7:00am - 7:00pm, 7 days per week.

The proposed modification (MOD 14) is seeking to extend the existing operating hours to 24 hours 7 days per week for the light Industrial Area residing on Lots 3 and 4 only (Precinct E).

6.2 Noise Barriers

The following noise mitigation barriers have been constructed in accordance with the design approved under Modification Application 6:

- Southern-eastern L-shaped barrier located adjacent to stormwater detention basin D, with a total length of 77 m;
- North-western barrier aligned with the northern-most point of the container stacking area, with a total length 370 m;
- South-eastern earth noise mound (east of the frog ponds), total length 110 m.

7 NOISE CRITERIA

7.1 Construction Noise Criteria

The Interim Construction Noise Guideline (ICNG) recommends a construction noise management level (CNML) equivalent to the daytime RBL plus 10 dBA within standard hours (i.e. daytime) and RBL plus 5 dBA outside standard hours. The ICNG also nominates a "highly noise affected level" (HNAL) daytime intrusive $L_{Aeq(15minute)}$ noise level of 75 dBA. As construction works would be limited to daytime standard working hours only, the ICNG CNMLs and HNALs are presented in **Table 3**. Note the CNMLs as presented in the Table are based on the daytime project approval 'Maximum Allowable Noise Contribution' noise levels of RBL+5 dBA.

Table 3 Construction Noise Management Levels and Highly Noise Affected Level (dBA re 20µPa)

Location		Intrusive $L_{Aeq(15minute)}$	Intrusive $L_{Aeq(15minute)}$
		Daytime[1] CNML	Daytime[1] HNAL
A1	Eastern end of Jean Street[2]	59	75
M1	Jean Street	59	
A2	Eastern end of Ivy Street[2]	58	
A3	2 Wentworth Street (south) [2]	54	
A4	Eastern end of Gregory Street[2]	54	
A5	Western end of Blanche Street[2]	51	
A6	40 Bazentin Street[2]	51	
Any	Industrial[3]	External 75 when in use	75
Any	Commercial[3]	External 70 when in use	
Any	Active Recreation[3]	External 65 when in use	

Location		Intrusive $L_{Aeq(15minute)}$	Intrusive $L_{Aeq(15minute)}$
		Daytime[1] CNML	**Daytime[1] HNAL**
Any	Passive Recreation[3]	External 60 when in use	
Any	Church, Cemetery[3]	External 55 when in use	
Any	Hospital[4]	External 55 when in use	
Any	School[4]	External 55 when in use	

Note 1: Daytime standard working hours 7:00am to 6:00pm (Monday to Friday), 8:00am to 1:00pm (Saturday)

Note 2: At the most-affected point within 30m of the residential premises.

Note 3: At the most-affected point within 50m of the non-residential premises

Note 4: External criteria equivalent to internal criteria plus 10 dBA.

7.2 Operational Noise Criteria

Ministers Conditions of Approval (MCoA) 2.17 establishes design noise criteria for operations on this site. The relevant MCoA are reproduced as follows:

Operation Noise

2.17 The Proponent shall design, construct, operate and maintain the project to ensure that the operational noise contributions from the project do not exceed the maximum allowable noise contributions specified in Table 3 below, at those locations and during those periods indicated. The maximum allowable noise contributions apply under:

a) wind speeds up to 3 ms^{-1} (measured at 10 metres above ground level), or

b) temperature inversion conditions up to 3^{o}C per 100 metres and wind speeds up to 2 ms^{-1} (measured at 10 metres above ground level).

Table 3 - Maximum Allowable Noise Contribution (dBA)

Location	Day 7:00am to 6:00pm on any day		Evening 6:00pm to 10:00pm on any day		Night 10:00pm to 7:00am on any day		
	L_{Aeq} (15-minute)	L_{Aeq} (period)	L_{Aeq} (15-minute)	L_{Aeq} (period)	L_{Aeq} (15-minute)	L_{Aeq} (period)	L_{A1} (1-minute)
A1 - Eastern end of Jean Street	*54*	*54*	*54*	*49*	*48*	*42*	*58*
A2 - Eastern end of Ivy Street	*53*	*52*	*52*	*51*	*47*	*45*	*57*
A3 - Wentworth Street (south)	*49*	*52*	*47*	*53*	*42*	*38*	*52*
A4 - Eastern endof Gregory Street	*49*	*52*	*47*	*46*	*45*	*37*	*55*
A5 - Western end of Blanche Street	*46*	*58*	*46*	*50*	*43*	*43*	*53*
A6 - 40 Bazentin Street	*46*	*58*	*45*	*54*	*41*	*39*	*51*
A11 - Begnell Park	-	*50*	-	*50*	-	*50*	-
A12 - Matthew Park	-	*50*	-	*50*	-	*50*	-
A13 - Greenacre Bowling Club	-	*55*	-	*55*	-	*55*	-
A14 - Strathfield High School (internal)	-	*35*	-	-	-	-	-
A15 - St Anne's School (internal)	-	*35*	-	-	-	-	-

2.18 For the purpose of assessment of noise contributions specified under condition 2.17 of this consent, noise from the development shall be:

a) measured at the most affected point on or within the site boundary at the most sensitive locations to determine compliance with LAeq(15-minute) and LAeq(period) noise limits;

b) measured in the free field at least 3.5 metres from any vertical reflecting surface in line with the worst-affected dwelling façade to determine compliance with LA1(1-minute) noise limits; and

c) subject to the modification factors provided in Section 4 of the New South Wales Industrial Noise Policy (EPA, 2000), where applicable.

Notwithstanding, should direct measurement of noise from the development be impractical, the Proponent may employ an alternative noise assessment method deemed acceptable by the DECC (refer to Section 11 of the New South Wales Industrial Noise Policy (EPA, 2000)). Details of such an alternative noise assessment method accepted by the DECC shall be submitted to the Director-General prior to the implementation of the assessment method.

2.19 To avoid any doubt, the Proponent shall ensure that locomotives located on the site and associated with the operation of the project do not cause an exceedance of the noise limits specified under condition 2.17 of this approval. This shall include, where necessary, measures to mitigate and manage noise associated with locomotive idling and any shunting operations occurring on the site.

2.19A The Proponent shall implement noise mitigation measures generally in accordance with the measures identified in the document listed in condition 1.1j). In relation to the north-western noise wall, the Proponent shall implement as part of the design and construction of this wall, mitigation measures to minimise potential reflective noise on its western face.

It has been noted that noise assessment location "A12 - Matthew Park" no longer exists. This site at 51-55 Roberts Road has been developed for commercial retail use. Therefore, the operational noise criteria for location "A12 - Matthew Park" is no longer applicable and this location will be removed from this assessment, noting there are no other recreation areas in this vicinity.

7.3 Off-site Road Noise Criteria

7.3.1 Existing Road Traffic Noise

According to the Noise and Vibration Assessment (dated October 2005) from the original EA (Chapter 11), a programme of background noise surveys to characterise and quantify the noise environment in the vicinity of the ILC operation was conducted in February 2005. The near-field road traffic noise monitoring locations adjacent to Liverpool Road (Hume Highway) and Roberts Road are shown on **Figure 4**.

Figure 4 Road Traffic Noise Monitoring Locations (February 2005)

Source: GoogleMap 2017

The measured traffic noise level results are presented in **Table 4** which include the daytime the night-time $L_{Aeq(period)}$ from all noise sources, which were controlled by traffic noise from the adjacent Liverpool Road (Hume Highway) and Roberts Road.

Table 4 Measured Road Traffic Noise Levels (2005)

ID	Address	Road Traffic Noise Source	Distance from Road	Traffic Noise Levels, dB(A)	
				Day $L_{Aeq(15hour)}$	Night $L_{Aeq(9hour)}$
M7	554 Liverpool Road	Liverpool Road	15	71	67
M8	1 Robinson Street	Hume Highway	10	70	67
M9	20 Rebecca Road	Roberts Road	25	72	69
M10	118 Roberts Road	Roberts Road	10	70	67

Other potentially noise sensitive locations affected by the road traffic noise were identified and presented in **Table 5**. The traffic noise levels at these locations were calculated in accordance with NSW Road Noise Policy's (DECCW, 2011) accepted model, 'Calculation of Road Traffic Noise' (CoRTN) and also presented in **Table 5**.

Table 5 Calculated Road Traffic Noise Levels (2005) at Other Noise Sensitive Locations

ID	Locations	Noise Levels Measured at	Road Traffic Noise Source	Distance from Road (m)	Traffic Noise Levels, dB(A)	
					Day $L_{Aeq(15hour)}$	Night $L_{Aeq(9hour)}$
A4	Eastern end of Gregory Street	-	Liverpool Road / Cosgrove Road	375	58	53
A13	Greenacre Bowling Club, Roberts Road	M10	Roberts Road	10	74	70

Recent road traffic counts and assessment have been prepared by Transport and Urban Planning Pty Ltd in November 2016. The measured and calculated road traffic noise levels for Year 2005 and 2016 without the ILC operation are shown in **Table 6**.

Table 6 Measured (2005) and Calculated 2016 Traffic Noise Levels

ID	Location	Period	Traffic Noise Levels - without ILC Operation	
			2005	**2016[1]**
A4	Eastern end of Gregory Street	Daytime $L_{Aeq(15hour)}$	58	59
		Night-time $L_{Aeq(9hour)}$	53	55
A7	554 Liverpool Road	Daytime $L_{Aeq(15hour)}$	71	73
		Night-time $L_{Aeq(9hour)}$	67	69
A8	1 Robinson Street	Daytime $L_{Aeq(15hour)}$	70	71
		Night-time $L_{Aeq(9hour)}$	67	69
A9	20 Rebecca Road	Daytime $L_{Aeq(15hour)}$	72	72
		Night-time $L_{Aeq(9hour)}$	69	69
A10	118 Roberts Road	Daytime $L_{Aeq(15hour)}$	70	70
		Night-time $L_{Aeq(9hour)}$	67	67
A13	Greenacre Bowling Club, Roberts Road	Daytime $L_{Aeq(15hour)}$	74	76

Note 1: Based on the traffic count conducted by Transport and Urban Planning Pty Ltd in November 2016.

7.3.2 Traffic Noise Assessment Criteria

The NSW Road Noise Policy (RNP) (DECCW, 2011) is the relevant policy for the assessment of road noise in NSW. The RNP classification scheme for assessing traffic noise impacts on an existing road network from the proposed ILC MOD 14 operation is presented in **Table 7**.

Table 7 Road Traffic Noise Assessment Criteria for Residential Land Uses (dBA re 20 µPa)

Road	Project Type and Land Use	Total Traffic Noise Criteria[1,2,3]	Relative Increase Criteria[1,2]
Liverpool Road Hume Highway Roberts Road Cosgrove Road[4]	Existing residences affected by additional traffic on existing freeway/arterial/sub-arterial roads generated by land use development	Daytime 60 LAeq(15hour)	Existing LAeq(15hour) plus 12dBA
		Night-time 55 LAeq(9hour)	Existing LAeq(9hour) plus 12dBA

Note 1: LAeq = equivalent continuous noise level.
Note 2: Daytime 7:00 am to 10:00 pm, Night-time 10:00 pm to 7:00 am.
Note 3: Where the total traffic criteria is already exceeded, then limit any increase to 2dBA or less.
Note 4: Section 2.2.2 of the NSW RNP states that 'where local authorities identify a 'principle haulage route', the noise criteria for the route should match those for arterial/sub-arterial roads, recognising that they carry a different level and mix of traffic to local roads'. Therefore, Cosgrove Road is identified as a sub-arterial road.

The NSW RNP also sets the noise assessment criteria for other non-residential land uses. **Table 8** below shows the traffic noise criteria which are applicable to Greenacre Bowling Club and Strathfield High School.

Table 8 NSW RNP Traffic Noise Criteria for Non-Residential Land Uses

Type of Land Use	Traffic Nosie Criteria, dB(A)	
	Day	**Night**
Open Space (active use)	LAeq,(15hour), 60 (external) when in use	-

Note 1: External criteria equivalent to internal criteria plus 10dBA, based on openable windows.

In relation to situations where exceedances of the road traffic noise assessment criteria are predicted, the RNP Section 3.4 relevantly provides:

> *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 a 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'.*

As shown in **Table 6**, the calculated 2016 traffic noise levels without Enfield ILC operation at most of the noise affected locations already exceed the RNP daytime or night-time criteria. Therefore, the 2 dB allowance will be applied to the calculated 'existing' 2016 traffic noise levels (which assumes that the Enfield ILC is not operational) as the "allowable traffic noise levels".

8 NOISE ASSESSMENT

8.1 Prediction of Noise Emissions

In order to calculate the noise emission levels at the nearest noise sensitive receptor locations, SoundPLAN (Version 7.1) environmental computer models were developed. SoundPLAN is a software package which enables compilation of a sophisticated computer model comprising a digital ground map (containing ground contours), the location and sound power levels (SWL) of noise sources on site, and the location of sensitive receivers for assessment purposes. The computer model predicts noise propagation taking into account factors such as distance attenuation, ground hardness, air absorption building and barrier shielding effects, as well as meteorological conditions.

The SoundPLAN model utilised noise propagation calculation algorithms in accordance with CONCAWE prediction method. The CONCAWE method was developed for large open air industrial facilities and incorporates the influence of the wind and atmospheric stability on propagation.

8.1.1 Meteorological Parameters

Noise predictions were conducted under the meteorological conditions referenced from the Environmental Assessment of 2005 and the Enfield Preferred Project Report of 2006, as presented in **Table 9**.

Table 9 Modelled Meteorological Parameters

Weather Conditions	Day		Evening		Night	
	Neutral Weather	Enhanced Weather	Neutral Weather	Enhanced Weather	Neutral Weather	Enhanced Weather
Temperature[1]	18°C	18°C	12°C	12°C	6°C	6°C
Humidity[1]	63%	63%	75%	75%	90%	90%
Atmospheric Stability Class[1]	D	D	D	D	D	D
Wind Speed[2]	0 m/s	2.5 m/s/2 m/s	0 m/s	2.5 m/s/2 m/s	0 m/s	2.5 m/s/2 m/s
Wind Direction	N/A	West North-West South-West	N/A	West North-West South-West	N/A	West North-West South-West South-East

Notes : 1. Referenced from the "Noise and Vibration Impact Assessment" (Renzo Tonin, 2005) submitted as Appendix E to the Environmental Assessment (SKM, 2005).
2. Wind speed of 2.5 m/s for intrusive noise assessment and 2 m/s for amenity noise assessment referenced from the "Enfield Preferred Project Report" (SKM, 2006): Noise Technical Memorandum (Renzo Tonin, April 2006).

8.1.2 Plant and Equipment

SLR conducted a review of the equipment sound power levels used in the EA report for the Enfield ILC (SKM, 2005). Documented sound power levels were considered as a reasonable representation of the equipment proposed in this modification and as such they have been adopted for use in this assessment for consistency. Sound power levels for plant/equipment not included in the EA report were based on previous assessments conducted by SLR.

Operational Sound Power Levels of the on-site equipment are detailed in **Table 10**.

Table 10 Operational Equipment Sound Power Levels

Equipment	Noise descriptor	A-weighted Sound Power Level dBA	Octave Band Centre Frequency (Hz) Sound Power Levels, dB (Lin)								
			31.5	63	125	250	500	1000	2000	4000	8000
Loading and Unloading of Trucks and Trains											
Large Truck	LAeq	102	96	96	101	104	99	97	94	88	82
	LA1	107	101	101	106	109	104	102	99	93	87
Small Truck	LAeq	102	96	96	101	104	99	97	94	88	82
	LA1	107	101	101	106	109	104	102	99	93	87
Truck Idling	LAeq	97	98	68	82	83	88	92	92	87	81
	LA1	100	71	71	85	86	91	95	95	90	84
Reach Stacker	LAeq	106	110	111	107	103	105	101	97	96	87
	LA1	111	115	116	112	108	110	106	102	101	92
Metal Clangs	LAeq	84	88	91	91	82	82	80	73	67	60
	LA1	116	120	123	123	114	114	112	105	99	92
Commercial Power Washer	LAeq	94	88	86	87	87	88	87	87	86	85
	LA1	102	97	95	96	96	97	95	96	95	94
Forklifts	LAeq	99	-	101	96	92	96	95	92	85	-
	LA1	107	-	109	104	100	104	103	100	93	-
Idling Trains											
Train Idling on Track	LAeq	100	103	107	104	101	98	93	89	88	90
	LA1	114	117	121	118	115	112	107	103	102	104
Moving Trains											
Slow Moving Train[1]	LAeq	100	103	107	104	101	98	93	89	88	90
	LA1	114	117	12	118	115	112	107	103	102	104
Coupling Clang	LAeq	-	-	-	-	-	-	-	-	-	-
	LA1	115	105	109	110	110	113	109	110	105	87
Train Refuelling	LAeq	97	98	68	82	83	88	92	92	87	81
	LA1	100	71	71	85	86	91	95	95	90	84
Mechanical Plants											
Air Condenser Unit	LAeq	60	73	64	57	58	57	56	51	49	46
	LA1	64	77	68	61	62	61	60	55	53	50
Exhaust Fan	LAeq	62	40	44	46	51	52	56	53	50	47
	LA1	65	43	47	49	54	55	59	56	53	50

Note 1: Based on EPL3142 noise testing limits for locomotives operating on the NSW network.

A noise model typically assumes that all noise sources are operating simultaneously at full power. For complex noise models with a large number of noise sources (especially mobile equipment) the predictions can overestimate a real world measured noise level as many of the noise sources do not operate continuously at full power and their operation may be intermittent or cyclical.