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AIR QUALITY



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Woolworths Distribution Centre – JR & JN

Air Quality Impact Assessment

Addressee(s): Fabcot Pty Ltd

Site Address: Moorebank Avenue, Moorebank NSW

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Final Authority

This report must be regarded as draft until the above study components have been each marked as final, and the document has been signed and dated below.



Martin Doyle

15th May 2020

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1. INTRODUCTION

Fabcot Pty Ltd (Fabcot), on behalf of Woolworths, has engaged Northstar Air Quality Pty Ltd (Northstar) to perform an air quality impact assessment (AQIA) for the proposed operation of a distribution centre (the Proposal), to be located on Moorebank Avenue, Moorebank NSW (the Proposal site). The Proposal site is part of the Moorebank Precinct West Stage 2 development.

Development consent was provided by the NSW Planning Assessment Commission (PAC) for State significant development (SSD) 5506 (Moorebank Intermodal Precinct West – Concept Proposal & Stage 1 Early Works) on 3 June 2016. Development consent was provided by the NSW Independent Planning Commission (IPC) for SSD 16_7709 (Moorebank Precinct West Stage 2 [MPW Stage 2]) on 11 November 2019. MPW Stage 2 was approved on the basis of concept design plans for the operational phase of the development. A modification to the concept plans is sought to allow the development of the Proposal.

This AQIA forms part of the Environmental Impact Statement (EIS) prepared to accompany the modification to SSD 16_7709 under Part 4 of the *Environmental Planning and Assessment Act 1979*.

This AQIA demonstrates that the scope of the proposed activity is in accordance with the SSD 16_7709 assessment and consent instrument. Further, it remains substantially the same as the MPW Concept Approval for SSD 5066.

2. THE PROPOSAL

The following provides a description of the Proposal and describes the potential sources of air emissions associated with the operational phase.

As previously described, there are concurrent modification applications pertaining to SSD 5066 and SSD 7709:

Modification 1: SSD 5066 MOD 2

- Amendment to the Concept Plan originally approved, via means of adjustment to the internal Moorebank Precinct West (MPW) boundaries; and
- Amendment to the maximum building height established across selected portions of the Subject Site from approximately 21 m up to and including 45 m.

Modification 2: SSD 7709 MOD 1

- Amendment to the MPW Stage 2 internal operational boundaries, with respect to indicative built form proposed under SSD 7709, via means of reconfiguration of the MPW Stage 2 internal operational boundaries. Noting, this is consistent with the post-approvals provision for updated Development Layout Drawings to the NSW DPIE in relation to Condition B2 of SSD 7709;
- Amendment to the maximum building height established across selected portions of the Subject Site from approximately 21 m up to and including 45 m with respect to future built form under MPW Stage 2; and
- Construction and operation of two (2) Warehouse and Distribution Facilities (High Bay Warehouses) across the site, including:
 - Ancillary hardstand;
 - Amenities;
 - Ancillary offices;
 - Associated car parking; and
 - Landscaping.

Each of the above elements is consistent with the development consent (SSD 7709) and post-approval documentation as approved

2.1 Overview

Woolworths is seeking to operate two distribution centres / warehouse facilities on Moorebank Avenue, Moorebank NSW (named JR and JN). This AQIA considers the potential impacts associated with the JR and JN warehouses together.

The JR warehouse will manage the fast-moving stock lines for Woolworths supermarkets and will be an automated warehouse. The JN warehouse will manage slower-moving product lines.

The Proposal will be located immediately to the west of the Moorebank Intermodal Terminal ("Terminal") and will receive some shipping container deliveries from the Terminal by Autostrad vehicles, which are unmanned and deliver to the site via an unencumbered access. The shipping containers will contain indent stock¹. In the main, this type of delivery shall be managed by the JN distribution centre facility, and any outbound pallets for regional NSW will be transferred from the JN facility to the JR facility via the over-head conveyor airbridge.

The JR warehouse contains the following of relevance to this AQIA:

- Gatehouses;
- Transport, Operations and Administration offices;
- Pedestrian air bridge connection between the Transport Office and the Operations and Administration office and the JN facility;
- Conveyor air bridge connection between the JR and JN warehouses;
- Warehouse; including,
 - Goods inbound docks (Primary and Secondary freight)
 - Goods outbound docks
 - High bay (including automation)
 - Case buffer (including automation)
 - Marshalling
 - AGV (Automated Guided Vehicle) corridors
 - Manual handling equipment workshop
 - MHE and MHS workshop
 - Truck wash / maintenance
 - Returns indent / salvage area
 - Cardboard and plastic compactors
 - Staff amenities
 - Vertical transportation
- Truck driver amenities;
- Refuelling facility (diesel);
- LPG refuelling facility;
- Truck wash;
- Energy complex;
- Fire tanks and pump house;
- Site works; including,
 - Weighbridges (inbound and outbound)
 - Chevron
 - Truck parking (rigid, pantechicon, prime mover)
 - Stormwater management
- Pylon signage.

¹ where orders are made to wholesaler once orders placed by customer

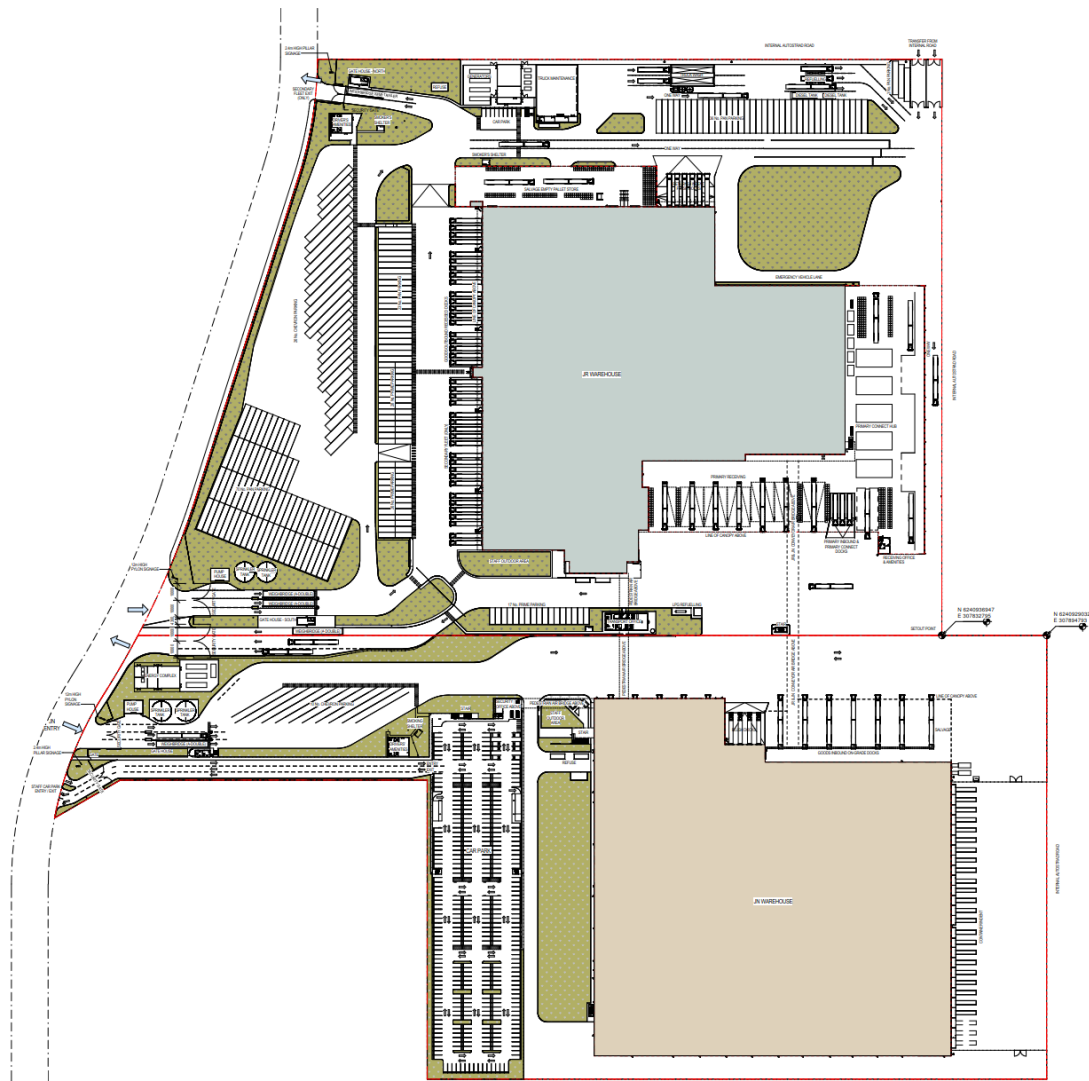
The JN warehouse contains the following of relevance to this AQIA:

- Gatehouse;
- Security office;
- Pedestrian air bridge connection between the security office and the JN warehouse, and the JR facility;
- Conveyor air bridge connection between the JN and JR warehouses;
- Warehouse; including,
 - Operations and Administration Office
 - Goods inbound docks
 - Goods outbound docks
 - Container indent docks
 - High bay (including automation)
 - Full Case and Split Case buffers (including automation)
 - Marshalling
 - Manual handling equipment workshop
 - Automation workshop
 - Cardboard and plastic compactors
 - Staff canteen
 - Staff amenities
 - Vertical transportation
- Truck driver amenities;
- Energy complex;
- Fire tanks and pump house;
- Site works; including,
 - Staff and visitor car park
 - Weighbridges (inbound)
 - Chevron
 - Stormwater management
- Pylon signage.

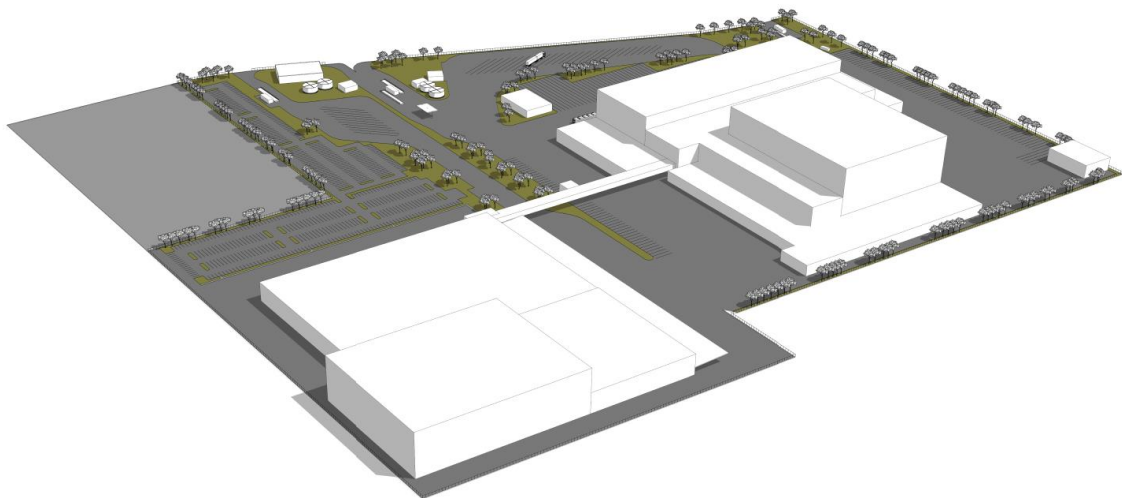
As part of the energy complex, four diesel generators may be located on site (2 x JR, 2 x JN) and would be used in a power outage to maintain electricity supply to the warehouses. It is anticipated that these generators would operate for less than 200 hours each per year and emissions would therefore be exempt from the air impurities emission concentration standard for nitrogen dioxide (NO₂) as outlined in Part 5, Division 5, Clause 57A of the Protection of the Environment Operations (Clean Air) Regulation (2010).

The proposed layout of the Proposal is presented in **Figure 1**.

Figure 1 Proposal layout



1 SITE MASTER PLAN
T. 1000px



The hours of operation are proposed to be 24 hours per day, 363 days per year (no operations are proposed on Christmas Day and Easter Sunday). Two main shifts would operate from 5 am to 3 pm, and 3 pm to 11 pm. A skeleton crew would work between 11 pm and 5 am. It is likely that up to 130 members of staff would be required for office and warehouse duties, with 80 drivers required.

The anticipated vehicle movements associated with the Proposal are presented in **Table 1**.

Table 1 Anticipated vehicle movements

Warehouse	Vehicle type	Anticipated number per day
JR	B-Double	267
	Semi-trailers	47 (Primary fleet) 344 (Secondary fleet) 391 (Total)
	Light vehicles	994
JN	B-Double	53
	Semi-trailers	116
	Light vehicles	994

2.2 Identified Potential for Emissions to Air

The construction of the Proposal would primarily result in emissions of particulate matter ('construction dust'), which would be experienced through the construction of the pad, construction of warehouses and associated infrastructure.

Operations at the Proposal site would result in emissions of particulate matter (PM₁₀ and PM_{2.5}), oxides of nitrogen (NO_x), sulphur dioxide (SO₂), carbon monoxide (CO) and volatile organic compounds (VOC). These would be emitted primarily through the operation of vehicles about the Proposal site, and also through the sporadic use of emergency electricity generation in the energy complex in the event of electricity supply failure.

These types of emissions are consistent with those assessed and approved under SSD 7709.

3. PREVIOUS ASSESSMENT

Schedule 4 of the Development Consent for SSD 5066 outlines the conditions which are to be met in future development applications. No conditions relate specifically to air quality.

A detailed AQIA and traffic impact assessment (TIA) were performed to support the EIS for SSD 16_7709 (Ramboll Environ, 2016) (Arcadis, 2016). These reports were subsequently updated in response to submissions (Arcadis, 2017a) (Arcadis, 2017b) and reflected a minor change to warehousing layout, with no change in total gross floor area (GFA) of those warehouses (215 000 m²). A change to the proposed hours of warehousing operations (to 24 hours) was also proposed within those submission reports, which formed the basis of the concept approval.

The AQIA for SSD 16_7709 assessed the likely air quality impacts at surrounding sensitive receptor locations associated with both construction and operation of the MPW Stage 2 project.

Development Consent for SSD 7709 provided for the:

“construction and 24/7 operation of a warehousing estate on the northern part of the site servicing the IMT facility and including:

- *six warehouses with a total gross floor area (GFA) of 215,000 m² and, for each warehouse, associated offices, staff amenities, hardstands and truck and light vehicle parking*
- *800 m² freight village (operating from 7 am to 6 pm, 7 days/week) including staff/visitor amenities*
- *Internal roads, noise wall, landscaping, lighting and signage”*

The Proposal is substantially the same as that for which Development Consent has previously been granted.

3.1 Construction

In relation to construction, Ramboll Environ (2016) quantitatively assessed the impacts of construction associated with:

- Pre-construction fill placement and stockpiling;
- Site preparation activities;
- Bulk earthworks, drainage and utilities;
- Moorebank Avenue intersection works and internal road networks;
- IMT facility and Rail link connection construction;
- Construction and fit-out of warehousing; and,
- Miscellaneous structural construction and finishing works.

Ramboll Environ (2016) indicated that impacts during the construction phase complied with all relevant impact assessment criteria. That quantitative (modelling) assessment concluded that incremental increases in annual average particulate concentrations at 38 nearby sensitive receptor locations would be minor when compared against existing background conditions. Short term (24-hour) impacts at those sensitive receptor locations were conservatively assessed as being up to $5.1 \mu\text{g}\cdot\text{m}^{-3}$ (approximately 10 % of the criterion). With the addition of existing air quality conditions, the construction of the MPW Stage 2 development was predicted not to result in any additional days of exceedances of the air quality criteria.

The construction phase assessment provided as part of the MPW Stage 2 development provided a conservative assessment of impacts associated with site preparation and bulk earthworks, and construction and fit-out of warehousing. It was recommended that during any construction and fit-out of warehousing, the Air Quality Management Plan (AQMP) for the approved development (as included as Appendix 6 of Ramboll, 2016) is reviewed and appropriate management measures adopted.

3.2 Operation

For operational phase activities, Ramboll Environ (2016) assessed the impact of:

- Diesel locomotives travelling along the Rail link to and from the Inter Modal Terminal (IMT);
- Diesel locomotives idling onsite during loading / unloading and shifting locomotives operating within the IMT;
- Reach stackers / container handling equipment loading and unloading trains and trucks;
- External trucks delivering / collecting containers to/from the IMT;
- Internal trucks transferring containers from the IMT to warehousing; and,
- Warehouse cooling and heating (gas fired).

In relation to vehicle traffic, the AQIA which supported SSD 16_7709 assumed that 1 458 external trucks movements would be anticipated for a container throughput of 500 000 TEU, with an additional 124 internal truck movements anticipated for warehousing.

A summary of the elements of SSD 16_7709 associated with warehousing activities as assessed and approved by the IPC is presented in **Table 2**. The proposed modification sits within the limits of SSD 16_7709 as approved.

Table 2 Warehousing elements of SSD 16_7709 as approved

Element	Description	Source
Total warehousing area	Approximately 215 000 square metres (m ²)	(Arcadis, 2017a)
Traffic movements (operation)	2 670 light vehicles per day 1 458 heavy vehicles per day	(Arcadis, 2017a)
Assumptions adopted in traffic assessment	<ul style="list-style-type: none"> Warehousing facilities would operate 52 weeks of year, 7 days a week and 24 hours a day. Containers will arrive every day of the year. In a typical week 95 % of containers will be processed on weekdays (Monday – Friday), with the remaining 5 % being processed on Saturday and Sunday. Container are loaded onto either on to a B - double, semi - trailer or rigid trucks. On average a rigid truck is equivalent to 0.8 TEUs About 65 % of delivers will be made by semi - trailers, 30 % will be made by rigid trucks and 5% will be made by B - doubles. 	(Arcadis, 2017a)

Ramboll Environ (2016) indicated that impacts during the operational phase complied with all relevant impact assessment criteria. As for the construction phase, the predicted impacts associated with the MPW Stage 2 development were shown to be minor when compared to annual average air quality criteria. For pollutants with shorter averaging periods, all pollutants were shown, with the addition of existing background conditions, to be below the relevant criteria.

3.3 Relevance to the Current Proposal

The level of assessment performed to allow the approval of SSD 16_7709 to be granted by the IPC was significant. That assessment (Ramboll Environ, 2016) included the construction and operation of all elements of the MPW Stage 2 development which might impact upon air quality in the surrounding area, and was determined to be 'substantially the same' as the Concept Approval under SSD 5066. .

The current Proposal seeks to gain approval for a minor change to the approved MPW Stage 2 development, specifically the construction and operation of two warehouses in the south of the MPW Stage 2 development area that include a high bay component to the warehouse structures.

The Proposal would not result in any changes in GFA of warehousing of the total approved MPW Stage 2 development area (215 000 m²). Taking into account the findings of the previous AQIA, it is not considered that the Proposal would result in any significant changes in particulate matter emissions during the construction phase, and certainly not by a level that could not be effectively managed through the extant construction dust management practices implemented through the AQMP. It is therefore considered reasonable to conclude that a further assessment of construction phase impacts is not required. The AQMP included as part of the AQIA for the MPW Stage 2 development would be reviewed and adhered to during the construction of the Proposal.

In relation to operational phase impacts, sufficient information is not available in the AQIA for the MPW Stage 2 development to allow each discrete element of the development to be assessed alone. The level of disaggregation relating to calculated emissions only allows examination of emissions in the operational phase on the following basis:

- Locomotives travelling, idling, shifting;
- Container handling;
- External truck movements;
- Internal truck movements;
- Light vehicles; and,
- Warehousing - internal transfer, heating/cooling, forklifts.

The distribution of total emissions of air pollutants which might be likely (should the Proposal be approved), has been reviewed. The potential impacts as predicted in the AQIA (Ramboll Environ, 2016) can then be placed into context regarding the sources contributing to those impacts, and discussed with regard to the Proposal.

This approach has been adopted in this current AQIA and is outlined in detail in the following section.

4. AIR QUALITY IMPACT ASSESSMENT

4.1 Emissions

As outlined in the AQIA for the MPW Stage 2 development, emissions of air pollutants across five source categories are presented in table 5-9 (Ramboll Environ, 2016), replicated in **Table 3**.

Table 3 Summary of annual emissions MPW Stage 2 (kg·annum⁻¹)

Source	CO	HC	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOC
Locomotives travelling, idling, shifting	6 015	2 416	60 353	1 140	1 106	13	2 544
Container handling	26 709	3 052	27 472	1 526	1 480	126	3 214
External truck movements	244	56	4 765	115	112	0	59
Light vehicles	672	64	216	16	15	0	68
Warehousing – internal transfer, heating, cooling, forklifts	14 266	4 123	7 232	486	481	296	4 601
Total	47 906	9 711	100 038	3 283	3 194	435	10 486

Source: (Ramboll Environ, 2016)

The dominant source of NO_x and PM₁₀ emissions are associated with locomotives and container handling which are not part of the Proposal. Emissions relevant to the Proposal are associated with warehousing, external truck movements, and light vehicles which represent 12 % of NO_x emissions, and 19 % of PM₁₀ emissions.

Under Proposal operations, emissions associated with all sources outlined in **Table 3** are not anticipated to change substantially from that approved under SSD 16_7709.

The emissions associated with the Proposal associated with truck and light vehicle movements can be determined through data provided by Woolworths, presented in **Table 4**, along with the relevant vehicle numbers as assessed under SSD 16_7709. **Table 4** identifies that no anticipated change to assessed emissions from vehicle movements.

Table 4 Vehicle movements – as approved and associated with Proposal

Vehicle movements per day	As assessed under SSD 16_7709	JR Warehouse	JN Warehouse
Light vehicles	2 670	994	994
Heavy vehicles	1 458	658 (267 B-Double plus 391 Semi trailer)	169 (53 B-Double plus 116 Semi trailer)

Source: Arcadis, 2017a, Woolworths

4.2 Impacts

The maximum incremental air quality impacts at any of the 38 receptors surrounding the MPW Stage 2 development associated with the emissions outlined in **Table 3** are partially reproduced in **Table 5**, based on the results presented in tables 6.2 and 6.3 of Ramboll Environ (2016).

Based on the emissions distribution by source, these predicted impacts are likely to be dominated by the locomotive and container handling emissions sources, with impacts associated with vehicle movements and warehousing operations (i.e. the Proposal) being relatively minor. Given that the Proposal has been shown to not result in a change in vehicle traffic or other operational characteristics than that approved under SSD 16_7709, these impacts remain unchanged. There is no predicted change in emissions associated with the change in building height being sought, or the operational characteristics of the Proposal.

Table 5 Predicted and calculated pollutant concentrations

Pollutant / averaging period	Units	Crit.	MPW Stage 2 development – approved ^(A)		Anticipated change associated with proposed modification (building height)
			Max Increment	Cumulative	
PM ₁₀ – 24-hour maximum	µg·m ⁻³	50	1.0	48.4	0 %
PM ₁₀ – Annual average	µg·m ⁻³	25 ^(B)	0.4	19.9	0 %
PM _{2.5} – 24-hour maximum	µg·m ⁻³	25	1.0	24.3	0 %
PM _{2.5} – Annual average	µg·m ⁻³	8	0.4	8.8	0 %
NO ₂ – 1-hour maximum	µg·m ⁻³	246	110.7	160.5	0 %
NO ₂ – Annual average	µg·m ⁻³	62	11.8	36.1	0 %
CO – 1-hour maximum	mg·m ⁻³	30	0.06	5.1	0 %
CO – 8-hour maximum	mg·m ⁻³	10	0.03	3.1	0 %

Notes (A): Ramboll Environ (2016)

(B): Updated annual average PM₁₀ criterion as per NSW EPA (2017)

4.3 Odour

The Proposal seeks to import, handle, and distribute a range of fast-moving goods. No perishable or fresh goods will be handled at the Proposal site, and the likelihood of odour emissions is therefore determined to be low. All waste materials generated by the Proposal will be handled appropriately, with waste contractors removing any generated waste from the Proposal site in a timely manner.

5. CONCLUSION

Fabcot Pty Ltd (Fabcot), on behalf of Woolworths, has engaged Northstar Air Quality Pty Ltd (Northstar) to perform an air quality impact assessment (AQIA) for the proposed operation of a distribution centre (the Proposal), to be located on Moorebank Avenue, Moorebank NSW (the Proposal site). The Proposal site is part of the Moorebank Precinct West Stage 2 development.

Development consent was provided by the NSW Planning Assessment Commission (PAC) for State significant development (SSD) 5506 (Moorebank Intermodal Precinct West – Concept Proposal & Stage 1 Early Works) on 3 June 2016. Development consent was provided by the NSW Independent Planning Commission (IPC) for SSD 16_7709 (Moorebank Precinct West Stage 2 [MPW Stage 2]) on 11 November 2019. MPW Stage 2 was approved on the basis of concept design plans for the operational phase of the development. A modification to the concept plan and staged consent is sought to allow the change in development building height associated with the Proposal.

This AQIA forms part of the Environmental Impact Statement (EIS) prepared to accompany the modification to SSD 5066 and SSD 16_7709 under Part 4 of the *Environmental Planning and Assessment Act 1979*.

In relation to operations at the Proposal site, this AQIA has referenced the inputs and results of the assessment provided to support the approved MPW Stage 2 development. No significant changes are anticipated to those inputs, which would result in any material change to the outcome of that assessment.

In relation to odour, given the materials to be handled as part of the Proposal, the adoption of appropriate waste management practices is anticipated to result in no odour impacts at surrounding receptor locations.

This AQIA demonstrates that the scope of the proposed activity is in accordance with the SSD 16_7709 assessment and consent instrument. Further, it remains substantially the same as the MPW Concept Approval for SSD 5066.

6. REFERENCES

- Arcadis . (2017b). *Air Quality Impact Assessment, MPW Stage 2 Response to Submissions - Addendum Impact Assessment, March 2017* .
- Arcadis. (2016). *Moorebank Precinct West - Stage 2 Operational Traffic and Transport Impact Assessment, October 2016*.
- Arcadis. (2017a). *Moorebank Precinct West Stage 2 Proposal, Response to Submissions, Appendix C: Consolidated Traffic Table, July 2017*.
- NSW EPA. (2017). *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*. NSW Environment Protection Authority.
- Ramboll Environ. (2016). *Moorebank Precinct West Stage 2 Air Quality Impact Assessment*.

APPENDIX A

Report Units and Common Abbreviations

Units Used in the Report

All units presented in the report follow the International System of Units (SI) conventions, unless derived from references using non-SI units. In this report, units formed by the division of SI and non-SI units are expressed as a negative exponent, and do not use the solidus (/) symbol. For example:

- 50 micrograms per cubic metre would be presented as $50 \mu\text{g}\cdot\text{m}^{-3}$ and not $50 \mu\text{g}/\text{m}^3$; and,
- 0.2 kilograms per hectare per hour would be presented as $0.2 \text{ kg}\cdot\text{ha}^{-1}\cdot\text{hr}^{-1}$ and not $0.2 \text{ kg}/\text{ha}/\text{hr}$.

Table A1 Common Abbreviations

Abbreviation	Term
ABS	Australian Bureau of Statistics
AHD	Australian height datum
AQIA	air quality impact assessment
AQMS	air quality monitoring station
AWS	automatic weather station
BoM	Bureau of Meteorology
°C	degrees Celsius
CO	carbon monoxide
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DPIE	NSW Department of Planning, Industry and Environment
EETM	emission estimation technique manual
EPA	Environmental Protection Authority
FEL	front end loader
GDA	Geocentric Datum of Australia
GIS	geographical information system
K	kelvin ($-273^{\circ}\text{C} = 0 \text{ K}$, $\pm 1^{\circ}\text{C} = \pm 1 \text{ K}$)
kW	kilowatt
MGA	Map Grid of Australia
$\text{mg}\cdot\text{m}^{-3}$	milligram per cubic metre of air
$\text{mg}\cdot\text{Nm}^{-3}$	Milligram per normalised cubic metre of air
$\mu\text{g}\cdot\text{m}^{-3}$	microgram per cubic metre of air
NCAA	National Clean Air Agreement
NEPM	National Environment Protection Measure
OEH	NSW Office of Environment and Heritage (now defunct)

Abbreviation	Term
PM	particulate matter
PM ₁₀	particulate matter with an aerodynamic diameter of 10 µm or less
PM _{2.5}	particulate matter with an aerodynamic diameter of 2.5 µm or less
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SEE	Statement of Environmental Effects
TAPM	The Air Pollution Model
TPM	total particulate matter
TSP	total suspended particulates
US EPA	United States Environmental Protection Agency
UTM	Universal Transverse Mercator
VKT	vehicle kilometres travelled