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Food Processing and Packaging Facility at Part Lot 2304 Templar Road, Erskine Park

Environmental Air Quality Assessment

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Environmental Air Quality Assessment

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1 INTRODUCTION

SLR Consulting Australia Pty Ltd (SLR) has been engaged by Commercial & Industrial Property Pty Ltd to assess the potential air quality impacts of the proposed operation of a food processing and packaging facility (the Project) to be located at Part Lot 2304 Templar Road, Erskine Park NSW (the Project site).

This assessment forms part of the supporting documentation for the Development Application (DA) for the proposal.

1.1 Objectives

The objectives of the following study are as follows:

- To investigate and identify any existing sources of air pollutants in the vicinity of the proposed development site.
- To review air quality monitoring data, topography and prevailing wind conditions to characterise the background ambient air environment.
- To identify the constraints and opportunities for the proposed development.
- To provide recommendations for mitigation where required.

1.2 Study Scope and Assessment Approach

The scope of the study is limited to an ambient air quality assessment. A greenhouse gas assessment and indoor air quality has not been included as part of this study.

The report identifies key pollutants for consideration and potential sources of emissions due to Project construction works and operations (refer to **Section 5**). The proposed development is further considered in the context of the receiving environment (refer to **Section 7**).

The report provides both an opportunities and constraints assessment comprising a qualitative risk-based assessment (refer to **Section 9**) and a semi-quantitative emissions estimate for the Project restricted to activities undertaken within the Project site boundary (refer to **Section 8**).

The level of assessment adopted is considered appropriate given the assessed risks associated with the proposed development, the proposed operations, and given the majority of emissions generated by the Project will be largely controllable at source through the implementation of specific mitigation measures and good 'housekeeping' practices.

Additionally, recommendations for pollutant control and management (refer to **Section 10**) and a program of monitoring (refer to **Section 10.3**) have been provided to ensure ongoing compliance with relevant air quality criteria.

1.3 Conditions of Consent

The Director-General's Requirements for the Project (document dated 17 July 2013) are as follows:

Air Quality and Odour – including:

- *a quantitative assessment of the potential air quality impacts (particularly odour and dust) of the development on surrounding receivers, including impacts from construction, operation and transport; and,*
- *details of the proposed mitigation, management and monitoring measures.*

The Environment Protection Authority (EPA) requirements for the Project (document dated 10 July 2013) require that the report:

1. *Assess the risk* (i.e. the risk to human health, the environment and amenity) *associated with potential discharges of fugitive and point source air emissions for all stages of the proposal.*

2. *Justify the level of assessment undertaken on the basis of risk factors, including but not limited to the proposed location, the characteristics of the receiving environment, and the type and quantity of pollutants emitted.*

The EPA also requires that the Project is contextualised within the receiving environment noting the potential for cumulative impacts and provide details that are essential to predicting and assessing air quality impacts including identification of sources and processes that have the potential to result in emissions to air, and identification of air pollutants that may be emitted.

It is noted that air dispersion modelling is required only where there is a risk of adverse air quality impacts.

Refer to a Statement of Compliance provided in **Section 13** of this report for more information.

1.4 Relevant Guidelines

The following guidelines and standards have been referenced in the construction of this report:

- Protection of the Environment Operations (POEO) Act 1997, POEO Amendment Act 2011, and POEO (Clean Air) Regulation 2004.
- NSW Department of Environment and Conservation, *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales,* 2005 (hereafter, the Approved Methods).
- NSW Department of Environment and Conservation, *Technical Framework and Notes - Assessment and Management of Odour from Stationary Sources in New South Wales, 2006* (hereafter, the Odour Policy).
- Office of Environment and Heritage (OEH) Air Quality Toolkit.
- Building Code of Australia (BCA) and relevant Australian Standards.
- Victoria Environment Protection Authority (VIC EPA), *Recommended Separation Distances for Industrial Residual Air Emissions*, 2013.
- Penrith City Council (Council) planning documentation.

1.5 Terminology

Specific air quality terminology is used within this assessment. An explanation of common air quality terms is included as **Appendix A**.

2 PROJECT DESCRIPTION

The Project involves the construction of a purpose built fully accredited fresh food packaging centre, where fresh cuts of meat and poultry will be prepared, packaged and labelled before being distributed to stores.

The proposed building area is 21,020 m^2 and comprises of the following components:

- Preparation and packaging area – 17,735 m^2
- Office area – 1,036 m^2
- Service building and plant area – 943 m^2
- Amenities – 1,306 m^2

2.1 Site Description

The site is located within the Erskine Business Park within the Local Government Area (LGA) of Penrith. An aerial view of the Project site is shown in **Figure 1**. The facility layout is shown in **Appendix B**.

Figure 1 Project Site

Aerial image courtesy of Google

2.2 Building Characteristics

The proposed development contains no openable windows and has a number of roller shutter doors along the east and west sides of the building.

The facility layout and commercial kitchen layout plans are provided in **Appendix B**. **Table 1** provides an overview of the proposed development.

Table 1 Development Components

Main Area and Equipment	Components
Meat Processing Facility	• Red Meat Receiving Dock, Processing Area, Chiller Area and Equipment Room • Chicken Receiving Dock, Processing Area and Chiller Area • Burger Processing Area • Fabrication Workshop • Robot Sorter Room • Collapsed Crate Pallet Storage Area • Forklift Battery Charge and Equipment Storage Areas • Dispatch Office, Training Room, Store Room, Office and Amenities
Commercial Kitchen	• Canteen and Indoor Eating Area • BBQ and Outdoor Eating Area • Waste Room • Clothing Store • Reception, Security Areas, Meeting Room, Amenities, Store Rooms
Outdoor Area	• Waste Water Treatment Area • Boiler Room • Waste Building, Cardboard Compactor and Overflow Bin Area • Refrigeration Engine Room and Compressor Room • Switch Room and Substation (Indoor) • Hot Water Storage Room • Gas Store and Gas Refill Area (southwest side of building) • Sprinkler Tanks and Pump House (northeast boundary) • Dispatch and Docking Areas (east and west sides of the building) • Trucking Parking and Car Parking Areas (250 car spaces)
Main Equipment	• Waste Water Treatment Plant (WWTP) • 2 x Hot Water Boilers (natural gas fired) • Refrigeration units (utilising NH_3, P/Glycol, CO_2) • Air compressor plant • Kitchen cooking equipment • Meat processing equipment • Welding equipment • Robotic palletisers, crate handling and conveyor system • Forklifts (10 total) • Ventilation system exhaust

2.3 Proposed Hours of Operation

The proposed hours of operation for the proposed development are 24 hours, 7 days a week, however initial operations will be on two shifts (day and afternoon).

2.4 Vehicle Movements

The following truck movements are expected during the operational phase of the Project:

Receivals:

- Dry Goods - 5 per day (HRV)
- Meat - 21 per day (semi-trailer)

Dispatch:

- Shuttle movement to CDC Eastern Creek - 16 per day (semi-trailer)
- Shuttle movement to CDC Queensland - 4 per day (B Double)
- Meat - 12 per day (HRV)
- Cardboard - 2 per day (HRV)
- Plastic - 2 per day (HRV)

The above numbers provide a total of 62 truck movements per day.

In addition, 250 car spaces have been allowed for at site. Project staff movements are indicated below:

Table 2 Projected Staff Vehicle Movements

Time Period	Number of Staff Vehicles Entering/Existing the Site
5:30 am - 6:00 am	206
7:30 am - 8:00 am	38
2:50 pm - 3:50 pm	170
4:00 pm - 5:00 pm	170
12:00 am - 1:00 am	189
Total	**773**

Reference should be made to the Transport and Traffic Planning Associate's document; A*ssessment of Traffic and Parking Implications*, June 2013, (hereafter, the Traffic Report) for further information.

3 OVERVIEW OF KEY POLLUTANTS

A general overview of key pollutants associated with the Project is provided below.

3.1 Oxides of Nitrogen (NO_X)

Oxides of nitrogen (NO_X) is a general term used to describe any mixture of nitrogen oxides formed during combustion. In atmospheric chemistry NO_X generally refers to the total concentration of nitric oxide (NO) and nitrogen dioxide (NO_2). NO is a colourless and odourless gas that does not significantly affect human health. However, in the presence of oxygen, NO can be oxidised to form NO_2 which can have significant health effects including damage to the respiratory tract and increased susceptibility to respiratory infections and asthma. Long term exposure to NO_2 can lead to lung disease. The oxidation of NO to NO_2 may also produce ozone (O_3) as a secondary pollutant.

NO_X is emitted by motor vehicles and other combustion sources. NO is converted to NO_2 soon after leaving a car exhaust. In the presence of sunlight, NO_X reacts photochemically with volatile organic compounds (VOCs) to form photochemical smog.

3.2 Particulate Matter

The term “particulate matter” refers to a category of airborne particles (including solid particles, liquid droplets and aggregates of particles and liquids) that range from 0.1 micrometres (µm) to 50 µm in aerodynamic diameter and represents a complex mixture of organic and inorganic substances. Typical particle sizes are detailed in **Table 3**.

Table 3 Typical Particle Sizes for Particulate Matter

Pollutant	Example of Particle Sizes
Dust	> 30 - 50 microns
Total Suspended Particulates (TSP)	< 30 - 50 microns
PM_{10}	< 10 microns

Note: A micron (µm) is one-millionth of a metre ($1x10^{-6}$m).

Sources of particulate matter can be attributed to anthropogenic and natural sources (i.e. bush fires and dust storms).

3.2.1 Particulate Matter (as PM_{10} and $PM_{2.5}$)

Particles less than 10 µm and 2.5 µm are referred to as PM_{10} and $PM_{2.5}$. Emissions of PM_{10} and $PM_{2.5}$ are considered important pollutants in terms of impact due to their ability to penetrate into the human respiratory system as this can lead to a variety of health effects including heart or lung disease. Smaller particles can remain suspended in the air for days or weeks until removed by rain.

Sources of these particles include combustion sources (i.e. residential wood burning, motor vehicles, agricultural burning, and some industrial processes), crushing and grinding, and materials handling and transfer.

3.2.2 Nuisance Dust and Total Suspended Particulate (TSP)

Amenity impacts from dust are usually associated with coarse particles and particles larger than PM_{10}. Amenity concerns can relate to “visibility” of dust plumes and dust sources while amenity impacts include dust depositing on fabrics (i.e. washing), balconies, and the transport of dust from roofs to water tanks. TSP refers to all particulates suspended in the air and is a good indicator of nuisance dust impacts. The measurement of deposited dust is also a measure of nuisance dust impacts.

3.3 Volatile Organic Compounds (VOC)

Volatile Organic Compounds (VOCs) are organic compounds (i.e. contain carbon) that have high vapour pressure at normal room-temperature conditions. Their high vapour pressure leads to evaporation from liquid or solid form and emission release to the atmosphere. Impacts due to emissions of VOCs can be health or nuisance (odour) related.

VOCs are emitted by a variety of sources, including motor vehicles, chemical plants, automobile repair services, painting/printing industries, and rubber/plastics industries. VOCs that are often typical of these sources include benzene, cyclohexane, ethylbenzene, toluene and xylenes. Benzene is a known carcinogen and a key VOC linked with the combustion of motor vehicle fuels. Biogenic (natural) sources of VOC emissions are also significant (e.g. vegetation).

3.4 Carbon Monoxide (CO)

Carbon monoxide (CO) is an odourless, colourless gas. Increased CO concentrations in the blood reduces the amount of oxygen carried by haemoglobin around the body in red blood cells. CO bonds to the haemoglobin to form carboxyhaemoglobin which reduces the oxygen carrying capacity of red blood cells, thus decreasing the oxygen supply to the tissues and organs. The result can lead to vital organs such as the heart and the brain not receiving enough oxygen to function properly.

CO is a product of the incomplete burning of fossil fuels. CO can be a common pollutant at the roadside with highest concentrations found at the kerbside and concentrations decreasing rapidly with increasing distance from the road. CO in urban areas results almost entirely from vehicle emissions and its spatial distribution follows that of traffic flow. Additional sources of CO include some industrial activities such as steel fabrication. Natural sources of CO include bush fires.

3.5 Sulphur Dioxide (SO_2)

Sulphur dioxide (SO_2) is a colourless, pungent gas with an irritating smell. When present in sufficiently high concentrations, exposure to SO_2 can lead to impacts on the upper airways in humans (i.e. the noise and throat irritation). SO_2 can also mix with water vapour to form sulphuric acid (acid rain) which can damage vegetation, soil quality and corrode materials.

Main sources of SO_2 in the air are industries that process materials containing sulphur (i.e. wood pulping, paper manufacturing, metal refining and smelting, textile bleaching, wineries etc). SO_2 is also present in motor vehicle emissions however since Australian fuels are relatively low in sulphur, high ambient concentrations are not common.

3.6 Air Toxics

Air toxics are a diverse range of air pollutants including volatile/semi-volatile compounds, benzene, polycyclic aromatic hydrocarbons, aldehydes and heavy metals. They are usually present in ambient air in relatively low concentrations but have characteristics such as toxicity and persistence that make them hazardous to human health. Reactive organic compounds in the air toxic group also play an important role in the formation of ozone.

Sources of air toxics include motor vehicle and aircraft exhaust, industrial emissions, and fugitive emissions from materials such as paints and adhesives.

4 LEGISLATION AND GUIDANCE

4.1 Protection of the Environment Operations Act 1997 & Amendment Act 2011

The Protection of the Environment Operations (POEO) Act 1997 and Amendment Act 2011 are a key piece of environment protection legislation administered by the EPA which enables the Government to establish instruments for setting environmental standards, goals, protocols and guidelines.

4.1.1 Scheduled Activities

Schedule 1, Part 1 and 2, of the POEO Act lists the activities that are 'Scheduled' activities for the purposes of the Act. A review of the proposed development's compliance with the POEO Act has been undertaken and is outlined in the following table.

Table 4 Compliance with POEO Act

Act Reference	Activity	Description	Licence (Y/N)	Justification
Schedule 1, Part 1, Item 9	Chemical storage	Chemical storage waste generation > 5Tprescribed waste on site at any one time (where 1,000L of liquid = 1T)	Y	Wastewater stored on site will be greater than 5T
		General chemicals storage Capacity to store >20T (pressurised gases), 200 T (liquefied gases) or 2,000T (chemicals)	N	Compressed oxygen, nitrogen, carbon dioxide, ammonia less than 20T. Cleaning chemicals, hypofoam detergent and acid less than 2,000T.
		Petroleum products storage Capacity to store >20T (pressurised gases), 200 T (liquefied gases) or 2,000T (chemicals)	N	LPG stored on site less than 20T, Heat Transfer Oil less than 2,000T, Hydraulic and Turbine Oil, Lubricant less than 2,000T.
Schedule 1, Part 1, Item 14	Container reconditioning	The reconditioning, recovering, treating or storing of containers (incl. metal, plastics or glass drums, bottles, cylinders or intermediate bulk containers) previously used for storage/transport of and containing residual quantities of Dangerous Goods (DG) Class 1, 3, 4, 5 or 8 / or those applicable under Division 6.2	N	No storage of containers previously used for storage of and containing residual quantities of these DG classes
Schedule 41, Part 1, Item 42	Waste storage	Hazardous, restricted solid/liquid waste stored on site > 5 T	Y	Wastewater stored on site will be greater than 5T
Schedule 1, Part 1, Item 48	Transport of trackable waste	Waste from the use of biocides, inks, dyes, varnish, organic solvents, oil etc	N	All wastes contractor removed

Act Reference	Activity	Description	Licence (Y/N)	Justification
Schedule 1, Part 1	Scheduled activities (Premise-based)	Activities regulated by the EPA that are undertaken at a premise	Y	WWTP operations
Section 43 (a)	Scheduled development work	Work at premises at which scheduled activities are not carried out on, that is designed to enable scheduled activities to be carried on at the premises.	Y	WWTP operations

Given the above information, the proposed development is considered to be a 'scheduled' activity and licensing requirements are considered necessary in relation to the WWTP. However, liaison with the EPA is recommended to ensure the above assessment is correct in order to reduce associated risks.

4.1.2 General Requirements

The following sections of the POEO Act are of general relevance to the Project.

- Section 117 of the POEO Act states that the wilful or negligent release of ozone depleting substances such as chlorofluorocarbons (CFCs) to the atmosphere carries the highest of all penalties under NSW environmental law.
- Section 124 and 125 of the POEO Act state that any plant located at a premise (e.g. spray booth filtration and exhaust system) should be maintained in an efficient condition and operated in a proper and efficient manner to reduce the potential for air pollution.
- Section 126 of the POEO Act requires that materials are managed in a proper and efficient manner to prevent air pollution.
- Section 128 of the POEO Act states:
    1. The occupier of a premises must not carry on any activity or operate any plant in or on the premises in such a manner to cause or permit the emission at any point specified in or determined in accordance with the regulation of air impurities in excess of [the standard of concentration and/or the rate] prescribed by the regulations in respect of any such activity or any such plant.
    2. Where neither such a standard nor rate has been so prescribed, the occupier of any premises must carry on activity, or operate any plant, in or on the premises by such practicable means as may be necessary to prevent or minimise air pollution.
- Section 129 of the POEO Act states that odours generated by operational activities should not be detectable beyond the site boundary.
- Section 133 of the POEO Act states that the EPA may prohibit the burning of fires in the open or burning of waste in an incinerator. These activities are illegal in most local council areas.

Changes under the POEO Amendment Act 2011 include that the owner of a premises, the employer or any person carrying on the activity which causes a pollution incident is to *immediately* notify the relevant authorities when material harm to the environment is caused or threatened. A list of each relevant authority is provided in the POEO Amendment Act and should be noted in the Project site's Incident Register.

4.2 Protection of the Environment Operations (Clean Air) Regulation 2010

The POEO (Clean Air) Regulation 2010 (the Regulation) is the core regulatory instrument for air quality issues in NSW.

In relation to industry, the Regulation:

- sets maximum limits on emissions from activities and plant for a number of substances.
- deals with the transport and storage of volatile organic liquids.
- restricts the use of high sulphur liquid fuel.
- imposes operational requirements for certain afterburners, flares, vapour recovery units and other treatment plant.

Part 5 (Division 2) of the Regulation deals with the emissions of air impurities from scheduled premises (i.e. activities and plant), and sets maximum limits on emissions for a number of substances (including solid particles and visible smoke).

Review of the Regulation identifies that Group 6 requirements apply to the Project. Criteria of particular relevance to the Project are outlined in Schedule 4 of the Regulation and are noted below in **Table 5**. Testing methods, averaging periods and reference conditions are detailed in Schedule 5.

Table 5 Standards of Concentration for Scheduled Premises: General Activities and Plant[1]

Emission	Activity	Criteria	Averaging Period	Testing/Monitoring
Solid particles	Any activity or plant	50 mg/m^3	1 hour	TM-15[1]
Oxides of nitrogen	Any boiler operating on gas	350 mg/m^3	1 hour	TM-11/CEM-2[1]
Sulphur dioxide	Any activity or plant	1,000 mg/m^3	1 hour	TM-4/CEM-2
Acid gases	Any activity or plant	100 mg/m^3	1 hour	TM-3 and TM-8
VOCs	Any activity or plant	40 mg/m^3 (or 125 mg/m^3 CO)	1 hour rolling	TM-34/CEM-8,9,10 TM-32/CEM-4 (CO)
Smoke	Liquid or gaseous fuel is burnt	Ringlemann 1 or 20% opacity	6 minutes rolling	TM-16/CEM-1[2]

Notes:

1. Reference conditions are: Dry, 273 K and 101.3 kPa for any activity. Also, gas fuel 3% O_2.
2. Reference conditions are: Gas stream temperature above dew point. Path length corrected to stack exit diameter.

The standards of concentrations prescribed by Part 5, Division 3 do not apply in relation to any plant during start-up and shutdown periods, however are still subject to requirements of Section 128 (2) of the POEO Act in relation to the prevention and minimisation of air pollution.

The Regulation notes that the EPA may grant an exemption in relation to smoke emitted in the course of activities such as research to improve safety in relation to the flammability of materials and smoke reduction or testing undertaken to certify that manufactured or imported products comply with Australian Standards, International Standards or meet any legislative requirements placed on them.

Part 6 of the Regulation outlines the control of VOCs and the requirement for any fuel burning equipment or industrial plant to be fitted with control equipment. Exemptions exist where approved by the EPA.

4.3 Air Quality Policy and Guidance

4.3.1 Approved Methods

The EPA's Approved Methods publication lists the statutory methods for modelling and assessing air pollutants from stationary sources and specifies criteria which reflect the environmental outcomes adopted by the EPA. The Approved Methods are referred to in the POEO (Clean Air) Regulation 2002 for assessment of impacts of air pollutants.

4.3.2 Odour Technical Framework and Notes

The EPA's Odour Policy publications provide a policy framework for assessing and managing activities that emit odour and offers guidance on dealing with odour issues.

4.3.3 Local Air Quality Toolkit

The Local Government Air Quality Toolkit (AQ Toolkit) has been developed by the Office of Environment and Heritage (OEH) to assist local government in their management of air quality issues and provides guidelines for air quality management and for the use of air pollution control techniques.

4.4 Penrith City Council Planning Documentation

4.4.1 Local Environmental Plan 2010

The general aims and objectives of Council's Local Environmental Plan (LEP) in relation to the development and the environment include:

- To ensure development incorporates the principles of sustainable development through the delivery of balanced social, economic and environmental outcomes.
- To encourage development to be designed in a way that assists in reducing and adapting the likely impacts of climate change.
- To minimise any adverse effect of industry on other land uses.

4.4.2 Development Control Plan 2006 and 2010

Council's Development Control Plan (DCP 2006), Part 6.10 relates directly to development within the Erskine Business Park area. Section 5.4 (Air Pollution) aims to maintain existing air quality and improve local air quality where possible and ensure future development does not adversely affect existing air quality. The requirements of Section 5.4 are as follows:

- The emission of air impurities is to be controlled and limited to the standards allowed by the POEO Act to the satisfaction of Council and the EPA at all times.
- Applicants may be required to provide information detailing the potential impact of their development on air quality in the region.
- Applicants should be able to demonstrate that the most efficient means of minimising emissions are being utilised.

4.5 Building Code of Australia and Australian Standards

The Building Code of Australia (BCA) is produced and maintained by the Australian Building Codes Board (ABCB) on behalf of the Australian Government with the aim of achieving nationally consistent, minimum necessary standards of relevant health and safety, amenity and sustainability objectives efficiently. The BCA contains mandatory technical provisions for the design and construction of BCA class buildings. Volume 1, Section F4 and J5.5 of the BCA (2011) specifically addresses amenity and energy efficiency in relation to building ventilation and exhaust systems.

Australian Standard (AS) 1668.2-2002 "The use of ventilation and air conditioning in building, Part 2: Ventilation design for indoor air contaminant control" sets design requirements for mechanical ventilation systems. Mechanical ventilation is required in enclosures where specific health and ventilation amenity requirements cannot be met by natural means.

Section 5 of the AS states the following:

5.2.2 Exhaust locations: As far as practicable, exhaust-air intakes used for general exhaust-air collection shall be located on the opposite sides of the enclosure from the sources of make-up air, to ensure that the effluents are effectively removed from all parts of the enclosure.

5.3.2.1 General requirements: The effluent shall be collected as it is being produced, as close as practicable to the source of generation.

5.10.1 Air discharges: Where discharges are deemed to be objectionable (i.e. nuisance related), discharges shall:

- Be emitted vertically with discharge velocities not less than 5 m/s.
- Be situated at least 3 m above the roof at point of discharge.
- Treated to reduce the concentration of contaminants where required.
- Be emitted to the outside at velocities and in a direction that will ensure, to the extent practicable, a danger to health or a nuisance will not occur.
- Be situated a minimum separation distance of 6 m (where the airflow rate is ≥ 1,000 L/s) from any outdoor) air intake opening, natural ventilation device or opening, and boundary to an adjacent allotment, except that where the dimensions of the allotment make this impossible, then the greatest possible distance shall apply.

4.6 Preliminary Assessment of Buffer Distances

The EPA has not published buffer distances that may be used to reduce the possibility of conflicting land uses in NSW.

In situations where the specifics of a development are unknown (i.e. the potential locations of residential developments, or the nature, scale and potential impact of industrial or commercial land uses), the application of buffer distances provide a valuable 'screening' tool to judge whether a detailed assessment is required to evaluate the potential risk of conflicting land uses.

In lieu of relevant NSW guidance, reference has been made to Victoria Environment Protection Authority (VIC EPA) documentation as relevant referenced buffer distances.

4.6.1 Recommended Buffer Distances for Industrial Residual Air Emissions

In accordance with Clause 13.04-2 (Air Quality) of Victoria's State Planning Policy Framework, all planning must consider the EPA's "*Recommended Separation Distances for Industrial Residual Air Emissions*" (2013). In their document, the EPA makes recommendations for assessing appropriate separation distances where amenity may be reduced for sensitive or incompatible land uses. Sensitive land uses which warrant protection from amenity-reducing off-site effects of industry by maintenance of a buffer distance include residential areas and zones, hospitals and schools.

A summary of the industrial residual air emissions (IRAE) buffer distances which may be applicable to the proposed urban development are provided below. These values have been provided for guidance only and are not regulatory guideline values.

Table 6 VIC EPA Recommended Buffer Distances for Industrial Residual Air Emissions[1]

Industry Type	Recommended Buffer Distance (m)[2]
Poultry processing works (no rendering)	500
Prescribed industrial waste treatment facility	500

Notes:

1. IRAEs are defined by the EPA as unintended or accidental emissions (i.e. due to equipment failure, abnormal weather conditions etc) which are often episodic in occurrence and may originate near ground level.
2. Buffer distances are recommended for large scale operations. The EPA should be consulted in relation to recommended buffer distances for smaller scale operations.

5 POTENTIAL SOURCES OF EMISSIONS TO AIR

The sources of emissions to air may be controlled discharge sources (i.e. an exhaust point or stack) or uncontrolled fugitive sources (i.e. the release of emissions from waste storage areas, windows and other building openings).

Project emission sources will be a combination of both controlled and fugitive sources, however the majority of emissions generated due to facility operations are proposed to be captured and extracted through exhaust vents and released to the atmosphere via flues/stacks located on the rooftop.

5.1 Specific Operational Processes

5.1.1 Waste Water Treatment Plant

Wastewater will be primarily generated by the facility during once a day cleaning. An on-site Waste Water Treatment Plant (WWTP) has been proposed to enable the treatment of liquid wastes to a standard prior to discharge to the sewer system, with solids removed from the wastewater and sent to landfill.

It is understood that the WWTP will have a daily design volume 554 m^3/day and a flow rate of 30 m^3/hour. Primary treatment will involve the removal of solids, oils and grease. Secondary treatment will consist of aerobic and/or anaerobic biological treatment processes and removal of solids to below 200 mg/L (final design pending). Solids will be removed from wastewater via a screening system. Solids will be drawn from the screen into a bin, and a dewatering system will be provided for sludge volume reduction. Sludge will be trucked off-site to landfill by a licenced contractor in secure containers during transit.

WWTPs can generate odorous emissions of VOCs and ammonia compounds as a result of collection, storage and primary and secondary (also tertiary) treatment activities. Impacts from odorous air contaminants are often nuisance-related rather than health-related. The strength and intensity of an odour due to these activities will vary with changes in the prevailing weather conditions (i.e. temperature, humidity, wind speed and direction).

Primary treatment will be undertaken via an enclosed process unit for odour control. The screen, solids bin and sludge storage area will also be enclosed to reduce the potential for fugitive odorous emissions and an odour control unit will be utilised for odour control.

Flow buffering of 24 hours will be provided by a balance tank and a mixer and/or aeration system provided to prevent anaerobic and odorous conditions. Flow metering and sampling will be undertaken prior to discharge to the stormwater drain and records logged. A Dissolved Oxygen (DO) probe will be used to control the aerator or mixer to set dissolved oxygen levels in the tank.

Further odour control units are being considered by the proponent including a foul air collection system and activated carbon filters for adsorption of contaminants. It is noted that an objective of the WWTP is that it will meet a criterion of 1 odour unit (OU) or less at the Project boundary.

5.1.2 Hot Water Boiler Plant

The proposed hot water boiler plant will be designed as a closed loop system with multiple gas-fired forced draft industrial grade hot water boilers working in conjunction with a buffer tank, primary hot water pumps, plate heat exchangers, and other associated equipment.

The use of a closed loop system will significantly reduce the amount of potential airborne contaminants emitted to air, however some products of incomplete combustion will still be released, primarily oxides of nitrogen but also carbon monoxide and hydrocarbons. Metals and their compounds may also be entrained. Low nitrogen burners are proposed which will work to further reduce and control emissions of oxides of nitrogen.

It is further understood that the insulated flue will be suitable for continuous operation at temperatures of up to 550ºC will be provided and will be elevated at least 3 m above roof in accordance with BCA requirements. A dial gauge thermometer will be fitted to measure flue gas temperature. Forced draft type boilers also allow control over the flue gas discharge velocity. In addition, an efflux cone will be installed to ensure an efflux velocity of approximately 11 m/s (as per gas authority requirements) is achieved.

5.1.3 Refrigeration Units

The proposed refrigeration units will utilise low Global Warming Potential (GWP) refrigerants such as ammonia, carbon dioxide and propylene glycol.

For plants using ammonia as a refrigerant, precautions must be taken to prevent ammonia leaks and spills from process equipment. Ammonia has a penetrating odour and a small leak can be detected by smell.

It is understood that an infrared scan will be undertaken upon completion of the insulation panel works and commissioning of the refrigeration plant to identify any leaks at this stage. The following refrigerant leak considerations will also be reflected in the refrigeration system design:

- A proposed refrigerant mechanical ventilation rate of 14 m^3/s. The refrigeration contractor will be responsible for ensuring that an adequate ventilation rate is achieved based on whichever is the more stringent condition stated in Australian Standard (AS) 1677 or the FM Global Section 7-13.
- Mechanical ventilation to ensure an adequate rate of volume of extraction.
- All ventilation discharges which may include ammonia gas to have appropriately rated fan motors, and be discharged at a high level for safety and best gas dispersion principles.
- Any refrigerant safety relief valves are to discharge at a high level, with the added consideration that it can contain a liquid phase as well as a gaseous phase. The liquid phase is to be decanted and captured for safe treatment or released through gaseous phase at high level.
- Areas with higher risks of liquid spills, such as charge areas and oil drain areas near vessel stations shall be bunded.
- Ammonia sensors, including trace level of detection (or part per million [PPM]) sensors and lower explosive limit [or LEL] sensors and CO_2 sensors (PPM), will be employed to provide both visual and audible alerts.
- All service valve stations will be equipped with suitable stainless steel drip trays piped to a suitable trade waste drain.

5.1.4 Chemical Storage, Spills/Leaks and Cleaning Activities

Quatfoam and Shurfoam cleaners are proposed for the site. Quatform is a quaternary ammonium chloride (QAC) based cleaner and Shurfoam is a heavy duty chlorinated foaming detergent used for foam application and is used for sanitising and removal of fats, oils, protein, blood etc. from all surfaces where hygiene is a requirement.

Chemical spills and leaks, in this case of stored acids or chlorinated cleaning products, will generate fugitive emissions to air. To reduce emissions from chemical spills, spill treatment kits will be located next to all bunded areas.

Cleaning activities are also likely to generate fugitive emissions of volatile organic compounds (VOCs). Roller doors will remain closed during cleaning activities to ensure fugitive emissions of VOCs are vented through flues on the rooftop to enable increased dispersion of these pollutants in the atmosphere.

5.1.5 Meat Receivals Area and Processing Activities

Chicken (fully cleaned, guttered and de-feathered) will be supplied to the facility in pallecons enclosed in plastic. The rest of the meat supplied to the facility will be vacuum packed and quality assurance processes will ensure meats are kept at the required temperature to avoid spoiling, therefore emissions to air due to raw meat handling processes are expected to be negligible.

It is understood that no cooking, smoking or drying of product will be undertaken on site in the meat processing areas, other than the commercial kitchen.

5.1.6 Welding Activities

Minimal welding activities (utilising argon gas and oxygen/acetylene gas) will be undertaken on site. Emissions from welding activities generally comprise of metal fumes (i.e. manganese, nickel, chromium, cobalt and lead) and particulates. Gaseous pollutants are also generated during welding and include carbon monoxide and oxides of nitrogen.

5.1.7 General Waste Storage Areas

Waste storage rooms and waste collection activities are likely to generate fugitive emissions of odour due to the decomposition of organic waste. Waste storage rooms will be enclosed, refrigerated and provided with adequate ventilation to prevent nuisance odour. Containment measures for spillages will be provided at appropriate locations to reduce odorous emissions from waste spillages.

5.1.8 Commercial Kitchen

A commercial kitchen is proposed for the provision of hot and cold food for staff working at the facility. Potentially odorous emissions may be generated due to cooking activities and the breakdown of natural fats and oils into odorous hydrocarbons or VOCs. Particulate matter may also be emitted in the form of smoke and fumes due to roasting, barbecuing and grilling cooking processes.

Cooking equipment proposed for the commercial kitchen includes fryer units, a burner top, a griddle top and a hob unit with flare grill top. These items utilise gas and will be constructed with stainless steel flue shrouds.

5.2 Emissions Associated with the Combustion of Fuels

As outlined in **Section 2.4**, the proposed facility has a moderate to large number of dispatch and receivals truck movements. Traffic visiting/exiting the site, as well as trucks and vehicles allowing their engines to idle whilst on site will generate emissions associated with the combustion of fuels including carbon monoxide, carbon dioxide, sulphur dioxide, oxides of nitrogen, VOCs and particulate matter.

All indoor forklifts will be electric and one outdoor forklift will run on LPG. The site therefore allows for a forklift charging area and a LPG tank and refuelling area to the southeast of the site. Emissions associated with the combustion of LPG include carbon monoxide, hydrocarbons and sulphur dioxide. LPG generates less carbon dioxide and particulate matter than petrol and diesel fuel types (per unit volume consumed).

5.3 Construction Phase

The main air pollutant emissions arising as a result of construction activities will include particulate matter and nuisance dust. Emissions associated with the combustion of fuels will also be generated by vehicle movements on site. Odorous emissions may also be generated during ground works and will need to be managed appropriately to minimise off-site amenity impacts. VOCs are likely to be emitted during painting and furnishings works.

6 RISK ASSESSMENT METHODOLOGY

A *qualitative* risk-based assessment has been carried out according to the methodology detailed below.

6.1 Overall Approach

Predictions of air quality impacts are necessary when appraising potential future impacts on potentially sensitive land uses. Specific methodologies are described in further detail in the relevant sections of this document, however the following broad "risk based" approach has been adopted for each study area.

For each potential source of air pollution, a *qualitative* risk-based impact assessment was undertaken of the potential air quality impacts to identify a range of suitable control measures available to mitigate those impacts.

The assessment criteria for receptor sensitivity (see **Section 6.3**), impact magnitude (see **Section 5.4**) and the resultant impact significance (see **Section 9**) have been developed by SLR.

The risk-based assessment takes account of a range of impact descriptors, including the following:

Nature of impact	Is the impact anticipated to result in an adverse or beneficial effect on the receiving environment?
Receptor Sensitivity	How sensitive is the receiving environment to the anticipated impacts?
Magnitude of Impact	What is the anticipated scale of the impact?

The integration of sensitivity with impact magnitude is used to derive the predicted significance of that impact, and may be adverse or beneficial in nature.

These terms, and the qualifying justification for each attributed value are described below.

6.2 Nature of Impact

Predicted impacts may be described in terms of the overall effect upon the environment. Terms such as "positive" and "negative" are not used to avoid complication (i.e. a positive increase in air pollutant concentration would have a negative impact, for example):

Beneficial	The predicted impact will cause a beneficial effect on the receiving environment.
Neutral	The predicted impact will cause neither a beneficial nor adverse effect.
Adverse	The predicted impact will cause an adverse effect on the receiving environment.

6.3 Receptor Sensitivity

Sensitivity may vary with the anticipated impact or effect. For example, a receptor may be determined to have varying sensitivity to different environmental changes (i.e. high sensitivity to changes in air quality, but low sensitivity to noise impacts, for example). Sensitivity may also be derived from statutory designation which is designed to protect the receptor from such impacts.

Table 7 outlines the methodology used in this study to define the sensitivity of receptors to air quality impacts.

Table 7 Methodology for Assessing Sensitivity of a Receptor

Sensitivity	Description	Examples
Very High	Receptors are highly sensitive to changes in air quality	- Background concentrations are above 90% of the air quality criterion. - Receptors of very high sensitivity to air pollution such as: hospitals and clinics, retirement homes, painting and furnishing, hi-tech industries and food processing.
High	Receptors have a high sensitivity to changes in air quality	- Background concentrations are above 75% of the air quality criterion. - Receptors of high sensitivity to air pollution such as: schools, residential areas, food retailers, glasshouses and nurseries, horticultural land and offices.
Medium	Receptors have a medium sensitivity to changes in air quality	- Background concentrations are above 50% of the air quality criterion. - Receptors of medium sensitivity to air pollution, such as: farms, outdoor storage, light and heavy industry.
Low	Receptors have a low sensitivity to changes in air quality	- Background concentrations are below 50% of the air quality criterion. - All other air quality sensitive receptors not identified above.

6.4 Magnitude

Magnitude describes the anticipated scale of the predicted environmental change in terms of how that impact may cause a change to existing (baseline) conditions, and may be described quantitatively or qualitatively. Where an impact is defined by qualitative assessment, suitable justification is provided in the text.

Table 8 Magnitude of Impacts

Magnitude	Description	Examples
Substantial	Impact is predicted to cause significant consequences on the receiving environment.	Substantial risk that the impacts will generate nuisance complaints, resulting in regulatory action.
Moderate	Impact is predicted to possibly cause statutory objectives/standards to be exceeded.	Moderate risk that the impacts will generate nuisance complaints, resulting in regulatory action.
Slight	Predicted impact may be tolerated.	Slight risk that the impacts will generate nuisance complaints, resulting in regulatory action.
Negligible	Impact is predicted to cause no significant consequences.	Negligible risk that the impacts will generate nuisance complaints, resulting in regulatory action.

6.5 Significance

The risk-based matrix provided below illustrates how the definition of the sensitivity and magnitude interact to produce impact significance.

Table 9 Impact Significance Matrix

Sensitivity \ Magnitude		[Defined by Table 8]			
		Substantial Magnitude	**Moderate Magnitude**	**Slight Magnitude**	**Negligible Magnitude**
[Defined by Table 7]	**Very High Sensitivity**	Major Significance	Major/Intermediate Significance	Intermediate Significance	Neutral Significance
	High Sensitivity	Major/Intermediate Significance	Intermediate Significance	Intermediate/Minor Significance	Neutral Significance
	Medium Sensitivity	Intermediate Significance	Intermediate/Minor Significance	Minor Significance	Neutral Significance
	Low Sensitivity	Intermediate/Minor Significance	Minor Significance	Minor/Neutral Significance	Neutral Significance

It is noted that the above approach is designed to provide an overall impact risk, and is not the defining determination for the requirement for mitigation and control. Impacts with a lower determined significance should also be minimised wherever possible.

The approach also may underestimate the impact significance in environments which are assessed as having low sensitivity to impacts of a substantial or moderate magnitude, and therefore a pragmatic approach to the assessment significance should be applied.

Any impacts identified as having a substantial magnitude should receive detailed appraisal of mitigation options. Refer to **Section 9** for a risk assessment.

7 THE EXISTING ENVIRONMENT

7.1 Sensitive Receptor Locations

Surrounding residences are located approximately 1 km to the north of the Project site within the residential area of Erskine Park and approximately 505 m to the south within the Emmaus Retirement Village on Bakers Lane. Further sensitive receptors to the south south-west (of distances greater than 600 m) include the Emmaus Catholic College, Trinity Primary School, the Mamre Anglican College and the Kemps Creek Early Education Centre. Schools and residential receptors are considered to have a high sensitivity to changes in air quality.

The recommended buffer distance of 500 m (refer to **Table 6**) has been complied with for all identified sensitive receptor locations. It is noted that vegetation lies between the Project site and receptors to the south. Vegetation can effectively act as a buffer to increase mechanical turbulence and improve dispersion of pollutants, as well as acting as a physical barrier to the transport of airborne pollutants.

Industrial receptors are situated within the recommended buffer distance (see **Section 9** for a risk assessment).

7.2 Local Topography

Topography is important in air quality studies as local atmospheric dispersion could be influenced by night-time katabatic (downhill) drainage flows from elevated terrain or channeling effects in valleys or gullies around the Project site.

The Project site is situated at an approximate elevation of 53 m Australian Height Datum (AHD). Residential receptors to the north and south lie at elevations of approximately 60 m to 70 m AHD and 55 m to 60 m AHD respectively.

The predominantly flat terrain surrounding the Project site indicates that downhill drainage flows towards residential receptors are unlikely to occur.

7.3 Local Meteorology

Meteorological mechanisms govern the dispersion, transformation and eventual removal of pollutants from the atmosphere. The extent to which pollution, including odour, will accumulate or disperse in the atmosphere is dependent on the degree of thermal and mechanical turbulence within the earth's boundary layer.

Wind speed determines both the distance of downwind transport and the rate of dilution as a result of plume 'stretching'. The generation of mechanical turbulence is similarly a function of the wind speed, in combination with the surface roughness.

The wind direction, and the variability in wind direction, determines the general path pollutants will follow, and the extent of crosswind spreading.

7.3.1 Local Wind Conditions

To adequately characterise the dispersion meteorology of the study area, information is needed on the prevailing wind regime. The Bureau of Meteorology's (BoM) Automatic Weather Station (AWS) at Horsley Park is situated approximately 6.3 km to the southeast of the Project site. Annual and seasonal wind roses for the period 2006 to 2009 are provided in **Appendix C**.

The annual wind rose indicates that light to moderate winds (wind speeds between 0.5 m/s and 8 m/s) are predominantly experienced from the southwest quadrant (approximately 12% of the year), with lesser occurrences of winds from the north and southeast (approximately 7% each). Only small occurrences of winds are experienced from the north northeast and the northeast (approximately 10% combined).

Calm wind conditions (i.e. wind speeds less than 0.5 m/s) are conducive to higher concentrations of odour due to poor dispersion. The average percentage of calms across all years (2006 to 2009) was approximately 8.1%.

Seasonal wind roses indicate the following:

- During Summer, predominant winds are experienced from the southeast, with calm wind conditions occurring approximately 7.8% of time during the year.
- During Autumn, predominant winds are experienced from the southwest, with calm wind conditions occurring approximately 9.3% of time during the year.
- During Winter, predominant winds are experienced from the southwest, with lesser occurrences of winds from the west southwest, and calm winds experienced approximately 7.9% of time during the year.
- During Spring, predominant winds are experienced from the southwest, north and the southeast, and calm wind conditions occurring approximately 7.2% of time during the year.

7.4 Background Air Quality

Background air quality is a measure of the existing air quality environment (i.e. in the absence of the Project activity) and is an important consideration when assessing the likelihood of cumulative impacts on sensitive receptors in the area.

7.4.1 Local Air Quality

The EPA operate a series of air quality monitoring stations around NSW to measure key pollutants in the region and to evaluate compliance against air quality goals. The closest monitoring station to the Project site is located approximately 5 km north of the site off Mamre Road at St Mary's. This monitoring station measures a number of airborne contaminants including of oxides of nitrogen (as NO_2) and particulate matter (as PM_{10}).

Analysis of NO_2 and PM_{10} monitoring data for the 2012 calendar year indicates the following:

Nitrogen Dioxide (NO_2)

- The annual average NO_2 concentration for 2012 was 0.5 pphm (or 9.4 µg/m^3). This lies well under the NSW EPA annual average NO_2 criterion of 3 pphm (or 62 µg/m^3) and represents approximately 15% of the criterion.
- The maximum daily 1-hour average NO_2 concentration measured during 2012 was 4.3 pphm (or 80.8 µg/m^3). This lies well under the 1-hour average NO_2 criterion of 12 pphm (or 246 µg/m^3) and represents approximately 36% of the criterion. No exceedances of the relevant criterion occurred during 2012.

Particulate Matter (PM_{10})

- The annual average PM_{10} concentration for 2012 was 14.4 µg/m^3. This lies under the NSW EPA 24-hour average PM_{10} criterion of 30 µg/m^3 and represents approximately 48% of the criterion.
- The maximum 24-hour average PM_{10} concentration measured during 2012 was 34.3 µg/m^3. This represents 69% of the PM_{10} 24-hour average criterion of 50 µg/m^3. The EPA guideline for PM_{10} allows for up to 5 exceedances per year to account for regional events such as bushfires and dust storms. No exceedances of the relevant criterion occurred during 2012.

7.4.2 Regional Emissions Estimate

Table 10 below presents selected air emissions data compiled from National Pollutant Inventory (NPI) returns for Post Code '2759' and which encompasses the Project site.

The total is presented with the significant sectoral contributors to that total. These data are presented to establish the regional emissions inventory for pollutants emitted from the local area, and also establish the significance of sources to that total.

This data will then allow potential mass emission increased from the proposed development to be placed into context of regional emissions (i.e. whether the anticipated change will have a significant impact upon regional emissions, and by inference, background concentrations).

Table 10 Selected Regional Emissions Data (2011/12) – NSW 2759

Substance	Source	Air (kg)
Oxides of Nitrogen	Motor Vehicles	300,000
	Other Fabricated Metal Product Manufacturing	9,300
	Fuel Combustion	5,400
	Gaseous fuel burning	4,100
	Other Food Product Manufacturing	2,400
	Total	**330,000**
Particulate matter (as PM_{10})	Solid fuel burning, domestic	31,000
	Motor Vehicles	10,000
	Other Fabricated Metal Product Manufacturing	3,000
	Windblown Dust	1,300
	Lawn Mowing	1,300
	Total	**48,000**
Carbon Monoxide	Motor Vehicles	1,800,000
	Lawn Mowing	210,000
	Solid fuel burning, domestic	190,000
	Lawn Mowing, public open spaces	23,000
	Other Fabricated Metal Product Manufacturing	12,000
	Total	**2,300,000**
VOCs	Motor Vehicles	210,000
	Domestic/Commercial Solvents	140,000
	Architectural Surface Coatings	66,000
	Solid fuel burning, domestic	64,000
	Lawn Mowing	27,000
	Total	**560,000**
Sulphur Dioxide	Other Fabricated Metal Product Manufacturing	8,000
	Motor Vehicles	5,300
	Solid fuel burning, domestic	490
	Lawn Mowing	76
	Liquid fuel burning, domestic	70
	Total	**14,000**

Review of the above shows motor vehicles, domestic solid fuel burning (domestic), lawn mowing, metal manufacture and domestic/commercial solvents are key sources of air pollution to the local area.

7.4.3 Industrial Sources

The following sources have been identified from a desktop mapping study of sites that are regulated under the NSW EPA and/or are required to report to the NPI as potentially generating air pollution that may impact the Project. An arbitrary cut-off distance of 2 km from the Project site has been applied and searches performed for the suburb of Erskine Park (postcode '2759').

Table 11 Neighbouring Industrial Sources

Name	Distance / Direction from Site Boundary	Address	NPI / EPA Licensed Activity
Bluescope Steel, Western Sydney Service Centre	145 m / NW	Templar Road, Erskine Park	NPI Activity: Coating and painting of steel products. EPL Overview: Metal coating up to 100,000 tonnes (T) and metal waste generation > 100 T generated or stored. Discharges to air from Chemical Dryer & Coater Room Exhaust, Oven Exhaust, and Air Quench Exhaust are to be monitored for VOCs, hazardous substances (i.e. heavy metals) and NO_X. Parameters such as CO, O_2, temperature, velocity, moisture content etc also monitored.
Goodman Fielder Consumer Foods	215 m / N	Templar Road, Erskine Park	NPI Activity: Manufacturing of liquid groceries such as mayonnaise, vinegar and salad dressing. Emissions: carbon monoxide, oxides of nitrogen, particulate matter, polycyclic aromatic hydrocarbons, sulphur dioxide, total VOCs.
Enviroguard, Erskine Park Landfill	340 m / W	50 Quarry Rd, Erskine Park	EPL Overview: Crushing, grinding or separating up to 2,000,000 T and waste disposal by application to land at any annual capacity. No non-compliances reported for dust since 2008. Regional odour assessment showed that odour generated by the landfill is negligible.
Nace Civil Engineering, Erskine Park Link Road	> 600 m / NE	Between Lenore Lane and Old Wallgrove Road, Erskine Park	EPL Overview: 0 – 10 km road constructed, widened or re-routed. Discharge to water monitoring including oils and grease, pH and TSP. Works restricted to between 7am and 6pm M – F, 8am – 1pm Sat except under special conditions. Rainfall must also be measured daily.
DHL Supply Chain / Reckitt Benckiser	1.3 km / NW	23-107 Erskine Park Road, Erskine Park	EPL Overview: General chemicals storage up to 5,000 kL. General waste, noise, odour, dust management requirements.

In addition to the above, the Project site is also located nearby by the following industries:

- Strandbags Warehouse
- Corporate Express Distribution Warehouse
- Midway Metals Stainless Steel Products and Equipment Warehouse
- Rondo Building Services Facility

The potential sources of air pollution identified in the above sections demonstrate the predominantly industrial nature of the local area.

8 EMISSIONS ESTIMATION FOR THE PROJECT

Key sources of pollutants associated with the Project have been identified as follows:

- Construction works
- Gas-fired boiler operations
- Forklift operations
- Trucks and staff cars entering/exiting the site

It is noted that the operation of the WWTP will be an enclosed process and fugitive emissions (i.e. from open vessels, leaks in containments, leaks during maintenance activities) should not occur where strict maintenance procedures are adhered to. Additionally, the Proponent is required to achieve a goal of 1 odour unit or less at the Project boundary (standard is 2 odour units at the site boundary) therefore emissions estimations have not been provided for the WWTP.

Emissions from the activities listed above have been estimated making reference to widely published and available emission factors published in NPI Emissions Estimation Technique Manuals (EETM) and United States Environmental Protection Agency (USEPA) AP-42 documentation, specifically:

- EETM for Combustion in Boilers, Version 3.6, December 2011.
- EETM for Combustion Engines, Version 3.0, June 2008.
- USEPA AP-42, Section 13.2.3 - Heavy Construction, Volume 1, Fifth Edition, January 1995.

Reference has also been made to the Traffic Report (refer to **Section 2.4**) for information on truck and vehicle movements.

The following highly conservative assumptions have been made:

- PM_{10} emissions from construction activities represent 50% of TSP emissions for construction activities. (Note: PM_{10}-specific emission factors were used to estimate emissions from fuel combustion in boilers, vehicles etc).
- Heavy construction (civil) works will be ongoing for a 3 month period during the hours 7am to 5pm each day.
- The remaining construction works will be ongoing for another 9 months at half the intensity during the hours of 7am to 5pm each day.
- The two boilers will have a power rating of 2,400 kW each and will operate 8 hours a day during the year.
- The boiler plant will be gas fired, wall fired, with air staging and utilise low nitrogen burner (LNB) pollutant control technology.
- The external LPG forklift will be operated continuously for 24 hours/7 days a week during the year with an average fuel consumption of 39,312 litres LPG per year.
- The forklift is assumed to have a power rating of 37 kW and a constant load factor of 0.20.
- All trucks are assumed to have a power rating of 500 kW and a constant load factor of 0.50.
- Vehicles using the car park will travel an average distance of 3 km on site every day for a 12 month period.

The results of this semi-quantitative assessment are provided below in **Table 12** for comparison to similar facilities identified through review of the NPI database.

Table 12 Emission Estimations Results (kg/yr)

Emission Sources	PM_{10}	NO_X	CO	VOC	SO_2
Construction					
All sources	11,210	N/A	N/A	N/A	N/A
Operations					
Boiler Plant	182	920	2,069	135	3
Forklift	-	60	1,208	133	-
Truck Movements	948	15,558	6,648	707	11
Car Movements	7	675	3,715	245	10
Total Operational Emissions	**1,136**	**17,213**	**13,639**	**1,220**	**24**

The results indicate the following:

- An estimated total of 11,210 kg particulate matter (as PM_{10}) will be generated during construction works at the Project site (assuming 3 months of heavy construction, followed by 9 months of construction at half that intensity). It is noted that dust is considered to be largely controllable at source through implementation of a range of dust management and control measures (refer to **Section 10.2.3**). Any air quality impacts during construction activities will also be short-term in nature.
- Oxides of nitrogen and carbon monoxide represent the highest emissions potential for the operational phase of the Project.
- The main source of emissions of oxides of nitrogen and carbon monoxide at the Project site will be truck movements and boiler operations respectively.
- The boiler plant is estimated to generate approximately 182 kg/year emissions of particulate matter (as PM_{10}) (or 0.006 g/s), 920 kg/year emissions of oxides of nitrogen (or 0.006 g/s), 2,069 kg/year emissions of carbon monoxide (or 0.066 g/s), 135 kg/year emissions of VOCs (or 0.0001 g/s).

It is noted that the above Project emission estimates are based on highly conservative assumptions and are indicative of worst case operations and may therefore overestimate the actual situation.

NPI reports provided for neighbouring facilities in Erskine Park and similar facilities identified through review of the NPI database for the 2011/12 reporting year are provided in **Table 13** for comparison with the above Project emission estimates.

Table 13 NPI Emissions for Similar Facilities – 2011/12 Reporting Year (kg/year)

Facility Type	PM_{10}	NO_X	CO	VOC	SO_2
Bluescope Steel	2,988	9,336	12,145	17,884	8,029
Goodman Fielder	111	2,432	1,861	161	17
Poultry Processing	192	3,303	15,062	1,670	15
Poultry Processing (incl. boiler plant)	24,257	47,862	47,548	6,087	93,889
Tuna Processing	1,164	4,519	7,045	4,815	6,936
Smallgoods Processing	1,271	1,778	1,498	1,044	29

Comparison of estimated total emissions associated with the operation of the Project with regional emission estimates provided in **Table 10** and NPI reports from similar facilities provided in **Table 13** indicates:

- Operational Project emission estimates represent approximately 0% - 5% or less of the cumulative total kg/year of all pollutant emissions (i.e. background regional estimates in addition to total operational emissions estimates).
- Operational Project emissions estimates are within the same range as similar goods processing facilities.

9 RISK ASSESSMENT

This section provides a framework for the assessment of risks to sensitive receptors (i.e. residences and industry) due to air emissions from the Project. The compatibility of the proposed development with surrounding land uses is also assessed. The impact assessment uses the methodology presented in the preceeding section of this report. In the context of this methodology, the risk is termed "*impact significance*".

9.1 Receptor Sensitivity

The sensitivity of residential land use areas to changes in air quality is considered to be ***high***.

The sensitivity of the existing Goodman Fielder Consumer Foods facility (which manufactures liquid groceries) to surrounding industrial land uses and changes in air quality (particularly dust) is considered to be ***very high*** given the facility processes food for human consumption.

The sensitivity of the existing Bluescope Steel Service Centre (painting and coating of steel products) to changes in air quality (particularly dust) is considered to be ***very high***.

The sensitivity of all other identified industrial land uses in the area to changes in air quality is considered to be ***medium***.

The sensitivity of the proposed development to surrounding industrial land uses and changes in air quality (particularly dust) is considered to be ***very high*** given the Project will involve the processing of food for human consumption.

9.2 Potential Operational Phase Impacts

Based on the assessment outlined in previous sections which considered:

- proposed operational activities, and the associated potential for emissions to air;
- sensitive receptor locations and existing buffer distances;
- local meteorology and topography; and,
- existing air quality environment and surrounding industries,

it is concluded that the key air quality impacts for the proposed development will likely be related to combustion gases during the operational phase of the Project.

9.2.1 Residential Land Uses – North and South

Sensitive residential receptors to the north and south of the site have been determined to be compliant with the VIC EPA buffer distance guideline of 500 m for food processing activities. Additionally, a review of the topography of the area indicates that downhill flows of airborne contaminants towards residential receptors are unlikely to occur.

Prevailing wind conditions from the southwest quadrant occur approximately 12% of the year, with lesser occurrences of winds experienced from the north and southeast (approximately 7% of the time during the year each). This means that a low frequency of winds have the potential to transport air pollutants from the Project site in the direction of residential receptors.

It is noted that existing buildings to the north and northeast of the Project may provide an additional buffer between the Project and Erskine Park residences to the north. Pollutant plumes trapped in building wakes can either be recirculated in the cavity region immediately downwind of a building or be subjected to plume downwash and enhanced horizontal or vertical spreading due to the turbulent zone that exists further downwind.

Existing vegetation to the south may also effectively act as a physical barrier to the transport of airborne contaminants.

Given the above information, the potential impact on residential land uses to the north and south is considered to be ***slight*** (i.e. the impact may be tolerated), and the impact significance may be determined to be ***intermediate/minor***.

Table 14 Impact Significance – Residential Receptors

Magnitude / Sensitivity	Substantial Magnitude	Moderate Magnitude	Slight Magnitude	Negligible Magnitude
Very High Sensitivity	Major Significance	Major/Intermediate Significance	Intermediate Significance	Neutral Significance
High Sensitivity	Major/Intermediate Significance	Intermediate Significance	Intermediate/Minor Significance	Neutral Significance
Medium Sensitivity	Intermediate Significance	Intermediate/Minor Significance	Minor Significance	Neutral Significance
Low Sensitivity	Intermediate/Minor Significance	Minor Significance	Minor/Neutral Significance	Neutral Significance

9.2.2 Industrial Land Uses – Erskine Business Park

Given the enclosed nature of the proposed development, and the nature of the surrounding industries (i.e. food processing, metal coating and manufacture, landfill, distribution warehousing, etc), it is expected that the operation of the proposed development will not cause adverse effects on the receiving environment. It is noted that the majority of buildings located near the proposed development site will be air-conditioned which will assist in mitigating off-site air quality impacts.

Given the above information, the potential impact on nearby industrial land uses is considered to be ***slight*** (i.e. the predicted impact may be tolerated). Correspondingly, the impact significance should be considered to be ***minor***.

Table 15 Impact Significance – Industrial Receptors

Magnitude / Sensitivity	Substantial Magnitude	Moderate Magnitude	Slight Magnitude	Negligible Magnitude
Very High Sensitivity	Major Significance	Major/Intermediate Significance	Intermediate Significance	Neutral Significance
High Sensitivity	Major/Intermediate Significance	Intermediate Significance	Intermediate/Minor Significance	Neutral Significance
Medium Sensitivity	Intermediate Significance	Intermediate/Minor Significance	Minor Significance	Neutral Significance
Low Sensitivity	Intermediate/Minor Significance	Minor Significance	Minor/Neutral Significance	Neutral Significance

9.3 Potential Construction Phase Impacts

Based on the assessment outlined in previous sections which considered:

- proposed construction activities, and the associated potential for emissions to air;
- sensitive receptor locations and existing buffer distances;

- local meteorology and topography; and
- existing air quality environment and surrounding industries,

it is concluded that the key air quality impact for the construction phase of the development is likely to be related to dust emissions associated with earthworks and other activities. These emissions will be short term in nature (i.e. for the duration of the construction works only) and are anticipated to be largely controllable at source through a range of mitigation and control measures.

9.3.1 Residential Land Uses – North and South

As previously discussed, sensitive residential receptors to the north and south have been determined to be compliant with the VIC EPA buffer distance guideline of 500 m for food processing activities. Additionally, review of the topography of the area indicates that downhill flows of airborne contaminants towards residential receptors are unlikely to occur.

Given the above information, it is considered highly unlikely that adverse offsite impacts will occur at sensitive receptor locations, particularly in the case that the appropriate mitigation measures are employed. The potential impact on residential land uses due to construction activities is considered to be ***negligible*** (i.e. the impact is predicted to cause no significant consequences). Correspondingly, the impact significance should be considered to be ***neutral***.

Table 16 Impact Significance – Residential Receptors

Magnitude / Sensitivity	Substantial Magnitude	Moderate Magnitude	Slight Magnitude	Negligible Magnitude
Very High Sensitivity	Major Significance	Major/Intermediate Significance	Intermediate Significance	Neutral Significance
High Sensitivity	Major/Intermediate Significance	Intermediate Significance	Intermediate/Minor Significance	Neutral Significance
Medium Sensitivity	Intermediate Significance	Intermediate/Minor Significance	Minor Significance	Neutral Significance
Low Sensitivity	Intermediate/Minor Significance	Minor Significance	Minor/Neutral Significance	Neutral Significance

9.3.2 Industrial Land Uses – Erskine Business Park

In general industry is considered to have low to medium sensitivity to changes in air quality however the Goodman Fielder facility and Bluescope Steel Service Centre have been assessed separately from the other surrounding industries given the nature of their operations and high sensitivities to changes in air quality.

Goodman Fielder Consumer Foods Facility

The existing Goodman Fielder Consumer Foods facility manufactures liquid groceries and is located approximately 215 m to the north of the Project site.

The facility appears to be enclosed with no openable windows. Roller doors are located on the buildings south and north sides. It is assumed that strict quality assurance procedures apply to ensure that food processing areas are free of dust.

Given the above information, the potential impact of Project site construction works on the Goodman Fielder facility is considered to be ***moderate*** (i.e. the impact is predicted to possibly cause statutory objectives/standards to be exceeded). Correspondingly, the impact significance should be considered to be ***major/intermediate***. Mitigation measures should be adhered to during construction works to ensure dust emissions are controlled at source (refer to **Section 10.2.3**).

Table 17 Impact Significance – Goodman Fielder Facility

Magnitude / Sensitivity	Substantial Magnitude	Moderate Magnitude	Slight Magnitude	Negligible Magnitude
Very High Sensitivity	Major Significance	Major/Intermediate Significance	Intermediate Significance	Neutral Significance
High Sensitivity	Major/Intermediate Significance	Intermediate Significance	Intermediate/Minor Significance	Neutral Significance
Medium Sensitivity	Intermediate Significance	Intermediate/Minor Significance	Minor Significance	Neutral Significance
Low Sensitivity	Intermediate/Minor Significance	Minor Significance	Minor/Neutral Significance	Neutral Significance

Bluescope Steel Service Centre

The existing Bluescope Steel Service Centre carries out painting and coating of steel surfaces and is located approximately 145 m to the northeast of the Project site.

The facility appears to be enclosed with no openable windows. It is assumed that strict quality assurance procedures apply to ensure that painting and coating application areas are free of dust. Tall stacks are located on the southern side of the building. Operations are regulated by the EPA (refer to **Table 11** licence conditions).

Given the above information, the potential impact of Project site construction works on the Bluescope Steel Service Centre is considered to be ***moderate*** (i.e. the impact is predicted to possibly cause statutory objectives / standards to be exceeded). Correspondingly, the impact significance should be considered to be ***major/intermediate***. Mitigation measures should be adhered to during construction works to ensure dust emissions are controlled at source (refer to **Section 10.2.3**).

Table 18 Impact Significance – Bluescope Steel Service Centre

Magnitude / Sensitivity	Substantial Magnitude	Moderate Magnitude	Slight Magnitude	Negligible Magnitude
Very High Sensitivity	Major Significance	Major/Intermediate Significance	Intermediate Significance	Neutral Significance
High Sensitivity	Major/Intermediate Significance	Intermediate Significance	Intermediate/Minor Significance	Neutral Significance
Medium Sensitivity	Intermediate Significance	Intermediate/Minor Significance	Minor Significance	Neutral Significance
Low Sensitivity	Intermediate/Minor Significance	Minor Significance	Minor/Neutral Significance	Neutral Significance

Additional Surrounding Industry

Given the predominantly industrial nature of the local area and the relative distances of existing industry to the Project site, the potential impact on nearby industrial land uses is considered to be ***slight*** (i.e. the predicted impact may be tolerated). Correspondingly, the impact significance should be considered to be ***minor***. Mitigation measures should be adhered to during construction works to ensure dust emissions are controlled at source (refer to **Section 10.2.3**).

Table 19 Impact Significance – Industrial Receptors

Magnitude / Sensitivity	Substantial Magnitude	Moderate Magnitude	Slight Magnitude	Negligible Magnitude
Very High Sensitivity	Major Significance	Major/Intermediate Significance	Intermediate Significance	Neutral Significance
High Sensitivity	Major/Intermediate Significance	Intermediate Significance	Intermediate/Minor Significance	Neutral Significance
Medium Sensitivity	Intermediate Significance	Intermediate/Minor Significance	Minor Significance	Neutral Significance
Low Sensitivity	Intermediate/Minor Significance	Minor Significance	Minor/Neutral Significance	Neutral Significance

9.4 Potential Impacts on the Development due to Surrounding Land Uses

The potential sources of air pollution identified in **Section 7.4.3** demonstrate the predominantly industrial nature of the local area.

9.4.1 Operation of Surrounding Industry

Erskine Park Landfill is located approximately 340 m to the east of the Project site and dust deposition monitoring is undertaken at a number of locations along the landfill site boundary. A review of the reported dust monitoring results for the north-eastern boundary monitoring location show that the dust deposition rates are generally below 4 g/m^2/month and therefore the annual average dust deposition rate is likely to be compliant with the NSW EPA annual average criterion (i.e. a total dust deposition rate of 4 g/m^2/month expressed as an annual average). While it is recognised that there may be a slight potential for off-site nuisance dust impacts due to landfill operations, compliance monitoring is undertaken at the site boundary and dust deposition rates will decrease over distance (i.e. the larger particles will settle out close to the source and no longer remain suspended in the air).

Emissions to air associated with remaining surrounding industries are either regulated by the EPA or are far removed from the Project site (i.e. are located greater than 1 km from the Project site). Food processing at the proposed development will also be controlled through the use of work instructions for all operations, training matrix and other records, risk assessments, and safety audits, to ensure the quality of the food product and the cleanliness of food processing areas.

Given the enclosed nature of the proposed development, the operation of the surrounding industries is considered compatible with the proposed land use. The potential impact of nearby industries on the Project is considered to be ***slight*** (i.e. the predicted impact may be tolerated). Correspondingly, the impact significance should be considered to be ***intermediate***.

Table 20 Impact Significance – Surrounding Industry on Proposed Development

Magnitude / Sensitivity	Substantial Magnitude	Moderate Magnitude	Slight Magnitude	Negligible Magnitude
Very High Sensitivity	Major Significance	Major/Intermediate Significance	Intermediate Significance	Neutral Significance
High Sensitivity	Major/Intermediate Significance	Intermediate Significance	Intermediate/Minor Significance	Neutral Significance
Medium Sensitivity	Intermediate Significance	Intermediate/Minor Significance	Minor Significance	Neutral Significance
Low Sensitivity	Intermediate/Minor Significance	Minor Significance	Minor/Neutral Significance	Neutral Significance

9.4.2 Erskine Park Construction Works

During the operation of the Project, future significant construction activities are located proximal to the Project site may have the potential to generate nuisance dust impacts. There may also be the potential for cumulative dust impacts to occur during strong winds where significant neighbouring construction works are undertaken simultaneously or at the same time as significant dust-generating landfill activities.

The potential impact of future nearby construction works on the Project site is therefore considered to be ***moderate*** (i.e. the impact is predicted to possibly cause statutory objectives / standards to be exceeded). Correspondingly, the impact significance should be considered to be ***major/intermediate***. Quality assurance measures and strict cleaning protocols will be implemented to avoid the transportation of dust and dirt into the facility on staff clothing and shoes (refer to **Section 10.1**).

Table 21 Impact Significance – Future Nearby Construction Activities on the Proposed Development

Magnitude / Sensitivity	Substantial Magnitude	Moderate Magnitude	Slight Magnitude	Negligible Magnitude
Very High Sensitivity	Major Significance	Major/Intermediate Significance	Intermediate Significance	Neutral Significance
High Sensitivity	Major/Intermediate Significance	Intermediate Significance	Intermediate/Minor Significance	Neutral Significance
Medium Sensitivity	Intermediate Significance	Intermediate/Minor Significance	Minor Significance	Neutral Significance
Low Sensitivity	Intermediate/Minor Significance	Minor Significance	Minor/Neutral Significance	Neutral Significance

10 MITIGATION MEASURES

10.1 Existing Controls

As previously noted, the tenant will follow stringent quality assurance protocols to ensure meat processing is controlled through the use of work instructions for all operations, training matrices and other records, risk assessments and safety audits.

Codes and regulations that apply to food processing and operations include:

- BCA guidelines
- State Food Act and Regulations
- State Gas Fitting/Supply Regulations
- State Public Health Act and Regulations – Legionella Control
- Food Standards Code 3.2.2 Food Premises & Equipment (ANZFA) – Food Safety Standards, Australia
- Standard for Food Safety – British Retail Consortium
- Food Grade Compressed Air COP – British Compressed Air Society Limited
- Work Health & Safety Act including associated Regulations and COPs
- Dangerous Good Safety Management Act and associated requirements
- EPA requirements
- Australian Standards as relevant

The installation of equipment will be designed so that cleaning operations can be easily and safely be carried out to maintain hygiene standards and ambient air quality.

Section 5.1 details the control measures proposed for specific processes. In summary, the majority of potentially odorous activities will be enclosed (i.e. meat will be vacuum packed for receivals/dispatch, and the main facility, the WWTP process, waste storage areas etc will be enclosed). Monitoring devices and odour control technologies will be installed at the WWTP where necessary to ensure nuisance odour impacts do not occur off-site and to maintain compliance with a 1 odour unit or less criterion at the Project site boundary.

The hot water boiler plant will be a closed-loop system which will significantly reduce the amount of emissions released to air due to greater combustion efficiency. A low nitrogen burner will be used for control of emissions of oxides of nitrogen and any remaining emissions will be directed to a rooftop stack and released at velocity for improved dispersion characteristics of the pollutant plume.

Measures are in place to ensure refrigerant leaks are monitored and areas at high risk of refrigerant leaks are bunded. Chemical storage areas will also be bunded and compliant with the requirements of the BCA.

Commercial kitchen cooking areas will be designed to capture smoke and fumes and direct emissions to a rooftop stack.

LPG forklifts are proposed for use externally during operations. LPG-operated forklifts will generate significantly less emissions to air compared to petrol or diesel alternatives.

Quality assurance measures and strict cleaning protocols will be implemented to avoid the transportation of dust and dirt into the facility on staff clothing and shoes, and entrainment of particulate into the facility during receivals/dispatch activities.

10.2 Additional Recommendations

10.2.1 General

- Compliance with relevant Australian Standards and BCA requirements.
- Use of low-VOC paints and solvents for surface painting of buildings and other activities where feasible and practicable.
- Installation of appropriate air extraction systems for equipment/activities generating significant air pollutant emissions, and use of suitable air pollution control (APC) devices and stacks to ensure compliance with POEO Act limits and regulations.
- Fuel/oil/solvent/chemical storage areas appropriately bunded in compliance with BCA requirements and spill kits located proximal to storage areas as well as high use areas for immediate clean-up of spills and leaks for mitigation of fugitive release of VOCs.
- Regular inspection, maintenance and cleaning of equipment, extraction systems, ductwork, and air pollution control devices, exhaust fans etc as required and in accordance with manufacturer's specifications.
- Appropriate operation of all equipment in accordance with manufacturer's specifications.
- Regular visual inspection of stacks and odour 'sniff tests' at site boundary during peak operations, start-up and shutdown.
- Prepare a written maintenance program for air pollution control equipment.
- Maintain a record of maintenance undertaken, inspection, repair and replacement of part.
- Organise scheduled inspection and maintenance by a service engineer.
- Implementation of good housekeeping practices and standard operating procedures addressing clean up and appropriate disposal of waste materials and old containers/drums.
- Provision of a concise Environmental Management Plan (EMP) outlining operating procedures, internal checking protocols, staff training requirements and awareness of air quality control measures and other environmental initiatives and commitments.
- Maintenance of a complaints log including all relevant details of the complaint/complainant.

10.2.2 Operational Phase

Emissions to Air via Roof top Stacks

- Discharges of pollutants to the air (as generated by the boiler, commercial kitchen and so on) should be directed through rooftop stacks discharging at least 3 m above the ridge line of the roof to ensure maximum levels of dispersion.
- Mechanical ventilation and stack location and design should meet BCA requirements.
- Stack emissions testing should be performed to ensure compliance with POEO Act limits.
- Equipment and plant air pollution control devices (i.e. for dust and particulate capture, and VOC filtration) should also be considered (particularly for indoor air quality purposes).
- Roller shutter doors should only be opened as required to prevent fugitive emission release to the outdoors (opening of doors should not be required to ensure sufficient internal ventilation for workers).

Staff Awareness and Training

Management should provide adequate training to staff and contractors on good housekeeping practices and efficient and appropriate use and maintenance of equipment used at the Project site. Staff should also be made aware of procedures relating to waste management and air quality control (including staff responsibilities associated with these procedures).

Practical and easy-to-read signage should be provided in waste management areas. Signage could also be provided to emphasise useful information relating to air quality control procedures and general housekeeping requirements to act as a daily reminder to staff working at the premises.

Implementation of Vegetated Buffers

Vegetated buffer placement may be considered where practical along the western and southern Project boundaries for increased amenity, odour mitigation and protection from neighbouring dust generating sources. Vegetated buffers can effectively act to increase mechanical turbulence and improve dispersion of pollutants, as well as acting as a physical barrier to the transport of airborne pollutants.

Boiler Operations

Where stack verification testing shows that pollutant concentrations do not meet with relevant air quality criteria, additional air pollution control devices may be considered however it is considered that further controls will likely be unnecessary given the boiler is gas-fired.

Kitchen and Cooking Areas

- Enclose raw materials during handling and processing activities, and refrigerate.
- Capture cooking fumes at source through use of an extraction canopy or kitchen hood located above cooking and dishwasher areas. The plan dimensions and the height of this equipment are important:
    - The plan dimensions should exceed those of the catering equipment, with overhand at the front provided to cope with steam or fumes.
    - The height of the canopy should ideally be located between 450 mm and 1,350 mm from the top of the cooking surface to the lowest edge of the grease filter.
    - A grease filter is typically used which comprise of layers of galvanised or stainless steel mesh with a steel housing.
- Best practice use of stainless steel for canopies.
- Extraction fans need to be sized to cope with design pressure.
- Remove oil and grease by filtration of other means.
- Perform regular cleaning of kitchen hoods, ductwork, filters, grease traps for odour control. 3 monthly cleaning intervals are recommended for heavy use kitchens operating between 12 to 16 hours per day, and 6 to 12 monthly cleaning intervals for kitchens operating at lesser frequencies or as per manufacturer's requirements.
- Enclose waste and waste storage areas and remove wastes promptly from the premises or refrigerate during storage.
- Air pollution control devices may be implemented to further reduce emissions where complaints are received in relation to nuisance odour or where prolonged smoke is visible during normal or peak operations (i.e. not during start up or shut down).

Refrigeration Units

Leak points can be covered and emissions of ammonia captured using devices such as enclosure hoods, capture or receiving hoods. The collected emissions can then be conveyed to a control device for treatment, to either a filter (which adsorbs the pollutants) or wet scrubber. The refrigerant may then be removed from the filter and recycled.

Welding

Fumes from welding can be captured via welding booths, hoods, torch fume extractors and flexible ducts, and airborne contaminants mitigated by directly captured air through high efficiency filters, electrostatic precipitators, particulate scrubbers and/or activated carbon filters.

Traffic

Encourage and reward employees commuting to work using sustainable modes of travel (such as public transport, cycling, and car share) through the implementation of an incentive scheme and for reduction of the company's overall carbon footprint. Provide facilities for cyclists such as bike storage areas, showers and lockers.

10.2.3 Construction Phase

Fugitive Emissions of Nuisance Dust from Construction Activities

Ambient dust emissions from wheel-generated dust, excavation and rehabilitation, clearing and grading, truck loading and unloading, and wind erosion areas will be the primary focus of dust control at the proposed development site.

Dust mitigation measures that may be implemented during the construction phase include:

- Emissions to be minimised through the implementation of water spraying, particularly during periods of heavy on-site activity.
- Use of windbreak walls to reduce wind speeds across the Project site.
- Silt and other material be removed from around erosion and sediment control structures to ensure deposits do not become a dust source.
- Amendment of dust-generating construction activities during adverse wind conditions blowing in the direction of sensitive receptors. A wind sock should be installed and be visible to all areas of the active construction site to assist in reactive response procedures (i.e. to determine when construction activities should be postponed, minimised or relocated in windy conditions).
- Minimise the use of material stockpiles and locating them away from receptor locations (e.g. neighbouring industries).
- Reduce the truck speeds on site will reduce wheel generated dust.
- If dirt track out is causing problems, manual brushing of the truck's flanks and wheels could be implemented as a further precaution. Also, trucks exiting the site should be observed to determine if the both wheels travel over the shaker grid.
- Air emissions associated with all construction activities should also be managed through compliance with a Construction Environmental Management Plan (CEMP). The CEMP would be implemented so that:
    - The works are conducted in a manner that minimises the generation of air emissions.
    - The effectiveness of the controls being implemented is monitored.
    - Additional measures are implemented where required.

- A complaints management system is implemented so that any identified incidents or complaints are dealt with through investigation and implementation of corrective treatments.

- Construction contractors should also undertake daily environmental inspections of their works and worksite. The daily environmental inspection reports should include the below observations, with remedial or corrective actions noted (as appropriate).

  Any remedial or corrective actions should be reported to the Site Manager as soon as is practicable. Inspections may include, but not be limited to:

  - Visual inspection of dust generation.
  - Ensure roads leaving the site are free of soil, and prevention of soil tracking onto the road network.
  - Inspection of the erosion and sediment controls.
  - Inspection of the waste storage areas.
  - Inspection of any rehabilitated areas (where relevant).
  - Ensure all hazardous goods, including fuel and oil, are adequately stored or bunded.
  - Ensure spill kits are appropriately located and stocked.

Fugitive Release of Emissions from Fuel and Chemical Storage Areas

- Storage areas for all liquids should be appropriately bunded.
- Spill kits including absorbing materials should be provided nearby handling and storage areas.
- Where possible, the delivery of liquid fuels and other volatile liquids should utilise reciprocal feeds, so that tank vapours are displaced into the delivery vehicle rather than being emitted to the atmosphere as a fugitive emission.
- Empty containers should be managed and disposed of in appropriate manner.
- Lids should be replaced on containers containing volatile compounds as soon as possible.

The Emission of Products of Combustion from Plant and Machinery

Control measures that may be implemented during the construction phase, where applicable, include:

- Ensuring vehicles and machinery are maintained in accordance with manufacturer's specifications.
- Minimising truck queuing through logistical planning of materials delivery and work practices.
- Stationary trucks should switch off engines (where possible) if idling time on-site is likely to exceed 2 minutes.
- Provide signage and briefing to contractors, truck operators and drivers employed for transport of goods in order to create awareness of the importance of maintaining ambient air quality.
- Fixed plant should be located as far from local receptors as practicable.

10.3 Emissions Testing and Monitoring for Ongoing Compliance

10.3.1 Construction Dust Monitoring

Visual inspection of ambient dust should be undertaken daily and during activities that have the potential to generate significant levels of dust to ensure appropriate control measures are implemented.

Where nuisance dust complaints are received, dust deposition monitoring or particulate monitoring should be considered for monitoring during construction works to ensure dust levels are compliant with NSW EPA air quality criteria at the Project site boundary.

10.3.2 Stack Verification Testing

Stack verification testing will be undertaken once operational to ensure boiler emissions are compliant with POEO (Clean Air) Regulation 2010 and relevant air quality criteria.

10.3.3 Odour Survey

An odour survey of the site will be undertaken to confirm that the 1 odour unit or less criterion has been achieved for the operation of the WWTP at the Project boundary. The survey will be carried out by a trained and calibrated odour assessor during both 'initial' start-up operations and 'peak' WWTP operations at various locations surrounding the Project site using a nasal ranger field olfactometer or other relevant odour detecting and measuring device. The odour survey will need to be conducted during weather conditions representative of worst case and a range of wind conditions (i.e. on a warm or hot day, during calm wind conditions and winds blowing in the direction of sensitive receptors).

10.3.4 Additional Measures

Should the results of the stack emissions testing or odour survey show non-compliances with relevant air quality goals and criteria, or where odour or other air quality complaints occur, additional pollution control measures should be investigated in consultation with Council and the EPA.

10.3.5 Response to Non-Compliances

Adverse results from any monitoring activity should be investigated by the operator as soon possible to identify the cause and to take appropriate corrective action.

Non-compliances should be recorded in a log book with details provided regarding the cause and extent of the problem, and the remedial action taken.

11 COMPLAINTS HANDLING

A complaints handling system should be maintained to monitor complaints and to effectively manage any requests for information or respond to any public concerns in relation to the proposed development (construction and operational phases).

All information relating to complaints should be kept in a complaints register.

The complaints register should note the following details of a complaint relating to nuisance odour or dust:

- Date and time that the complaint was made.
- Name and contact details of the complainant.
- Location where the nuisance odour/dust was noted.
- Weather conditions experienced on the day (e.g. temperature, humidity, wind characteristics, clear or rainy).
- The perceived frequency and duration of the conditions giving rise to the complaint.
- The perceived (or assumed) cause of the condition giving rise to the complaint.
- A description of the conditions and the effect upon the complainant.
- Project-related activities undertaken at the time of the complaint.
- Actions taken where site activities are determined to be the cause of the complaint.
- Sign-off by a responsible person.
- Follow-up with the complainant.

Where a complaint is made, investigation into the source of the complaint should be made and remedial control measures undertaken to reduce emissions to a level that does not cause a continuation of unacceptable nuisance.

12 KEY PERFORMANCE INDICATORS

Key performance indicators (KPIs) should be established to monitor progress against ambient air quality and ambient air quality amenity targets.

Proposed KPIs are as follows:

12.1.1 Construction Phase:

- Compliance with air quality standards.
- Compliance with CEMP requirements.
- The number of complaints received in relation to nuisance dust/odour during construction phase works.
- The completion of daily visual inspection logs of construction activities and controls.

12.1.2 Operational Phase:

- Compliance with air quality standards.
- Compliance with EPL and EMP requirements.
- Compliance with equipment cleaning and maintenance scheduling (including air pollution control equipment) as demonstrated in a well maintained logbook kept on site.
- The number of complaints received in relation to operations.
- The implementation and percentage of employees participating in a company sustainable travel incentive scheme.

13 STATEMENT OF COMPLIANCE

Given the nature of the proposed operations, the quality assurance protocols and equipment controls employed, the Project will be compliant with POEO legislation and NSW EPA guidance and relevant air quality criteria provided cleaning and maintenance schedules and air quality management procedures are strictly adhered to during construction works and operations. Where complaints relating to dust or odour or other air quality issues are received, additional measures may be undertaken to ensure ongoing compliance is achieved.

It is recommended that construction contractors and tenants implement daily visual checks for smoke visibility and odour at the Project boundary during (a) start-up/shutdown and (b) normal or peak operations. This obligation should be written into the EMP, conducted on a daily basis (or during each day of operation), and the records retained at the site and made available for inspection by Council / the EPA on request.

The Environment Protection Authority (EPA) requirements for the Project (document dated 10 July 2013) require that the report:

3. *Justify the level of assessment undertaken on the basis of risk factors, including but not limited to:*
   a) *proposed location*
   b) *characteristics of the receiving environment; and*
   c) *type and quantity of pollutants emitted.*

The EPA also requires that the Project is contextualised within the receiving environment noting the potential for cumulative impacts and provide details that are essential to predicting and assessing air quality impacts including identification of sources and processes that have the potential to result in emissions to air and identification of air pollutants that may be emitted.

It is noted that air dispersion modelling is required only where there is a risk of adverse air quality impacts.

Table 22 Compliance Table – DGRs and EPA Requirements

Requirements	Report Section
Conditions of Consent:	
Air quality and odour including -	
A quantitative assessment of the potential air quality impacts (particularly odour and dust) of the development on surrounding receivers, including impacts from construction, operation and transport.	**Section 8**
Details of the proposed mitigation, management and monitoring measures.	**Section 10**
Environment Protection Authority:	
The EA should include a detailed air quality impact assessment (AQIA) for the proposal. The AQIA should:	
1. Assess the risk associated with potential discharges of fugitive and point source air emissions for all stages of the proposal. Assessment of risk relates to environmental harm, risk to human health and amenity.	**Section 6**, **Section 9**
2. Justify the level of assessment undertaken on the basis of risk factors, including but not limited to: - *proposed location;* - *characteristics of the receiving environment; and,* - *type and quantity of pollutants emitted.*	**Section 1.2**, **Section 7**, **Section 8**, **Section 9**
3. Describe the receiving environment in detail. The proposal must be contextualised within the receiving environment (local, regional and inter-	**Section 7**

Requirements		Report Section
	regional as appropriate). The description must include but need not be limited to: - *meteorology and climate;* - *topography;* - *surrounding land-uses;* - *receptors; and* - *ambient air quality.*	
4.	*Provide details of the proposal that are essential to predicting and assessing air quality impacts including:* - *Identification and description of all potential sources and processes that could result in air emissions (including odour);* - *Identification of all air pollutants emitted, providing sufficient detail of all emissions regarding the characteristics and estimated quantity (and size for particles), emission levels relative to relevant standards in regulations, source and discharge points;* - *An outline of procedures for management of solid, liquid and gaseous waste streams with potential for significant air impacts (including handling, production, storage, treatment activities);* - *For potentially odorous emissions, provide an assessment of odour in accordance with the Technical Framework: Assessment and Management of Odour from Stationary Sources in NSW (DEC 2006) and associated Technical Notes.*	**Section 5**, **Section 8**, **Section 10**
	- *Use sampling and analysis techniques for individual or complex odours and for point or diffuse sources, as appropriate.*	**Section 10.3**
5.	*Account for cumulative impacts associated with existing emission sources as well as any currently approved developments linked to the receiving environment.*	**Section 8**, **Section 9**
6.	*Include air dispersion modelling where there is a risk of adverse air quality impacts, or where there is sufficient uncertainty to warrant a rigorous numerical impact assessment. Air dispersion modelling must be conducted in accordance with the Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (2005).*	**Section 9** (low risk determined)
7.	*Demonstrate the proposal's ability to comply with the relevant regulatory framework, specifically the Protection of the Environment Operations (POEO) Act (1997) and the POEO (Clean Air) Regulation (2010).*	**Section 4.1**, **Section 4.2**, **Section 10**
8.	*Provide an assessment of the project in terms of the priorities and targets adopted under the NSW Government's State Plan: NSW 2021.*	**Whole of Document**, **Section 10.2.2**
9.	*Detailed emission control techniques/practices that will be employed by the proposal.*	**Section 10**

14 CONCLUSION

SLR has assessed the potential air quality impacts of the proposed food processing and packaging facility at Erskine Park NSW.

The main air quality impacts associated with the operation and construction of the Project include the following:

- Controlled (point) source emissions from rooftop stacks.
- Uncontrolled (fugitive) emissions release from the indoor operations during roller shutter door opening.
- Fugitive emissions release of odour from waste management processes.
- Exhaust emissions from truck movements and other vehicles entering and exiting the site.
- Fugitive emissions release of dust from construction activities.

It is concluded that the proposed operations are unlikely to cause significant air quality impacts on the receiving environment given the industrial nature of Erskine Business Park and the nature of the operations. However, verification testing of boiler stack emissions and an odour survey of Waste Water Treatment Plant (WWTP) operations is recommended to confirm the conclusions of this assessment.

It is recommended that the emission stacks are designed and constructed to comply with the minimum requirements of the Building Code of Australia. Further odour control should be considered for the WWTP and further specific assessment may be required to ensure nuisance odour is not realised offsite. Dust mitigation measures should be undertaken during construction works to ensure nuisance dust impacts are not realised offsite. It is considered that these recommendations may be implemented through planning conditions.

Based upon the information provided by the client, and the assumptions presented in this report, it is considered that there will be no significant impacts associated with the operation or construction of the facility, that the uncertainties are low risk and these may be effectively managed through planning conditions. It is respectfully concluded that planning approval should not be refused on air quality grounds.

Units of Measurement and Air Pollutants

AHD	Australian Height Datum
m^3	cubic metre of air
VOCs	Volatile Organic Compounds

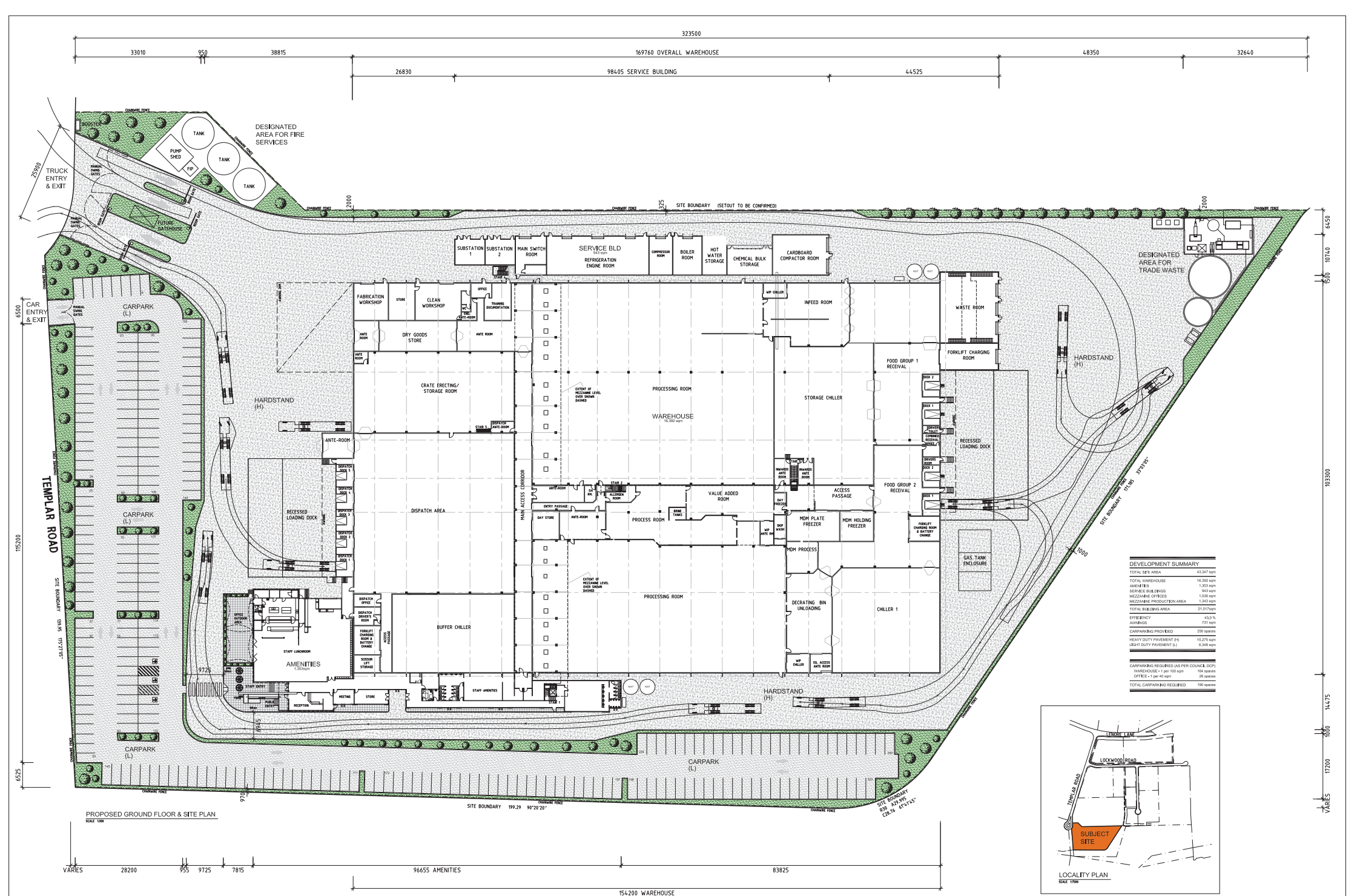
Commonly Used Terminology

ambient	Pertaining to the surrounding environment or prevailing conditions
atmosphere	A gaseous mass surrounding the planet Earth that is retained by Earth's gravity. It is divided into five layers. Most of the weather and clouds are found in the first layer
calms	Refers to calm wind speeds of less than 0.5 m/s.
combustion	The process of burning. A chemical change, especially oxidation, accompanied by the production of heat and light
dust deposition	Settling of particulate matter out of the air through gravitational effects (dry deposition) and scavenging by rain and snow (wet deposition)
dispersion	The spreading and dilution of substances emitted in a medium (e.g. air or water) through turbulence and mixing effects
downwind	The direction in which the wind is blowing
fugitive emissions	Pollutants which escape from an industrial process due to leakage, materials handling, transfer, or storage
guideline	A general rule, principle, or piece of advice. A statement or other indication of policy or procedure by which to determine a course of action.
mitigate	To moderate (a, quality or condition) in force or intensity; alleviate
meteorological	The science that deals with the phenomena of the atmosphere, especially weather and weather conditions
particulate	Of, relating to, or formed of minute separate particles. A minute separate particle, as of a granular substance or powder
plume	A space in air, water, or soil containing pollutants released from a point source
pollutant	A substance or energy introduced into the environment that has undesired effects, or adversely affects the usefulness of a resource
receptor	Coordinate locations specified in an air dispersion model where ground level pollutant concentrations are calculated by the model
sensitive receptor	Locations such as residential dwellings, hospitals, churches, schools, recreation areas etc where people (particularly the young and elderly) may often be present, or locations with sensitive vegetation and crops.

Air Quality Terminology

standard	The prescribed level of a pollutant in the outside air that should not be exceeded during a specific time period to protect public health
topography	Detailed mapping or charting of the features of a relatively small area, district, or locality
volatile organic compounds	All organic compounds (substances made up of predominantly carbon and hydrogen) with boiling temperatures in the range of 50-260°C, excluding pesticides. This means that they are likely to be present as a vapour or gas in normal ambient temperatures.
wind direction	The direction from which the wind is blowing
wind erosion	Detachment and transportation of loose topsoil or sand due to action by the wind
wind rose	A meteorological diagram depicting the distribution of wind direction and speed at a location over a period of time

Facility Layout Plan



PROPOSED GROUND FLOOR & SITE PLAN
SCALE 1:200

DEVELOPMENT SUMMARY	
TOTAL SITE AREA	43,347 sqm
TOTAL WAREHOUSE	16,392 sqm
AMENITIES	1,303 sqm
SERVICE BUILDINGS	943 sqm
MEZZANINE OFFICES	1,036 sqm
MEZZANINE PRODUCTION AREA	1,343 sqm
TOTAL BUILDING AREA	21,017sqm
EFFICIENCY	43.0 %
AWNINGS	731 sqm
CARPARKING PROVIDED	250 spaces
HEAVY DUTY PAVEMENT (H)	15,275 sqm
LIGHT DUTY PAVEMENT (L)	6,346 sqm

CARPARKING REQUIRED (AS PER COUNCIL DCP)	
WAREHOUSE - 1 per 100 sqm	164 spaces
OFFICE - 1 per 40 sqm	26 spaces
TOTAL CARPARKING REQUIRED	190 spaces

LOCALITY PLAN
SCALE 1:7500

FOR APPROVAL

REVISIONS	NO.	DATE	DESCRIPTION	NO.	DATE	DESCRIPTION
WRITTEN DIMENSIONS TO TAKE PRECEDENCE OVER SCALE. BUILDER SHALL CHECK AND VERIFY ALL DIMENSIONS ON SITE. ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ARCHITECT.	-	29.07.2013	FOR APPROVAL			

CLIENT: GPT The GPT Group

PROJECT: FOOD PROCESSING & PACKAGING FACILITY
AT
PART LOT 2304 TEMPLAR ROAD, ERSKINE PARK, NSW.

ARCHITECTS DOCUMENTATION: NICHOLAS & ALEXANDER ARCHITECTS
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ACN 070 432 992

NORTH POINT:

SHEET TITLE: LOCALITY & SITE PLAN

DOCUMENTATION	AG	DATE	JUNE 2013
DRAWN	AG	SCALE	AS SHOWN @ A0
CHECKED	ND	PLOT SCALE	1 : 1
DRWG No.	13424	SHEET No.	DA-010
		REV.	--

Wind Roses

Horsley Park
(BoM Station 061779)
01/01/2005 - 31/12/2009
610.12821