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Westfield Design & Construction

Westfield Parramatta Redevelopment

Draft Odour Assessment

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EXECUTIVE SUMMARY

Vipac Engineers and Scientists Ltd (VIPAC) has been commissioned by Westfield Design & Construction to carry out an odour assessment of their proposed re-development of the Westfield Parramatta Project. This assessment considers potential odour impacts from future tenants. Recommendations are made for design and operation requirements that will ensure odour pollution is acceptable.

The development site is surrounded by primarily commercial and residential land uses. Key sensitive residential receptors are located to the south and west of the site. Based on the local meteorology, odour is expected to be carried from source to receptor on an irregular basis.

Key concerns for odour pollution are waste management and ventilation systems. Waste management should be addressed by a well-implemented waste management plan. Ventilation systems should be designed appropriately for the type of odour produced.

It is recommended that certain requirements for ventilation and waste management are included in a site-wide Environmental Management Plan (EMP). These requirements are listed in Appendix A. To enforce these requirements, tenants should agree to these conditions as part of their tenancy agreement.

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1 INTRODUCTION

Vipac Engineers and Scientists Ltd (VIPAC) has been commissioned by Westfield Design & Construction to carry out an odour assessment of their proposed re-development of the Westfield Parramatta Project. This assessment considers potential odour impacts from future tenants.

2 PROJECT DESCRIPTION

The Westfield Parramatta Project comprises a re-development and refurbishment of the existing shopping complex. Westfield is seeking approval for construction of an additional retail level, a high-rise commercial office building, additional car parking and activation to the Argyle Street façade at ground level.

The retail component of the project, including additional parking levels, will have a maximum building height of 34.14m above ground level. The proposed office building will comprise approximately 20 levels of commercial floor space above the retail podium, with a maximum building height of 100 m.

2.1 DEVELOPMENT STAGES

The development is to proceed in 2 stages:

- Stage 1: Additional retail level located over the existing Westfield Shopping Centre footprint connecting directly into the existing centre and additional retail car parking; and
- Stage 2: New commercial building.

It is understood that a full approval will be sought for Stage 1 and that a concept approval will be sought for Stage 2. The proposed development consists of the following.

Alterations to level 6:

- Addition of new retail level 6 which consists of:
  - Additional supermarket of 4412 sqm
  - Additional discount department store of 8263 sqm
  - Additional mini majors totalling 4781 sqm
  - Additional 6531 sqm of specialty shops

Alterations to level 5:

- Relocated supermarket from level 5 to level 6 and replace it with 3969 sqm of 2 mini majors and 541sqm of specialty shops
- Relocated travelators and replace with 211 sqm of specialty shop

Alterations to Level 4:

- Replace the tenant on Church Street with a shop, reserve area and loading dock for the new discount department store at level 6

Alterations to Level 2:

- Alterations to Aird Street loading dock

Carpark additions:

- Alterations to carpark at level 5M2, 6 and level 6M
- Additional 3 levels of car parks at level 6m, 7, 7m at Aird street carpark
- Additional level 7, 7m and level 8 car parks at Campbell street carpark

Landmark office tower positioned at the South West corner of Church Street and Argyle Street.

2.2 ODOUR SOURCES

For this project, the main sources of concern are odour from food preparation and cooking from restaurants and the odour from food waste.

Odours produced from cooking can be mitigated through appropriate ventilation. It is recommended that tenants be required to meet minimum ventilation requirements to manage these odours. Odours produced from food waste can be mitigated through simple operational measures. It is recommended that tenants be required to demonstrate that their operational procedures are adequate for dealing with waste.

3 SITE DETAILS

3.1 LOCATION

The proposed development site is located centrally in Parramatta, Sydney. The surrounding areas consist of residential and commercial land uses. In particular, residential residences to the south and west of the development site are considered to be the most sensitive receptors. The site is within walking distance of the CBD's commercial core and the Parramatta Transport Interchange is in close proximity, located a short distance to the north-east.

Figure 3-1: Site Location

3.2 METEOROLOGY

The local meteorology at the site will affect pollutant transport and dispersion. Pollutants are carried downwind of the source and therefore impacts will occur when the wind blows from a source to a receiver. Wind roses are a means of presenting a summary of wind speed and directional data for a particular time and location. Wind roses were generated for different hours of the day from the Bureau of Meteorology (BOM) located at Mason's Drive, Parramatta North which is approximately 3 km north-east of the site. The annual wind roses for 9 am and 3 pm are presented in Figure 3-2 and Figure 3-1, respectively.

From the wind roses, it can be seen that the wind blows from the west and north-west in the morning, while winds are more likely to blow from the east and south-east in the afternoon. Both morning and evening winds have some capacity to transport pollutants to sensitive receptors, however, northerly winds are most capable of carrying pollutants to sensitive receptors. As these winds occur less than 10% of the time, pollutant concentrations at these receptors are expected to be generally low.

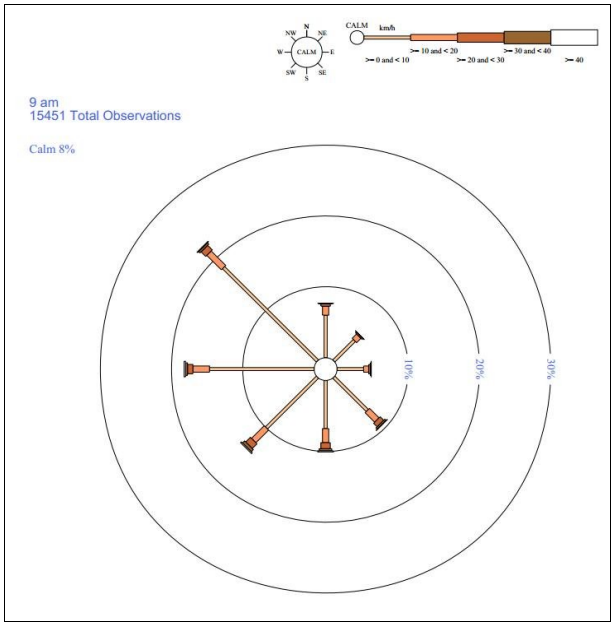

Figure 3-2: Annual 9 am Wind Rose for Parramatta North (Source: BOM)

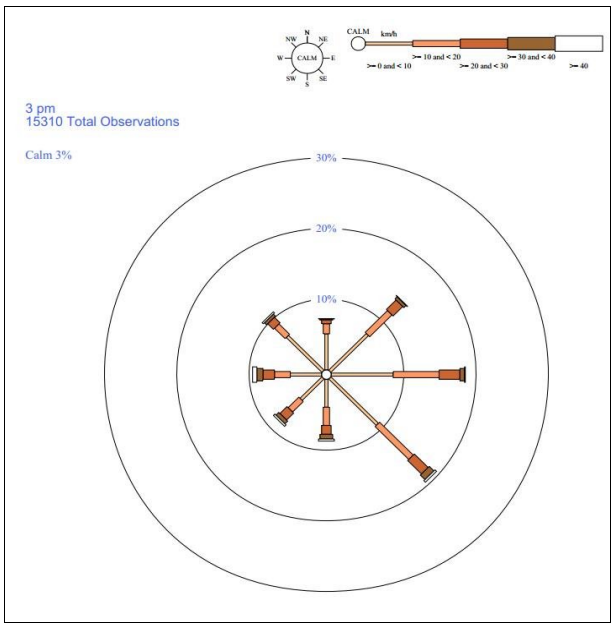

Figure 3-3: Annual 3 pm Wind Rose for Parramatta North (Source: BOM)

4 AIR QUALITY GOALS

Odour from cooking and waste is of most concern for this development. Cooking of food has the potential to produce offensive odours. For instance, excessive cooking of eggs can produce a sulphurous smell.

Additionally, food waste will produce offensive odours. In particular, putrescible waste needs to be managed appropriately as this is the key contributor to waste odour.

Ambient air quality goals set down in New South Wales are defined in the New South Wales Department of Environment and Conservation (NSW DEC) document "*Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*". Most of the pollutants defined in this document are not of significant concern to this assessment; the only significant pollutant of concern is odour from cooking and waste. It should be noted that this document and criteria contained therein is intended for significant sources of offensive odours, such as landfill sites etc.

The normal process for ensuring that cooking odours do not result in any potential for nuisance is to ensure that the cooking odours are captured by exhaust systems and exhausted to roof vents. This assessment therefore recommends compliance with AS 1668.2-2002 "*The use of ventilation and air conditioning in buildings PART2: Ventilation design for indoor air containment control*", which sets out design requirements for air handling systems for the control of odours from cooking operations.

AS1668.2 is intended to simplify analysis of ventilation by providing a generic and simplified approach to ventilation design. This prevents the need for more complicated and expensive analysis. As such, this approach is conservative in nature to ensure that safe ventilation is achieved.

5 BACKGROUND ODOURS

To determine the total effect of emissions in the local area at sensitive receivers, background concentrations of pollutants should be considered. The proposed development is not expected to generate any significant pollution except small amounts of odourous air from cooking and waste.

As the surrounding land use is predominantly residential and commercial, there is not expected to be any significant nearby sources that emit odours. Background odour may exist due to operation of other restaurants. However, odour emissions from these sources will be transient events. It is highly unlikely that these events will coincidence and produce cumulative impacts. Additionally, the differing constituents of these odours mean that there would be no cumulative effect, therefore, there are no other sources of concern in the immediate vicinity of the development site and there will be no significant background odour.

6 METHODOLOGY

This assessment recommends that compliance with AS 1668.2-2002 "*The use of ventilation and air conditioning in buildings PART2: Ventilation design for indoor air containment control*" is achieved at the development. In order to do this, tenants must comply with the minimum requirements of AS1668.2. This sets out design requirements for air handling systems for the control of odours from cooking operations.

Additionally, operational policies should be defined in order to ensure that waste odour is managed. Tenants should be required to comply with these policies and demonstrate good waste management practices.

These requirements should be included in the development's Environmental Management Plan (EMP) as well as tenancy agreements. This assessment specifies the minimum requirements that should be included.

7 VENTILATION REQUIREMENTS

Kitchen extraction systems are expected to effectively exhaust all significant cooking odours providing they are designed correctly. The required flow rate of the exhaust system depends on the type of cooking process. These processes and their flow rate requirements should be calculated at the design phase for each tenant according to the procedure outlined in Appendix A.

The exhausted air must be discharged to the atmosphere in such a manner as not to cause odourous nuisance to occupants of neighbouring buildings or members of the public. To achieve this, the exhaust velocity and height of exhaust stacks should be design according to the procedure outlined in Section Appendix A.

8 RECOMMENDATIONS FOR ENVIRONMENTAL MANAGEMENT PLAN

It is recommended that the following Sections be included in the development site's EMP in order to manage odour. Where appropriate, clauses should be included in tenancy agreements to ensure compliance with these requirements.

8.1 DESIGN OF VENTILATION SYSTEM

- The design of ventilation systems must comply with AS1668.2. This can be achieved by following the float chart shown in Figure 8-1;
- Exhaust stack heights must be at least 3m above the roof height at the point of discharge; and
- An appropriately qualified person must certify the ventilation system to comply with AS1668.2.

8.2 DESIGN OF WASTE AREAS

- Refrigerated areas must be provided for storage for any putrescible waste; and
- Waste storage areas must be located as far as practical from the site boundary.

8.3 OPERATION OF VENTILATION SYSTEMS

- A service schedule must be implemented for the maintenance of ventilation systems.

8.4 OPERATION OF WASTE MANAGEMENT

- Tenants must store putrescible waste in refrigerates areas;
- Waste storage areas are kept clean; and
- External bins are to be kept closed to eliminate odours and keep fauna from interfering with waste.

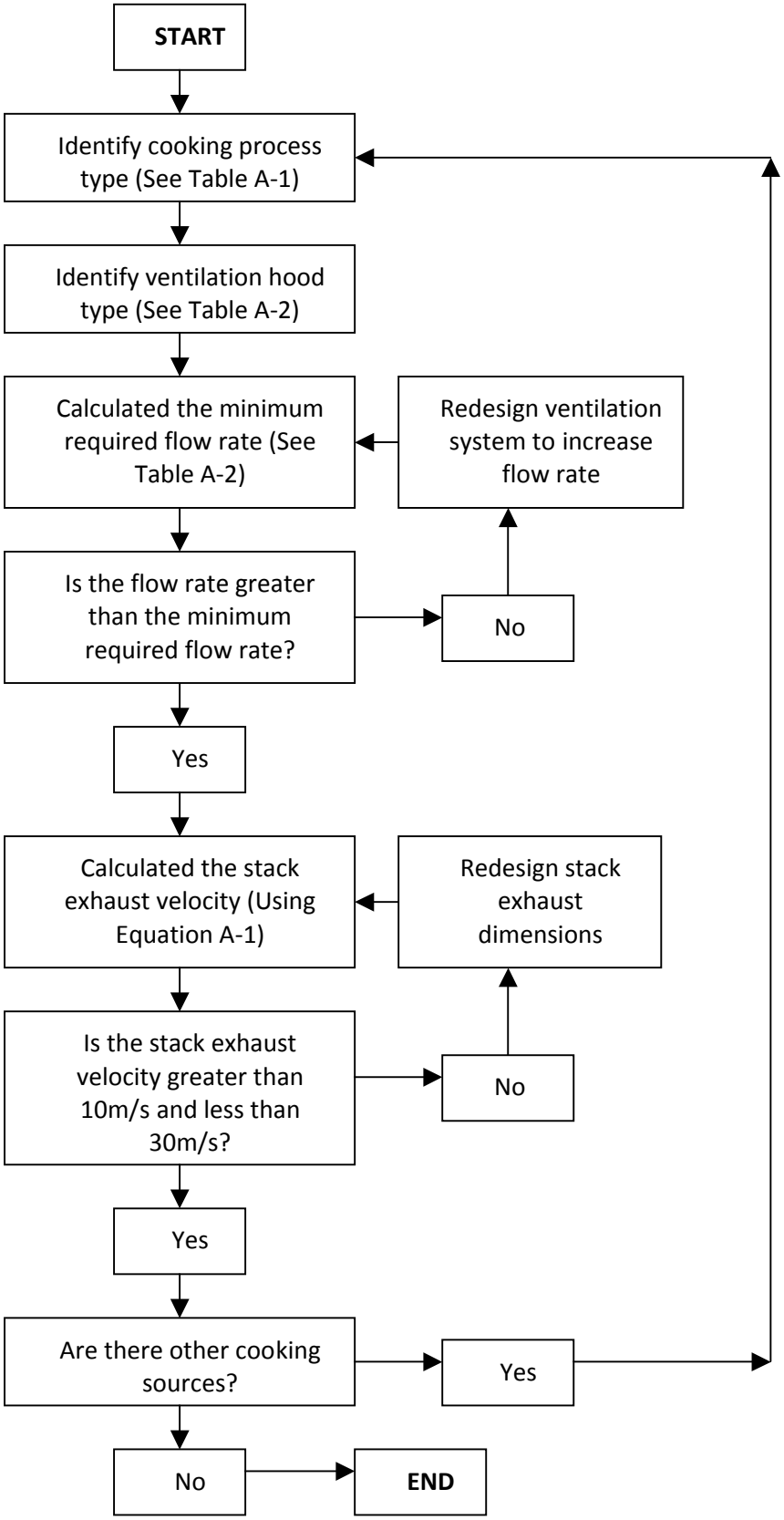

Figure 8-1: Flowchart for Determining AS1668.2 Compliance

9 CONCLUSION

In order to ensure odour impacts are minimised, certain requirements as detailed in Section 8 should be included in the development site's EMP. Tenancy agreements should contain these requirements such that tenants are required to comply.

Appendix A: AS1668.2 Compliance Calculations

Table A-1: Cooking Process Type Classification

Process Type 1	Non-grease producing equipment and void spaces under the hood, which serve to ventilate other cooking equipment
Process Type 2	Low-grease, medium-heat producing equipment such as griddles, ranges, conventional fryers, tilting skillets, steam kettles and gas ovens
Process Type 3	High-grease, low-heat producing equipment such as electric deep-fat fryers, grooved griddles, hot tops and hot top ranges
Process Type 4	High-grease, medium-heat producing equipment such as countertop barbecues and gas-fired deep fat fryers
Process Type 5	High-grease, high-heat producing equipment such as woks, salamanders, and open flame charcoal equipment utilising solid fuel

Table A-2: Calculation of Minimum Hood Exhaust Airflow Rate

Hood Type	**Cooking Process**		
	Type 1 and Type 2	**Type 3**	**Type 4 and Type 5**
Hood Type 1 (Low Sidewall)	Q = 400 x L	Q = 600 X L	Q = 800 x L
Hood type 2, 3 and 4 (Corner mounted, sidewall or island)	Q = 190 x P x H	Q = 250 x P x H	Q = 375 x P x H

Where, Q = exhaust airflow rate (L/s)
L = length of hood (m)
P = inside perimeter of hood over all exposed sides (m)
H = height of hood above cooking appliance (m)

Equation A-1: Stack Exhaust Velocity Calculation Formula

$$V = Q/(1000*A)$$

Where V is the exhaust velocity (m/s),

Q is the exhaust flow rate (L/s, calculated from Table A-2),

A is the exhaust exit area (m^2)