REPORT

EL JANNAH WARRINGAH

BROOKVALE, NSW

AIR QUALITY / ODOUR IMPACT STUDY
RWDI # 2410723
14 August 2024

SUBMITTED TO

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NOTE

RWDI

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EXECUTIVE SUMMARY

This Air Quality/ Odour Impact Assessment (AQOIA) report has been prepared by RWDI Australia Pty Ltd for El Jannah Franchise Company Pty Ltd for the proposed El Jannah Charcoal Chicken Restaurant at Shop 2006/8, Cross Street, Brookvale, NSW 2100.

El Jannah Franchise Company Pty Ltd seeks approval for the use of the existing building at Shop 2006/8, Cross Street, Brookvale, NSW 2100 for the proposed El Jannah Charcoal Chicken restaurant. The assessment indicates that the impact on the nearest receptor would be below the most stringent NSW EPA guideline criterion for the assessment of odour impacts of 2 OU (NSW EPA, 2022 & NSW EPA, 2006) and therefore compliance with Section 129 of the Protection of the Environment Operations Act (NSW Parliament, 2023) would be achieved.

1 INTRODUCTION

RWDI was commissioned by El Jannah Franchise Company Pty Ltd. to prepare an Air Quality / Odour Impact Assessment (AQOIA) to support a Development Application (DA) for the proposed operation of the El Jannah Charcoal Chicken restaurant at Shop 2006/8, Cross Street, Brookvale, NSW 2100 (the 'Proposal'). The existing site comprises of a restaurant building which would be renovated to El Jannah Charcoal Chicken Restaurant. The proposal involves a typical restaurant operation of charcoal chicken cooking that has the potential to generate odours. It is proposed that the kitchen exhaust will be located on the rooftop of the building.

This report provides the following details:

- Identification of the site location;
- Outline of the proposed development;
- Odour Assessment Methodology;
- Conduct Level 2 - screening-level dispersion modelling technique, using worst-case input data to determine the potential for odour impacts; and
- Recommend appropriate odour controls to reduce the risk of potential nuisance odours to an acceptable level, if required.

The AQOIA has been completed with reference to relevant guidelines and policies, namely:

- Climate Averages Australia, Bureau of Meteorology (BOM, 2024).
- Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (2022), New South Wales Environmental Protection Authority (NSW EPA, 2022).
- Protection of the Environment Operations Act 1997 No 156 (NSW Parliament, 2023).
- Technical Notes - Assessment and management of odour from stationary sources in NSW (NSW EPA, 2006).
- Food Outlets. Air quality guidance note NSW Air Quality Guidance Note. Local Government Air Quality Toolkit (NSW DPE, undated).

2 PROJECT DESCRIPTION

2.1 Development Description

Development consent is being sought from the Council for the use of the existing building site at Shop 2006/8, Cross Street, Brookvale, NSW 2100 ("the site"), for the proposed El Jannah Charcoal Chicken restaurant. The proposal seeks consent for the following works:

- Interior Alterations and additions to the building;
- Internal fit out, including charcoal cooking apparatus (Internal fit out covered under CDC); and
- Signage at the premises.

The proposed floor plan and roof plan has been reproduced as shown in Figure 2-1 and Figure 2-2 respectively. The primary source of potential air emissions from the Project is the typical restaurant operation of charcoal chicken cooking that has the potential to generate odours.

Figure 2-1: Proposed Floor Plan highlighting the Charcoal Station (orange) (Source: Preliminary Drawing by Zone Design, Rev# DA4, Dated 12 August 2024)

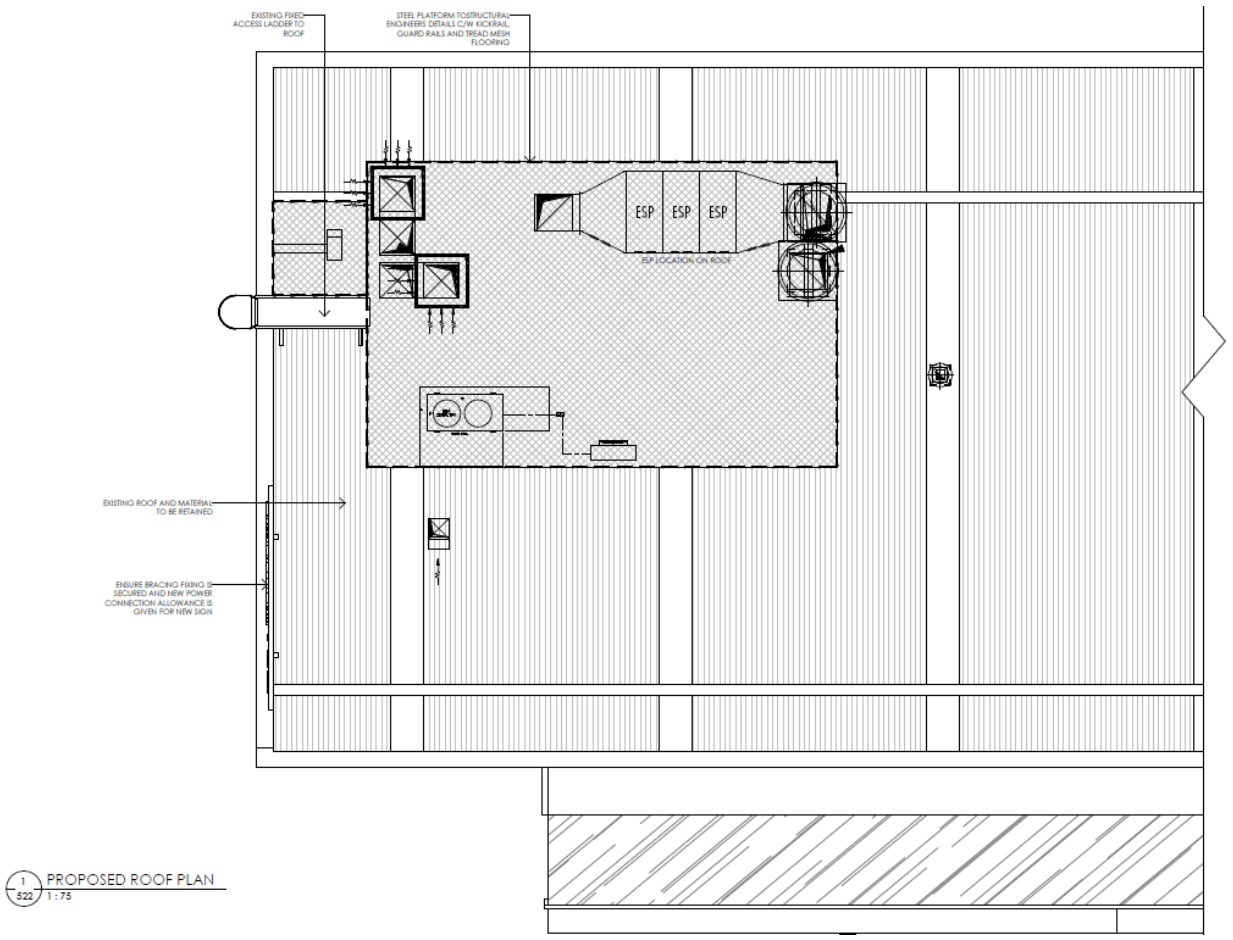

Figure 2-2: Proposed Roof Plan (Source: Preliminary Drawing by Zone Design, Rev# DA4, Dated 12 August 2024)

2.2 Surrounding Land Use and Sensitive Receptors

The site at Shop 2006/8, Cross Street, Brookvale, NSW 2100, is located in Brookvale in the suburbs of North Sydney, in the state of New South Wales, Australia. The site is bounded by Dale Street to the east and Cross Street to the north as shown in Figure 2-3 below.

The land use immediately surrounding the site consists of Commercial Centres and General Industry. The site is located along the west of Dale Street. The nearest sensitive receivers are commercial centres including Mall around the proposed site, approximately 30 metres from the site. The Vale Medical Practice complex is located northeast of the site approximately 50 m from the site.

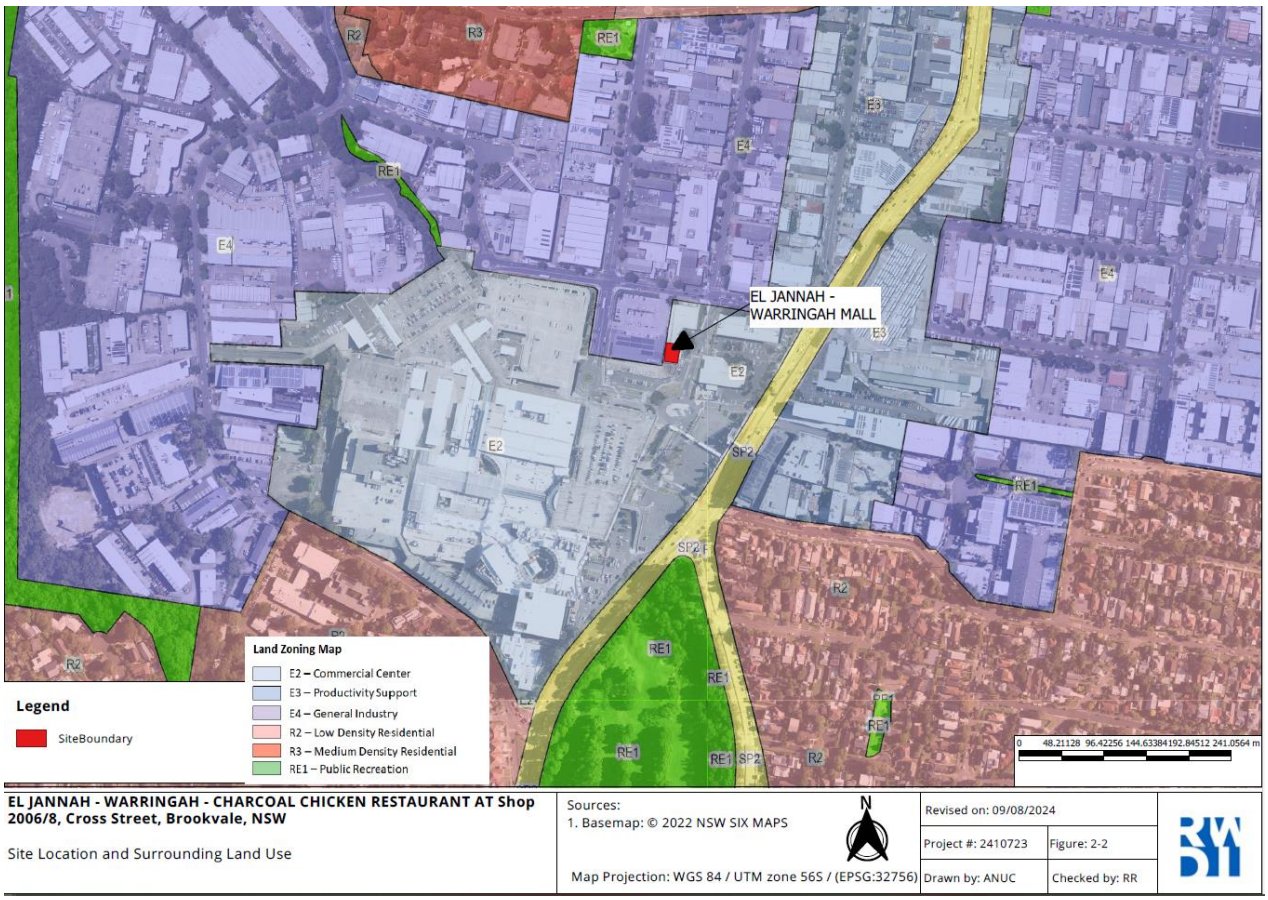

Figure 2-3: Site Location and Surrounding Land Use

2.2.1 Hours of Operation

The proposed hours of operation would be between 11 am to 10 pm.

3 ODOUR CRITERIA

NSW legislation prohibits emissions that cause offensive odour to occur at any off-site receptor. Offensive odour is evaluated in the field by authorised officers, who are obliged to consider the odour in the context of its receiving environment, frequency, duration, character, etc., and to determine whether the odour would unreasonably interfere with the comfort and repose of the normal person. In this context, the concept of offensive odour is applied to operational facilities and relates to actual emissions in the air. However, in the approval and planning process for proposed new operations or modifications to existing projects, no actual odour exists, and it is necessary to consider hypothetical odour.

Odour concentrations are defined in odour units. The number of odour units represents the number of times that the odour would need to be diluted to reach a level that is just detectable to the human nose. Thus, by definition, odour less than one odour unit (1 OU), would not be detectable to most people.

The range of a person's ability to detect odour varies greatly in the population, as does their sensitivity to the type of odour. Therefore, there can be a wide range of variability in the way odour response is interpreted.

It should be noted that odour refers to complex mixtures of odours, and not “pure" odour arising from a single chemical. Odour from a single, known chemical very rarely occurs (when it does, it is best to consider that specific chemical in terms of its concentration in the air). In most situations, odour will be comprised of many substances that is referred to as a complex mixture of odorous pollutants, or more simply odour.

For developments with potential for odour it may be necessary to predict the likely odour impact that may arise. This is done by using air dispersion modelling, which can calculate the level of dilution of odours emitted from the source at the point that it reaches surrounding receptors. This approach allows the air dispersion model to produce results in terms of odour units.

The NSW criteria for acceptable levels of odour range from 2 to 7 OU, with the more stringent 2 OU criteria applicable to densely populated urban areas and the 7 OU criteria applicable to sparsely populated rural areas. Table 3-1 presents the relevant impact assessment criteria for complex mixtures of odorous pollutants.

Table 3-1: Impact Assessment Criteria – Complex Mixture of Odourous Pollutants

Population of affected community	Impact assessment criteria (OU)*
Urban (≥~2000) and/or schools and hospitals	**2.0**
~500	**3.0**
~125	**4.0**
~30	**5.0**
~10	**6.0**
Single rural residence (≤~2)	**7.0**

Note: * 99th percentile nose-response time.

The Brookvale area where the project site is located was conservatively classified as an urban area. Therefore, in accordance with the criteria in Table 3-1, an impact assessment criterion of 2 OU has been adopted for this study.

4 ODOUR ASSESSMENT METHODOLOGY

The Environmental Protection Authority (EPA) developed a guideline ("the Approved Methods") that sets out applicable impact assessment criteria for several air pollutants (NSW EPA, 2022). Air quality criteria are benchmarks set to protect the general health and amenity of the community in relation to ambient air quality. In the context of the proposed development, odour is the only pollutant of interest in this study.

4.1 Guidelines

NSW EPA (2006) outlines the approach for the assessment of odour emissions, using a three-level system of odour impact assessment of increasing complexity and detail. The individual characteristics of a new development and its proposed location determine the required degree of investigation into the potential for odour impacts.

- Level 1 is a screening-level technique based on generic parameters for the type of activity and site. It requires minimal data and uses simple equations to provide a broad estimate of odour impacts. It may be used to assess site suitability and odour mitigation measures for new or modified activities.
- Level 2 is a screening-level dispersion modelling technique, using worst-case input data (rather than site-specific data). It Is more rigorous and more realistic than a Level 1 assessment. It may be used to assess site suitability and odour mitigation measure for new, modified, or existing activities.
- Level 3 is a refined-level dispersion modelling technique using site-specific input data. This is the most comprehensive and most realistic level of assessment available. It may be used to assess site suitability and odour mitigation measure for new, modified, or existing activities.

This assessment is based on a Level 2 odour impact assessment as the typical restaurant operation of charcoal chicken cooking has the potential to generate odours.

4.2 Local Meteorological Conditions

Meteorological conditions strongly influence air quality. Most significantly, wind speed, wind direction, temperature, relative humidity, and rainfall affect the dispersion of air pollutants. Long-term meteorological data for the area surrounding the site is available from the Sydney (Observatory Hill) (Station# 066062) station operated by the Bureau of Meteorology (BoM, 2024). The Sydney (Observatory Hill) is located approximately 12 km south-west of the site and records observations of meteorological data including wind speed, wind direction, temperature, humidity, and rainfall.

Table 4-1 present a summary of data from the Sydney (Observatory Hill) collected over an approximately 160 – 50-year period for the various parameters. The data indicate that January is the hottest month with a mean maximum temperature of 26.0°C and July as the coldest with a mean minimum temperature of 8.1°C. Humidity levels exhibit some variability over the day with seasonal fluctuations. Mean 9 am humidity levels range from 74% in February, March, May and June to 62% in September. Mean 3 pm humidity levels vary from 64% in February to 49% in August. Rainfall tends to peak during the summer and autumn months and declines during winter and spring. The data shows June is the wettest month with an average rainfall of 133 mm over 9 days and September is the driest month with an average rainfall of 68 mm over 7 days. The mean 9am wind speeds range from 13.3 km/h in August to 7.9 km/h in March. The mean 3pm wind speeds vary from 19.5 km/h in December to 12.7 km/h in May.

Table 4-1: Monthly Climate Statistics Summary – Sydney (Observatory Hill)

Obs.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
9am Mean Observations													
Temp (°C)	22.5	22.3	21.1	18.2	14.6	11.9	10.9	12.5	15.7	18.5	19.9	21.6	17.5
Hum (%)	71	74	74	72	74	74	71	66	62	61	66	67	69
Mean Wind Speed (km/h)	8.6	8.2	7.9	8.8	10.5	11.9	13.1	13.3	12.4	12.2	11.0	9.8	10.6
3pm Mean Observations													
Temp (°C)	24.8	24.9	24.0	22.0	19.4	16.9	16.4	17.5	19.2	20.7	22.1	23.8	21.0
Hum (%)	62	64	62	59	57	57	51	49	51	56	58	59	57
Mean Wind Speed (km/h)	17.9	16.8	15.2	13.8	12.7	13.6	15.3	17.6	18.3	19.1	19.4	19.5	16.6
Minimum and Maximum Temperatures													
Min (°C)	18.8	18.9	17.6	14.8	11.6	9.3	8.1	9.0	11.1	13.6	15.7	17.6	13.8
Max (°C)	26.0	25.8	24.8	22.5	19.5	17.0	16.4	17.9	20.1	22.2	23.7	25.3	21.8
Rainfall													
Rain (mm)	101.2	119.3	131.6	126.5	117.4	133.1	96.3	80.2	68.1	76.7	83.8	77.1	1211.1
Rain (days)	8.6	9.0	9.9	8.9	8.6	8.8	7.4	7.1	7.1	7.9	8.3	7.9	99.5

Figure 4-1 presents the annual wind-roses for 9am and 3pm from the Sydney (Observatory Hill) (from 1955 to 1992). The wind roses indicate a notable emphasis of westerly and easterly winds at 9am and 3pm respectively.

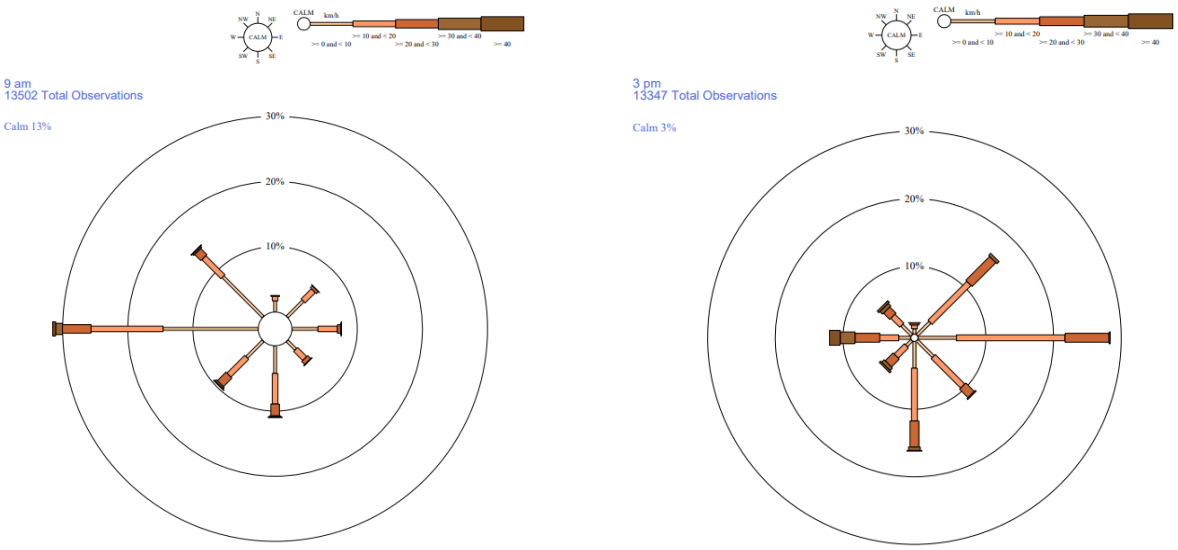

Figure 4-1: Sydney (Observatory Hill) 9am and 3pm Annual Wind Roses – Wind Speed in km/h (01 January 1955 to 01 May 1992)

The wind distribution patterns indicate that relative to the Project site, there is modest capacity for air emissions generated on-site to be transported to the closest commercial and hospital receptor locations.

4.3 Methodology

As indicated in Section 4.1 above, this assessment is based on a Level 2 odour impact assessment as the typical restaurant operation of charcoal chicken cooking has the potential to generate odours.

Figure 4-2 presents the proposed ground floor plan, which includes the layout for the Charcoal Chicken fume hoods. Two fume hoods are planned for the cooking areas. The first hood will be connected to exhaust air ducts that vent the charcoal roasting exhaust to a stack on the building's roof. The second hood will serve the fryers, with exhaust air ducts venting to a separate stack on the roof. Figure 4-3 shows the location of the exhaust system outlet for the cooking areas in the proposed restaurant.

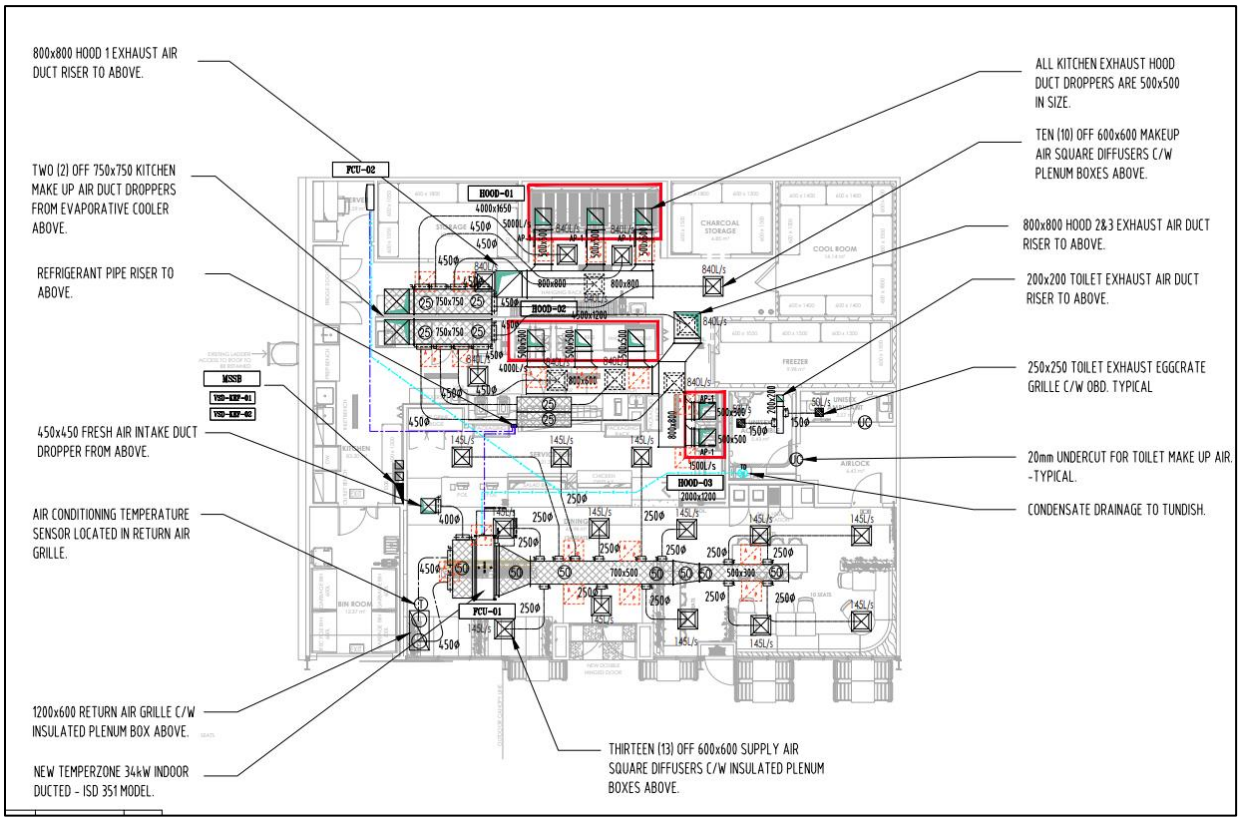

Figure 4-2: Proposed Charcoal Chicken Fume Hood Ground Floor Plan

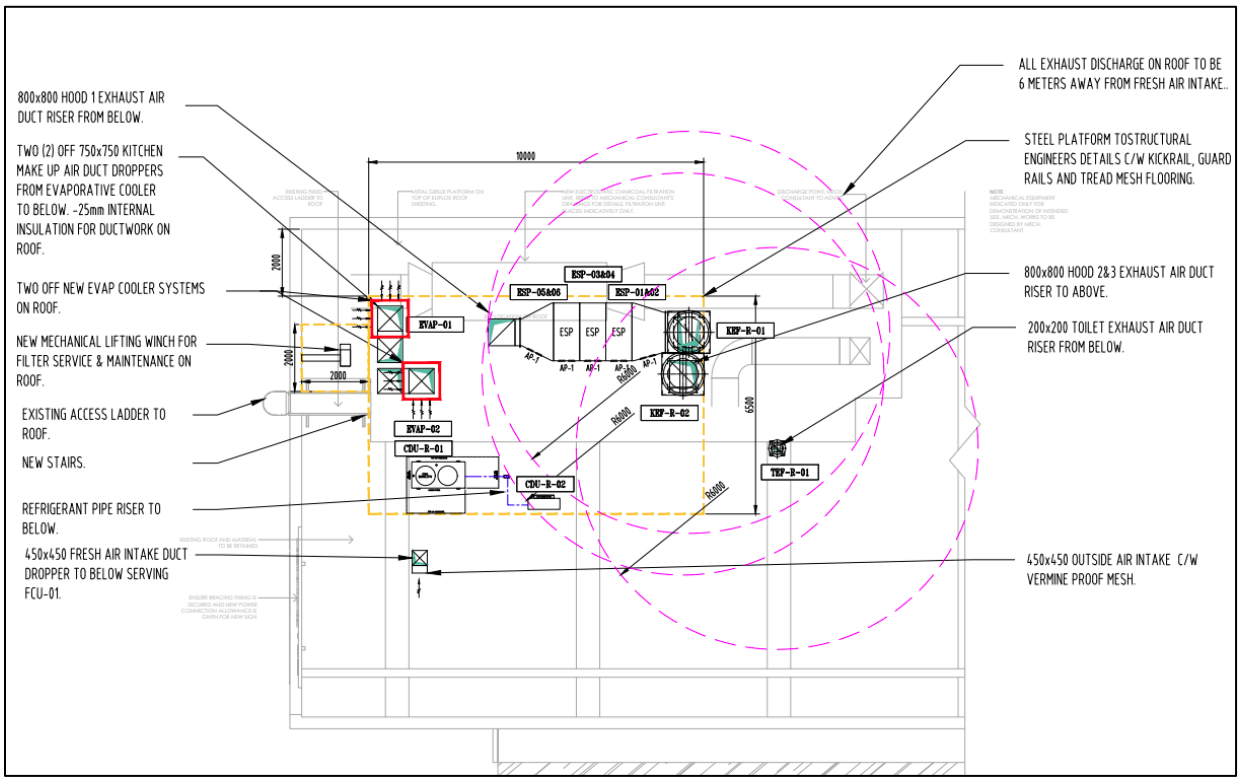

Figure 4-3: Proposed Charcoal Chicken Exhaust Stacks on the Roof Level

To ensure that air/odour emissions generated during operational activities are minimised as far as practicable, the following concept exhaust system and mitigation measures would likely be included in the design:

- Fume extraction systems above cooking areas to be operated at all times during cooking activities;
- Flow rate of the exhaust fan for is 5,000 litres per second;
- Odour reduction system which includes an Ozone Generation System (similar to Air & Filtration Solutions); and
- The fume hood of Charcoal pit are provided with 6 particulate/ Electronic Static Precipitator (ESP) filters.

Odours and smoke from the charcoal cooking processes would be captured and dispersed into the ambient air via the roof-top exhaust stack. The exhaust stack would be located toward the north end of the restaurant building and would be approximately 1 metre in height above the roof level. Odour emissions from the frying of fries/chips through exhaust stack were not included in the assessment because of the substantially lower odour emissions compared to the charcoal cooking of chicken.

To determine if the dispersion of odour emissions from the exhaust stack is suitable, a Level 2 screening level odour impact assessment for the Project has been conducted per the NSW EPA, 2006. A Level 2 impact assessment is very conservative as it assumes worst-case 'synthetic' meteorological data and is based on the 100th percentile (maximum) dispersion model predictions. The PRIME building wake algorithm and the Building Profile Input Program (BPIP) were used to include the effects of building wakes on pollutant dispersion. To account for the time-averaging limitations of the dispersion model, a peak-to-mean ratio of 2.3 has been incorporated into the odour modelling in accordance with the NSW EPA Approved Methods (NSW EPA, 2022).

Appendix A outlines the parameters for the exhaust stack used in the screening model. The worst-case operating scenario assumes 5 chickens on each rotator, 10 rotators (assuming 40 cm wide spacing per rotator and 5 m total width) for a total of 50 chickens at any given time. Based on the NSW air quality guidance note for food outlets (NSW DPE, undated), Sydney establishments showed odour emissions ranging from 130 to 1,300 OU per bird cooked. Conservatively assuming emissions of 1,300 OU per chicken gives 65,000 odour units at maximum production. The electronic static preceptors provided has 99.9% odour destruction efficiency based on Air Odour Solutions (AOS) Electrostatic Air Cleaner. Therefore, the worst-case odour concentration of 65 OU would be exhausted at any given time, which is considered a conservative (i.e., high) estimate of the potential odour.

Based on the above parameters, the estimated odour emission rate from the exhaust stack is 748 OU/s.

5 RESULT AND DISCUSSION

The maximum odour impact at the nearest residential receptor was found to be approximately 1 OU, which is below the most stringent NSW EPA odour impact assessment guideline criterion of 2 OU, as outlined in the NSW EPA Technical Framework Assessment and management of odour from stationary sources in NSW (DEC 2006). The result indicates that offensive odour impacts are unlikely and that odour emissions from the Project are unlikely to be noticeable to most nearby commercial and hospital receptors. The worst-case odour contours modelled are shown in Appendix B.

The perception of offensive odours can vary greatly between people. Meat cooking odours are often perceived as pleasant; however, the intensity, frequency, duration, and circumstances of cooking odours can cause annoyance. Given the context of other similar land uses in the area and the receiving environment, it is unlikely that the diluted/dispersed odorous emissions originating from cooking processes within El Jannah restaurant would be considered offensive by a reasonable person at this location.

6 CONCLUSIONS

Based on the evaluation of potential air quality emissions from the Project, it is identified that this operation has low potential to generate any adverse odour impacts on the surrounding environment.

The results of the Level 2 odour impact assessment conducted for the Project indicate that the impact at the nearest receptor would be below the most stringent NSW EPA odour impact assessment guideline criterion of 2 OU (NSW EPA, 2022 & NSW EPA, 2006) and therefore, compliance with Section 129 of the Protection of the Environment Operations Act (NSW Parliament, 2023) would be achieved.

Although impacts on receptors are unlikely, it is recommended to keep records of any odour complaints from neighbouring receptors and the responses to these complaints. Responses should be prompt and responsive to the complaint. An inspection to confirm the condition of the filters should be conducted as part of the complaint response.

7 REFERENCES

AOS (Air Odour Solutions), 2023: RY10000B. Electrostatic Air Cleaner with UV Ozone. Brochure. Accessible at: AOS_RY10000B_Electrostatic_Air_Cleaner_Brochure (aosaus.com.au)

BoM (Bureau of Meteorology), 2024: Climate Averages Australia. Accessible at: http://www.bom.gov.au/climate/data/

NSW DPE (Department of Planning and Environment), undated: Food Outlets. Air quality guidance note. Accessible at Local Government Air Quality Toolkit, last updated 14 July 2021: https://www.environment.nsw.gov.au/resources/air/mod3p3food07268.pdf

NSW EPA, 2006: Technical Notes - Assessment and management of odour from stationary sources in NSW. Accessible at: https://www.environment.nsw.gov.au/resources/air/20060441notes.pdf

NSW EPA, 2022: Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (2022). Applicable as of 9 September 2022. Accessible at: https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/air/22p3963-approved-methods-for-modelling-and-assessment-of-air-pollutants.pdf?la=en&hash=79991C3AD2F7A1FAEC34EBAA857E7D0CCDDD1B24

NSW Parliament, 2023: Protection of the Environment Operations Act 1997 No 156. Current version as of 24 February 2023. Accessible at: https://legislation.nsw.gov.au/view/html/inforce/current/act-1997-156

8 STATEMENT OF LIMITATIONS

This report "*El Jannah - Warringah Mall Restaurant at Shop 2006/8, Cross Street, Brookvale, NSW 2100*– Air Quality / Odour Impact Study", 13 August 2024, was prepared by RWDI Australia Pty Ltd ("RWDI") for El Jannah Franchise Company Pty Ltd ("Client"). The findings and conclusions presented in this report have been prepared for the Client and are specific to the project described herein ("Project"). The conclusions and recommendations contained in this report are based on the information available to RWDI when this report was prepared. Because the contents of this report may not reflect the final design of the Project or subsequent changes made after the date of this report, RWDI recommends that it be retained by Client during the final stages of the project to verify that the results and recommendations provided in this report have been correctly interpreted in the final design of the Project.

The conclusions and recommendations contained in this report have also been made for the specific purpose(s) set out herein. Should the Client or any other third party utilize the report and/or implement the conclusions and recommendations contained therein for any other purpose or project without the involvement of RWDI, the Client or such third party assumes any and all risk of any and all consequences arising from such use and RWDI accepts no responsibility for any liability, loss, or damage of any kind suffered by Client or any other third party arising therefrom.

Finally, it is imperative that the Client and/or any party relying on the conclusions and recommendations in this report carefully review the stated assumptions contained herein and to understand the different factors which may impact the conclusions and recommendations provided.

APPENDIX A

ODOUR EMISSIONS INVENTORY

Odour sources and emissions used in the Dispersion Screening Model

El Jannah Charcoal Chicken restaurant

Source ID's	Source	Source Type	Height (m)	Stack Tip Diameter (m)	Base Elevation (m)	Temperature (C)	Velocity (m/s)	Air Flow (m^3/s)	Odour Concentration [1] (OU/m^3)	Average Odour Emission Rate (OER) (OU/s)	Peak Odour Emission Rate (OU/s)
KEF-01	Charcoal Chicken Fume Hood 1 Exhaust	Point	6.5	1.0	12.0	58.0	6.4	5.0	65.0	325.0	748

Notes:

[1] - The worst case operating scenario assumes 5 chickens on each rotator, 10 rotators (assuming 40 cm wide spacing per rotator and 5 m total width according to building plan) for a total of 50 chicken at any given time. Based on the NSW Air Qquality Guidance note for food Outlets (https://www.environment.nsw.gov.au/resources/air/mod3p3food07268.pdf), Sydney establishments showed odour emissions ranging from 130 to 1,300 OU per bird cooked. Conservatively assuming emissions of 1,300 OU per chicken , gives 65,000 odour units at maximum production. The electronic static preceptors provided on Fumehood 1 has 99.9% odour destruction efficiency based on Air Odour Solutions (AOS) Electrostatic Air Cleaner (https://www.aosaus.com.au/brochures/AOS_RY10000B-UV_Electrostatic_Air_Cleaner_Brochure.pdf). Therefore, the worst case Odour COncentration of 65 OU would be exhausted at any given time.

APPENDIX B

ODOUR CONTOURS (WORST-CASE)

EL JANNAH - WARRINGAH - CHARCOAL CHICKEN RESTAURANT AT SHOP 2006/8, Cross Street, Brookvale,NSW

Contour Plots 1-Hour Average 100 percentile Odour Concentration

Sources:
1. Basemap: © 2022 NSW Six Maps

N

Map Projection: WGS 84 / UTM zone 56S / (EPSG:32756)

Revised on: 09/08/2024	
Project #: 2410723	Figure: Appendix B
Drawn by: ANUC	Checked by: RR