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5 September 2024

Megan Naylor
Designer (Level 3)
H & E
Via email: megann@h-e.com.au

RE: Air Quality Statement – 40 Myoora Road, Terrey Hills

Dear Megan,
Todoroski Air Sciences has investigated the potential for air quality impacts to arise due to the proposed development at Terrey Hills, New South Wales (NSW) (hereafter referred to as the Project). This letter report provides an overview of the Project, a review of the existing environmental conditions, a qualitative analysis of potential air quality impacts associated with the Project and discussion of proposed air quality mitigation and management measures.

The report has been prepared with consideration of the NSW Environment Protection Authority (EPA) documents *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (**NSW EPA, 2022**) and *Technical framework Assessment and management of odour from stationary sources in NSW* (**NSW DEC, 2006**).

Overview
The Project involves the development of a village-like array of buildings offering a variety of hospitality services across the site. These include three restaurants with terrace dining and a beer garden, as well as an extensive children's play area. The design also allows for under croft car parking and back-of-house (BOH) facilities, minimising the impact on the footprint and visual aesthetics. As part of the development, several indoor and outdoor wood-burning fireplaces and live fuel equipment in the kitchens are proposed.

The use of wood-burning fireplaces and wood-fired cooking methods would generate wood smoke and odour emissions during the operation. The fireplaces would adhere to the relevant Australia Standards and emissions from cooking would be captured in a fume hood over the cooking area, treated appropriately and ducted through flues to minimise the potential for ground level impacts. Proposed hours of operation for the Project are 8:00am to 12:00am, seven days per week.

Figure 1 presents an indicative site layout for the Project.

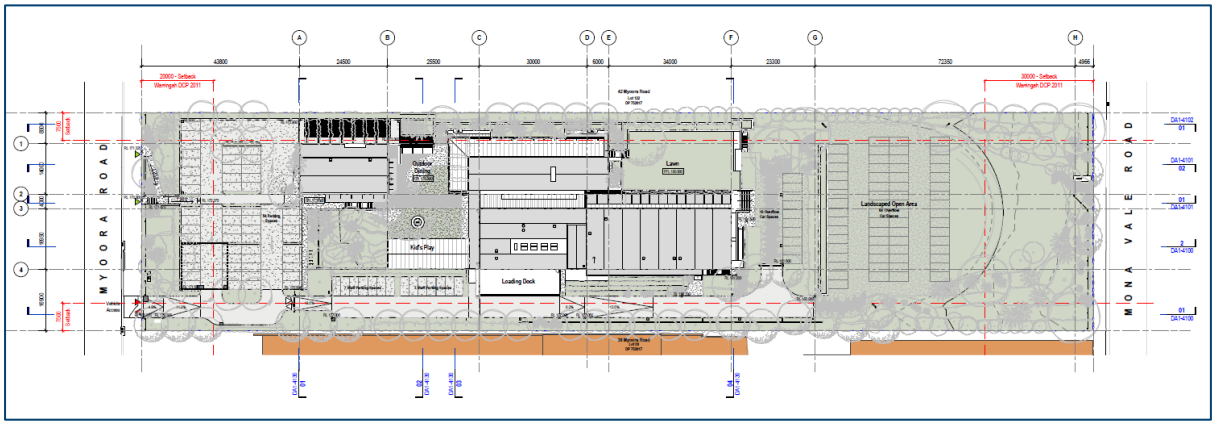

Figure 1: Indicative site layout for the Project

Project setting

The Project site is located at 40 Myoora Road, Terrey Hills, approximately 7 kilometres (km) west of Mona Vale and approximately 7km north of Frenchs Forest situated within a mixed-use area. The area surrounding the Project site is comprised of various industrial and commercial operations with scattered residential receptors and recreational areas to the east. The nearest residential receptor is identified adjacent to the site to the north on Myoora Road.

Figure 2 presents the location of the Project.

Figure 2: Project setting

Existing environmental conditions

Local climatic conditions

Long-term climatic data from the closest Bureau of Meteorology (BoM) weather station at Terrey Hills Automatic Weather Station (AWS) (Site No. 066059) were analysed to characterise the local climate in the proximity of the Project. This weather station is located approximately 0.3km east of the Project.

Table 1 and **Figure 3** present a summary of data from the Terrey Hills AWS collected over an approximate 19-to-20-year period for the various meteorological parameters.

The data indicate that January is the hottest month with a mean maximum temperature of 26.7 degrees Celsius (ºC) and July is the coldest month with a mean minimum temperature of 7.8ºC. Rainfall decreases during the latter half of the year, with an annual average rainfall of 1,205.2 millimetres (mm) over 97.4 days. The data indicate that March is the wettest month with an average rainfall of 177.5mm over 11 days and August is the driest month with an average rainfall of 58.5mm over 5.1 days.

Table 1 Monthly climate statistics summary – Terrey Hills AWS

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann.
Temperature													
Mean max. temp. (ºC)	26.7	25.9	24.7	22.3	19.4	16.5	16.4	17.9	20.7	22.6	23.8	25.5	21.9
Mean min. temp. (ºC)	18.5	18.1	16.9	14.0	10.7	8.7	7.8	8.4	11.1	13.2	15.2	16.6	13.3
Rainfall													
Rainfall (mm)	105.1	144.5	177.5	120.5	59.5	126.0	74.8	58.5	62.0	85.6	98.2	87.6	1205.2
No. of rain days (≥1mm)	10.0	10.0	11.0	8.0	6.0	9.2	6.9	5.1	6.3	7.8	8.4	8.7	97.4

Source: **Bureau of Meteorology, 2024**

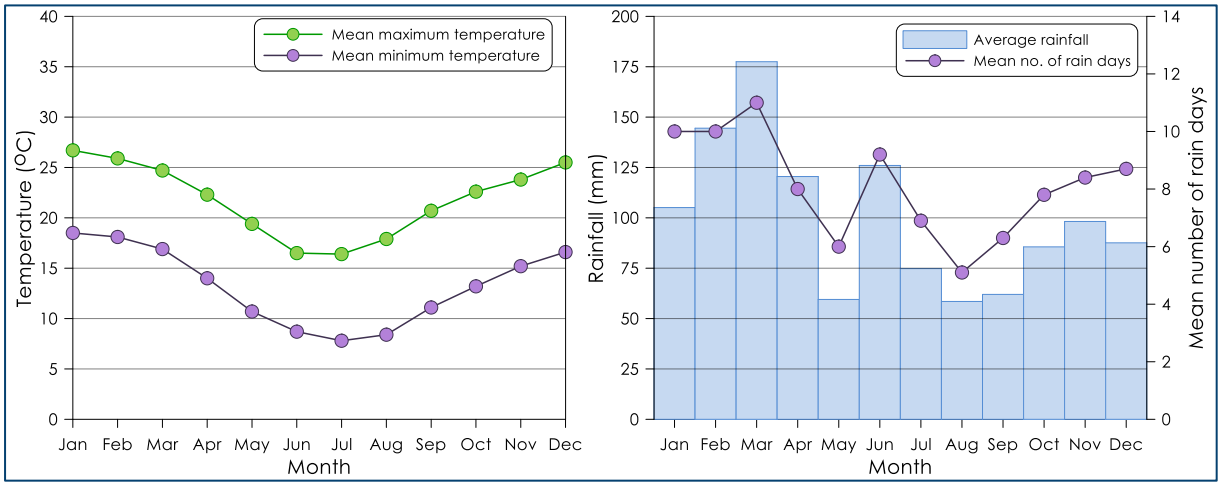

Figure 3: Monthly climate statistics summary – Terrey Hills AWS

Annual and seasonal windroses for the Terrey Hills AWS for the 2019 - 2023 period is presented in **Figure 4**.

Analysis of the annual windrose shows that the wind directions predominantly arise from the west and west-northwest. During the summer months, there is a noticeable shift, with winds most frequently blowing from the northeast to the south in a clockwise direction. The autumn windrose shows a similar distribution pattern to the annual windrose, with the strongest and most frequent winds continuing to come from the west and west-northwest.

In winter, the dominance of winds from the west and west-northwest persists, reinforcing the annual end and indicating a stable wind pattern in the colder months. However, the spring windrose presents a more varied

picture, with winds arising from all directions, though still most frequently from the west-northwest and northeast. This variability in spring reflects the transitional nature of the season, where changing atmospheric conditions lead to a more diverse wind pattern across the site.

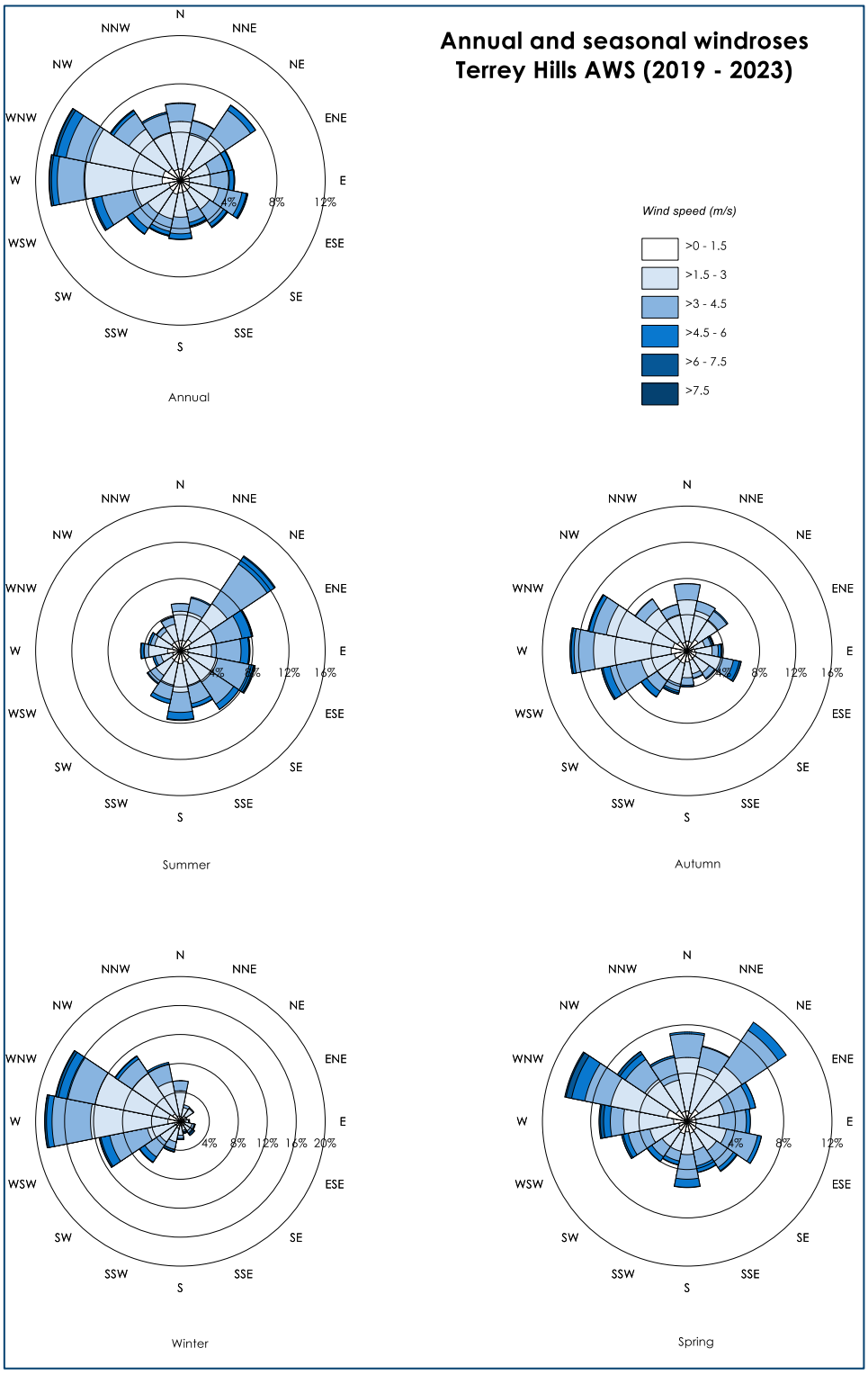

Figure 4: Annual and seasonal windroses for Terrey Hills AWS (2019-2023)

Assessment of potential air quality impacts

To assess the potential for air quality impacts from the Project, a qualitative approach has been used which includes the identification of potential air emission sources, a review of the proposed air quality control measures, an assessment of the existing air quality levels in the vicinity of the Project and local dispersion conditions.

A qualitative approach has been applied due to the nature of the activities at the Project having an inherently low potential for air quality impacts with consideration of appropriate air emissions controls.

Potential air emission sources

Based on the proposed activities at the Project, air emissions can have potential to arise from the use of wood-burning fireplaces and wood-fired cooking methods within the kitchens. The rate of emissions would vary throughout the day depending on the demand with peak times generating more air emissions.

Other potential sources of air emissions include odour arising from the storage and handling of waste at the site and from the storage of raw materials at the site.

Air control measures

The potential air emissions associated with the wood-burning fireplaces are expected to be easily managed with good operational practices. These measures include, but are not limited to:

- Using only dry seasoned hardwood;
- Storing wood in a dry well-ventilated place;
- Having a hot, well-oxygenated, fire;
- Ensuring that the exhaust flue is clean and regularly serviced;
- Checking the exhaust at different stages of the fire to see if there is any smoke; and,
- Ensuring the fire does not smoulder overnight.

In accordance with the Northern Beaches Council *Wood Smoke Information Guide* (**Northern Beaches Council, 2024**), the wood-burning fireplaces will comply with the Australian Standards for domestic solid fuel burning appliances (AS/NZS 4012:2014 & AS/NZS 4013:2014), which require an overall average efficiency of not less than 55% and particulate emission factor not greater than 1.5g/kg. Exhaust flues for the wood-burning fireplaces will also comply with AS/NZS 2918-2001 *Domestic Solid Fuel Burning Appliances – Installation*.

As part of the regular operational management of the wood-burning fireplaces, emissions from the exhaust flues will be monitored by site staff to detect if excessive smoke is being generated. Excessive smoke is characterised as a visible plume of smoke from a continuous period of at least 10 minutes, including a period of no less than 30 seconds during which the plume extends at least 10m from the exhaust flue. If excessive smoke is identified, staff will take appropriate actions to determine the cause and implement measures to prevent its recurrence. These actions may include, but are not limited to, allowing more oxygen into the fireplace and checking the moisture content of the wood used.

The air control measures for managing emissions from the wood-fired cooking will include a kitchen ventilation extraction system with ventilation hoods positioned above the wood-fired cooking points. The

system will be equipped with standard filtration, and an Electrostatic Precipitator (ESP) will be required to manage particulate matter and smoke emissions. An ozone generator, or carbon filter type arrangement, will be used to control odorous air emissions. The treated emissions would then be directed to the roof top before being dispersed into the ambient air.

The use of the ESP will control particulate matter and smoke in the air stream, ensuring compliance with the standards of concentrations in the Protection of the Environment Operations (Clean Air) Regulation 2022 as outlined in **Table 2**. The ozone generator or carbon filter will manage the odour concentration in the exhaust stream, minimising the potential for any odour impact.

Table 2: General standards of concentration for non-scheduled premises

Air impurity	Standards of Concentration
Solid particles	100mg/m³
Smoke	Ringlemann 1 or 20% Opacity

This type of arrangement is considered best practice for operations that utilise wood or charcoal in the cooking process and is implemented at other similar facilities. Given the position of the exhaust flues on the rooftop, emissions are expected to disperse reasonably well into the ambient air, making it unlikely that they will negatively impact the surrounding environment. With regular maintenance and cleaning of the exhaust flues and filters, the physical measures are likely to be effective in managing smoke and odour emissions.

The potential odour from the storage and handling of waste and raw materials at the site are considered to be minor and can be sufficiently mitigated with normal good housekeeping procedures such as:

- Store all waste materials in sealed/ enclosed bins;
- Ensure regular disposal of waste materials from the site;
- Regularly cleaning and maintaining dining, kitchen and storage areas; and,
- Ensuring all raw materials are not left out for excessive periods of time.

Existing air quality levels

Given that the Project site is proposed for a mixed-use area, the background air quality and odour levels can be attributed to the existing sources. The type of odour generated from the Project is expected to be comparable to that of other restaurant operations and is not anticipated to be malodorous or offensive.

There are several industrial operations in the surrounding area with the potential to generate air emissions. However, the emissions from the Project are expected to be lower and better dispersed, resulting in less impact in the surrounding area by comparison. Road traffic emissions on Mona Vale Road and surrounding streets are also a potential source of air pollution, with traffic volumes fluctuating at peak times similar to the Project. Any emissions from the Project would be mixed with these road traffic emissions and likely be indiscernible. As the Project would comply with all relevant codes and standards, it is not expected to adversely affect the air quality of the area.

Local dispersion conditions

Annual and seasonal windroses for the Terrey Hills AWS are presented in Error! Reference source not found.. Strong winds are generally experienced in the area with wind directions predominately coming from the northwest and southeast quadrant with varied winds from other directions throughout the year.

Potential air emissions from the Project will most likely be subject to similar wind patterns and be reasonably well distributed through the year. This means that it is unlikely for nearby residential receptors to remain downwind of the operations for extended periods of time and overall, the prevailing dispersion conditions should allow for air emissions from the Project to be reasonably well dispersed before reaching any residential receptors.

Summary

This report has assessed the potential for air impacts associated with the proposed hospitality development utilising wood-burning fireplaces and wood-fired cooking methods at 40 Myoora Road, Terrey Hills.

Given the nature of the air emission sources, the air emission controls, the receiving environment, and prevailing winds, it is unlikely that the operation of the Project would create any air quality issues at this location.

Please feel free to contact us if you would like to clarify any aspect of this report.

Yours faithfully,
Todoroski Air Sciences

Philip Henschke
CAQP

References

Bureau of Meteorology (2024)

Climate Averages Australia, Bureau of Meteorology website, accessed August 2024. <http://www.bom.gov.au/climate/averages>

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