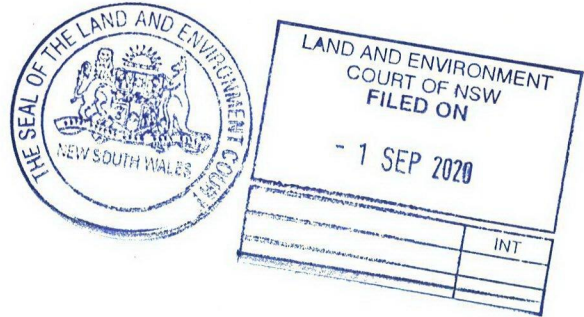


4 March 2019

Mr Tamer Mikhail
St Mary's and St Minas Coptic Orthodox Church
339 Forest Rd
BEXLEY NSW 2207



Re: Air-Quality & Odour Assessment Report, Proposed Childcare Development

Dear Mr Mikhail

This letter presents our air-quality and odour assessment report for a proposed childcare development at the St Mary's and St Minas Coptic Orthodox Church at 339 Forest Road in Bexley.

Scope of Works

Airsafe was asked to provide a prompt report for a proposed childcare development.

Methodology

EPA (NSW) Methodology

Where appropriate, this assessment has been conducted using methodology endorsed by the Environment Protection Authority (NSW).

Air Toxics, including Benzene

One 24-hour sample for air toxics was collected in a 6-litre passivated and cleaned stainless-steel canister. The sample was tested by Envirolab Services (NATA 2901) using GC-MS (gas chromatography and mass spectroscopy). The reference method was USEPA TO-15 *Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specially-Prepared Canisters and Analysed by Gas Chromatography/Mass Spectrometry (GC/MS)* issued by the USEPA (United States Environmental Protection Authority). Method TO-15 is a method listed in the *National Environmental Protection (Air Toxics) Measure* (air toxics NEPM), which is endorsed by the NSW Environment Protection Authority (EPA).

The impact of lead from air pollution was tested by collecting samples of surface soil to determine the long-term effects of deposition from air.

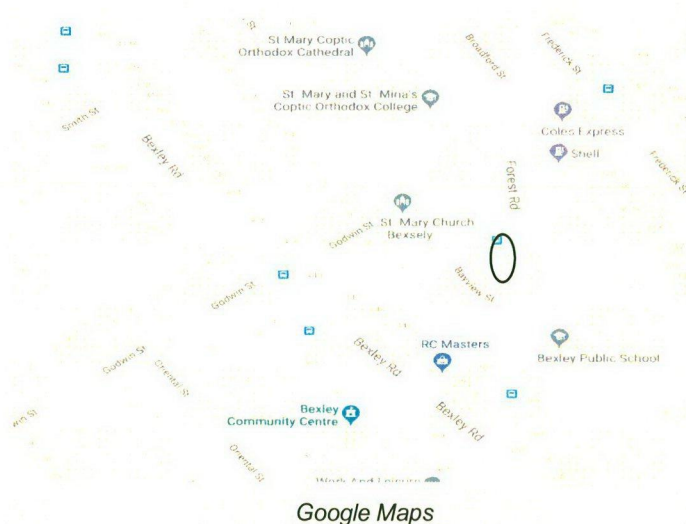
Screening tests for exhaust gases were conducted during peak hour with a calibrated gas detector fitted with electrochemical cells.

Odour was assessed qualitatively, using the nose as an indicator, using an approach modified from Module 3 of the *Local Government Air Quality Toolkit* (NSW).

Screening tests for particulates (PM₁₀ size fraction) was conducted over 48 hours (Wednesday to Friday) with a calibrated TSI DustTrak Model 8530 Aerosol Monitor (a direct-reading aerosol photometer) in an environmental enclosure – results corrected for ambient air monitoring (0.38) were reported. The PM_{2.5} size fraction was estimated as 40% of PM₁₀, the approximate PM_{2.5}/PM₁₀ ratio on at the Earlwood monitoring station operated by the Environment Protection Authority (EPA) during the test period.

The DustTrak is direct-reading instrument that is widely-used by air-quality professionals for the rapid detection of environments polluted by airborne particles.

A plan with the location of the monitoring is shown below



Report

A report was prepared to address the risks associated with the development and the issues raised by the Department of Planning *Development near Rail Corridors and Busy Roads-Interim Guideline*.

Code of Conduct

This report has been prepared in accordance with regulation 31.23 of the *Uniform Civil Procedure Rules 2005* (NSW). I have read the *Expert Witness Code of Conduct* in Schedule 7 and agree to be bound by it.

Credentials

This work has been conducted under the supervision of an occupational hygiene consultant with over 20 years of experience. Occupational hygiene professionals anticipate, recognise, evaluate and control workplace and environmental hazards, with a particular emphasis on chemical, physical and biological hazards. The knowledge and skills required for occupational hygiene are equally useful in the arena of public health. Qualifications include a Bachelor of Science (Applied Chemistry) degree (University of Technology, Sydney), a Master of Safety Science degree (University of New South Wales) and the Worksafe Australia short course in occupational hygiene. Professional affiliations include the Australian Institute of Occupational Hygienists (AIOH), the Australasian Institute of Dangerous Goods Consultants (AIDGC) and the Clean Air Society of Australia and New Zealand (CASANZ). Certification includes a certified industrial hygienist (CIH) accreditation with the American Board of Industrial Hygiene (ABIH) and a certified occupational hygienist (COH) accreditation with the AIOH.

Air Pollution

Potential Health Effects

Common air pollutants from motor vehicles include hydrocarbons, lead, particulate matter, carbon dioxide, carbon monoxide and oxides of nitrogen. Exposure to these pollutants needs to be controlled in order to avoid respiratory and cardiovascular illnesses. Children, people who are already ill and older people are more susceptible than the general population.

Background Levels

The background level of airborne particulates at the site can be estimated by using air monitoring data obtained by the Environment Protection Authority (EPA) from the ambient-air-quality monitoring station at Earlwood. During the test period for particulates, the average results in the PM₁₀ size fraction were 10-16 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). During the test period for particulates, the average results in the PM_{2.5} size fraction were 9-15 $\mu\text{g}/\text{m}^3$.

The background level of pollutant gases at the site can be estimated by using air monitoring data obtained by the Environment Protection Authority (EPA) from the ambient-air-quality monitoring stations at Chullora and Earlwood. Recent (February 2019) daily maximum carbon monoxide levels at Chullora have ranged between <0.1-0.4 parts per million (ppm), and daily maximum nitrogen dioxide (NO₂) levels at Earlwood have ranged between 0.007-0.033 ppm.

The background level of benzene at the site can be estimated by using air monitoring data reported by the Department of Environment and Conservation (NSW) in the 2004 document *Internal Working Paper No 2 Ambient Concentrations of Toxic Organic Compounds in NSW*. Average levels in the city over 24-hour periods were about 2 parts per billion (range <0.2-5 ppb), with levels in the outer suburbs (St Marys) at about 0.2 parts per billion (range <0.2-1 ppb). Environment Australia (2003) reported an average personal exposure to benzene of 1.3 ppb, with a maximum level of 24 ppb.

Relevant Legislation

Air Pollution

The Environment Protection & Heritage Council (EPHC) issued the *National Environmental Protection (Ambient Air Quality) Measure* (ambient air NEPM) that includes *national environmental protection standards* for carbon monoxide, nitrogen dioxide, sulphur dioxide, lead, and particles as PM₁₀. They have been established to set out goals for desirable environmental outcomes. Pollutant gases are measured in parts per million (ppm). Environmental airborne particles are measured in micrograms per cubic meter (µg/m³).

Table 1 Relevant Monitoring Investigation Levels

Substance	Level	Averaging Period
carbon monoxide (CO)	9 ppm	8 hours
nitrogen dioxide (NO ₂)	0.12 ppm	1 hour
particles (PM ₁₀)	50 µg/m ³	24 hours

There is no standard for fine particles (PM_{2.5} size fraction). Authorities are gathering data to determine if a daily maximum of 25 micrograms per cubic meter (µg/m³) and an annual average of 8 µg/m³ are feasible.

The Environment Protection & Heritage Council (EPHC) also issued the *National Environmental Protection (Air Toxics) Measure* (air toxics NEPM) that includes *monitoring investigation levels* for benzene, toluene and xylenes. They have been established to provide a framework for Australian governments to monitor, assess and report on air toxics. Trace levels of vapour are measured in parts per billion (ppb).

Table 2 Relevant Monitoring Investigation Levels

Substance	Level	Averaging Period
Benzene	3 ppb	24-hour, annual average
Toluene	1000 ppb 100 ppb	24-hour 24-hour, annual average
Xylenes	250 ppb 200 ppb	24-hour 24-hour, annual average

Development

Development in New South Wales is regulated by the *Environmental Planning and Assessment Regulation 1994* under the *Environmental Planning and Assessment Act 1979*.

The consent authority is Bayside Council, the administrator of the *Rockdale Local Environmental Plan (LEP) 2011* and the *Rockdale Development Control Plan (DCP) 2011*.

Settled Dust - Soil Contamination

The Environment Protection Authority (EPA) has endorsed the soil contamination targets outlined in the *National Environmental Protection (Assessment of Site Contamination) Measure 1999*.

Table 3 Relevant Soil Contamination Limits - Australia

Contaminant	Target
lead (residential A-with vegetable gardens)	300 milligrams per kilogram (mg/kg)
lead (residential B-extensive paved yards)	1200 milligrams per kilogram (mg/kg)

Results*Air-Quality Testing***Table 4 EPA Air Pollution Data**

Daily average (maximum) PM ₁₀ (Earlwood) 20 Feb 2019 – 16 (25) µg/m ³ Daily average (maximum) PM _{2.5} (Earlwood) 20 Feb 2019 – 5 (9) µg/m ³
Daily average (maximum) PM ₁₀ (Earlwood) 21 Feb 2019 – 16 (30) µg/m ³ Daily average (maximum) PM _{2.5} (Earlwood) 21 Feb 2019 – 7 (15) µg/m ³
Daily average (maximum) PM ₁₀ (Earlwood) 22 Feb 2019 – 10 (18) µg/m ³ Daily average (maximum) PM _{2.5} (Earlwood) 22 Feb 2019 – 4 (15) µg/m ³

Table 5 Bureau of Meteorology Weather Data (Sydney Airport)

13 Feb 2019 19-25°C, no rain, SSE-SSW winds (30-74 km/h)
14 Feb 2019 18-27°C, no rain, E-SSE-WSW winds (20-37 km/h)
20 Feb 2019 18-23°C, 6.2 mm rain, SSW winds (22-48 km/h)
21 Feb 2019 19-22°C, 1.8 mm rain, S winds (33-57 km/h)
22 Feb 2019 18-22°C, 8.2 mm rain, S-SSW winds (17-39 km/h)

Table 6 Test Results

Date	Test	Result (Method)	Guideline
20 Feb 2019 08:45	Carbon monoxide (CO)	<1.0 ppm (electrochemical cell)	9 ppm
20 Feb 2019 08:45	Nitrogen dioxide (NO ₂)	<0.1 ppm (electrochemical cell)	0.12 ppm
20 Feb 2019	Particles (PM ₁₀)	8.3 µg/m ³ (DustTrak)(0.38)	50 µg/m ³
20 Feb 2019	Particles (PM _{2.5})	3.2 µg/m ³ (DustTrak)(0.38)(0.4)	25 µg/m ³
21 Feb 2019	Particles (PM ₁₀)	8.6 µg/m ³ (DustTrak)(0.38)	50 µg/m ³
21 Feb 2019	Particles (PM _{2.5})	3.4 µg/m ³ (DustTrak)(0.38)(0.4)	25 µg/m ³
22 Feb 2019	Particles (PM ₁₀)	9.0 µg/m ³ (DustTrak)(0.38)	50 µg/m ³
22 Feb 2019	Particles (PM _{2.5})	3.6 µg/m ³ (DustTrak)(0.38)(0.4)	25 µg/m ³
13 Feb 2019 16:40	Odour	No noticeable odour	No unusual odours
14 Feb 2019 17:10	Odour	No noticeable odour	No unusual odours
20 Feb 2019 09:00	Odour	No noticeable odour	No unusual odours
22 Feb 2019 09:00	Odour	No noticeable odour	No unusual odours
22 Feb 2019	Lead in soil	69 mg/kg (Forest Rd side)	300 mg/kg
22 Feb 2019	Lead in soil	25 mg/kg (Bayview St side)	300 mg/kg
13-14 Feb 2019	Benzene	<0.5 ppb (USEPA/TO-15)	3 ppb
13-14 Feb 2019	Toluene	<0.5 ppb (USEPA/TO-15)	100 ppb
13-14 Feb 2019	Xylenes	<1.0 ppb (USEPA/TO-15)	200 ppb

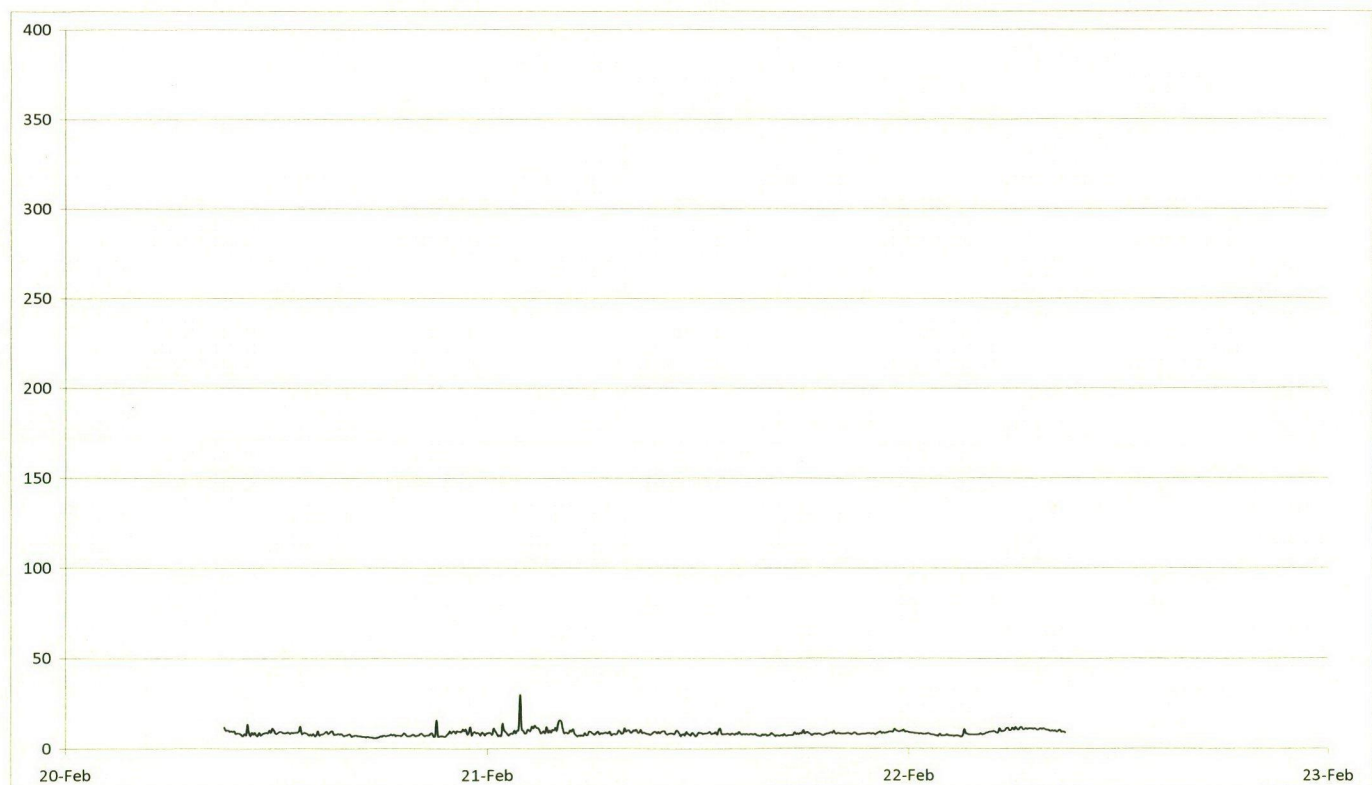


Figure One
DustTrak Ambient PM₁₀ Data Recording
339 Forest Road, 20 Feb – 22 Feb 2019

Discussion of Results

Air-Quality Measurements

The measured pollutants complied with all relevant National Environment Protection Measures (NEPM). The screening results do not point to a need for further testing using other methodology.

While air quality at the site could be conducted over a wider range of weather conditions, further testing is not likely to change the result of the assessment.

Like all other localities in Sydney, the site will be affected by higher levels of bushfire smoke or other air pollution from time-to-time.

Odour

There were no noticeable odours at the site.

Background Air Pollution

All results were within background levels of air pollution in the Sydney region.

Traffic

The results of air-quality testing indicate that the site is not significantly affected by nearby traffic.

Mitigation

No need for mitigation measures was identified. It remains prudent (but not essential) to locate play areas, sleeping areas and outdoor areas as far as practicable from the highway.

References

Department of Environment and Conservation (2004) *Internal Working Paper No 2 Ambient Concentrations of Toxic Organic Compounds in NSW*

Department of Planning (2008) *Development Near Rail Corridors and Busy Roads-Interim Guideline*

Environment Australia (2001) *Air Toxics and Indoor Air Quality in Australia*

Environment Australia (2003) *Executive Summary in Technical Report No 6 BTEX Personal Exposure Monitoring in Four Australian Cities*

TSI (2013) Application Note EXPMN-007 *Rationale for Programming a Photometer Calibration Factor (PCF) of 0.38 for Ambient Monitoring*

Conclusions

An air-quality assessment has been conducted at 339 Bexley Road in Bexley, and the results were satisfactory.

I hope this report meets your current requirements. Please don't hesitate to contact Airsafe on (02) 9555 9034 if you need any further information.

Yours faithfully

A handwritten signature in brown ink, appearing to be 'P. Turner', written over a faint, dotted line.

PHILIP TURNER
Occupational Hygienist