ASPHALTECH

LICENCE APPLICATION

Part Lot 55 Sutherland Way, Picton, WA, 6229, Dec 2024

ATTACHMENT 3A 1

ODOUR RISK ASSESSMENT

Contents

1.0 Background

This proposed asphalt plant was previously located at 416 Victoria Road, Malaga.

Asphaltech operated the plant in Malaga for 19 years without incident or a complaint related to the operation. As that plant has now been replaced the plant is proposed to be relocated on part of Lot 55, 2 Sutherland Way, Picton, WA, 6229.

Refer to current Licence, Environmental Protection Act 1986, Part V:

- Licensee: Asphaltech Pty Ltd
- Licence: L8447/2010/3

2.0 Methodology

This assessment is based on the DWER - Odour guideline for prescribed premises Part V Division 3 Environmental Protection Act 1986.

The perception of odour is considered in the DWER 2018 Draft Guideline to relate to

- Frequency of odour impacts
- Intensity of the odour
- Duration of the odour events
- Offensiveness of the odour
- Location of the impacts (receiving environment)

The DWER Guideline provides for a Risk Assessment Approach as outlined below.

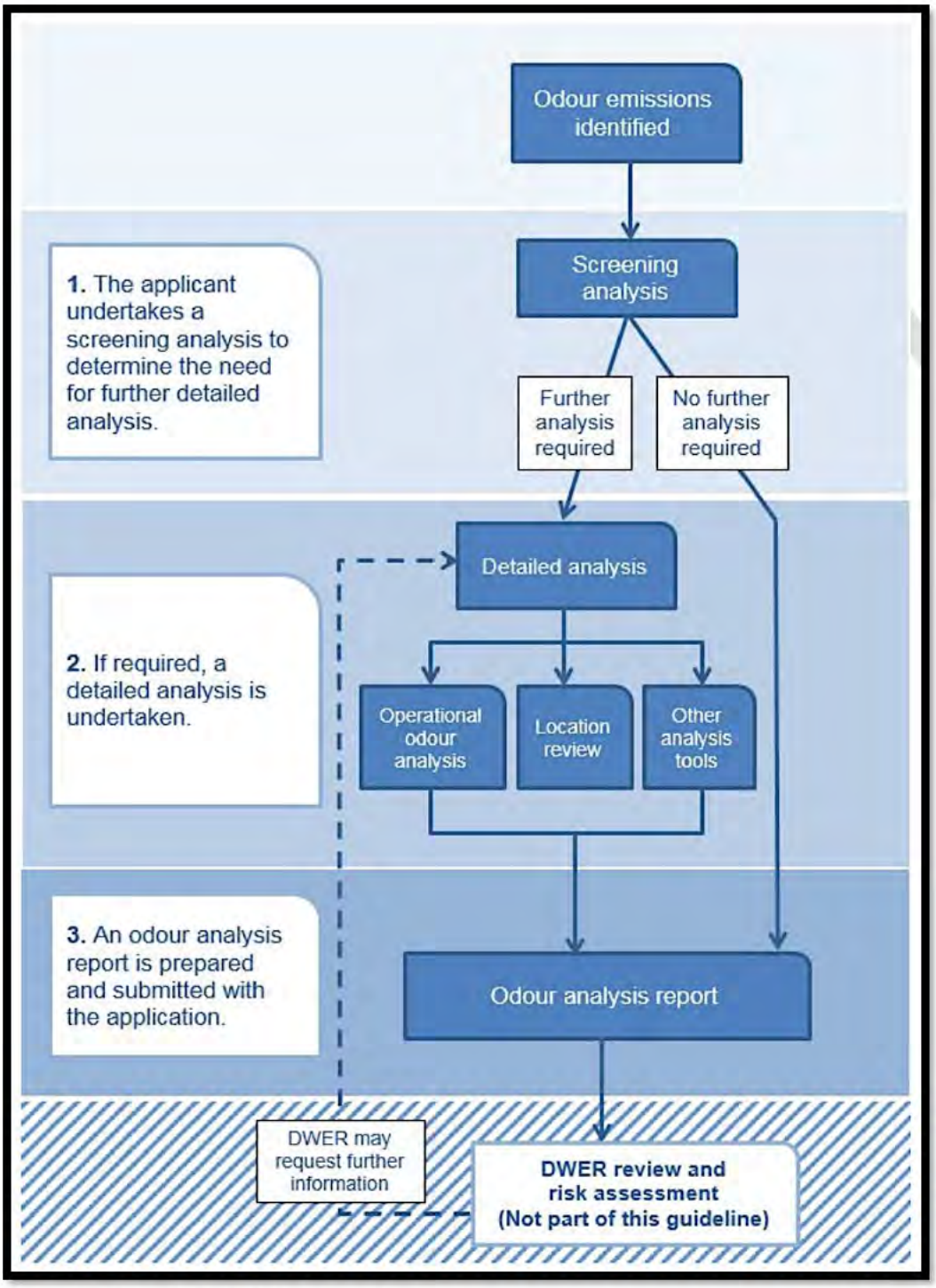


Figure OD1 DWER Odour Guideline

3.0 Plant and Operations

The proposed Asphaltech plant operated in Malaga for 19 years until June 2018 when it was decommissioned to make way for a new plant of increased capacity.

A schematic of the plant and operations is provided at Figure 2. The plant is a normal type of plant that is commonly used at sites across Western Australia.

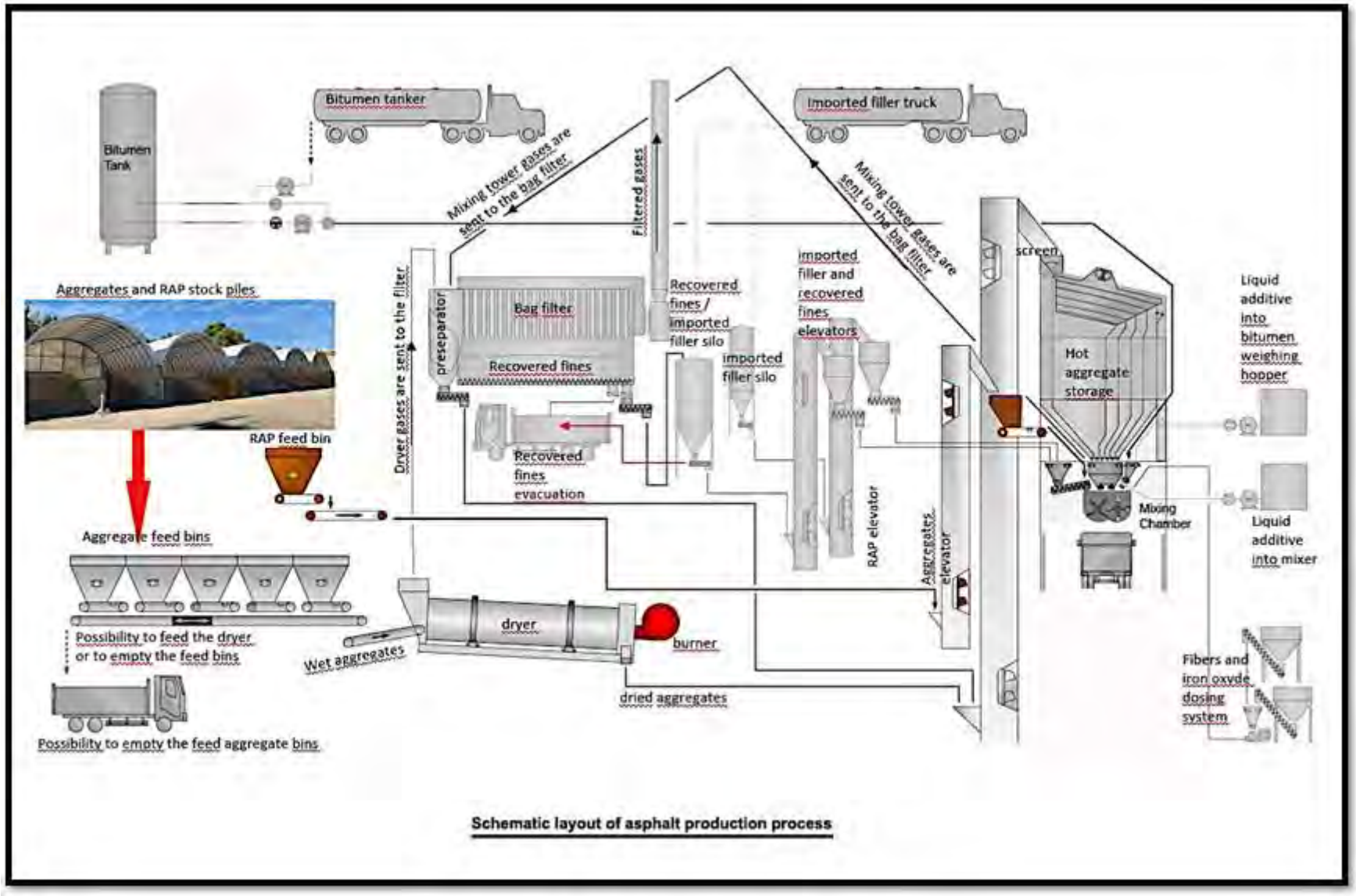


Figure OD2 Schematic layout of asphalt production process

4.0 Sources of Emissions

In reality there is little risk of odour from the production of asphalt when the plant is operated correctly. Occasionally there is a smell of asphalt within the premises boundary itself, which can be seen to be small at Malaga where the plant previously operated.

The Malaga site has light industry and commercial land uses around the premises with a significant number of persons working in those premises. During the 19 years of operations the asphalt plant was well accepted and was not subject to any known complaints relating to odour from the plant.

The main sources of odour during the operation of the asphalt plant are:

- Bitumen Ventilation during hot bitumen transferring from road tanker to storage tank.
- Hot Asphalt Discharge to Trucks at Pugmill Mixing Chamber.

The two main sources of emissions are shown in concept in the diagram Figure 3 and relate to the truck delivery and loading; that is the “Bitumen Tanker” and the “Mixing Chamber” from which trucks are loaded.

Odour normally originates from the aromatic organic compounds that are vapourised when heated and then can be carried by the air. As the compounds cool they condense to a liquid or solid. At the transfer of hot bitumen and discharge to trucks most compounds rapidly cool on contact with the air and it is only lighter, more volatile compounds, which are capable of being transmitted in the air.

The hotter the substances the greater the number of compounds vapourised, and therefore bitumen and asphalt plants operate within defined temperatures which are not exceeded. The loading of asphalt is conducted in a strictly controlled manner with the truck being loaded in a dedicated bay.

The Loading from the Bitumen Tanker does not cause significant odour with the only odour coming from the venting of air from above the bitumen at elevation when filling.

The main source of odour risk is from the pugmill, where the asphalt is mixed and loaded to the trucks. When operating at Malaga there were no particular odour management actions located on the plant. However for the Bunbury site the loading bay is proposed to be installed with skirts which will extend approximately 10 metres before and after the loading bay. This will trap the air during loading and enable it to escape over a broad area, slowly through the shade cloth and out each end of the tunnel.

By spreading the air in the loading bay there is much greater dispersion of any odour at the source which will significantly mitigate and reduce the risk of noticeable odour carry on and potentially offsite. In addition with the open ends of the tunnel the air will also travel out each end additionally adding to the broad based dispersion. A solid tunnel is not proposed because that will create point sources of odour.

The loading facility will also be installed with skirts and the receiving truck will be loaded with small drops.

Odour during hot bitumen transfer from tanker truck to the storage tank is vented high above the plant to provide significant mixing and air dispersion.

All staff are trained to report and or investigate any abnormal source of odour as that may indicate the mix is out of specification. The temperature of the mix is constantly measured via a control room to maintain the mixture specification.

If any significant odour is first noted on site by the operators who are moving around the premises, action is taken prior to the odour becoming excessive.

Reductions to the risk of odour at the two sources are listed in the table below in Clause 5.0.

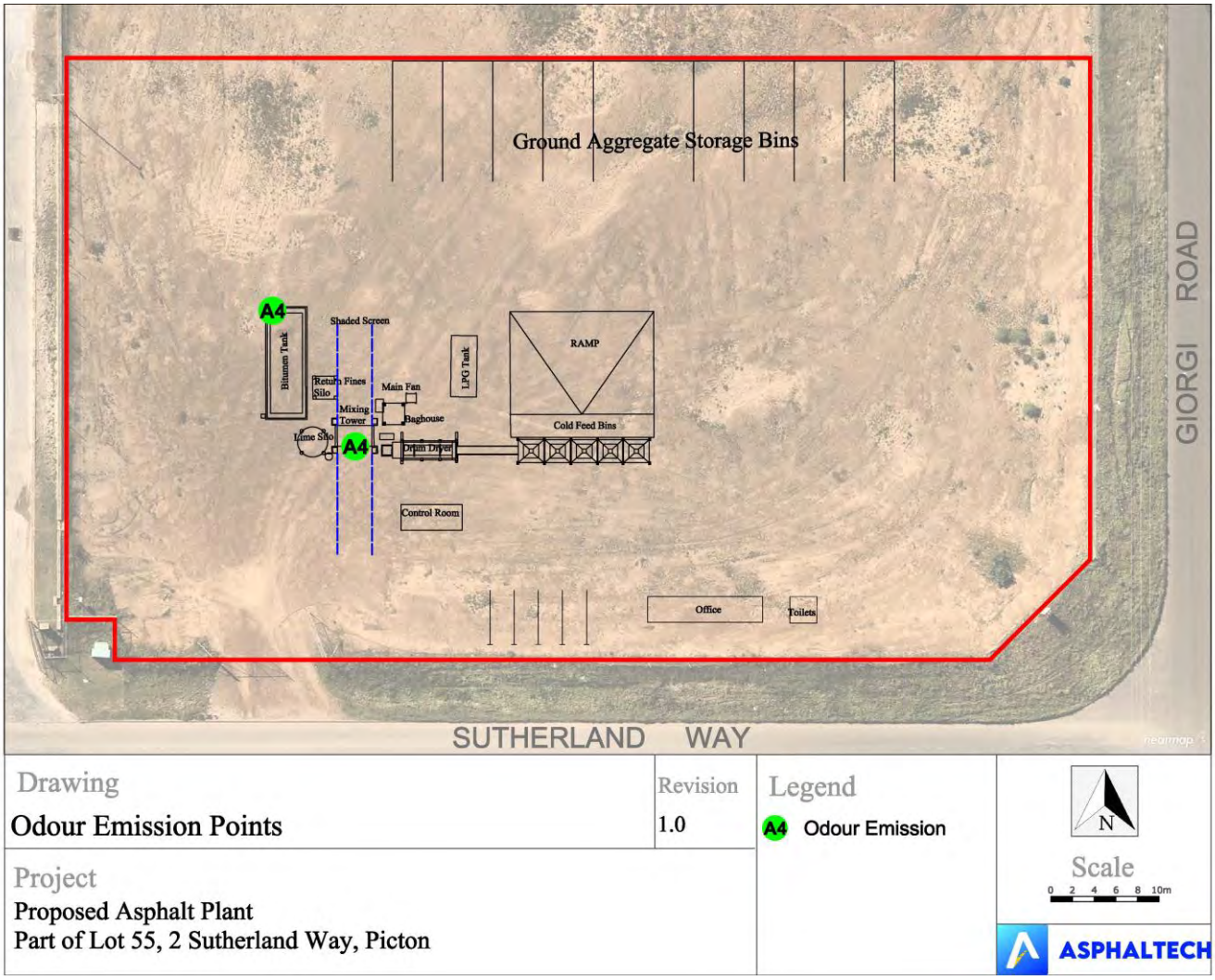


Figure OD3 Location of potential odour emissions

5.0 Odour Management

Odour Management at the risk areas.

Activity	Management	Evaluation and Contingencies
Bitumen import and loading	➢ Bitumen arrives at the plant in sealed tankers. ➢ The bitumen tank is sealed and vented, for pressure and temperature changes. ➢ Trained staff only are permitted to load bitumen. ➢ Loading of bitumen has a lower risk of odour generation. ➢ Bitumen is only transferred once the couplings are tightly fastened and checked. ➢ The hoses and connections are checked for wear and tear, security, tightness. The greatest risk is safety issue and not odour because hot bitumen could leak or spray if the hoses are incorrectly connected. Hence close attention is paid to the bitumen loading. ➢ The only risk of loading of bitumen is from the venting of air from above the bitumen, which is vented to the atmosphere where it is diluted as noted in the DWER Licence. ➢ Venting to the atmosphere is high above the plant to enable significant mixing and dispersion of any odour.	➢ Check and inspect hoses and couplings for wear and tear. ➢ Provide additional training or supervision of loading staff. ➢ Assess and modify if necessary the loading procedures. ➢ Check the venting of the bitumen tank and maintain or repair as necessary. ➢ Check that the hoses and couplings are tight and do not allow any odour to be emitted. ➢ Check bitumen ventilation during hot bitumen transferring from road tanker to storage tank. ➢ Check that all equipment is sealed, the connectors are sound and there are no leaks. Repair as necessary.
Pugmill operation and truck loading	➢ The main odour risk arises from overheated asphalt. ➢ The pugmill is enclosed. ➢ A dedicated load bay is provided for loading into trucks. ➢ The pug mill chute is designed to minimise the drop height of the bitumen and therefore to reduce the risk of exposure to the air and odour generation. ➢ When the pug mill chute is open for loading there is a negative pressure which sucks air into the pug mill to minimise the loss of volatile compounds. ➢ The air from the pug mill is vented through the bag house where the air cools the volatile compounds which condense and odour is reduced/eliminated. ➢ All trucks are covered/tarped as soon as possible following loading. ➢ The loading bay is to be installed with a tunnel extending for approximate 10 metre past either end of the loading bay and covered with shade cloth. The shade cloth will enable the air in the loading bay to be dispersed over a large are through the shade cloth. ➢ All loads of asphalt leaving the site are covered. ➢ Operation of the pugmill is strictly controlled for temperature which is maintained as per specifications. ➢ The plant operator watches the temperature of the mix and adjusts the heating accordingly. ➢ Automatic shutdown procedures are incorporated in the pugmill in the event of temperature not being maintained within specification and the pugmill overheats.	➢ Check the asphalt temperature and correct. ➢ Check the Hot Asphalt Discharge to Trucks at Pugmill. ➢ Check that the mixer is discharging and loading correctly. Correct for flow rates delivery shut off and odour treatment systems. ➢ Check that the asphalt on the truck is adequately covered for transport. ➢ Provide updated instructions to drivers. ➢ Check that the mix matches the mix data sheet. Shut down the mix and load procedure as necessary to correct the mix or abandon the mix. Contingencies that may be used to further reduce odour. ➢ The venting of the pugmill could be investigated and improved if required. ➢ Minimise the drop height or provide addition screening at the loading bay., ➢ Review and improve the temperature monitoring equipment and provide warnings or other triggers to better detect excessive temperatures.

	➢ The temperature of the asphalt is printed on each load docket which provides documented proof of the quality of the asphalt ➢ An individual mix docket is generated for each contract. The mix is checked against the mix docket and if found to be non-compliant, the mix is brought into compliance or recycled back by dilution through later mixes.	

Actions if Excessive Odour is detected

Operational Triggers	Corrective Actions	Evaluation and Contingencies
Complaint from a member of the public or authority	➢ Record the complaint in the site record book and report to DWER if required by Licence. ➢ Contact the complainant and establish the nature of the complaint. ➢ Complete an investigation and undertaken any repairs and improvements as necessary ➢ Document the actions taken in the site record book. ➢ Contact the complainant and explain what has been actioned and improved on.	➢ After one week of operations, review the complaint to determine whether the actions taken have solved the problem. ➢ At least annually conduct an audit of all complaints and verify that the actions taken have solved the issues raised by the complainant.
Equipment failure	➢ Record the incident in the site record book. ➢ Shut down the plant or take the necessary steps to minimise environmental or health and safety impacts. ➢ Assess the failure. ➢ Investigate whether there is any potential to make improvements to prevent or minimise the failure from occurring again. ➢ Provide a solution to the failure that and develop a best practice, replacement or repair. ➢ Complete the restoration. ➢ Re – start the equipment and retest.	➢ Restart the plant and retest by observation, odour and other means for leakage and ongoing. ➢ Determine whether there are any improvements to the plant, maintenance schedule or operational procedures that will reduce the risk of failure.
Operating temperatures are too high	➢ Reduce the operating temperature. ➢ Check the operational procedures. ➢ Check the monitoring equipment and automated correction mechanisms.	➢ Provide additional training if required.
There is excessive odour at the mixer and loading bay	➢ Check for leakages of the structure and working parts and correct. ➢ Check for venting, gas recovery and screening and repair or restore as required. ➢ Check that the mixer if discharging and loading correctly. ➢ Check the pressure of the hot aggregate storage to ensure that no positive pressure occurs. ➢ Check the air exchange rate is working satisfactorily and not leading to internal pressure increase that force vapours out. ➢ Provide additional screening material. ➢ Change the mixture for composition or temperature to minimise fume. ➢ Check the Hot Asphalt Discharge to Trucks at Pugmill. ➢ Check that the asphalt on the truck is adequately is covered for transport. ➢ Provide updated instructions to drivers. ➢ Check the temperature of the asphalt that is printed on each load docket. ➢ Check that the mix matches the mix data sheet. Shut down the mix and load procedure as necessary to correct the mix or abandon the mix.	➢ Restart the plant and retest by observation, odour and other means for leakage and ongoing. ➢ Monitor all trucks leaving site and alert any with inadequate covering. ➢ The loading dockets provide a check on temperature.
Noticeable Odour smell within the prescribed boundary.	➢ Identify the source of odour and investigate that source as outlined above.	Take actions as necessary to solve any short or longer term emissions abnormalities

6.0 Location

The asphalt plant is to be located on part of Lot 55, 2 Sutherland Way, Picton. The land is zoned Industrial with industrial and other similar land used around the facility.

The distance to the nearest sensitive receptor (residential) is 1300m which complies with EPA Guidance for the Assessment of Environmental Factors 2005.

Sensitive Premises	Distance	Status
North West	1300 metres	Urban Area
North	1785 metres	Urban Area
East	1310metres	Caravan Park
South	1550 metres	Isolated Premises

Figure OD4 Surrounding Lots at the Picton Site

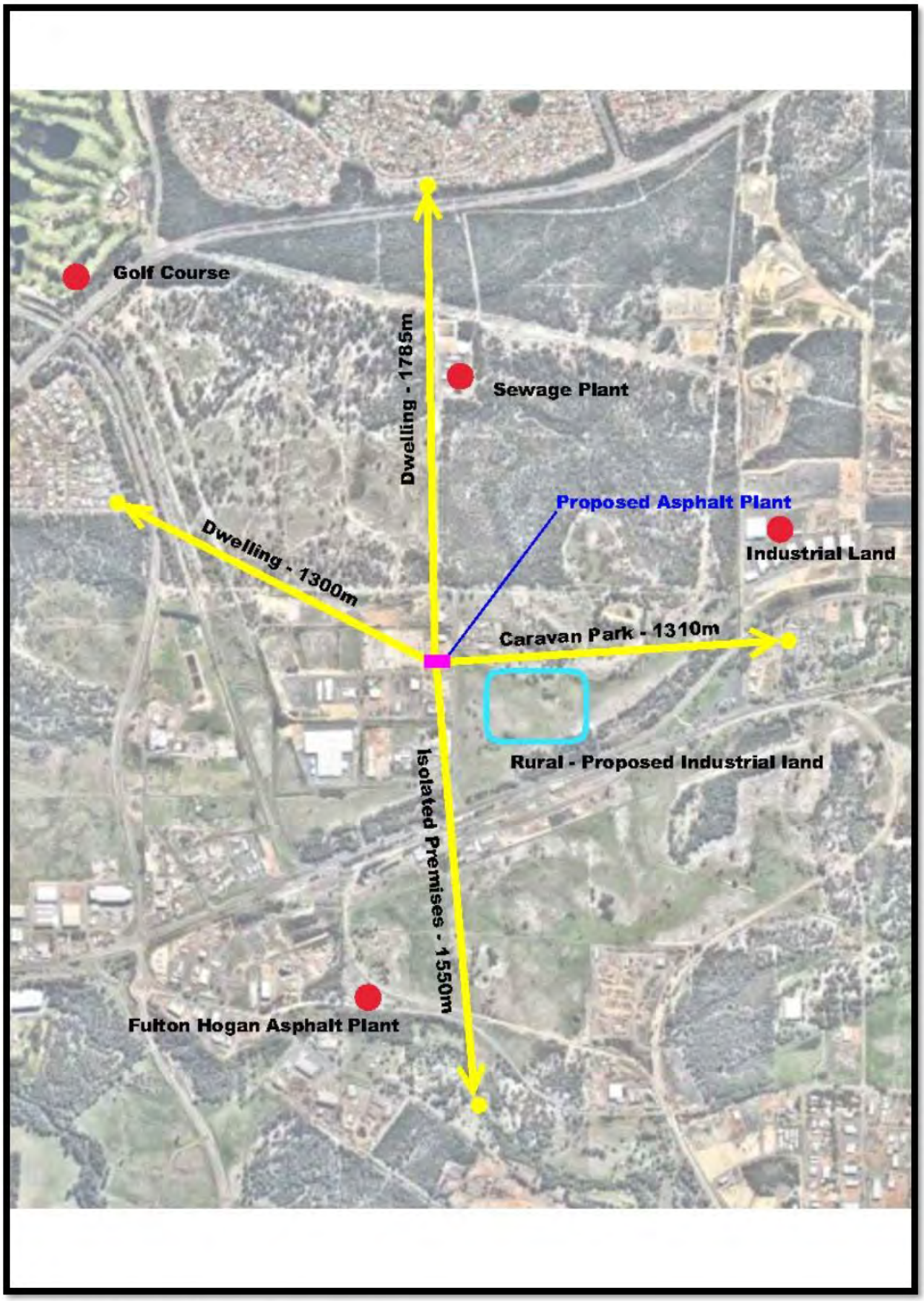


Figure OD5 Surrounding Land Users

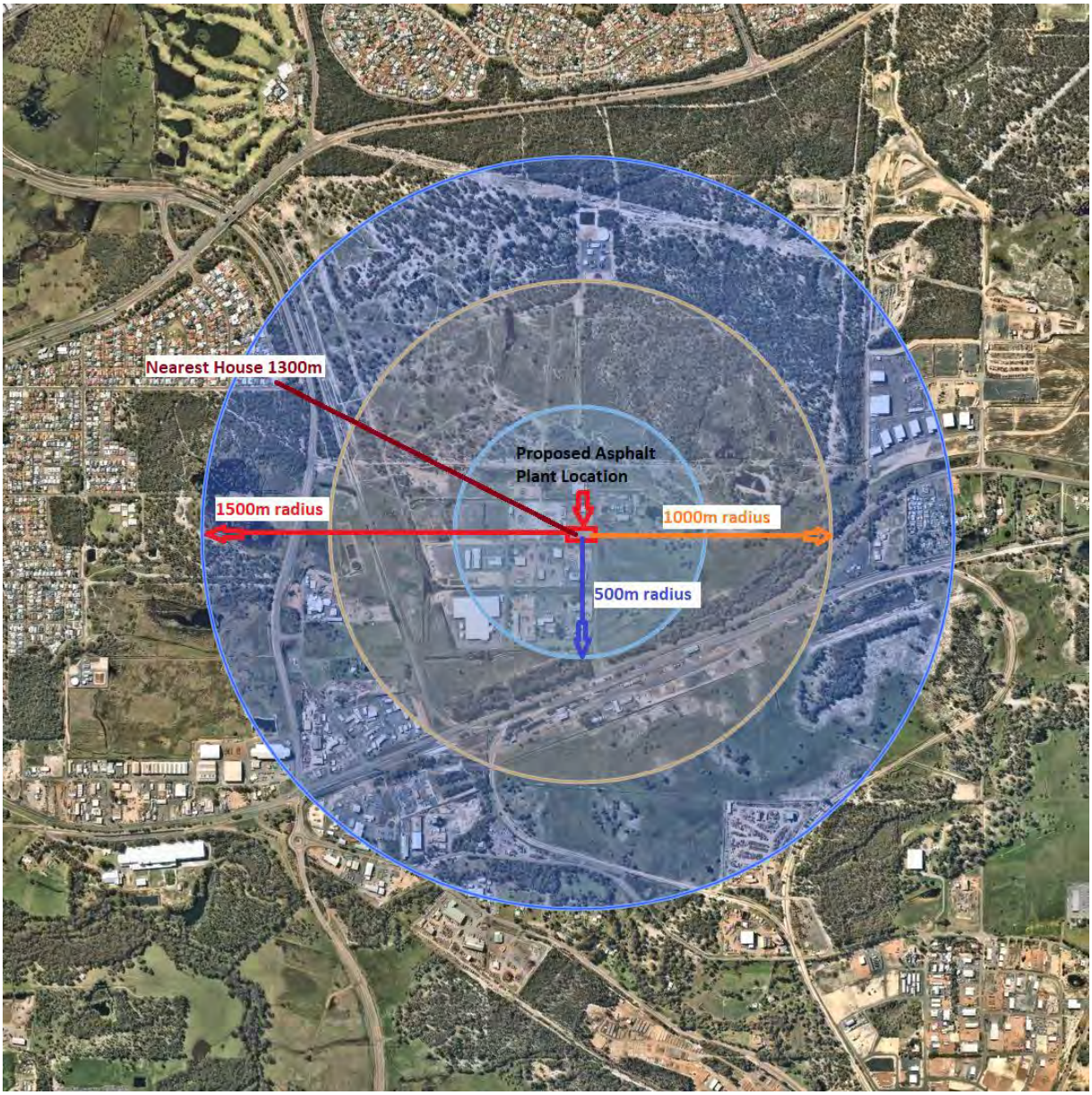


Figure OD6 Separation distances

7.0 Screening Analysis for New Premises

Step 1: Questionnaire

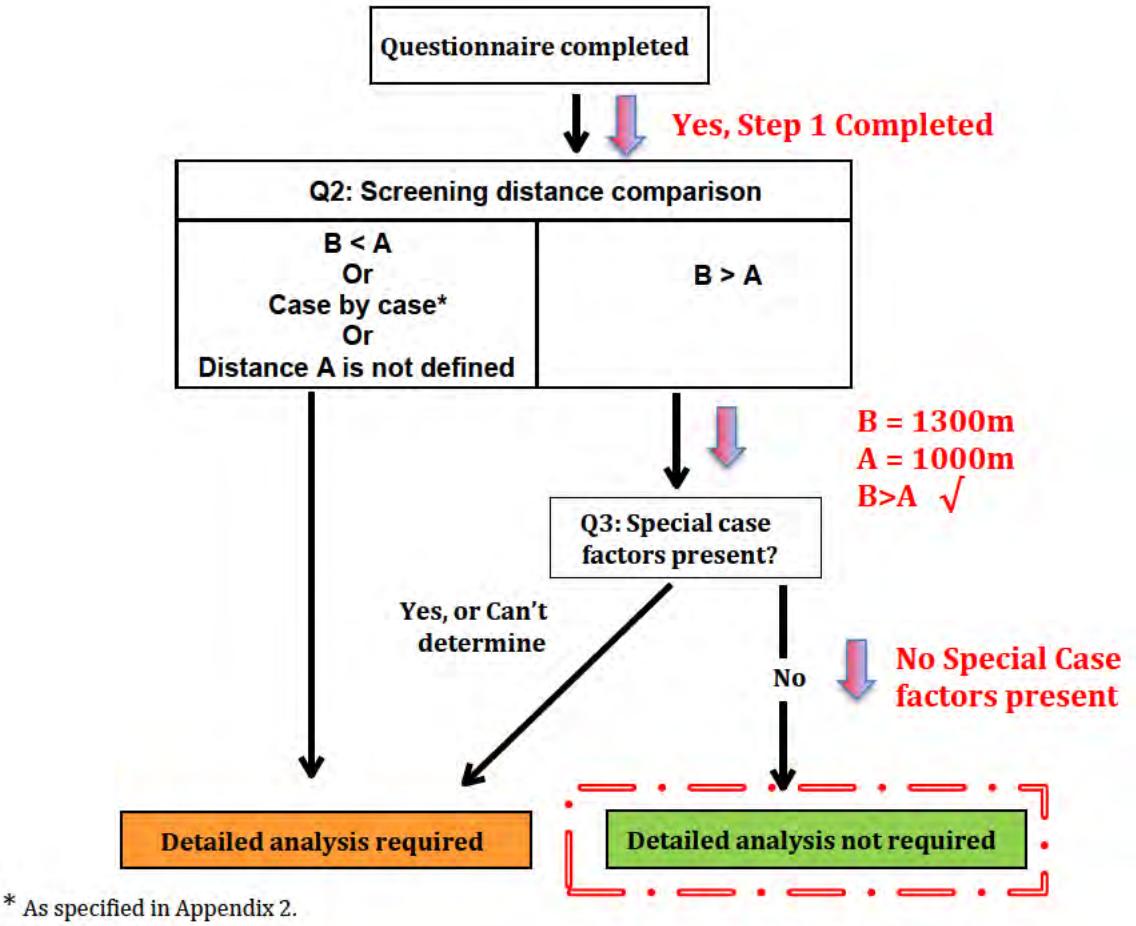
Q1. DESCRIPTION OF ODOUR EMISSIONS Provide succinct information about activities and sources that emit odour using the table below.	
Activity/ odour source	**Description** **Potential for offsite impact (Y/N) and justification**
Bitumen Tank	**Bitumen Ventilation during hot bitumen transferring from road tanker to storage tank**
Pugmill Area	**Hot Asphalt Discharge to Trucks at Pugmill Mixing Chamber**

Q2. SCREENING DISTANCE	
Screening distances for categories of odour-generating activities are identified in Appendix 2. Select the appropriate option from the list below.	
Option 1: The ***screening distance*** is listed in Appendix 2 for this industry category/throughput level. ***Screening distance*** (**A**) = 1000 m ***Sensitive receptor distance*** (**B**) = 1300 m **OR** ~~**Option 2:**~~ ~~The ***screening distance*** for this industry category and throughput level is specified as case by case in Appendix 2.~~ ~~**OR**~~ ~~**Option 3:**~~ ~~There is no ***screening distance*** for this industry category in Appendix 2.~~	☐ **B < A**: Detailed analysis required ☒ **B ≥ A**: Go to Question 3 ☐ ~~**Case by case**: Detailed analysis required~~ ☐ ~~**No *screening distance***: Detailed analysis required~~

Q3. SPECIAL CASE FACTORS	
Are there special case factors that might increase odour impacts beyond the ***screening distance*** shown in Question 2? Please tick the applicable special case factors: ☐ Cumulative impacts from other nearby sources ☐ Presence of an existing elevated odour background ☐ ***Complex terrain*** (see Glossary) ☐ Unusually large and/or complex facility when compared with other Western Australian operations ☐ Unusual configuration of odour sources or technology that does not conform to contemporary leading practice compared with other Western Australian operations	☐ **Yes** or **Can't determine:** Detailed analysis required **OR** ☒ **No:** Detailed analysis NOT required Justification should be provided to support the 'No' response.
Special case factors – justification **There are no special case factors. There are no nearby odour producing sources as far as is known and no other asphalt plants. A sewerage plant lies to the north.** **The proposed asphalt plant has operated for 19 years without complaint. There are no changes to the plant that will result in greater odour emissions. In fact over the years, as new technology became available the plant has been installed with improvements that have resulted in the risk of odour emission decreasing over the 19 years of operation.** **Further improvements that are now available, such as a screening tunnel over the loading bay will be incorporated into the rebuild of this plant and further improvements will be installed as they become available in the future.** **The terrain is not complex, but flat and level, which is similar to the existing plant sites in Perth. And so the characteristics and operation of the plant are well known.**	
Additional comments	

Step 2: Flowchart

The screening analysis result is determined by using the flowchart below and theresponses to the questionnaire.



* As specified in Appendix 2.

Figure OD7 DWER Odour Guideline Questionaire

Based on the above Flow chart, Detailed Analysis is not required in this report.

8.0 Comparison to the Malaga Plant Site

The Malaga site at which the plant operated is shown below. The closest dwelling was at a distance of 930 metres to the north with extensive and intensive light industrial and other activities, offices, commercial and people working in close proximity to that Malaga plant. See Figure 8.

The proposed site has less commercial and office activities in the nearby location and is further away from the closest sensitive premises. For example there is a sewerage plant to the north.

The consideration of the existing asphalt plants and the Malaga plant from which this plant was installed for 19 years, can provide substantial supporting evidence.

For example if odour was an issue there would have been some complaints during the 19 years the plant operated at Malaga, especially considering the dense land uses surrounding the plant.

Even though these land uses are not residential the lack of complaints indicates that the odour is capable of being well managed within short distances and will be able to be managed on the Picton Site.

Figure OD8 Location of the Victoria Road Asphaltech Plant at Malaga where the plant operated.

Figure 6 shows the proposed plant location at Picton Site with a circle showing the radius of the nearest residence, together with a 500m radius, a 1000m radius and a 1500m radius

The location of, and the buffers, for other asphalt plants in Perth and other locations have dwellings as close as 500 metres as shown below such as BGC Neerabup, Fulton Hogan Hazelmere, Super Civil Maddington, Roads 2000 Wangara and Downer Gosnells.

Figure OD9 BGC Neerabup

Figure OD10 Downer Gosnells

Figure OD11 Fulton Hogan Hazelmere

Figure OD12 Super Civil Maddington

Figure OD13 Roads 2000 Wangara

9.0 Complaints

In the 19 years that the plant was located in Malaga, being 416 Victoria Rd, Asphaltech did not receive any substantiated odour complaint from any dwelling or business.

Only one set of complaints had been received in Dec 2018 and Jan 2019 from a site less than 200m away but at that time the current plant was being installed and commissioned and therefore the complaint did not relate to the plant to be installed.

In addition, when this complaint was investigated, it was found that the complainant was actually detecting odours from asphalt delivery trucks to the Northlink Project and not the plant itself. It also remains unclear whether the complaint related to Asphaltech or another company such as BGC whose trucks delivering via Malaga to the North Link project at the time.

Asphaltech's production Engineer in fact invited the complainant to inspect/view/smell the plant itself one morning and the complainant did not detect the alleged odours that he was complaining about.

The analysis of complaints, locations, wind patterns and the like, combined with a comparison to the plant when it operated at Malaga shows that there will be no increased risk from the commissioning of the plant on part Lot 3.

10.0 Local Climate

The climate data was studied with respect to the asphalt plant. The proposed land has a separation distance to the closest dwellings of over 1000 metres.

The climate is Mediterranean with warm summers and cool moist winters. Data is recorded at the Bunbury post office (latitude 33° 20' 5, longitude 115° 38' E, elevation 4 m), which is located in central Bunbury 8 km North West of the site.

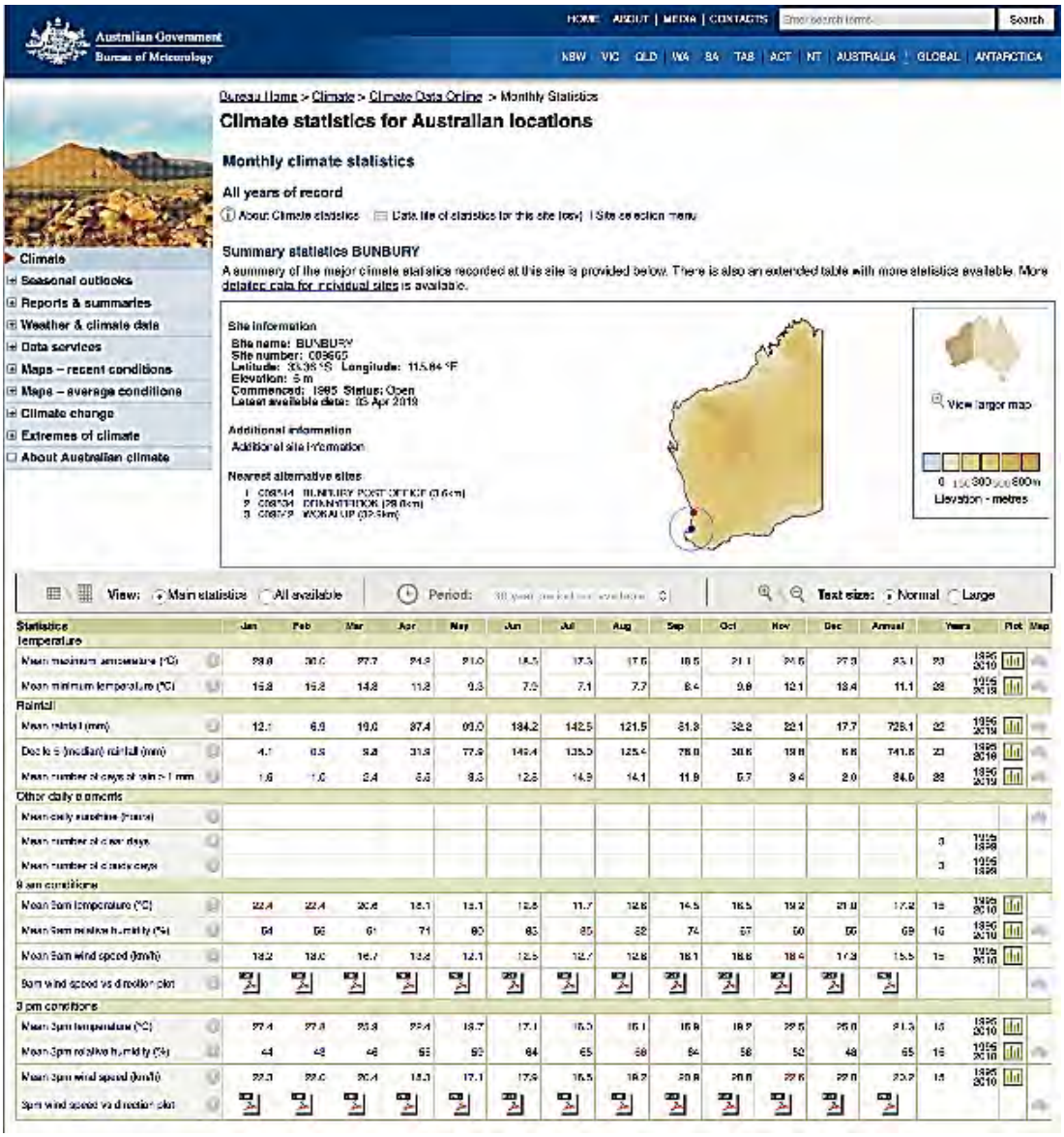


Figure OD14 Climate Data Bunbury

Wind data shows a predominantly easterly and westerly trend.

Summer winds at 9.00 am are predominantly light to moderate from the east – south east (>60%) with speeds less than 20 kph on 75% of the mornings. At 3.00 pm the winds are stronger from the west and southwest for over 65% of the time.
In winter the morning winds are lighter and more variable with 7% of the mornings being calm. At 3.00 pm the winds are again variable although they are from the northwest to south west on over 50% of the afternoons with speeds of less than 20 kph for over 60% of the time.

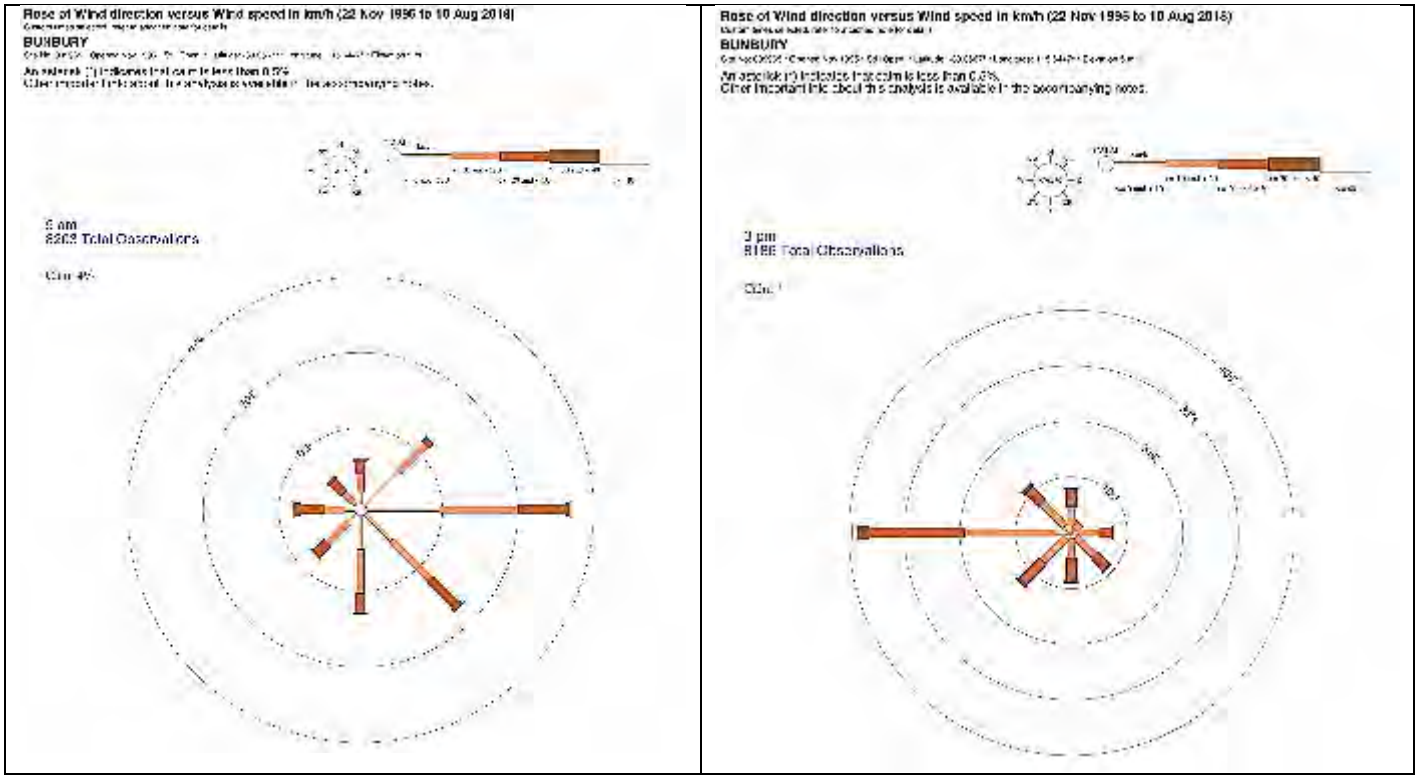


Figure OD15 Yearly Wind Data Bunbury

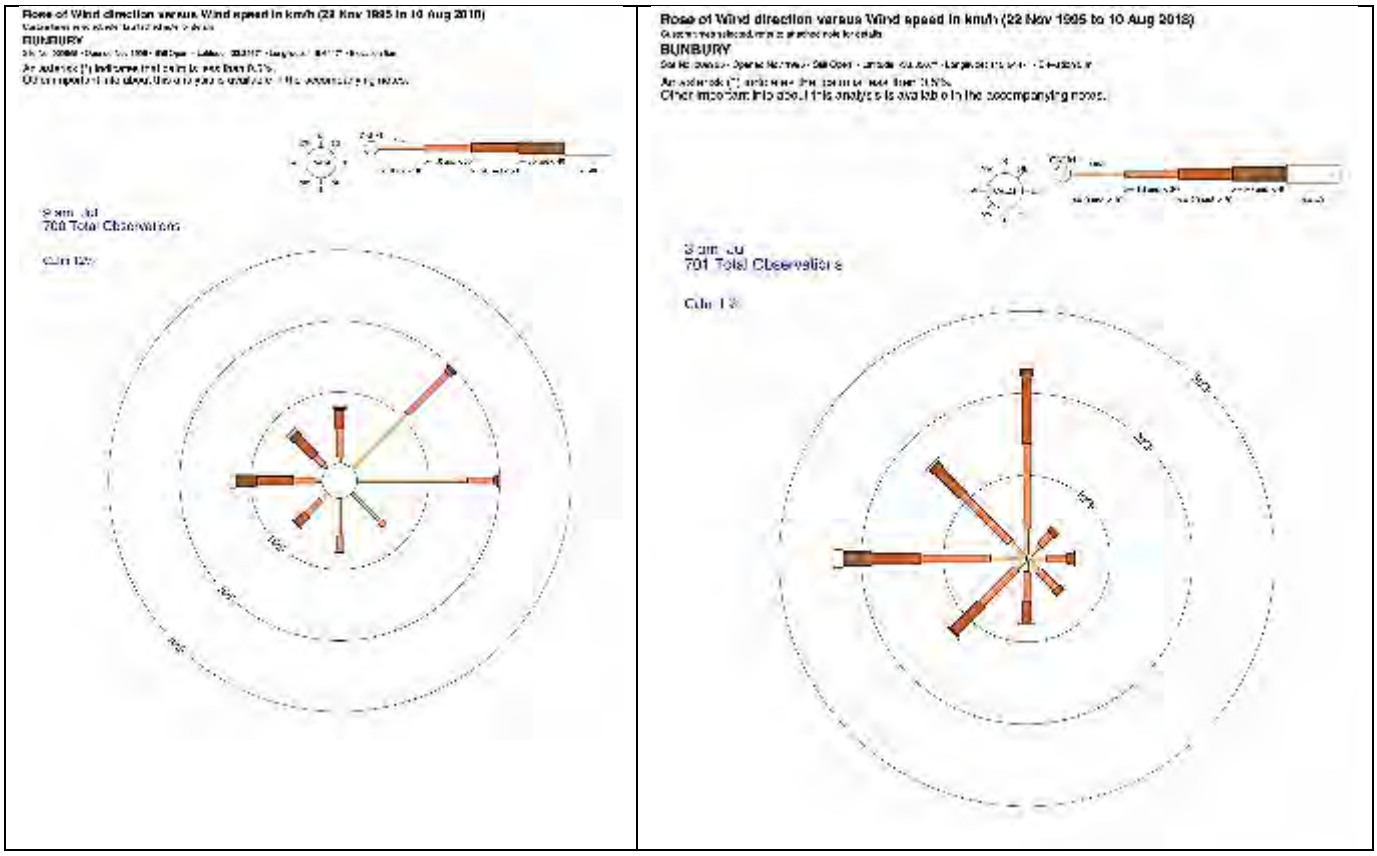


Figure OD16 July Wind Data Bunbury as being typical of winter

For odour the worst time is normally on still winter mornings when there is little turbulence to disperse any odour. Overall, the number of calm days is low with just 4% at 9.00 am and no significant occasions at 3.00 pm.

All the calm days occur in winter with no calm days in summer, with February as an example when there are no significant number of calm conditions even at 9.00 am.

That represents 12 days per year when the wind may be calm. It can be seen that the number of calm days increases in winter to around 2.6 mornings per month. There are also times when the winds are light and another 15% or 3 days when gentle easterly winds are blowing.

In winter therefore the number of calm days or light winds is around one per working day per week when there is an increased risk of odour.

All dwellings lie outside 1,000 metres setback.

The chances of dwellings being impacted by odour is therefore considered very low, based on the frequency of calm and gentle winds, the buffer distances, the management of the asphalt plant and the past record of the operation of the asphalt plant.

11.0 Special Case Factors

There are no special case factors. There are no nearby odour producing sources as far as is known.

12.0 Past Emission Testing Assessment Summary

A summary of site analyses of emission taken at the Malaga when this plant was operating is illustrated as below.

Attachment 1

EMISSION TESTING ASSESSMENT

Licence: L8447/2010/3
Commencement Date: 04 October 2015
Expiry Date: 03 October 2021

Test Parameters	Limits	Date: 2016		Date: 2017		Date: 2018		Date: 2019		Date: 2020		Date: 2021	
		Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
Test date		28-Apr-16		28-Apr-17		15-May-18							
Volumetric flow rate		3.5 m³/s	-	4.33 m³/s	-	3.66 m³/s	-						
PM	50 mg/m³	5.4 mg/m³	0.09 g/s	26 mg/m³	0.43 g/s	39 mg/m³	0.65 g/s						
Total VOC		0.72 mg/m³	0.012 g/s	2.4 mg/m³	0.04 g/s	19 mg/m³	0.31 g/s						
Carbon monoxide		360 mg/m³	6 g/s	430 mg/m³	7.16 g/s	520 mg/m³	8.66 g/s						
Nitrogen oxides		28 mg/m³	0.46 g/s	27 mg/m³	0.45 g/s	23 mg/m³	0.38 g/s						

13.0 Stack Emission Test Report

The Total Particulate Matter and the Exit Velocity for the asphalt plant to be located in Picton are reported in the below emission test report.

Ektimo

Address (Head Office)
7 Redland Drive
MITCHAM VIC 3132

Postal Address
52 Cooper Road
COCKBURN CENTRAL WA 6164

Office Locations
VIC NSW WA QLD

Freecall: 1300 364 005
www.ektimo.com.au
ABN: 86 600 381 413

Report Number R005970

Emission Testing Report
Asphaltech
Malaga, Western Australia

Document Information

Client Name:	Asphaltech (WA)
Report Number:	R005970
Date of Issue:	6 June 2018
Attention:	[redacted]
Address:	416 Victoria Road Malaga WA 6062
Testing Laboratory:	Ektimo Pty Ltd, ABN 86 600 381 413

Report Status

Format	Document Number	Report Date	Prepared By	Reviewed By (1)	Reviewed By (2)
Preliminary Report	-	-	-	-	-
Draft Report	-	-	-	-	-
Final Report	R005970	6/06/2018	NBo	Aha	CMa
Amend Report	-	-	-	-	-

Template Version: 220318

Amendment Record

Document Number	Issue	Report Date	Section	Reason
Nil	-	-	-	-

Report Authorisation

[redacted]

NATA Accredited Laboratory
No. 14601

Accredited for compliance with ISO/IEC 17025 - Testing. NATA is a signatory to the ILAC mutual recognition arrangement for the mutual recognition of the equivalence of testing, calibration and inspection reports.

Table of Contents

1 EXECUTIVE SUMMARY

Ektimo was engaged by Asphaltech (WA) to conduct emission testing at the Malaga asphalt plant. An Ektimo sampling team completed yearly emission testing on 15 May 2018.

Results from this stack emission monitoring program indicate that Asphaltech (WA) was compliant with requirements of Licence L8447/2010/3 during the sampling period.

Monitoring was performed as follows:

Location	Test Date	Test Parameters*
Asphalt Plant Exhaust Stack	15 May 2018	Total particulate matter Volatile organic compounds Nitrogen oxides, carbon monoxide, carbon dioxide, oxygen

* Flow rate, velocity, temperature and moisture were determined unless otherwise stated

All results are reported on a dry basis at STP. Unless otherwise indicated, the methods cited in this report have been performed without deviation.

Plant operating conditions have been noted in the report.

2 RESULTS SUMMARY

The following licence comparison table shows that all analytes highlighted in green are below the licence limit set by the WA Department of Water and Environmental Regulation (DWER) as per licence L8447/2010/3.

Parameter	Units	Licence limit	Detected values (corrected to 17% O_2)
Total particulate matter	mg/m^3	50	39

3 RESULTS

3.1 Asphalt Plant Exhaust Stack

Date	[illegible]	Client	[illegible]
Report	R005970	Stack ID	Asphalt Plant Exhaust Stack
Licence No.	L8447720/03	Location	Malaga
Ektimo Staff	Ashley Hart	State	WA
Process Conditions	Product: 7mm Stone Dolomite		

Sampling Plane Details	
Sampling plane dimensions	700 x 870 mm
Sampling plane area	0.609 m²
Exit plane dimensions	500 x 700 mm
Exit plane area	0.35 m²
Sampling port size, number & depth	3 x 4" BSP, 100 mm
Access & height of ports	Fixed ladder 15 m
Duct orientation & shape	Vertical Rectangular
Downstream disturbance	Exit cone 4 D
Upstream disturbance	Centrifugal fan 6 D
No. traverses & points sampled	3 12
Sample plane compliance to AS4323.1	Satisfactory

Stack Parameters		
Moisture content, %v/v	6.2	
Gas molecular weight, g/g mole	28.5 (wet)	29.2 (dry)
Gas density at STP, kg/m³	1.27 (wet)	1.30 (dry)
% Oxygen correction & Factor	17 %	1.05
Gas Flow Parameters		
Flow measurement time(s) (hh:mm)	0840 & 0955	
Temperature, °C	82	
Velocity at sampling plane, m/s	8.2	
Velocity at exit plane, m/s	14	
Volumetric flow rate, discharge, m³/min	300	
Volumetric flow rate (wet STP), m³/min	230	
Volumetric flow rate (dry STP), m³/min	220	
Mass flow rate (wet basis), kg/hour	18000	

Gas Analyser Results	Average			Minimum			Maximum		
Sampling time	0850 - 0950			0850 - 0950			0850 - 0950		
	Concentration mg/m³	Corrected to 17% O2 mg/m³	Mass Rate g/s	Concentration mg/m³	Corrected to 17% O2 mg/m³	Mass Rate g/s	Concentration mg/m³	Corrected to 17% O2 mg/m³	Mass Rate g/s
Combustion Gases									
Nitrogen oxides (as NO_2)	22	23	0.081	20	21	0.073	24	26	0.089
Carbon monoxide	490	520	1.8	420	440	1.5	690	730	2.5
	Concentration %			Concentration %			Concentration %		
Carbon dioxide	2.1			3.1			2.2		
Oxygen	17.2			17.1			17.4		

Isokinetic Results	Average			Test 1			Test 2		
Sampling time				0845-0949			0845-0949		
	Concentration mg/m³	Corrected to 17% O2 mg/m³	Mass Rate g/s	Concentration mg/m³	Corrected to 17% O2 mg/m³	Mass Rate g/s	Concentration mg/m³	Corrected to 17% O2 mg/m³	Mass Rate g/s
Total particulate matter	37	39	0.14	36	38	0.13	38	40	0.14
Isokinetic Sampling Parameters									
Sampling time, min				60			60		
Isokinetic rate, %				106			101		

Total Speciated VOCs	Average			Test 1			Test 2		
Sampling time									
	Concentration mg/m³	Corrected to 17% O2 mg/m³	Mass Rate g/s	Concentration mg/m³	Corrected to 17% O2 mg/m³	Mass Rate g/s	Concentration mg/m³	Corrected to 17% O2 mg/m³	Mass Rate g/s
VOCs	18	19	0.067	18	19	0.065	19	20	0.069
Total	18	19	0.067	18	19	0.065	19	20	0.069

VOCs	Average			Test 1			Test 2		
Sampling time				0840-0855			0840-0855		
	Concentration mg/m³	Corrected to 17% O2 mg/m³	Mass Rate g/s	Concentration mg/m³	Corrected to 17% O2 mg/m³	Mass Rate g/s	Concentration mg/m³	Corrected to 17% O2 mg/m³	Mass Rate g/s
Detection limit[1]	<0.7	<0.7	<0.002	<0.7	<0.7	<0.002	<0.7	<0.7	<0.002
1,2,4-trimethylbenzene	1.2	1.2	0.0043	1.1	1.2	0.0042	1.2	1.3	0.0044
Nonane	1.8	1.9	0.0066	1.8	1.9	0.0067	1.8	1.9	0.0066
Decane	4.7	5	0.017	4.5	4.8	0.017	4.9	5.2	0.018
Undecane	5.1	5.4	0.019	4.8	5	0.017	5.4	5.7	0.02
Dodecane	3.9	4.1	0.014	3.8	4	0.014	4	4.2	0.015
Tridecane	1.8	1.8	0.0064	1.8	1.9	0.0067	1.7	1.8	0.0061

(1) Unless otherwise reported, the following target compounds were found to be below detection:
Ethanol, Isopropanol, 1,1-Dichloroethene, Dichloromethane, trans-1,2-Dichloroethene, cis-1,2-Dichloroethene, Chloroform, 1,1,1-Trichloroethane, 1,2-Dichloroethane, Benzene, Carbon tetrachloride, Butanol, 1-Methoxy-2-propanol, Trichloroethylene, Toluene, 1,1,2-trichloroethane, Tetrachloroethene, Chlorobenzene, Ethylbenzene, m + p-Xylene, Styrene, o-Xylene, 2-Butoxyethanol, 1,1,2,2-Tetrachloroethane, Isopropylbenzene, Propylbenzene, 1,3,5-trimethylbenzene, tert-Butylbenzene, 1,2,3-trimethylbenzene, Acetone, Pentane, Acrylonitrile, n-Hexane, Methyl ethyl ketone, Ethyl acetate, Cyclohexane, 2-Methylhexane, 2,3-Dimethylpentane, Isopropyl acetate, 3-Methylhexane, Ethyl acrylate, Heptane, Methyl methacrylate, Propyl acetate, Methylcyclohexane, MIBK, 2-Hexanone, Octane, Butyl acetate, 1-methoxy-2-propyl acetate, Butyl acrylate, Cellosolve

4 PLANT OPERATING CONDITIONS

The asphalt plant was in operation at the time of sampling. 7mm SMA asphalt was being produced at a production rate of 50 tons per hour.

Plant operating conditions have been supplied by Asphaltech personnel.

5 TEST METHODS

All sampling and analysis was performed by Ektimo unless otherwise specified. Specific details of the methods are available upon request.

Parameter	Sampling Method	Analysis Method	Uncertainty*	NATA Accredited	
				Sampling	Analysis
Sample plane criteria	AS 4323.1	NA	-	✓	NA
Flow rate, temperature and velocity	USEPA 2	NA	8%, 2%, 7%	✓	NA
Moisture (stacks ≥60°C)	USEPA 4	USEPA 4	8%	✓	✓
Carbon dioxide	USEPA 3A	USEPA 3A	13%	✓	✓
Carbon monoxide	USEPA 10	USEPA 10	12%	✓	✓
Nitrogen oxides	USEPA 7E	USEPA 7E	12%	✓	✓
Oxygen	USEPA 3A	USEPA 3A	13%	✓	✓
Speciated volatile organic compounds (VOC's)	USEPA 18	Ektimo 344	19%	✓	✓†
Total particulate matter	USEPA 17	USEPA 17	5%	✓	✓

180404

* Uncertainty values cited in this table are calculated at the 95% confidence level (coverage factor = 2)

† Analysis performed by Ektimo, NATA accreditation number 14601. Laboratory analytical results were reported on 4 June 2018 in report number R005970_SVOCs.

6 QUALITY ASSURANCE/QUALITY CONTROL INFORMATION

Ektimo is accredited by the National Association of Testing Authorities (NATA) for the sampling and analysis of air pollutants from industrial sources. Unless otherwise stated test methods used are accredited with the National Association of Testing Authorities. For full details, search for Ektimo at NATA's website www.nata.com.au.

Ektimo is accredited by NATA (National Association of Testing Authorities) to ISO/IEC 17025 - Testing. ISO/IEC 17025 - Testing requires that a laboratory have adequate equipment to perform the testing, as well as laboratory personnel with the competence to perform the testing. This quality assurance system is administered and maintained by the Quality Director.

NATA is a member of APLAC (Asia Pacific Laboratory Accreditation Co-operation) and of ILAC (International Laboratory Accreditation Co-operation). Through the mutual recognition arrangements with both of these organisations, NATA accreditation is recognised worldwide.

A formal Quality Control program is in place at Ektimo to monitor analyses performed in the laboratory and sampling conducted in the field. The program is designed to check where appropriate; the sampling reproducibility, analytical method, accuracy, precision and the performance of the analyst. The Laboratory Manager is responsible for the administration and maintenance of this program.

7 DEFINITIONS

The following symbols and abbreviations may be used in this test report:

~	Approximately
<	Less than
>	Greater than
≥	Greater than or equal to
APHA	American public health association, Standard Methods for the Examination of Water and Waste Water
AS	Australian Standard
BSP	British standard pipe
CARB	Californian Air Resources Board
CEM	Continuous Emission Monitoring
CEMS	Continuous Emission Monitoring System
CTM	Conditional test method
D	Duct diameter or equivalent duct diameter for rectangular ducts
D_{50}	'Cut size' of a cyclone defined as the particle diameter at which the cyclone achieves a 50% collection efficiency ie. half of the particles are retained by the cyclone and half are not and pass through it to the next stage. The D_{50} method simplifies the capture efficiency distribution by assuming that a given cyclone stage captures all of the particles with a diameter equal to or greater than the D_{50} of that cyclone and less than the D_{50} of the preceding cyclone.
DECC	Department of Environment & Climate Change (NSW)
Disturbance	A flow obstruction or instability in the direction of the flow which may impede accurate flow determination. This includes centrifugal fans, axial fans, partially closed or closed dampers, louvres, bends, connections, junctions, direction changes or changes in pipe diameter.
DWER	Department of Water and Environmental Regulation
EPA	Environment Protection Authority
FTIR	Fourier Transform Infra Red
ISC	Intersociety committee, Methods of Air Sampling and Analysis
ISO	International Organisation for Standardisation
NA	Not applicable
NATA	National Association of Testing Authorities
NIOSH	National Institute of Occupational Safety and Health
NT	Not tested or results not required
OM	Other approved method
OU	The number of odour units per unit of volume. The numerical value of the odour concentration is equal to the number of dilutions to arrive at the odour threshold (50% panel response).
PM_{10}	Atmospheric suspended particulate matter having an equivalent aerodynamic diameter of less than approximately 10 microns (µm).
$PM_{2.5}$	Atmospheric suspended particulate matter having an equivalent aerodynamic diameter of less than approximately 2.5 microns (µm).
PSA	Particle size analysis
RATA	Relative Accuracy Test Audit
STP	Standard temperature and pressure. Gas volumes and concentrations are expressed on a dry basis at 0°C, at discharge oxygen concentration and an absolute pressure of 101.325 kPa, unless otherwise specified.
TM	Test Method
TOC	The sum of all compounds of carbon which contain at least one carbon to carbon bond, plus methane and its derivatives.
USEPA	United States Environmental Protection Agency
VDI	Verein Deutscher Ingenieure (Association of German Engineers)
Vic EPA	Victorian Environment Protection Authority
VOC	Any chemical compound based on carbon with a vapour pressure of at least 0.010 kPa at 25°C or having a corresponding volatility under the particular conditions of use. These compounds may contain oxygen, nitrogen and other elements, but specifically excluded are carbon monoxide, carbon dioxide, carbonic acid, metallic carbides and carbonate salts.
XRD	X-ray Diffractometry