

Genesis Zero Waste Facility Field Ambient Odour Assessment and Review Study

Prepared for Cardno Limited

Eastern Creek/Minchinbury, NSW

Final Report

August 2015



THE ODOUR UNIT PTY LTD

ABN 5309 116 5061 ACN 091 165 061

Australian Technology Park
Locomotive Workshop
Bay 4 Suite 3011, 2 Locomotive St
EVELEIGH, NSW 2015
P: +61 2 9209 4420

F: + 61 2 9209 4421
E: info@odourunit.com.au
W: www.odourunit.com.au

This document may only be used for the purpose for which it was commissioned and in accordance with the Terms of Engagement for the commission. This document should not be used or copied without written authorisation from **CARDNO LTD** and **THE ODOUR UNIT PTY LTD**.

Project Number: N2050L

Report Revision		
Report Version	Date	Description
Draft Report	14.07.2015	Draft report issued for review
Final Report	17.08.2015	Final report issued
Report Preparation		
Report Prepared By: M.	Assal	Approved By: T. Schulz
Report Title: Cardno Line Assessment Study and R		S Zero Waste Facility - Field Ambient Odour

CARDNO LTD P A G E | II



CONTENTS

1	Introduction	1
1.1	Scope of works	1
1.2	Site Visits	2
1.2.1	Reconnaissance visit	2
1.2.2	Assessment Visit	2
2	THE FACILITY OPERATIONS OVERVIEW	3
2.1	Key Process areas	3
2.2	Non-Putrescible Landfill Operations	4
2.3	Timber Yard Area	4
2.4	Construction Material Processing Area	5
2.5	Leachate Treatment Plant	6
3	FAOA SURVEY METHODOLOGY	7
3.1	Preamble	7
3.1.1	FAOA Survey Measurements Methodology	9
3.1.2	Odour Intensity Categories	9
3.1.3	Odour intensity and frequency criterion.	10
3.1.4	Surveys Meteorological Conditions	11
3.1.5	FAOA Key Odour Descriptors	11
3.1.6	Recording of Meteorological Conditions	12
4	REVIEW OF RELEVANT DOCUMENTATION	14
4.1	Odour and Dust Assessment: Development Application (April 2008)	14
4.1.1	Approach and Assessment Methodology	14
4.1.2	Odour emissions data	15
4.2	Air Quality Odour and Greenhouse Gas Management Plan (June 2011)	16
5	FAOA SURVEY RESULTS	19
5.1	Interpretation of Survey Findings	19
5.1.1	FAOA Map Plot Result	19
5.2	FAOA Survey Results	20
5.2.1	FAOA Survey #1: 1130 hrs – 1446 hrs	20
5.2.2	FAOA Survey #2: 1454 hrs -1517 hrs	22
6	ASSESSMENT FINDINGS/RECOMMENDATIONS	24
6.1	Review Findings/Recommendations	24



6.2	FAOA Survey Findings24
6.3	Assessment Study Limitations
7	REFERENCES
REPO	RT SIGNATURE PAGE27
	FAOA MAP PLOTS, FIGURES, PHOTOS & TABLE
	FACA MAF FLOTS, FIGURES, FITO TOS & TABLE
	FAOA MAP PLOTS
	A Survey Map Plot 5.1 – FAOA Survey No. 1: 10 June 2015 between 1130 hrs
	A Survey Map Plot 5.2 - FAOA Survey No. 2: 10 June 2015 between 1454 hrs23
	Figures
Figure	e 2.1 – Simplified site layout as found on 10 June 2015
Figure	e 3.1 – FAOA Survey Template for the Assessment8
Figure	e 3.2 – Key odour characters/descriptors used for the FAOA assessment 12
	Рнотоѕ
Photo	2.1 – Non-putrescible landfill area as present on 10 June 20154
Photo	2.2 – A section of material stockpiled in the TYA as present on 10 June 2015 5
Photo	2.3 - An area section of the construction material processing area as present
on 10	June 20156
Photo	3.1 – Illustrated setup of the Kestrel Anemometer apparatus in operation
(Sour	rce: The Odour Unit Pty Ltd)13
	Table
Table	3.1 - VDI 3882 (Part 1) Odour Intensity Categories10
	APPENDICES
A PPEI	NDIX A: FAOA SURVEY FIELD LOGSHEETS



1 INTRODUCTION

In May 2015, The Odour Unit Pty Ltd (TOU) was engaged by Cardno Limited (Cardno) to undertake a Field Ambient Odour Assessment Study (the Assessment) of the Genesis Zero Waste Facility located at Eastern Creek, NSW (the Facility). It is understood that the Assessment will form part of the requirement in the Independent Environmental Audit managed and conducted by Cardno of the landfill and waste processing facilities at the Facility.

The following report summarises the methodology and results from the Assessment conducted by TOU. The Assessment findings are limited to the prevailing conditions found on the day of the audit visit. Therefore, the findings may not necessarily represent other potential operating conditions that could prevail, such as plant upset conditions and high rainfall periods. The intention of the Assessment is to provide adequate information as feed input for the Independent Environment Audit. The Assessment is not intended to be an odour audit in its own right. The findings in this report should be read with this in mind.

1.1 SCOPE OF WORKS

The scope of works for the Assessment was prescribed by Cardno and based on satisfying the audit conditions prescribed in the Facility's Environment Protection Licence (EPL), Project Consent and odour assessment and management plans. The approach taken by Cardno to satisfy the odour related audit conditions is as follows:

- a) The undertaking of field-based odour assessment on the day of the audit visit;
- b) Review the existing odour assessment reports relevant to the landfill and waste process operations at the Facility; and
- c) Assess the adequacy of the existing odour management plan with respect to current industry guidelines or good practice.

TOU undertook the above approach for the Assessment.



1.2 SITE VISITS

1.2.1 Reconnaissance visit

A reconnaissance visit was carried out by TOU's Managing Director and a TOU Senior Engineer & Consultant on 2 June 2015. The objective of this visit was to receive a formal project briefing from Cardno and the Facility on TOU's role and responsibilities during the audit and be given a tour of the Facility's landfill and waste processing operations. The reconnaissance visit was followed by a final visit by TOU on 10 June 2015, during which the main undertakings of the Independent Environmental Audit were conducted by Cardno in the form of an on-site audit visit (see **Section 1.2.2**).

1.2.2 Assessment Visit

The audit visit was undertaken by a TOU Senior Engineer & Consultant supported by an experienced TOU Field Technician on 10 June 2015. TOU's scope during the audit visit consisted of the following:

- The undertaking of a Field Ambient Odour Assessment Survey downwind of the Facility; and
- A review of the landfill and waste processing operations conducted at the Facility. The review consisted of a site walk-around by a staff member from the Facility. The objective of the review was to understand the basic operations at each key area, identify potential odour emission sources and gauge the character/quality of odour emissions from each key area. This enabled the TOU assessors to be familiar with the character of each odour that could be emitted from the Facility and develop a suitable odour descriptor inventory for each key area.

CARDNO LTD



2 THE FACILITY OPERATIONS OVERVIEW

The Facility is located at Eastern Creek in the central western suburbs of Sydney, NSW. Currently, it is licenced to operate as a non-putrescible landfill; material processing centre and waste storage facility. The Facility is also licensed to carry out green waste composting, however, it is understood that this is not being currently undertaken as of this report date for commercial and operational reasons. The type and scale of waste that the Facility is licenced to receive is defined in Environment Protection License (EPL) No. 20121 issued by the New South Wales Environment Protection Authority (EPA) dated 5 June 2014.

2.1 KEY PROCESS AREAS

A simplified site layout highlighting the key areas at the Facility (as found on 10 June 2015) is shown in **Figure 2.1**.



Figure 2.1 - Simplified site layout as found on 10 June 2015

The following sections are intended to provide a brief overview of each key process area shown in **Figure 2.1** as found on 10 June 2015.

CARDNO LTD PAGE | 3



2.2 Non-Putrescible Landfill Operations

The non-putrescible landfill currently resides inside a large void area which was previously used as a quarry. The non-putrescible landfill currently receives waste product generated from the Material Processing Centre (MPC) which is conveyed to the bottom of the void active tipping face area by a long vertically steep chute system. The waste conveyed through the chute system primarily consists of material that cannot be recycled or recovered in the MPC. **Photo 2.1** shows the non-putrescible landfill area and chute system as present on 10 June 2015.



Photo 2.1 - Non-putrescible landfill area as present on 10 June 2015

2.3 TIMBER YARD AREA

The Timber Yard Area (TYA) consists primarily of the dry-woody material of different size fractions that is generated during sorting and separation processes conducted within the MPC. The sorted and separated material is stockpiled in the TYA until it is sold and transported by trucks off-site. An example of stockpiled material in the TYA as present on 10 June 2015 is shown in **Photo 2.2.**

CARDNO LTD PAGE | 4





Photo 2.2 - A section of material stockpiled in the TYA as present on 10 June 2015

2.4 Construction Material Processing Area

The construction material processing area stores sorted construction waste that is segregated/crushed to different size fractions. The final product is used as recyclable building material. An example of stockpiled material in the TYA as present on 10 June 2015 is shown in **Photo 2.3.**



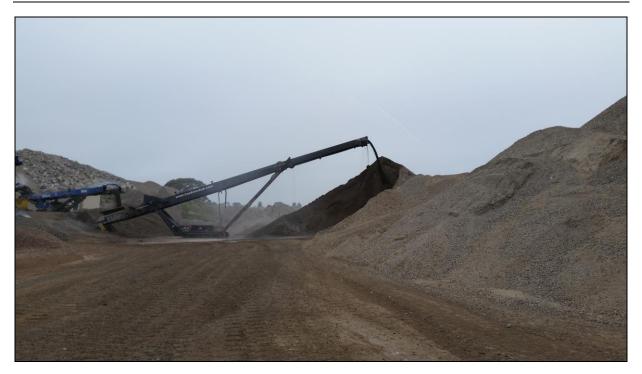


Photo 2.3 – An area section of the construction material processing area as present on 10 June 2015

2.5 LEACHATE TREATMENT PLANT

The leachate treatment plant (LTP) exists on the south-eastern corner outside of the quarry Void perimeter. All leachate from the landfill and waste processing operations is directed to this LTP, treated and discharged. The LTP operates in a sequencing batch reactor (SBR) treatment configuration. In the event of excess leachate flow, provisions have been made to direct this to the Leachate Contingency Dam for progressive treatment by the LTP.



3 FAOA SURVEY METHODOLOGY

3.1 PREAMBLE

At present, no Australian Standard exists for FAOA surveys. Consequently, TOU utilises a method for assessing the ground level impacts of odour emissions using a modified version of the German Standard VDI 3940 (1993) – 'Determination of Odorants in Ambient Air by Field Inspections'. This standard prescribes the methods by which field technicians (or assessors) determine, define and document observed ground level odours and the manner in which the determination of these odours is defined in relation to odour character, frequency of odours observed and the odour intensity of those individual observations as a quantitative scale of measure.

FAOA surveys are considered a valuable odour impact assessment tool as previous experience with ambient odour sampling and subsequent olfactometry testing suggests that accurate and useful ambient odour concentration data is difficult to obtain. Therefore, TOU has adopted a more practical approach based on the field measurement of odour intensity. With this method, calibrated and experienced odour assessor/s traverse the general area and downwind surrounds of odour sources in a strategically mapped pattern, assessing the presence, character and intensity of any odours encountered and recording these observations along with wind speed and direction (when applicable). For the FAOA surveys conducted at the Facility, all accessible upwind and downwind areas on 10 June 2015 were assessed. The assessed areas were based on the wind conditions prevailing at the time of the FAOA Survey.

Figure 3.1 presents the map template for the assessment area and highlights the location of the Facility relative to the measurement location points (see **Section 3.1.1** for details).





Figure 3.1 – FAOA Survey Template for the Assessment

CARDNO LTD



3.1.1 FAOA Survey Measurements Methodology

The techniques employed in the surveys were able to quantify and / or qualify the following:

- Odour intensity:
- Odour character:
- Frequency;
- Extent of odour plume; and
- The likely source of odours detected near and far-field from the Facility

For the surveys undertaken at the Facility, each TOU assessor spent 10 minutes at each Measurement Location Point (MLP) in order to gauge the effects of any odour impact. Each measurement cycle comprised of 60 individual 'grab' assessments of odour, one every 10 seconds for a single measurement cycle of 10 minutes. When plotted each grab measurement resulted in a single data point.

Overall, each survey utilised two assessors, with each assessor undertaking 14 single measurement sets over the assessment area at different MLPs over the duration of the two surveys. The derived results of the survey were then illustrated visually on odour impact maps, which are based on the field logsheets for the survey (see **Appendix A**).

At each MLP, wind velocity and direction was checked using a Vane Anemometer. In the event of a positive detection of odour at a MLP, the TOU assessor attempted to evaluate the odour intensity, odour character and likely source (whenever possible). In this way, the FAOA method enables for the determination and extent of the impact of odour around the area of interest, rank their intensity and likely source.

3.1.2 Odour Intensity Categories

The ranking scale for the observed off-site odours detected beyond the facility boundary were quantified according to the *German Standard VDI 3940 'Determination*



of Odorants in Ambient Air by Field Inspections'. The standard's ranking system is based on the following 7-point intensity scale as shown in **Table 3.1.**

Table 3.1 - VDI 3882 (Pa	art 1) Odour Intensity C	Categories
Odour Strength	Intensity Rank (code)	TOU Interpretation (meaning)
Not detectable	0	No odour detected
Very Weak	1	Odour recognised and where possible assigned to the odour source
Weak	2	Odour is weak but not yet distinct
Distinct	3	Odour is clearly distinct
Strong	4	Strong odour detectable
Very Strong	5	Very strong odour detectable
Extremely Strong	6	Extremely strong odour detectable

Locations assessed that are assigned an odour intensity score of '0' (not detectable) were still be recorded in order to outline the presence and extent of the odour present at the assessment location. The 'distinct' level is that at which the odour character (e.g. landfill gas, garbage) is clearly definable.

3.1.3 Odour intensity and frequency criterion.

Although outside the scope of work for this project, and referring to the Odour Intensity Categories listed and described in **Table 3.1** above, a particular odour intensity level can often be linked to a possible odour impact from the facilities. This criterion, whether it is Category 2 (Weak) or Category 3 (Distinct), will be dependent upon the sensitivity of the receptor areas, the nature / offensiveness of the odours present and the frequency of exposure. Odour Intensity Category 1 (very weak) would rarely, if ever, correspond to adverse odour impacts.

As previously mentioned in **Section 3.1.1**, the FAOA surveys conducted in the Assessment resulted in the generation of 60 sniffs per measurement cycle per MLP. From this, the data was benchmarked against a suitable frequency impact criterion of 10% i.e. a positive detection of an odour is measured for more than or equal to 10% of



time (equivalent to 10 sniffs) during the measurement cycle at an odour intensity of 1 or greater. This criterion was selected based on previous FAOA studies conducted by TOU and considered to be the event in which adverse odour impact is likely. An example where this criterion was extensively used is the *New South Wales Western Sydney Regional Odour Assessment Project* conducted by TOU in 2012 & 2013 for the NSW EPA.

3.1.4 Surveys Meteorological Conditions

Ideally, FAOA surveys should be carried out over a range of meteorological conditions, from near-calm to moderate to strong wind speeds, and under differing wind directions. The result of each FAOA survey would then determine the impact range within that assessment area for that survey, and the overall findings representing a broader picture of possible adverse odour impacts.

Unfortunately, the relatively short duration of the Assessment coincided with a narrow range of wind speeds, although there was a reasonable range of wind directions available for assessment. The findings of this project are therefore restricted to the wind and weather conditions prevailing at the time of the Assessment, and the nature and condition of the various processes and activities carried out at each of the key areas at the Facility.

The general prevailing local wind conditions at the time of conducting the FAOA surveys were calm (< 0.5 m/s) to light (< 1 m/s) wind speeds, cloudy skies, and wind direction varied however was blowing predominately from the westerly and easterly cardinal directions. Previous rainfall had been encountered prior to the undertaking of the FAOA survey.

3.1.5 FAOA Key Odour Descriptors

The odour sources at the Facility have their origins from the processes occurring at each key area. Based on TOU's experience, the reconnaissance visit and site tour during the audit visit, key odour descriptors were allocated, and subsequently standardised to represent the quality of odours detected within the assessed area as shown in **Figure 3.2**. The odour descriptors used in the surveys enabled for the characterisation of the detected odour/s and determination of likely source, by



strategically undertaking the surveys upwind, downwind and closer to the Facility boundary.

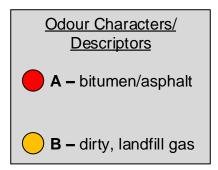


Figure 3.2 - Key odour characters/descriptors used for the FAOA assessment

The definition for each odour character/descriptor used in the FAOA surveys are as follows:

- 1. **Bitumen/asphalt:** odour likely to be generated from Fulton Hogan process operations that occur adjacent to the Facility; and
- 2. **Dirty, landfill gas:** odour likely to be generated from MPC non-putrescible landfill area and operations.

Based on TOU's on-site tour visit on 10 June 2015, there is a potential for other key odour descriptors to be included in the FAOA surveys however, for similar reasons outlined in **Section 3.1.4**, it was not possible for alternate conditions to be assessed given these constraints in the Assessment.

3.1.6 Recording of Meteorological Conditions

Local meteorological conditions prevailing over the duration of the FAOA surveys were recorded using a Kestrel 4500 Pocket Weather Tracker Anemometer (see **Photo 3.1** for an illustrated setup). At each MLP assessed, the assessors would setup the anemometer apparatus enabling for real-time measurement of local temperature, wind speed and direction at a MLP over each 10-min measurement cycle. This was undertaken during every survey at each MLP.

CARDNO LTD P A G E | 12





Photo 3.1 – Illustrated setup of the Kestrel Anemometer apparatus in operation (Source: The Odour Unit Pty Ltd)



4 REVIEW OF RELEVANT DOCUMENTATION

As part of the odour assessment study, TOU was engaged to undertake a concise peer-review of relevant documentation in relation to odour. The documents that were made available to TOU for this review are as follows:

- Air Quality Odour and Dust: Light Horse Business Centre Development Application (April 2008); and
- Environmental Management Strategy: Air Quality Odour and Greenhouse Gas Management Plan (June 2011).

This section provides a concise review of these two documents, and evaluates whether or not this is consistent with best industry practice and whether the current management controls are actively in place to attenuate odour emissions from the Facility.

4.1 ODOUR AND DUST ASSESSMENT: DEVELOPMENT APPLICATION (APRIL 2008)

TOU understands that an odour (and dust) assessment was undertaken as part of the Development Application (DA) for the Facility in 2008, and is currently the only odour assessment carried out since commencement of operations. It was prepared for Environment Resources Management Australia Pty Ltd (ERMA) on behalf of Light Horse Business Centre.

4.1.1 Approach and Assessment Methodology

The 2008 odour assessment appears to have been undertaken in accordance with the relevant technical guidelines set by the New South Wales Environment Protection Authority (NSW EPA) at the time that the assessment was being undertaken.

The dispersion model used was CALPUFF. This is considered appropriate given the complex topography and meteorological conditions prevailing at the Facility location. In addition, the selection of a ground level odour criterion (glc) of 2 odour units (ou) for the modelling is conservative and considered appropriate given the close proximity of the existing, densely populated, urban residential area, to the north and west of the Facility.



Without being provided the raw modelling files, there is no way of checking the model itself. This could be carried out in the event of the undertaking of an odour verification assessment, where the estimated odour emissions can be used to verify the predicted modelling results, if ever required (see **Section 4.1.2** for further details). Overall, however, TOU is satisfied with the approach and assessment methodology used in the 2008 odour assessment.

4.1.2 Odour emissions data

The odour emissions data used in the 2008 odour assessment appear to be based on the Facility's previous operations at its Alexandria Facility, where its non-putrescible landfill operations had occurred. An assumption is made in this odour assessment that given the Alexandria Facility at the time accepted a similar waste stream, the odour emissions for the active tipping face and capped areas are representative of what the Facility's emissions would be once approved and in operation. This approach is considered appropriate given the absence of data that appeared to be available at the time. In addition, the higher results from the measurement data for these areas have been used for the modelling, and this is considered appropriate and conservative given the close proximity of the urbans area to the north and west of the Facility.

For the active tipping face and capped areas, the 2008 odour assessment appears to apply a correction factor of 1% (derived from 32 tonnes of organic waste in 5,282 tonnes of total waste received in 2006) to the emissions data for these sources to account for the lower organic or biodegradable material expected to be received at the Facility. Whilst at first glance this could appear reasonable, TOU considers that this correction factor is not necessarily applicable for the following reasons:

- Waste streams are very well known to vary in mixture composition (there are many factors for this including, but not limited to, social dynamics in different municipal areas, consumption trends at the time, and production technologies), and it is difficult therefore to assume that such compositions would prevail throughout the life of the Facility's landfill operations; and
- There is no rigorous evidence in the 2008 odour assessment to suggest that lower volumes of organic/biodegradable waste in inorganic waste will result in a



lower specific odour emission rate (ou.m³/m²/s) from the covered tip face and capped areas. TOU would consider that this would reduce the mass emission rate of landfill gas/odour and not concentration of the potential emissions. Therefore, it would be better to correct emission rates based on potential fugitive gas emission rate from the landfill rather than on a waste tonnage basis.

In addition, the odour emissions for the leachate/dam trench appear to be based on measurements from a greenwaste processing facility, and not for landfill gas operations, and also assume aerobic conditions. No background details are given on the specific wastewater treatment system that the data was derived from and nor is its applicability to the Facility's current operations.

No greenwaste processing is carried out at the Facility and therefore the emissions in this 2008 odour assessment for greenwaste windrows is not applicable. No other context behind the usage of this odour emission has been provided.

Based on the above review analysis, TOU is of the opinion there is a requirement to undertake an odour verification assessment consisting of odour sampling and testing to characterise the current odour emissions of the Facility, for the purposes of:

- a) Verifying the odour emissions data used in the Environmental Assessment (EA) for the project approval; and
- b) Informing the need for, and if required, the scope of a long term odour monitoring program for the Facility.

4.2 AIR QUALITY ODOUR AND GREENHOUSE GAS MANAGEMENT PLAN (JUNE 2011)

The air quality odour (and greenhouse gas management plan) was developed by Light House Business and appears to be based on two previous documents, as follows:

- 22 December 2009 Air Quality Management Plan by PAE Holmes; and
- 1 July 2010 Noise and Air Quality Monitoring Report.

TOU did not have access to these documents at the time of writing this assessment report.



The Facility's odour management plan (OMP) is contained within the air quality odour and greenhouse gas management plan and is titled *Odour Management*. It is considered by TOU that the OMP is very concise and limited in detailing process information and specific operational practices used at each key area at the Facility to attenuate odour emissions. It also appears to be solely focused on the landfill gas operations. It is TOU's experience at other waste processing facilities across Australia that the OMP should be a site-specific, comprehensive document that:

- Documents the regulations, operating practice and procedures undertaken at the Facility;
- Contains odour monitoring programs currently in use or planned. Landfill gas monitoring is noted in the current OMP however no recent monitoring data has been sighted or provided to TOU. A landfill gas monitoring strategy and site-specific landfill gas data would assist in evaluating the level of fugitive emissions from the landfill operations. TOU is uncertain whether or not this monitoring strategy is being undertaken at the Facility;
- Is a 'live' document which is updated regularly by the Facility's Environment Officer/Management Team to ensure it is constantly reflecting the operating conditions prevailing at any given time; and
- The OMP should document an odour complaints procedure specifying how complaints are handled and recorded. It should be orientated at assisting the Facility with useful feedback from the community, such as corresponding an odour complaint to process conditions prevailing at the time of the incident. This would provide valuable feedback to the Facility in regards to actively managing on-site odour emissions.

TOU's opinion is that the OMP in its current status requires considerable update and expansion to reflect current operating conditions, highlight the odour risks and controls at the Facility, and best industry practice. This advice is consistent with the project approval conditions (Condition B of the *Air Quality, Odour and Greenhouse Gas Management Plan*) which stipulates that:

CARDNO LTD P A G E | 17



b) Describe in detail the measures that would implemented on site to control the odour and air quality impacts of the project, and to ensure that these controls remain effective over time.

Notwithstanding this, the information provided in the current air quality plan, in principal, is considered to be valid operational practices aimed at attenuating odour emissions. In addition, some of the air quality and greenhouse gas control measures mentioned in the air quality plan would be applicable to odour management (such as the landfill gas monitoring/management strategies), however, this link is not immediately obvious in the current state of the OMP.



5 FAOA SURVEY RESULTS

5.1 Interpretation of Survey Findings

Each map plot result shown consists of several features. These are generally depicted on a pie chart and wind vane indicator on each map plot. The features include:

- MLP: these are strategic points on the map were designed to enable assessors to pursue upwind and downwind effects from the Facility;
- Location wind conditions: the local wind direction and speed at each MLP has been indicated by a yellow arrow. In the event a wind direction has not been indicated, the conditions at the time were calm (i.e. < 1 m/s) and wind direction was unable to be accurately determined. The recorded wind conditions at each MLP may have varied at the time of the assessment from the prevailing wind conditions that existed in the general Sydney precinct recorded by local meteorological stations. Given the complex meteorological dynamics that can occur arising (such as local terrain, topography, katabatic channelling and effects from natural and built environments) affecting wind direction and speed, the local wind conditions experienced at some MLP varied from the prevailing wind condition; and
- Odour descriptors: at each MLP where a measurement cycle was undertaken, key parameters were recorded in the event an odour was detected (methodology for this has been previously described in Section 3.1.5). The key descriptors shown on the maps includes the intensity of odour (how strong the smell was) based on the VDI 3882 German Odour Intensity Scale. In addition, the odour character was also recorded based on an odour character inventory developed by TOU to describe the range of odours encountered throughout the course of the surveys.

5.1.1 FAOA Map Plot Result

Section 5.2 contains the findings of each of the FAOA surveys. The logsheets for each FAOA survey, showing the raw field data, are appended as **Appendix A.**

CARDNO LTD PAGE | 19



5.2 FAOA SURVEY RESULTS

The following comments on results should be read in conjunction with their corresponding FAOA Map Plots. The likely source/s mentioned in these results is based on the odour character/s detected and position of the odour source/the Facility relative to the wind direction i.e. whether the odour source/the Facility was upwind or downwind of a positive detection event.

5.2.1 FAOA Survey #1: 1130 hrs - 1446 hrs

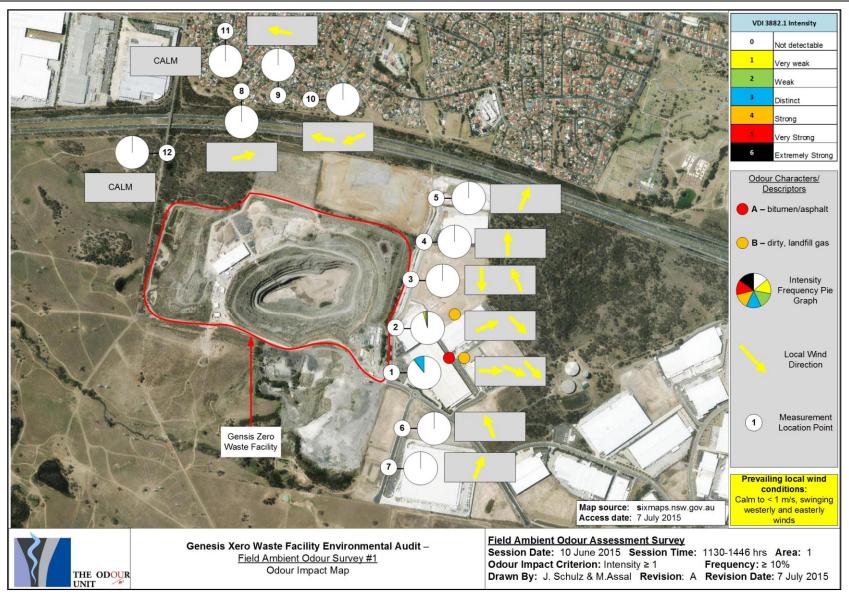
FAOA Survey #1 was carried out on 10 June 2014 between 1130 hrs to 1446 hrs. The wind conditions at the time of this survey assessment were calm (< 0.5 m/s) to light (< 1 m/s) winds, swinging between westerly and easterly cardinal directions. Local wind direction varied during the survey.

The results from this survey is as follows:

- At MLP 1 i.e. close to the site boundary along Kangaroo Avenue odour was intermittently detected at an intensity between Very Weak to Distinct (odour intensity values of 1 to 3 respectively), with distinct prevailing for the bulk of measurement period;
- The odour character/descriptor detected at MLP 1 varied across the measurement cycle. The initial odour character detected was 'bitumen/asphalt' followed by a period of no odour. This suggested that the likely source of this odour was the Fulton Hogan operations that operate in the southern eastern area of the Facility. The next positive detection during the measurement cycle was a 'dirty/landfill gas' odour suggesting that the non-putrescible landfill area was the likely source;
- The dirty/landfill gas odour was further detected at MLP albeit at a much lesser duration and odour intensity of Very Weak to Weak; and
- No other odour was detectable from MLP 3 to MLP 12 at the time of the survey assessment including further downwind areas of the Facility and nearby Minchinbury urban areas that exist to the north of the Facility.

CARDNO LTD P A G E | 20





FAOA Survey Map Plot 5.1 - FAOA Survey No. 1: 10 June 2015 between 1130 hrs and 1446 hrs



5.2.2 FAOA Survey #2: 1454 hrs -1517 hrs

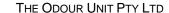
FAOA Survey #2 was carried out on 10 June 2014 between 1454 hrs to 1517 hrs. The wind conditions at the time of this survey assessment were light (1-2 m/s) winds, tending predominately from the south. Local wind direction varied during the survey.

The objective of this survey was to revisit MLPs 1 & 2 to evaluate if another positive odour detection event could be observed at these locations.

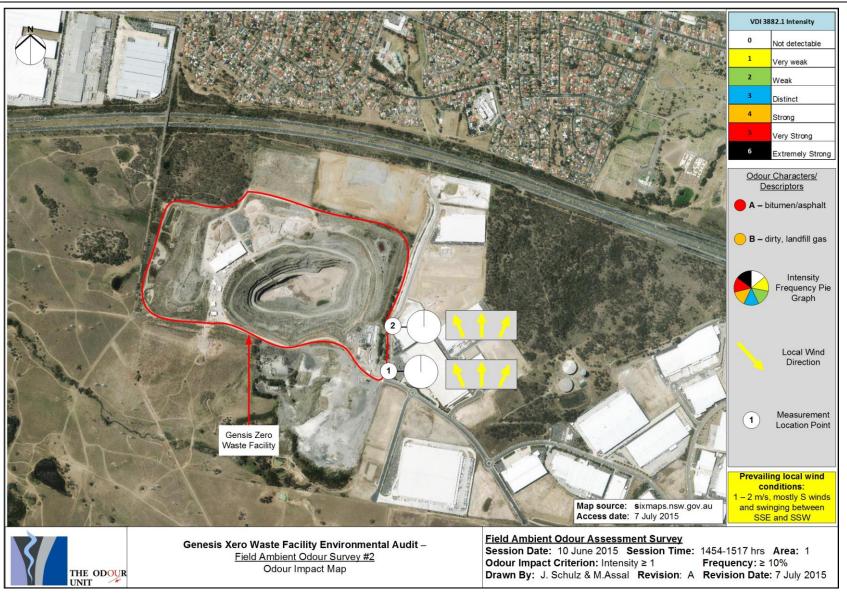
The results from this survey is as follows:

No other odour was detectable at the time of this survey assessment. This is likely due to a combination of wind and/or operating conditions prevailing at the time of the assessment.

CARDNO LTD P A G E | 22







FAOA Survey Map Plot 5.2 - FAOA Survey No. 2: 10 June 2015 between 1454 hrs and 1517 hrs



6 ASSESSMENT FINDINGS/RECOMMENDATIONS

6.1 REVIEW FINDINGS/RECOMMENDATIONS

The findings from the review indicate that the Facility requires additional information to that currently available to better reflect current operations and industry best practice. Based on the review findings in the Assessment, the following is recommended:

- An update to the current OMP. This update should document in more details the regulations, operating practices and procedures, odour monitoring programs currently in use and/or planned, and odour risks and controls. Once this is implemented, the OMP should be used as a 'live' document, and updated regularly; and
- In conjunction with the next bi-annual environmental audit, the undertaking of an odour verification assessment consisting of odour sampling and testing to characterise the current odour emissions of the Facility, for the purposes of:
 - a) Verifying the odour emissions data used in the Environmental Assessment (EA) for the project approval; and
 - b) Informing the need for, and if required, the scope of a long term odour monitoring program for the Facility.

6.2 FAOA SURVEY FINDINGS

The overall FAOA Survey findings indicate that minimal adverse odour impact beyond the Facility boundary was found at the time of the Assessment. Notwithstanding this result, there were instances during the FAOA survey assessment period where odour from the Facility was detectable within the immediate vicinity of the site boundary i.e. along Kangaroo Avenue, however, this odour was not detectable further downwind from the Facility at the time. The odour characters/descriptors detected included a dirty/landfill gas odour and a bitumen/asphalt odour. The former odour character/descriptor suggests that the likely source was from the landfill gas operations at the Facility at the time of the assessment. The latter odour character/descriptor suggests the likely source at the time was the asphalt processing plant, which is understood to be not related to the Facility operations. Otherwise, no



other odour was detectable during the Assessment that could be related back to other key operations at the Facility.

6.3 ASSESSMENT STUDY LIMITATIONS

Ideally, FAOA surveys should be carried out over a range of meteorological conditions, from near-calm to moderate to strong wind speeds, and under differing wind directions. The results of each FAOA survey would then determine the impact range within that assessment area for that survey, and the overall findings representing a broader picture of possible adverse odour impacts.

Unfortunately, the relatively short duration of the Assessment coincided with a narrow range of wind speeds, although there was a moderate range of wind directions available for assessment however not favourable at times. The findings of this project are therefore restricted to the wind and weather conditions prevailing at the time of the Assessment, and the nature and condition of the various processes and activities carried out at each of the key areas at the Facility. The findings should be read with this in mind.



7 REFERENCES

- Six Maps, Figure 2.1 Simplified site layout, URL: https://maps.six.nsw.gov.au/
 [Access date: 10 June 2015]
- Six Maps, FAOA Survey Map Plot 5.1 FAOA Survey No. 1: 10 June 2015 between 1130 hrs and 1446 hrs, URL: https://maps.six.nsw.gov.au/ [Access date: 10 June 2015]
- Six Maps, FAOA Survey Map Plot 5.2 FAOA Survey No. 2: 10 June 2015 between 1454 hrs and 1517 hrs, URL: https://maps.six.nsw.gov.au/ [Access date: 10 June 2015]
- New South Wales Environment Protection Authority, Follow-up Western Sydney Regional Odour Assessment – Eastern Creek, Kemps Creek & Erskine Park, NSW, The Odour Unit Pty Ltd, Final Report, October 2014
- New South Wales Environment Protection Authority, Western Sydney Regional Odour Assessment – Eastern Creek, Kemps Creek & Erskine Park, NSW, The Odour Unit Pty Ltd, Final Report, February 2013
- Light Horse Business Centre, Environmental Management Strategy: Air Quality Odour and Greenhouse Gas Management Plan, June 2011, URL: http://www.dadi.com.au/assets/files/EMS%20Appendix%20E%20Air%20Quality %20Odour%20and%20GHG%20Management%20Plan.pdf

[Access date: 8 June 2015]

Light Horse Business Centre, Air Quality – Odour and Dust: Light Horse Business Centre Development Application, April 2008, URL: http://www.dadi.com.au/assets/files/EA%20Appendix%20E%20-%20LHBC_Air%20and%20odour_ERM_Final.pdf

[Access date: 8 June 2015]

 German Standard VDI 3940 – 'Determination of Odorants in Ambient Air by Field Inspections', 1993

CARDNO LTD P A G E | 26



REPORT SIGNATURE PAGE

The Odour Unit Pty Ltd (NSW)

P: (02) 9209 4420

F: (02) 9209 4421

E: info@odourunit.com.au

ABN: 53 091 165 061

Terry Schulz

Principal & Managing Director

Michael Assal

Senior Engineer & Consultant



Genesis Zero Waste Facility Field Ambient Odour Assessment and Review Study

Prepared for Cardno Limited

Eastern Creek/Minchinbury, NSW

Appendix

August 2015



APPENDIX A:FAOA SURVEY FIELD LOGSHEETS

FAOA - Session Summary (Odour Intensity)

 Date:
 10/06/2015
 Start Time:
 1130 hrs
 End Time:
 1249 hrs



 Assessment Area:
 1
 Intensity ≥
 1
 Frequency ≥
 10%

Location		1			2			3			4			5			6	
Intensity	1	2	%	1	2	%	1	2	%	1	2	%	1	2	%	1	2	%
0	54	53	89%	58	57	96%	60	60	100%	60	60	100%	60	60	100%	60	60	100%
1	0	1	1%	1	1	2%	0	0	0%	0	0	0%	0	0	0%	0	0	0%
2	0	0	0%	1	1	2%	0	0	0%	0	0	0%	0	0	0%	0	0	0%
3	6	6	10%	0	1	1%	0	0	0%	0	0	0%	0	0	0%	0	0	0%
4	0	0	0%	0	0	0%	0	0	0%	0	0	0%	0	0	0%	0	0	0%
5	0	0	0%	0	0	0%	0	0	0%	0	0	0%	0	0	0%	0	0	0%
6	0	0	0%	0	0	0%	0	0	0%	0	0	0%	0	0	0%	0	0	0%
≥ 1's	6	7	11%	2	3	4%	0	0	0%	0	0	0%	0	0	0%	0	0	0%
Freq Exceeded?		YES			NO			NO			NO			NO			NO	
≥ 2's	6	6	10%	1	2	3%	0	0	0%	0	0	0%	0	0	0%	0	0	0%
Freq Exceeded?		YES			NO			NO			NO			NO			NO	



330331	nent Are	ea:	1		-						Start Ti	me:	1130 hrs	3	End Tin	ne:	124	9 hrs	-	
Vind Sp		oint: Direction 0 hrs		< 1 m/s		_		eed and	oint: Direction 3 hrs			s WNW	-		eed and	int: Direction 7 hrs		< 1 r	n/s N 7 hrs	_
min-1	0	3	3	3	3	0	min-1	0	1	0	0	0	0	min-1	0	0	0	0	0	0
min-2	0	0	0	0	0	0	min-2	0	0	0	0	0	0	min-2	0	0	0	0	0	0
min-3	0	0	0	0	0	0	min-3	0	0	0	0	0	0	min-3	0	0	0	0	0	0
min-4	0	0	0	0	0	0	min-4	0	0	0	0	0	0	min-4	0	0	0	0	0	0
min-5	3	3	0	0	0	0	min-5	0	0	0	0	0	0	min-5	0	0	0	0	0	0
min-6	0	0	0	0	0	0	min-6	0	0	0	0	0	0	min-6	0	0	0	0	0	0
min-7	0	0	0	0	0	0	min-7	0	0	0	0	0	0	min-7	0	0	0	0	0	0
min-8	0	0	0	0	0	0	min-8	0	0	0	0	0	0	min-8	0	0	0	0	0	0
min-9	0	0	0	0	0	0	min-9	0	0	0	0	0	0	min-9	0	0	0	0	0	0
min-10	0	0	0	0	0	0	min-10	0	0	0	0	0	2	min-10	0	0	0	0	0	0
Descripto	or(o):	А	В				Danada	or(a):	А	В		-		Descript	or(s):	А	В			
Jescripit	JI (5).						Descript	UI(5).												
Field con Local wire	mments and direct	 s: ion swing pint:	 ing betwe	-	 nd NW		Field co Local wi Wind sp	emments nd direct eed inter	ion swing mittently pint:	between 5	1-2 m/s			Field co	mments nd direct	ion swing	 ging betwee	=		
Field con Local wir	mments and direct	 s: ion swing	ing betwe	een W ar			Field co Local wi Wind sp Measure Wind Sp	nd direct eed inter ement Po	s: ion swing mittently	ping between	een WN\ 1-2 m/s	W and SS	sw	Field co Local wi	mments and direct	I :: ion swing	ging between	een N an	<u>I</u>	-
Field con Local wir Measure Wind Sp	mments and direct ment Po eed and 121	cion swing	ing betwee	een W ar		-	Field co Local wi Wind sp Measure Wind Sp	emments eed inter ement Po	s: ion swing mittently pint: Direction 4 hrs	ping between	een WN\ 1-2 m/s	W and SS	- -	Field co Local wi	mments and direct	icinicinicinicinicinicinicinicinicinici	ging between	een N an	d SSE	- -
Field con Local wir Measure Wind Spr Start:	mments and direct ment Po eed and 121	ion swing	4 End:	- <1 n	od NW		Field co Local wi Wind sp Measure Wind Sp Start:	emments and direct eed inter ement Po eed and 122	ion swing mittently point: Direction 4 hrs	sing between 5 End:	een WN\ 1-2 m/s	W and SS	- - 0	Field co Local wi Measure Wind Sp Start:	mments and direct ament Po aleed and 123	icion swing	6 End:	- < 1 m. 124	d SSE //s SSE 9 hrs	- 0
Field con Local wir Measure Wind Spo	mments and direct ment Po eed and 121	cion swing	ing betwee	een W ar		-	Field co Local wi Wind sp Measure Wind Sp Start:	emments eed inter ement Po	s: ion swing mittently pint: Direction 4 hrs	between 5 End:	een WN\ 1-2 m/s	W and SS	- -	Field co Local wi Measure Wind Sp Start:	mments and direct ament Po aeed and 123	icinicinicinicinicinicinicinicinicinici	6 End:	een N an	d SSE	- -
Field collaboration Measure Wind Spr Start: min-1 min-2	mments ment Po eed and 121	ion swing int: Direction 1 hrs	ing betwee 4 End:	- <1 n 122		0	Field co Local wi Wind sp Measure Wind Sp Start:	omments and direct eed inter ement Po eed and 122	ion swing mittently bint: Direction 4 hrs	sping between 5	een WN\ 1-2 m/s - <1 m/ 123	V and SS Vs SSW 4 hrs	- - 0	Field co Local wi Measure Wind Sp Start:	mments and direct ament Po aged and 123	icion swing	6 End:	- < 1 m. 124	d SSE /s SSE 9 hrs	0
Field cool Local wir Measure Wind Spr Start: min-1 min-2 min-3	mments and direct ment Po eed and 121 0 0	ion swing	4 End:	- <1 n 122		0 0	Field co Local wi Wind sp Measure Wind Sp Start: min-1 min-2 min-3	ement Popeed and 122	ion swing mittently bint: Direction 4 hrs	sing between 5 End:	een WN\\ 1-2 m/s - <1 m/ 123	W and SS	- - 0 0	Field co Local wi Measure Wind Sp Start:	ement Poseed and 123	int: Direction 9 hrs	6 End:	- < 1 m	d SSE /s SSE 9 hrs	0 0
Field cool Local wir Measure Wind Spr Start: min-1 min-2 min-3 min-4	mments Potential Medical Medic	s: ion swing sint: Direction 1 hrs	ing between 4 End:	- <1 n 122		0 0	Field co Local wi Wind sp Measure Wind Sp Start: min-1 min-2 min-3 min-4	emments and direct eed inter ement Po eed and 122 0 0 0	s: ion swing mittently sint: Direction 4 hrs	sing between 5 End:	een WNV 1-2 m/s - <1 m/ 123 0 0 0	/s SSW 4 hrs 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Field co Local wi Measure Wind Sp Start: min-1 min-2	mments ament Po ament Po ament 123 0 0 0	int: Direction 9 hrs	6 End:	- < 1 m. 124	d SSE //s SSE 9 hrs 0 0 0	0 0
Field cool wire Measure Measure Start: min-1 min-2 min-3 min-4 min-5	mments and direct ment Po	s: ion swing int: Direction 1 hrs	4 End:			0 0	Field co Local wi Wind sp Measure Wind Sp Start: min-1 min-2 min-3 min-4 min-5	mments and direct eeed inter eeed inter eeed and 122	s: ion swing mittently pint: Direction 4 hrs 0 0 0	sing between 5 Control of the contro	een WN\ 1-2 m/s	V and SS Vs SSW 44 hrs	0 0 0	Field co Local wi Measure Wind Sp Start: min-1 min-2 min-3	mments and direct mement Po	int: Direction 9 hrs	6 End:	- < 1 m. 124	d SSE (s SSE 9 hrs	
Measure Wind Sp Start: min-1 min-2 min-3 min-4 min-5 min-6	mments and direct ment Po	s: ion swing int: Direction 1 hrs 0 0 0 0	4 End:	- <1 m / 1222		0 0 0	Field co Local wi Wind sp Measure Wind Sp Start: min-1 min-2 min-3 min-4 min-5	mments ceed inter ceed inter ceed and 1222	s: ion swing mittently bint: Direction 4 hrs	End:	eeen WNN 1-2 m/s - <1 m/s - 123 0 0 0 0 0 0	// N and SS	0 0 0 0	Field co Local wi Measure Wind Sp Start: min-1 min-2 min-3 min-4	mments mment Pcc mment Pcc o o o o o o o o o o o o o o o o o o	int: Direction 9 hrs	6 End:	- <1 m. 124	d SSE (s SSE 9 hrs 0 0 0	0 0 0 0 0
Field cool Local wir Measure Wind Sp Start: min-1 min-2 min-3 min-4 min-5 min-6 min-7	mments Port Port Port Port Port Port Port Port	s: ion swing int: Direction 1 hrs 0 0 0 0 0		- <1 n 122		0 0 0 0 0 0	Field co Local wi Wind sp Measure Wind Sp Start: min-1 min-2 min-3 min-4 min-5 min-6 min-7	mments Pc eed inter eed and 122 0 0 0 0 0 0	ion swing mittently point: Direction 4 hrs 0 0 0 0 0		- <1 m/ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	S SSW 4 hrs		Field co Local wi Measure Wind Sp Start: min-1 min-2 min-3 min-4 min-5	mments mment Pc eed and 123 0 0 0 0 0 0	int: Direction swing	6	- <1 m 124	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0
Field cool wire Measure Wind Sp Start: min-1 min-2 min-3 min-4 min-5 min-6 min-7 min-8	mments and direct ment Popel and 121	s: ion swing int: Direction 1 hrs 0 0 0 0 0 0	ing between 4 End:	- <1 m 122		0 0 0 0 0 0 0 0 0	Field co Local wi Wind sp Measure Wind Sp Start: min-1 min-2 min-3 min-4 min-5 min-6 min-7 min-8	mments and direct eed inter eed inter eed and 122	size ion swing mittently sint: Direction 4 hrs 0 0 0 0 0 0 0	End:	eeen WNV 1-2 m/s - <1 m/ 123 0 0 0 0 0 0 0 0	N and SS 'S SSW 4 hrs 0 0 0 0 0	0 0 0 0 0	Field co Local wi Measure Wind Sp Start: min-1 min-2 min-3 min-4 min-5 min-6	mments and direct ment of the control of the contro	int: Direction swing one of the content of the con	6	- <1 m 124	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0
Measure Wind Sp Start: min-1 min-2 min-3 min-4 min-5 min-6 min-7 min-8 min-9 min-10	mments and direct ment Poc eeed and 121	ion swing int: Direction 1 hrs 0 0 0 0 0 0 0	ing between 4	- <1 n 122		0 0 0 0 0 0 0 0 0 0 0 0	Field co Local wi Wind sp Measure Wind Sp Start: min-1 min-2 min-3 min-4 min-5 min-6 min-7 min-8 min-9	mments and direct eed inter ment Pc eed and 122 0 0 0 0 0 0 0 0 0 0 0 0	sicion swing mittently sint: Direction 4 hrs 0 0 0 0 0 0 0	sping between 5 company of the compa	eeen WNI 1-2 m/s <1 m/ 123 0 0 0 0 0 0 0 0 0 0 0 0 0	N and SS 's SSW 4 hrs 0 0 0 0 0 0 0	0 0 0 0 0 0	Field co Local wi Measure Wind Sp Start: min-1 min-2 min-3 min-4 min-5 min-6 min-7 min-8 min-9	mments mment Pc meed and 123 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	int: Direction 9 hrs 0 0 0 0 0 0	6 End:	- <1 m 124 0 0 0 0 0 0 0 0	d SSE /s SSE 9 hrs 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Measure Wind Sp Start: min-1 min-2 min-3 min-4 min-5 min-6 min-7 min-8 min-9 min-10	mments and direct ment Poc eeed and 121	int: Direction 1 hrs 0 0 0 0 0 0 0 0				0 0 0 0 0 0 0 0 0 0	Field co Local wi Wind sp Measure Wind Sp Start: min-1 min-2 min-3 min-4 min-5 min-6 min-7 min-8 min-9	mments and direct eed inter ment Pc eed and 122 0 0 0 0 0 0 0 0 0 0 0 0	s: ion swing mittently bint: Direction 4 hrs 0 0 0 0 0 0 0 0	specific production in the control of the control o	eeen WNN 1-2 m/s - <1 m/s 123 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	N and SS 's SSW 4 hrs 0 0 0 0 0 0 0	0 0 0 0 0	Field co Local wi Measure Wind Sp Start: min-1 min-2 min-3 min-4 min-5 min-6 min-7	mments mment Pc meed and 123 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	int: Direction 9 hrs 0 0 0 0 0 0 0 0	6 End:	- <1 m. 124	d SSE (s SSE 9 hrs 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Measure Wind Sp Start: min-1 min-2 min-3 min-4 min-5 min-6 min-7 min-8 min-9	mments and direct ment Poeed and 121	s: ion swing int: Direction 1 hrs 0 0 0 0 0 0 A	ing between 4	- <1 n 122		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Field co Local wi Wind sp Measure Wind Sp Start: min-1 min-2 min-3 min-4 min-5 min-6 min-7 min-8 min-9	mments and direct eed interest end direct eed and 122	s: ion swing mittently pint: Direction 4 hrs 0 0 0 0 0 A	S	eeen WNI 1-2 m/s <1 m/ 1-2 123 0 0 0 0 0 0 0	S SSW 4 hrs 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Field co Local wi Measure Wind Sp Start: min-1 min-2 min-3 min-4 min-5 min-6 min-7 min-8 min-9	mments and direct ment Pole eed and 123	int: Direction swing 9 hrs 0 0 0 0 A	End:	- <1 m 124 0 0 0 0 0 0 0 0	d SSE (s SSE 9 hrs 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0



3303311	nent Are	ea:	1								Start Ti	me:	1130 hrs	<u> </u>	End Tir	ne:	124	9 hrs	-	
	eed and	oint: Direction 0 hrs		< 1 m/s		_		eed and	oint: Direction 3 hrs			s WNW	-		eed and	int: Direction 7 hrs		='	m/s N 7 hrs	_
min-1	3	3	3	3	0	0	min-1	3	1	0	0	0	0	min-1	0	0	0	0	0	0
min-2	0	0	0	0	0	0	min-2	0	0	0	0	0	0	min-2	0	0	0	0	0	0
min-3	0	0	0	0	0	0	min-3	0	0	0	0	0	0	min-3	0	0	0	0	0	0
min-4	0	0	0	0	0	0	min-4	0	0	0	0	0	0	min-4	0	0	0	0	0	0
min-5	0	0	0	0	0	0	min-5	0	0	0	0	0	0	min-5	0	0	0	0	0	0
min-6	3	3	1	0	0	0	min-6	0	0	0	0	0	0	min-6	0	0	0	0	0	0
min-7	0	0	0	0	0	0	min-7	0	0	0	0	0	0	min-7	0	0	0	0	0	0
min-8	0	0	0	0	0	0	min-8	0	0	0	0	0	0	min-8	0	0	0	0	0	0
min-9	0	0	0	0	0	0	min-9	0	0	0	0	0	0	min-9	0	0	0	0	0	0
min-10	0	0	0	0	0	0	min-10	0	0	0	0	0	2	min-10	0	0	0	0	0	0
Descripto	()	А	В	С				(a).	А	В	С	-		Descript	or(s).	А	В	С		-
	or(s):			-			Descript	OI(S).												
Field cor Local win	mments and direct	ion swing	 ing betwo	 een W ar	 ad NW		Wind sp	emments nd direct eed inter	ion swing mittently pint:	between 5	1-2 m/s			Field co	ement Po	ion swing	 ging between	=		
Field cor Local win	mments and direct	 s: ion swing	 ing betwe	een W ar			Field co Local wi Wind sp Measure Wind Sp	nd direct eed inter ement Po	s: ion swing mittently	ping between	een WN\ 1-2 m/s	W and SS	sw	Field co Local wi	mments nd direct	I :: ion swing	ging between	een N an	d SSE	-
Field cor Local win Measurer	mments and direct ment Po eed and	cion swing	ing betwee	een W ar	 nd NW	-	Field co Local wi Wind sp Measure Wind Sp	emments eed inter ement Po	s: ion swing mittently pint: Direction 4 hrs	ping between	een WN\ 1-2 m/s	W and SS	- -	Field co Local wi	mments nd direct	icinicinicinicinicinicinicinicinicinici	ging between	een N an	d SSE	- -
Field cor Local win Measurer Wind Spe Start:	mments and direct ment Po eed and 121	s: ion swing bint: Direction 1 hrs	ing betwee				Field co Local wi Wind sp Measure Wind Sp Start:	emments and direct eed inter ement Po eed and 122	ion swing mittently point: Direction 4 hrs	between 5 End:	een WN\ 1-2 m/s	W and SS	- - 0	Field co Local wi Measure Wind Sp Start:	ement Popeed and	icion swing	6 End:	- < 1 m. 124	d SSE /s SSE 9 hrs	- 0
Field cor Local win Measurer Wind Spe Start: _	mments and direct ment Po eed and	cion swing	ing betwee	 een W ar - <1 n	 nd NW	-	Field co Local wi Wind sp Measure Wind Sp Start:	emments eed inter ement Po	s: ion swing mittently pint: Direction 4 hrs	between 5 End:	een WN\ 1-2 m/s	W and SS	- -	Field co Local wi Measure Wind Sp Start:	ement Poseed and	icinicinicinicinicinicinicinicinicinici	6 End:	een N an	d SSE /s SSE 9 hrs	- -
Field cor Local win Measurer Wind Spe Start:	mments ment Po eed and 121	ion swing int: Direction 1 hrs	ing between	 een W ar - <1 n 122		0	Field co Local wi Wind sp Measure Wind Sp Start:	omments and direct eed inter ement Po eed and 122	ion swing mittently bint: Direction 4 hrs	sing between 5 End:	een WN\ 1-2 m/s - <1 m/ 123	V and SS Vs SSW 4 hrs	- - 0	Field co Local wi Measure Wind Sp Start:	ement Popeed and 123	icion swing	6 End:	- < 1 m. 124	d SSE /s SSE 9 hrs	0 0
Field cor Local win Measurer Wind Spe Start: min-1 min-2	mments ment Po eed and 121 0 0	ion swing	4 End:		od NW	0 0	Field co Local wi Wind sp Measure Wind Sp Start: min-1 min-2 min-3	ement Popeed and 122	ion swing mittently bint: Direction 4 hrs	5 End:	een WN\\ 1-2 m/s - <1 m/ 123	W and SS	- - 0 0	Field co Local wi Measure Wind Sp Start:	ement Popeed and 123	int: Direction 9 hrs	6 End:	- < 1 m	d SSE /s SSE 9 hrs 0 0	0 0
Field cor Local win Measurer Wind Spe Start: min-1 min-2	mments Potential Control of the Cont	s: ion swing int: Direction 1 hrs	ing between 4 End:		od NW on/s S 1 hrs	0 0	Field co Local wi Wind sp Measure Wind Sp Start: min-1 min-2 min-3 min-4	emments and direct eed inter ement Po eed and 122 0 0 0	s: ion swing mittently sint: Direction 4 hrs	5 End:	een WNV 1-2 m/s - <1 m/ 123 0 0 0	/s SSW 4 hrs 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Field co Local wi Measure Wind Sp Start: min-1 min-2	ement Popeed and 123	int: Direction 9 hrs	6 End:	- < 1 m. 124	d SSE /s SSE 9 hrs	0 0
Field cor Local win Measurer Wind Spe Start: min-1 min-2 min-3	mments and direct ment Pc eeed and 121	s: ion swing int: Direction 1 hrs	4 End:		od NW	0 0	Field co Local wi Wind sp Measure Wind Sp Start: min-1 min-2 min-3 min-4 min-5	mments and direct eeed inter eeed inter eeed and 122	s: ion swing mittently pint: Direction 4 hrs 0 0 0	5 End:	een WN\ 1-2 m/s	V and SS Vs SSW 44 hrs	0 0 0	Field co Local wi Measure Wind Sp Start: min-1 min-2 min-3	mments and direct direc	int: Direction 9 hrs	6 End:	- < 1 m. 124	d SSE /s SSE 9 hrs 0 0 0	0 0 0
Field cor Local win Measurer Wind Spo Start: min-1 min-2 min-3 min-4 min-5	mments and direct ment Po	s: ion swing int: Direction 1 hrs 0 0 0 0	4 End:		od NW	0 0 0	Field co Local wi Wind sp Measure Wind Sp Start: min-1 min-2 min-3 min-4 min-5	mments ceed inter ceed inter ceed and 1222	s: ion swing mittently bint: Direction 4 hrs	End:	eeen WNN 1-2 m/s - <1 m/s - 123 0 0 0 0 0 0	// N and SS	0 0 0 0	Field co Local wi Measure Wind Sp Start: min-1 min-2 min-3 min-4	mments and direct ment Pc eved and 123 0 0 0 0 0 0	int: Direction 9 hrs	6 End:	- <1 m. 124	d SSE /s SSE 9 hrs 0 0 0 0	0 0 0
Field cor Local win Measurer min-1 min-2 min-3 min-4 min-5 min-6 min-7	mments ment Pc eed and 121 0 0 0 0 0	s: ion swing int: Direction 1 hrs 0 0 0 0 0	### ##################################		odd NW	0 0 0 0 0 0	Field co Local wi Wind sp Measure Wind Sp Start: min-1 min-2 min-3 min-4 min-5 min-6 min-7	mments Pc eed inter eed and 122 0 0 0 0 0 0	ion swing mittently point: Direction 4 hrs 0 0 0 0 0	_ End:	- <1 m/ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	S SSW 4 hrs		Field co Local wi Measure Wind Sp Start: min-1 min-2 min-3 min-4 min-5	mments and direct or an area of the control of the	int: Direction swing	6	- <1 m 124	d SSE //s SSE 0 0 0 0 0	0 0 0 0 0 0 0
Field cor Local win Measurer Wind Spe Start: min-1 min-2 min-3 min-4 min-5 min-6 min-7 min-8	mments and direct	s: ion swing int: Direction 1 hrs 0 0 0 0 0 0	End:			0 0 0 0 0 0 0 0 0	Field co Local wi Wind sp Measure Wind Sp Start: min-1 min-2 min-3 min-4 min-5 min-6 min-7 min-8	mments and direct eed inter eed inter eed and 122	size ion swing mittently sint: Direction 4 hrs 0 0 0 0 0 0 0	sing between 5	eeen WNV 1-2 m/s - <1 m/ 123 0 0 0 0 0 0 0 0	N and SS 'S SSW 4 hrs 0 0 0 0 0	0 0 0 0 0	Field co Local wi Measure Wind Sp Start: min-1 min-2 min-3 min-4 min-5 min-6	mments and direct and	int: Direction swing one of the content of the con	6	- <1 m 124	d SSE //s SSE	0 0 0 0 0 0 0 0 0 0
Field cor Local win Measurer Wind Spe Start: min-1 min-2 min-3 min-4 min-5 min-6 min-7 min-8 min-9	mments and direct ment Pc eeed and 121 0 0 0 0 0 0 0 0 0 0 0 0 0	s: ion swing int: Direction 1 hrs 0 0 0 0 0 0 0 0 0			ord NW ord NW ord NW ord NA ord N	0 0 0 0 0 0 0 0 0 0 0 0	Field co Local wi Wind sp Measure Wind Sp Start: min-1 min-2 min-3 min-4 min-5 min-6 min-7 min-8 min-9	mments and direct eed inter ment Pc eed and 122 0 0 0 0 0 0 0 0 0 0 0 0	sicion swing mittently sint: Direction 4 hrs 0 0 0 0 0 0 0	sing between 5 Control of the contro	eeen WNI 1-2 m/s - <1 m/ - 123 0 0 0 0 0 0 0 0 0 0 0 0 0	N and SS 's SSW 4 hrs 0 0 0 0 0 0 0	0 0 0 0 0 0	Field co Local wi Measure Wind Sp Start: min-1 min-2 min-3 min-4 min-5 min-6 min-7 min-8 min-9	mments and direct ment Pc ceed and 123 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	int: Direction 9 hrs 0 0 0 0 0 0	6 End:	- <1 m 124	d SSE /s SSE 9 hrs 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Field cor Local win Measurer Wind Spe Start:	mments and direct ment Pc eeed and 121 0 0 0 0 0 0 0 0 0 0 0 0 0	int: Direction 1 hrs 0 0 0 0 0 0 0 0			ord NW ord NW ord NW ord NA ord N	0 0 0 0 0 0 0 0 0 0	Field co Local wi Wind sp Measure Wind Sp Start: min-1 min-2 min-3 min-4 min-5 min-6 min-7 min-8 min-9	mments and direct eed inter ment Pc eed and 122 0 0 0 0 0 0 0 0 0 0 0 0	s: ion swing mittently bint: Direction 4 hrs 0 0 0 0 0 0 0 0	End:	eeen WNN 1-2 m/s - <1 m/s 123 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	N and SS 's SSW 4 hrs 0 0 0 0 0 0 0	0 0 0 0 0	Field co Local wi Measure Wind Sp Start: min-1 min-2 min-3 min-4 min-5 min-6 min-7	mments and direct ment Pc ceed and 123 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	int: Direction 9 hrs 0 0 0 0 0 0 0 0	6 End:	- <1 m. 124	d SSE /s SSE 9 hrs 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Field cor Local win Measurer Wind Spe Start: min-1 min-2 min-3 min-4 min-5 min-6 min-7	mments and direct ment Popular and the control of t	s: ion swing int: Direction 1 hrs 0 0 0 0 0 0 A	4 End: 0 0 0 0 0 0 0 0 B			0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Field co Local wi Wind sp Measure Wind Sp Start: min-1 min-2 min-3 min-4 min-5 min-6 min-7 min-8 min-9	mments and direct eed interest end direct eed and 122	s: ion swing mittently pint: Direction 4 hrs 0 0 0 0 0 A	sing between 5	eeen WNI 1-2 m/s <1 m/ 1-2 1 m/ 1 23 0 0 0 0 0 0 0 0 C C	S SSW 4 hrs 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Field co Local wi Measure Wind Sp Start: min-1 min-2 min-3 min-4 min-5 min-6 min-7 min-8 min-9	mments and direct mement Pc appeared and appeared appear	int: Direction swing 9 hrs 0 0 0 0 A	End:	- <1 m 124 0 0 0 0 0 0 0 0 C	d SSE /s SSE 9 hrs 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

FAOA - Session Summary (Odour Intensity)

 Date:
 10/06/2015
 Start Time:
 1253 hrs
 End Time:
 1446 hrs



 Assessment Area:
 1
 Intensity ≥
 1
 Frequency ≥
 10%

Location		7			8			9			10			11			12	
Intensity	1	2	%	1	2	%	1	2	%	1	2	%	1	2	%	1	2	%
0	60	60	100%	60	60	100%	60	60	100%	60	60	100%	60	60	100%	60	60	100%
1	0	0	0%	0	0	0%	0	0	0%	0	0	0%	0	0	0%	0	0	0%
2	0	0	0%	0	0	0%	0	0	0%	0	0	0%	0	0	0%	0	0	0%
3	0	0	0%	0	0	0%	0	0	0%	0	0	0%	0	0	0%	0	0	0%
4	0	0	0%	0	0	0%	0	0	0%	0	0	0%	0	0	0%	0	0	0%
5	0	0	0%	0	0	0%	0	0	0%	0	0	0%	0	0	0%	0	0	0%
6	0	0	0%	0	0	0%	0	0	0%	0	0	0%	0	0	0%	0	0	0%
≥ 1's	0	0	0%	0	0	0%	0	0	0%	0	0	0%	0	0	0%	0	0	0%
Freq Exceeded?		NO																
≥ 2's	0	0	0%	0	0	0%	0	0	0%	0	0	0%	0	0	0%	0	0	0%
Freq Exceeded?		NO																



Name: Michael Assal Member ID: 1 Assessment Area: Start Time: 1253 hrs End Time: 1446 hrs Measurement Point: Measurement Point: Measurement Point: < 1 m/s ESE Wind Speed and Direction < 1 m/s SSW Wind Speed and Direction <1 m/s WSW Wind Speed and Direction 1253 hrs End: 1303 hrs Start: 1340 hrs End: 1350 hrs Start: 1354 hrs End: 1404 hrs min-1 min-1 min-1 min-2 min-2 min-2 min-3 min-3 min-3 min-4 min-4 min-4 min-5 min-5 min-5 min-6 min-6 min-6 min-7 min-7 min-7 min-8 min-8 min-9 min-9 min-9 min-10 min-10 min-10 Α В Α В Α В Descriptor(s): Descriptor(s): Descriptor(s): Field comments: Field comments: Field comments: None Tod PI, Minchinbury. Winds intermittently calm during Rutherglen PI, Minchinbury measurment period. Local ambient temperature 14.6 °C Measurement Point: ___10 Measurement Point: 11 Measurement Point: <1 m/s ESE Wind Speed and Direction Wind Speed and Direction Calm Wind Speed and Direction Calm Start: 1407 hrs End: 1417 hrs Start: ____1421 hrs ___ End: ____1431 hrs Start: 1436 hrs End: 1446 hrs min-1 min-1 min-1 min-2 min-2 min-2 min-4 min-4 min-4 min-5 min-5 min-5 min-6 min-6 min-7 min-7 min-7 min-8 min-8 min-8 min-10 min-10 min-10 Α В --Α В --Α В Descriptor(s): Descriptor(s): Descriptor(s): Field comments: Field comments: Field comments: Ann Minchin Way, Minchinbury. Wind direction swinging McFarlane Dr. Minchinbury. Slight ESE wind gust (< 1 m/s) Archbold Rd. Minchinbury between ESE and ENE intermittently present measurement period Weather conditions: cloudy, previous rainfall event, no rain during survey time Key Odour Descriptors: A = bitumen/asphalt B = dirty, landfill gas

FAOA - Field Data Record Sheet (Odour Intensity & Quality) Name: Alex Schulz Member ID: Assessment Area: Start Time: 1253 hrs End Time: 1446 hrs Measurement Point: Measurement Point: Measurement Point: Wind Speed and Direction < 1 m/s SSW Wind Speed and Direction <1 m/s WSW Wind Speed and Direction < 1 m/s ESE 1253 hrs End: 1303 hrs Start: _ 1340 hrs End: 1350 hrs Start: 1354 hrs End: 1404 hrs min-1 min-1 min-1 min-2 min-2 min-2 min-3 min-3 min-3 min-4 min-4 min-4 min-5 min-5 min-5 min-6 min-6 min-6 min-7 min-7 min-7 min-8 min-8 min-9 min-9 min-9 min-10 min-10 min-10 Α В Α В Α В Descriptor(s): Descriptor(s): Descriptor(s): Field comments: Field comments: Field comments: None Tod PI, Minchinbury. Winds intermittently calm during Rutherglen PI, Minchinbury measurment period. Local ambient temperature 14.6 °C __10__ Measurement Point: Measurement Point: Measurement Point: ___11___ Wind Speed and Direction Wind Speed and Direction Wind Speed and Direction Calm Calm <1 m/s ESE Start: 1407 hrs End: 1417 hrs Start: 1421 hrs End: 1431 hrs Start: 1436 hrs End: 1446 hrs min-1 min-1 min-1 min-2 min-2 min-2 min-4 min-4 min-4 min-5 min-5 min-5 min-6 min-7 min-7 min-7 min-8 min-8 min-8 min-10 min-10 min-10 Α В Α В Α В Descriptor(s): Descriptor(s): Descriptor(s): --Field comments: Field comments: Field comments: Ann Minchin Way, Minchinbury. Wind direction swinging McFarlane Dr. Minchinbury. Slight ESE wind gust (< 1 m/s) Archbold Rd. Minchinbury between ESE and ENE intermittently present measurement period Weather conditions: cloudy, previous rainfall event, no rain during survey time Key Odour Descriptors: A = bitumen/asphalt

B = dirty, landfill gas

FAOA - Session Summary (Odour Intensity)

 Date:
 10/06/2015
 Start Time:
 1454 hrs
 End Time:
 1517 hrs



Assessment Area: 1 Intensity ≥ 1 Frequency ≥ 10%

Location		1			2							
Intensity	1	2	%	1	2	%						
0	60	60	100%	60	60	100%						
1	0	0	0%	0	0	0%						
2	0	0	0%	0	0	0%						
3	0	0	0%	0	0	0%						
4	0	0	0%	0	0	0%						
5	0	0	0%	0	0	0%						
6	0	0	0%	0	0	0%						
≥ 1's	0	0	0%	0	0	0%						
Freq Exceeded?		NO			NO							
≥ 2's	0	0	0%	0	0	0%						
Freq Exceeded?		NO			NO							

FAOA - Field Data Record Sheet (Odour Intensity & Quality	FAOA - Field D	ata Record Sheet (Odour Intensit	y & Quality
---	----------------	--------------------	----------------	-------------



Name: Michael Assal Member ID: 1 Date: Assessment Area: Start Time: 1454 hrs End Time: 1517 hrs Measurement Point: Measurement Point: Measurement Point: Wind Speed and Direction 1-2 m/s S Wind Speed and Direction 1-2 m/s S Wind Speed and Direction Start: 1454 hrs End: 1504 hrs Start: 1507 hrs End: 1517 hrs Start: ____ End: ____ min-1 0 0 0 0 0 min-1 0 0 0 0 0 0 min-1 0 0 0 0 0 0 0 0 0 0 0 0 min-2 min-2 min-2 0 0 min-3 0 0 0 0 0 min-3 0 0 0 0 0 min-3 min-4 0 0 0 0 0 0 min-4 0 0 0 0 0 0 min-4 0 0 min-5 0 0 0 0 min-5 min-5 0 0 0 0 0 0 min-6 0 0 0 0 0 0 min-6 min-6 min-7 0 0 0 0 0 0 min-7 0 0 0 0 0 0 min-7 min-8 0 0 0 0 0 min-8 0 0 0 0 0 0 min-8 0 0 0 0 0 0 min-9 0 0 0 0 0 0 min-9 min-9 min-10 0 0 0 0 0 0 min-10 0 0 0 0 0 0 min-10 Α В Α В В Descriptor(s): Descriptor(s): Descriptor(s): Field comments: Field comments: Field comments: Wind direction swinging between SSE and SSW Wind direction swinging between SSE and SSW None Measurement Point: Measurement Point: Measurement Point: Wind Speed and Direction Wind Speed and Direction Wind Speed and Direction Start: End: Start: End: Start: __ End: __ min-1 min-1 min-1 min-2 min-2 min-2 min-4 min-4 min-4 min-5 min-5 min-5 min-6 min-6 min-6 min-7 min-7 min-7 min-8 min-8 min-8 min-10 min-10 min-10 В Α В -----Α --Α В Descriptor(s): Descriptor(s): Descriptor(s): ----------------------Field comments: Field comments: Field comments: None None None Weather conditions: cloudy, previous rainfall event, no rain during survey time Key Odour Descriptors: A = bitumen/asphalt B = dirty, landfill gas

	Field D	ata Rec	ord She	eet (Odo	ur Inten	sity & Q	uality)											3	THE	ODOU
Name:	Alex Sc	hulz					Men	nber ID:	2		Date:	10/06	6/2015	_						
Assessi	ment Are	ea:	1		-						Start Ti	me:	1454 hr	rs_	End Ti	me:	151	7 hrs	-	
Wind Sp	ement Po beed and 145	Direction	1 n End:	1-2 r			1	eed and	oint: Direction 7 hrs		1-2 r	m/s S 7 hrs		Wind	rement Po	d Direction				=
min-1	0	0	0	0	0	0	min-1	0	0	0	0	0	0	min-1						
min-2	0	0	0	0	0	0	min-2	0	0	0	0	0	0	min-2						
min-3	0	0	0	0	0	0	min-3	0	0	0	0	0	0	min-3						
min-4	0	0	0	0	0	0	min-4	0	0	0	0	0	0	min-4						
min-5	0	0	0	0	0	0	min-5	0	0	0	0	0	0	min-5						
min-6	0	0	0	0	0	0	min-6	0	0	0	0	0	0	min-6						
min-7	0	0	0	0	0	0	min-7	0	0	0	0	0	0	min-7						
min-8	0	0	0	0	0	0	min-8	0	0	0	0	0	0	min-8						
min-9	0	0	0	0	0	0	min-9	0	0	0	0	0	0	min-9						
	0	0	0																	
min-10			U	0	0	0	min-10	0	0	0	0	0	0	min-10						
	tor(s):	A	В						0 A	0 B		0	0			А	В		-	
Descript	tor(s):	A				 	Descripte	or(s):	A	 				Descri	otor(s):		В			1
Descript	omments	A	В				Descripto	or(s):	A	В			-	Descri	otor(s):			1		1
Descript Field co Wind dir Measure	pomments rection sy ement Po	A s: winging b sint: Direction	B	SSE and S	 		Descripte Field co Wind dir Measure Wind Sp	mments ection so	A	B	SE and S	 		Field (None	otor(s):	s: Dint:				
Descript Field co Wind dir Measure	pomments rection sy ement Po	A s: winging b sint: Directior	B	SSE and S	 		Descripte Field co Wind dir Measure Wind Sp	mments ection so	A s: winging b bint: Direction	B	SE and S	 		Field (None	comments	s: Dint:				
Descript Field co Wind dir Measure Wind Sp Start:	pomments rection sy ement Po	A s: winging b sint: Directior	B	SSE and S	 		Descripte Field co Wind dir Measure Wind Sp Start:	mments ection so	A s: winging b bint: Direction	B	SE and S	 		Pield of None Measu, Wind Star	comments	s: Dint:				
Descript Field co Wind dir Measure Wind Sp Start:	pomments rection sy ement Po	A s: winging b sint: Directior	B	SSE and S	 		Descripton Field co Wind dir Measure Wind Sp Start:	mments ection so	A s: winging b bint: Direction	B	SE and S	 		Pield (None Measu Wind (Star	comments	s: Dint:				
Descript Field co Wind dia Measure Wind Sp Start: min-1 min-2	pomments rection sy ement Po	A s: winging b sint: Directior	B	SSE and S	 		Descriptor Field co Wind dir Measure Wind Sp Start: min-1	mments ection so	A s: winging b bint: Direction	B	SE and S	 		Descri Field (None Measu Wind : Star min-1	comments	s: Dint:				
Descript Field co Wind dir Measure Wind Sp Start: min-1 min-2 min-3	pomments rection sy ement Po	A s: winging b sint: Directior	B	SSE and S	 		Descript Field co Wind dir Measure Wind Sp Start: min-1 min-2 min-3	mments ection so	A s: winging b bint: Direction	B	SE and S	 		Descri Field (None Measu Wind (Star) min-1 min-2	comments	s: Dint:				
Descript Field cc Wind di Weasure Wind Sp Start: min-1 min-2 min-3	pomments rection sy ement Po	A s: winging b sint: Directior	B	SSE and S	 		Descriptor Field co Wind dir Measure Wind Sp Start: min-1 min-2 min-3 min-4	mments ection so	A s: winging b bint: Direction	B	SE and S	 		Pield (None Measu Wind Star	comments	s: Dint:				
Field co Field co Wind dir Weasure min-1 min-2 min-3 min-4	pomments rection sy ement Po	A s: winging b sint: Directior	B	SSE and S	 		Descriptor Field co Wind dir Measure Wind Sp Start: min-1 min-2 min-3 min-4 min-5	mments ection so	A s: winging b bint: Direction	B	SE and S	 		Descri Field (None Measu Wind : Star min-1 min-2 min-3	comments	s: Dint:				
Pield co Wind din Weasurer Wind Spart: min-1 min-2 min-3 min-4	pomments rection sy ement Po	A s: winging b sint: Directior	B	SSE and S	 		Descripton Field co Wind dir Measure Wind Sp Start: min-1 min-2 min-3 min-4 min-5 min-6	mments ection so	A s: winging b bint: Direction	B	SE and S	 		Descri Field of None Measu Wind : Star min-1 min-2 min-3 min-4	comments	s: Dint:				
Pield company of the	pomments rection sy ement Po	A s: winging b sint: Directior	B	SSE and S	 		Descriptor Field co Wind dir Measure Wind Sp Start: min-1 min-2 min-3 min-4 min-5 min-6 min-7	mments ection so	A s: winging b bint: Direction	B	SE and S	 		Descri Field (None Meast Wind: Star min-1 min-2 min-3 min-6 min-7	comments	s: Dint:				
Descript Field co Wind din Measure min-1 min-2 min-3 min-4 min-5 min-6 min-7 min-8	pomments rection sy ement Po	A s: winging b sint: Directior	B	SSE and S	 		Descriptor Field co Wind dir Measure Wind Sp Start: min-1 min-2 min-3 min-4 min-5 min-6 min-7 min-8	mments ection so	A s: winging b bint: Direction	B	SE and S	 		Descri Field of None Measu Wind s Star min-1 min-2 min-3 min-6 min-6 min-7	rement Pic	s: Dint:				

Weather conditions: cloudy, previous rainfall event, no rain during survey time

Key Odour Descriptors:

A = bitumen/asphalt

B = dirty, landfill gas