



ODOUR FIELD ASSESSMENT (OFA): METHODOLOGY STATEMENT

RESOURCE RECOVERY GROUP: CANNING VALE CENTRE



Resource Recovery Group: Canning Vale Centre

Bannister Road
Canning Vale, Western Australia 6155

Prepared for: Southern Metropolitan Regional Council *T/a*
Resource Recovery Group



Environment | Air Quality



Environmental & Air Quality Consulting Pty Ltd
PO Box 897
JOONDALUP DC
WA 6919
+61 (8) 6108 3760
+61 (0) 449 915 043
www.eaqconsulting.com.au
jhurley@eaqconsulting.com.au

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Signature

A handwritten signature in black ink, appearing to read "John Hurley".

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1 Method Background

This Methodology Statement (the Method) has been compiled by Environmental and Air Quality Consulting Pty Ltd (EAQ) and details the Method undertaken to determine the impact of offsite, ground level odours observable at sensitive receptor locations downwind of the Resource Recovery Group's (RRG) Canning Vale Centre (CVC).

This Method of observing and empirically assessing odours in ambient air is based on the German Standard VDI 3940 known as "*Measurement of Odour Impact by Field Inspection*".

The system by which those observed odours are ranked, according to the strength of the odour sensation experienced, is based on the German Standard VDI 3940 Part 3.

The Measurement of Odour Impact by Field Inspection, otherwise referred to as an Odour Field Assessment (OFA), records the presence, intensity (strength) and frequency of observable odours from a pre-defined odour source. These odours are detected by a panel of field odour technicians (assessors) that have been calibrated for their olfactory sensitivity according to the Australian/New Zealand Standard AS/NZS4323.3:2001.

The CVC site has three primary processes and associated process areas:

- Materials Recovery Facility (MRF) of recyclables handling and distribution;
- Green Waste Facility (GWF) receivals, handling and processing and distribution; and
- FOGO Processing Facility (FPF) of municipal and FOGO wastes (kerb side collections).

The use of OFAs informs the understanding of actual offsite odour impacts from the pre-defined odour source allowing the observations to be interpreted as (among others) problematic at a given location due to high intensity and frequency, or acceptable when observing a low intensity and frequency of those observations.



2 Terms & Definitions

“Assessment Area” refers to the defined area for the specific task in hand. The size and shape depend on the task and on the number and type of odour sources whose impact range is being assessed;

“Assessor” somebody who participates in the OFA;

“Calibrated Assessor” a person calibrated for their olfactory sensitivity using n-butanol in a Dynamic Olfactometry Laboratory according to Australian Standard AS/NZS4323.3:2001 for Dynamic Olfactometry;

“Field Inspection” measuring odours in ambient air using panel members;

“Field Survey” total of measurement sessions (cycles) required to characterize an exposure level (see part 2 plume method) or plume extent (see part 2 plume method) in an area under study affected by one or more sources or emitting facilities;

“OFA” means Measurement of Odour Impact by Field Inspection;

“Grab Measurement” refers to the panel member taking a single sniff of the ambient air at each ten second interval within the measurement cycle and ranking the odour intensity experienced at that grab measurement – the result is a single odour sample;

“Impact Range” refers to the area in which an odour impact is caused by the emitter(s) under investigation;

“Maximum Plume Reach” maximum distance downwind where an odour type can be perceived and recognized (under defined meteorological conditions);

“Measurement Cycle” refers to the time required for a single measurement at a measurement point (10 minutes);

“Measurement Day” refers to the day on which a survey or surveys was undertaken;

“Measurement Point” refers to the panel members’ position at which a single measurement is carried out. For a plume measurement the measurement point is identified at an approximate point of intersection of grid lines;

“Method” refers to the methodology to be undertaken;

“Methodology” means the system of all individual tasks, techniques, tools and measurements undertaken to collect the desired dataset of information or solve the problem;

“Odorant” substance whose volatiles can be perceived by the olfactory organ (including nerves);

“Odour” sensation perceived by means of the olfactory organ in sniffing certain volatile substances;

“Odour Absence Point” measurement point at which the odour under study is not perceived and recognized as a result of a single measurement;



“Odour Detection” to become aware of the sensation resulting from adequate stimulation of the olfactory system;

“Odour Hour” is obtained by a single measurement when the percentage odour time reaches or exceeds 10 % by convention. Note 1: Only relevant for the stationary method. Note 2: A test result of one single measurement can be positive for more than one distinct odour type;

“Odour Impact” means the impact of odours on humans expressed by the frequency, duration, quality, intensity and hedonic tone of odorant concentrations above the recognition threshold in the field;

“Odour Intensity” refers to the strength of odour sensation caused by the olfactory stimulus;

“Odour Quality” means the comparative description of an odour with olfactory experience, e.g. “there is a smell of...”, and “it smells burnt, rotten...” etc;

“Odour Recognition (in ambient air)” odour sensation in ambient air that allows positive identification of the odour type;

“Odour Unit (European)” amount of odorant(s) that, when evaporated into 1 cubic metre of neutral gas at standard conditions, elicits a physiological response from a panel (detection threshold) equivalent to that elicited by one European Reference Odour Mass (EROM), evaporated in one cubic metre of neutral gas at standard conditions;

“Panel” refers to the group of odour assessors that carry out the survey (Assessor, Calibrated Assessor);

“Panel Members” refer to person/s (calibrated assessor/s) making up the panel;

“Percentage Odour Time” refers to the total times/intervals which the odour is recognizable during a measurement cycle at a single measurement point.

“Plume Extent Area” surface area enclosed by a smoothed interpolation polyline through the transition points, the source location and the location determined by the maximum plume reach estimate;

“Recognition Threshold” as it relates to the German Standard VDI 3940 means the odorant concentration at which a detectable odour within a facility’s impact range can be clearly assigned to a facility for the first time;

“Single Measurement” procedure to obtain recorded observations at a given moment at a given measurement point necessary to determine absence or presence of recognizable odour. Note 1: For the stationary plume method one single measurement results in the test result ‘odour hour’ or ‘non-odour hour’. Note 2: For the stationary plume method the absence or presence is determined based on the observed percentage odour time over a defined single measurement duration. For the dynamic plume method the absence or presence is based on the direct and instantaneous observation of recognizable odour or the lack of it;

“Single Measurement Duration” time required to conduct a single measurement. Note 1: The single measurement duration is 10 min (60 observations) for a stationary plume method. A single



measurement duration of at least ten minutes is required in order to obtain a representative statement with at least 80 % certainty on the odour situation within an hour. The single measurement duration for the dynamic plume method is the duration of one inhalation (one observation);

“Survey” refers to a single OFA;

“Survey Period” refers to the period in which all single measurements are carried out, e.g. from December to April, July to December.



3 The Odour Source (RRG CVC)

The RRG’s CVC encompasses a Materials Recovery Facility (MRF) that recovers recyclables, a Green Waste Facility (GWF) that collects and processes green waste influent from council operations, kerbside collections and residential streams and a FOGO Processing Facility (FPF), previously known as the waste composting facility, that currently receives, and transfers kerbside collected household wastes and Food Organics Garden Organics (FOGO) wastes. There is no processing of these kerbside/FOGO wastes other than general separation (decontamination) of non-organics and subsequent transfer of the “decontaminated” FOGO to an offsite facility for further processing.

The CVC is a Prescribed Premises licenced under the Environmental Protection Act 1986 according to the following categories:

Table 3-1: RRG CVC Licenced Capacities

Category	Description	Capacity
67A	Composting manufacturing and soil blending	No more than 109,200 tonnes per year
61A	Solid waste facility	No more than 52,000 tonnes per year
62	Solid waste depot	30,000 tonnes per year

The main areas for odour generation are the GWF and the FPF.

The MRF has negligible odour generation given at least 85% of all materials through the MRF are recyclables. There is a small fraction of putrescible waste recovered from the MRF at typically 15% annually, however; the putrescible fraction is recovered in finite amounts over the annual period.

The GWF operates within a daily timeframe where incoming residential greenwaste is temporarily stored and then transported off-site, or incoming commercial greenwaste is processed by way of grinding and downsizing before it is temporarily stored then removed from site. The GWF grinding and downsizing activities only occur within day time working hours.

The FPF receives influent household general wastes and FOGO wastes via the tipping floor. The risk of odour emission from the tipping building is considered to be low given that there is no processing of these wastes that would otherwise generate malodours. The FPF building is maintained under negative pressure and captures and treats the low strength odours using biofiltration.



4 OFA Method

4.1 Purpose of OFAs

The RRG CVC's operational licence prescribes the required independent assessment of offsite odour impacts by way of OFAs. The licence relating to OFAs include the following specific conditions:

- 18(a) - The Licence Holder must implement the Odour Field Assessment (OFA): Methodology Statement (Environmental & Air Quality Consulting Pty Ltd);
- 18(b) - The Licence Holder must publish on a Southern Metropolitan Regional Council website accessible to the public, by 5 p.m. of the first Wednesday of each month, the outcomes of the ambient odour assessments required by condition 18(a) conducted during the previous month;
- 18(c) - The Licence Holder must submit an OFA report by 15 March of each year detailing the results of all the ambient odour assessments and an assessment of the results against the criteria as detailed in the Odour Field Assessment (OFA): Methodology Statement (Environmental & Air Quality Consulting Pty Ltd);
- 18(d) - The OFA report prepared pursuant to condition 18(c) is to include, as a minimum:
 - a) the objective of the assessment;
 - b) a description of the measurement strategy, measurement conditions and the odour field survey standards that were followed;
 - c) the following details for each single measurement:
 - (i) odour intensity levels and odour characters;
 - (ii) location (GPS coordinates), date and time;
 - (iii) field survey odour panelist identification; and
 - (iv) details of waste storage volumes held and/or transferred through the site during the assessment period.
 - d) the following representative meteorological measurements as recorded during the measurement cycle:
 - (i) wind speed (metres per second);
 - (ii) wind direction;
 - (iii) cloud cover estimate; and
 - (iv) temperature.
 - e) map(s) depicting the assessment area, odour sources at the premises and other potential odour sources (if relevant);
 - f) a graphical summary of field survey results showing the recorded odour intensity levels either as a percentage of total observations using pie charts if the stationary plume method was used or as coloured dot points if the dynamic plume method was used that will be superimposed at each point assessed on a map of the survey area;
 - g) any deviations from the conditions targeted in the OFA strategy and those occurring during the measurement (conclusions should reflect the influence of such deviations on the results); and



h) detailed analysis, interpretation and conclusions with regard to the objectives of the assessment.

- 20 - The Licence Holder must ensure that odour emitted from the premises does not unreasonably interfere with the health, welfare, convenience, comfort or amenity of any person who is not on the premises.

These OFAs are to be used as an ‘assessment tool’ to determine the extent of offsite odour impacts from emissions sources at the CVC, where; the emission sources are the MRF (negligible to nil emissions), GWF and more intently the FPF.

The FPF has two primary emissions sources of interest, namely the biofilters (3&4) which treat the captured process air from the FPF building, and the FPF building itself as fugitive odour emissions.

The OFAs will be the assessment tool (among others) to define the level of odour impact offsite (if any), and the magnitude to which any observed odour impacts do exist.

4.2 Preamble to OFA Method

The undertaking of an OFA is based herein on the German Standard VDI 3940 “*Measurement of Odour Impact by Field Inspection*”.

This standard prescribes the methods by which field odour 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.

EAQ undertakes this Method as it relates to the CVC in consideration of (not limited to):

- Preferential wind conditions:
 - Easterly;
 - East, south-easterly;
 - South-easterly;
 - South, south-easterly; and
 - Southerly.
- Preferential worst-case meteorological conditions:
 - Time-of-day;
 - Early morning (6-7AM);
 - Midday (12NOON); and
 - Early-late evening (5PM) & (8PM).
 - Calm conditions.
- Preferential CVC Operational Conditions supporting heightened odour emissions:
 - Daytime typical delivery of waste streams in/out of the FPF; and
 - Receivals, grinding/shredding & storage at the GWF.



- 1 kilometre radius from the CVC as the extent of the field inspection *gridded* pattern;
- Assessor selection; and
- Number of assessors.

With this method, calibrated and experienced odour assessors conduct a single measurement(s) at pre-defined measurement points (a grid defined within the surveyed odour plume) within a pre-determined assessment area downwind of the CVC.

Each measurement cycle comprises 60 grab measurements every 10 seconds for a single measurement cycle of 10 minutes. Each grab measurement results in a single Odour Sample. Each assessment area is representative of a preferential wind condition as it relates to the odour source being assessed i.e. the CVC.

A OFA comprises the total individual discrete measurement points, and the total single measurement(s) undertaken within the assessment area representative of the preferential wind condition on the measurement day. For example: *Under an easterly wind condition one survey on the measurement day was conducted by undertaking two single measurements at ten discrete measurement points within the assessment area. The outcome of the survey provided a dataset of twenty single measurements over the assessment area on that measurement day. The survey utilised a panel of five, with each panel member undertaking four single measurements over the assessment area.*

The survey period is often reflective of worst-case meteorological conditions such as the survey period of December – April as it relates to the CVC. A survey may be undertaken at any interval during the survey period (i.e. daily, weekly etc).

The result of each OFA derives the impact range within that assessment area for each survey. Assessment areas may vary over the survey period to cover multiple wind conditions.

For every single measurement the assessor(s) observe and record the presence, character and intensity of any observed odours. Each survey is designed to collect a multitude of single measurements per measurement day, since one survey may typically take up to three hours to completely assess each measurement point within the assessment area when accounting for panel member mobility and the size of the panel itself.

In general, the objective of the OFA is to determine the ‘decay’ of odours observed downwind of the odour source(s) thus defining the odour impact and impact range.

Within the impact range the magnitude of the odour impact can be defined by determining the maximum distance to which the recognisable odour is considered problematic. This is done by firstly assigning a level of odour intensity (quantitative scale) considered problematic for a given odour source, which would be generally considered to be equal to or greater than a nuisance odour intensity. For example, an assigned odour intensity of 3 (distinct) may be considered the upper limit to which an observed odour is acceptable in the community. Once a 3 is observed, or greater, the odour is considered to be sufficiently intense (strength) at that measurement point and subsequently that



measurement point may be considered to be impacted by nuisance odour if the frequency of observed odours, at an intensity of 3, is also sufficiently high. Multiple measurement points within the assessment area impacted by an observed odour intensity of 3 or greater would then make up the impact range. Importantly, the frequency of the odour observation, not solely the odour intensity (strength) must also be considered.

4.3 OFA Objectives

The objectives of these OFAs as they relate to the CVC are as follows:

- Define the Odour Key as it relates to the odour sources at the CVC;
- Define the problematic odour intensity and frequency criterion for the CVC;
- Under multiple preferential wind conditions and times of day:
 - Define the assessment area downwind of the CVC within a 1 kilometre radius from the edge of the nearest CVC odour source;
 - Define the number of measurement points (a grid within the surveyed odour plume), and their corresponding point identifications, within the assessment area;
 - Observe & record the odour intensities at each measurement point;
 - Derive the odour intensity frequencies at each measurement point;
 - Derive the odour impact at each measurement point as it relates to a predefined problematic odour intensity and frequency criterion; and
 - Determine the impact range (if any) offsite of the CVC.
- Compile OFA reports that detail the collected datasets over each survey period;
- Determine if the impact range is wholly affecting sensitive receptors; and
- Determine those odour emission sources at the CVC that are causing the off-site odour impact within those assessment areas.

4.4 CVC Odour Key Descriptors

The odour sources at the CVC have their origins from the MRF, GWF and the FPF.

MRF odours are typically a cardboard character with slight contamination of a weak garbage-bin odour.

GWF odour sources are related to green waste grinding and shredding on-site.

FPF odour sources are primarily related to the biofilters and any fugitive odour losses from the FPF. There are currently two (2) operational biofilters at the FPF which treat captured air from the FPF building during receivals and transfer.

The OFA Odour Key (odour quality) for the CVC is:

- (a) Materials Recovery Facility (MRF):
 - Cardboard-Weak Rubbish Bin Odour.
- (b) Green Waste Facility (GWF):



- Dry Cut Grass, Tobacco.
- (c) FOGO Processing Facility (FPF):
 - FPF Building
 - General Rubbish Bin Odour.
 - Biofilters 3 and 4;
 - Cool, Pine-Solvent, Garden Compost.

4.5 Odour Intensity Scale

The observed offsite odours are quantified according to the German Standard VDI 3940 Part 3. The category scale for judging odour intensity in the field is a quantitative reference scale where odour assessors award one of the attributes in the **Table 4-1** to his or her odour impression.

Table 4-1: VDI 3940 (Part 3) Odour Intensity Scale

Odour Strength	Intensity Rank
Not detectable	0
Very weak	1
Weak	2
Distinct	3
Strong	4
Very strong	5
Extremely strong	6

When an odour is observed as “weak” the odour can be assigned to the odour source being investigated and subsequently the recognition threshold has been achieved.

4.6 Odour Intensity and Frequency Criterion

Referring to the Odour Intensities listed in **Table 4-1** above, the odour intensity of 2 (Weak) has been chosen to represent an odour impact from the CVC.

The Odour Intensity of 2 (Weak) is chosen due to the high-density residential areas (sensitive receptors) that exist downwind of the CVC and the historical complaints from these sensitive receptor locations. An intensity level of 2 is more conservative in assessing a problematic odour impact for the CVC when compared to the typically chosen intensity level of 3. The higher conservatism will demand a higher level of odour control and treatment at the CVC.

The frequency of the observed odour intensity of 2 will be considered problematic when the percentage odour time of the intensity 2 is $\geq 20\%$ of the single measurement cycle, i.e. 20% of a total of 60 odour samples (12 odour samples of an intensity of 2 or more).



This 20% does not include observed odour intensities less than 2, i.e. does not include an observed odour intensity of 1.

Should the single measurement cycle at a discrete measurement point result in a percentage of observed intensities of 2 equaling or exceeding 20%, then that single measurement point is considered to be odour impacted.

Where more than one panel member has assessed that measurement point within the survey, the results of the odour samples collected are presented as the maximum single measurement observation to depict the worst-case outcome.

Often an assessment area or multiple assessment areas are assessed more than once within a survey period, in particular where little to no odour is observed.

4.7 Selection of Odour Assessors

For the selection of odour assessors as it relates to the VDI 3940 standard, the most important selection criterion is currently odour sensitivity to *n*-butanol in nitrogen. Each odour assessor shall meet the calibration criteria recommended by the VDI 3940 standard and in accordance with the Australian Standard AS/NZS4323.3:2001.

VDI 3940 additionally recommends assessor calibration data history for the reference gas Hydrogen sulphide when assessing hedonic tone in consort with odour intensity. This methodology statement is only for odour intensity determination and, as such, this recommendation is not applicable.

Optional tests, from VDI 3940, are used to determine the assessors' ability to discriminate odours of different intensities. The first test involves ranking 7 flasks of different *n*-butanol concentrations (derived from VDI 3940). EAQ has previously found the results of this optional test to be poor, with only 2 of the assessors ranking them successfully. The assessors considered the solutions 'relatively weak' and 'too similar' to be compared to the VDI intensity scale. As such EAQ does not rely on this optional test when selecting panel members.

The second optional test utilises the triangle method where each assessor must discern between three bags of odorants, 2 identical and 1 different, to identify the different sample by either intensity or quality. This test is routinely chosen to be performed before each survey when EAQ considers that the assessors have been 'out of practice' for undertaking OFAs.

EAQ undertakes a high volume of OFAs annually for a variety of odour source combinations which exposes panel members to a variety of odour sources in the field, and furthering each assessors experience and capability in undertaking OFAs.

4.8 Size of Assessor Panel

EAQ deploys three (3) assessors for each survey period with one assessor acting as the OFA operator.



4.9 Frequency of OFAs

Currently, the RRG is licenced to undertake OFAs on a monthly basis with at least 15 days between each survey period.

4.10 OFA Areas and Measurement Points

The CVC is east of the nearest residential sensitive receptors. Those preferred ambient wind conditions (wind direction and speed) and corresponding assessment areas are as follows:

- 1) Easterly Wind Origin
 - a. Assessment Area 1, bordered by:
 - i. Dundee Street;
 - ii. Beasley Road;
 - iii. Hollingsworth Way, and
 - iv. Roe Highway Pedestrian Footpath.
 1. 12 Measurement Points,
 2. Refer **Figure 4-1**.
- 2) East, South-easterly Wind Origin
 - a. Assessment Area 2, bordered by:
 - i. Hollingsworth Way;
 - ii. Beasley Road;
 - iii. Timbrell Way;
 - iv. McGuinness Drive;
 - v. Beasley Road;
 - vi. Merrifield Circle; and
 - vii. Roe Highway Pedestrian Footpath.
 1. 12 Measurement Points,
 2. Refer **Figure 4-2**.
- 3) South-easterly Wind Origin
 - a. Assessment Area 3, bordered by:
 - i. Beasley Road;
 - ii. Merrifield Circle (in its entirety); and
 - iii. Roe Highway Pedestrian Footpath.
 1. 10 Measurement Points,
 2. Refer **Figure 4-3**.
- 4) South, South-easterly and Southerly Wind Origins
 - a. Assessment Area 4, bordered by:
 - i. Merrifield Circle (northern part adjacent to South Street);
 - ii. Darian Drive (via access from South Street, but not including);



- iii. Trident Terrace;
- iv. Plover Drive; and
- v. Arlington Drive,
 1. 9 Measurement Points,
 2. Refer **Figure 4-4**.

EAQ tracks the weather daily and observes weather forecasts and immediate conditions prior to and on the morning or evening of each survey period. EAQ conducts each OFA preferentially when the winds are generally light to moderate (1m/s – 5m/s) and preferentially dusk and dawn to mirror those times where people inhabit their homes in the morning and evening.

OFA during the middle period of daylight hours are discouraged but may be required if suitable wind conditions affecting Assessment Areas 1-4 are not predicted to prevail at those preferred AM and PM timeframes.

4.11 Meteorology during OFAs

During each OFA one (1) assessor is assigned the task of collecting ambient meteorological observations, to include:

- Wind speed (m/s) and wind direction (cardinal) - refer nearest Jandakot Automatic Weather Station (AWS);
- Cloud Cover estimate (8ths); and
- Ambient temperature (Jandakot AWS).



Figure 4-1: Assessment Area 1



Figure 4-2: Assessment Area 2



Figure 4-3: Assessment Area 3



Figure 4-4: Assessment Area 4



Appendix A – Example of Monthly OFA Report



ODOUR FIELD ASSESSMENT

RESOURCE RECOVERY GROUP: CANNING VALE CENTRE



Resource Recovery Group: Canning Vale Centre

Bannister Road
Canning Vale, Western Australia 6155

**Prepared for: Southern Metropolitan Regional Council *T/a*
Resource Recovery Group**

Project Ref: EAQ-xxxxx



Environment | Air Quality



Environmental & Air Quality Consulting Pty Ltd

PO Box 897

JOONDALUP DC

WA 6919

+61 (8) 6108 3760

+61 (0) 449 915 043

www.eaqconsulting.com.au

jhurley@eaqconsulting.com.au

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Assessment Disclaimer:

This document presents the results of one or more Odour Field Assessments (OFAs); undertaken for the assessment of offsite ground level odour intensities downwind of the RRG’s Canning Vale Centre according to the German Standard VDI 3940. The results presented herein are representative of the observations made during each OFA, and do not represent conditions outside of those OFA observation times.



1 Background & Scope

Environmental & Air Quality Consulting Pty Ltd (EAQ) was engaged by the Southern Metropolitan Regional Council trading as Resource Recovery Group (RRG) to undertake monthly Odour Field Assessment (OFA) compliance works downwind of the RRG's Canning Vale Centre (CVC).

The OFAs are undertaken as per the RRG's Government of Western Australia Department of Environment Regulation Licence (L7799/12001/8) **Condition 18(a)** for Prescribed Premises in accordance with the Environmental Regulation Act 1986, which states:

- The Licence Holder must implement the Odour Field Assessment (OFA): Methodology Statement (Environmental & Air Quality Consulting Pty Ltd).

The OFA compliance works involves calibrated and experienced odour assessors surveying the downwind surrounds of the RRG's CVC detailing observations of odour presence, odour character, odour intensity and frequency of observations emanating from the CVC.

The CVC site has three primary processes and associated process areas:

- i. Materials Recovery Facility (MRF) of recyclables, handling and distribution;
- ii. Green Waste Facility (GWF) receivables, handling and processing and distribution; and
- iii. FOGO Processing Facility (FPF) receivals and transfer of FOGO and municipal solid wastes (kerb side collections).

Of primary consideration are the GWF and FPF with respect to observable offsite odours. Although included in the OFA design, the MRF odours are not considered to be a risk for offsite odour impacts given the very low odour concentrations within the MRF. EAQ's trained and calibrated OFA assessors have extensive experience in assessing odours from the RRG's CVC and in particular the ability to discern the differing odour characters from the MRF, GWF and FPF processes.

1.1 OFA Compliance Objective

Assessments are based on the German Standard VDI 3940 "Measurement of Odour Impact by Field Inspection" where the standard prescribes the methods by which field technicians (odour 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.

EAQ undertakes these OFAs following the VDI 3940 Plume Method ^[1]. Where ambient wind conditions shift notably during the survey period, EAQ often assesses an adjacent Assessment Area where applicable. The objective is to demonstrate compliance with Condition 18(a). In achieving this, offsite odour impacts observed will be less than the ambient odour assessment criterion as follows:

- percentage odour times at each discrete assessment location do not exceed an odour intensity ≥ 2 for $\geq 20\%$ of the measurement cycle.

^[1] Measurement of odour impact by field inspection – Measurement of the impact frequency of recognizable odours Plume measurement. VDI 3940 Part 2. ICS 13.040.20.



2 OFA Assessment Details

Site of Assessment	RRG's CVC
Survey Day & Date:	November 2019
Start Time(s) of Survey Period:	0800hrs – 1130hrs
Average Wind Origin:	(South, South-Easterlies: 151.875° – 163.125°)
BoM Wind Velocity throughout Survey:	2.50 – 5.56 m/s (9 – 20 km/h)
Assessment Area(s):	3, 4
Field Assessors:	3
Laboratory Calibration Type:	<i>n</i> -butanol – Forced Choice Dynamic Olfactometry
Field Inspection Method Standard:	VDI 3940 (Part 2)
Description of Standard:	Measurement of odour impact by field inspection – Measurement of the impact frequency of recognizable odours Plume measurement
Field Inspection Method Standard:	VDI 3940 (Part 3)
Description of Standard:	Measurement of odour impact by field inspection – Determination of odour intensity and hedonic odour tone
Exceptions:	VDI 3940 (Part 3) Hedonic odour tone not assessed
Odour Key Descriptors (Quality):	A – Cardboard-Weak Rubbish Bin Odour (MRF Origin)
	B - Dry Cut Grass, Tobacco (GWF origin)
	C – Cool, Pine-Solvent, Garden Compost (FPF Bio's 3 & 4)



3 CVC Process Details; Ambient Weather & Site Map

Table 3-1: RRG’s CVC Operational Process Details

FOGO Processing Facility (FPF)	Materials Recovery Facility (MRF)
<ul style="list-style-type: none"> > 1600hrs; < 0800hrs - after hours (no receivals); > 0800hrs; < 1600hrs - business as usual; No process odour observed outside of the Transfer Building; No leachate odours onsite; and No odour complaints recorded. 	<ul style="list-style-type: none"> > 1600hrs; < 0800hrs - after hours (no receivals); and; > 0800hrs; < 1600hrs - business as usual.
	Green Waste Facility (GWF)
	<ul style="list-style-type: none"> > 1600hrs; < 0800hrs - after hours (no receivals); and; > 0800hrs; < 1600hrs - business as usual.

Table 3-2: Ambient 10-minute Weather Observations (Jandakot AERO)

Start of 10-min	Wind Direction	Wind Speed (km/h)	Ambient Temp. (°C)	Ambient Rel. Humidity (%RH)
Fri 08:00 WST	S	17	16.4	65
Fri 08:10 WST	S	13	16.8	64
Fri 08:20 WST	SSE	19	17.1	61
Fri 08:30 WST	SSE	17	17.4	61
Fri 08:40 WST	SE	19	17.3	61
Fri 08:50 WST	SE	15	18	60
Fri 09:00 WST	SE	15	18.9	57
Fri 09:10 WST	SE	15	19.2	56
Fri 09:20 WST	ESE	15	19.6	55
Fri 09:30 WST	ESE	13	20.2	53
Fri 09:40 WST	SE	11	20.9	52
Fri 09:50 WST	ENE	19	21.6	50
Fri 10:00 WST	E	17	21.5	49
Fri 10:10 WST	E	20	21.3	47
Fri 10:20 WST	NNE	9	21.7	48
Fri 10:30 WST	SE	13	22.8	45
Fri 10:40 WST	S	17	22.6	44
Fri 10:50 WST	S	9	22.7	42
Fri 11:00 WST	SSW	11	23.1	40
Fri 11:10 WST	ESE	13	23.6	34
Fri 11:20 WST	SE	19	24	38
Fri 11:30 WST	SSE	13	24.2	35



Figure 3-1: RRG's CVC Site Layout, Odour Source Origins & Descriptors



3.1 Discussion of OFA Results

The RRG’s CVC OFA Survey undertaken in November 2019 from 0800hrs – 1130hrs in Assessment Areas 3 and 4 showed that no single measurement point was odour impacted since the respective percentage odour times did not exceed the criterion of 20% or greater for odour intensity observations of 2.

Within the Assessment Areas there were no odours from the CVC observed.

The CVC currently receives wastes into the MRF, GWF and FPF, where the FPF receives and loads-out FOGO and general municipal solid wastes via the Waste Transfer Building.

In terms of continuous odour emissions from the CVC, two operational Biofilters (Biofilters 3 & 4) receive and treat extracted odours from the FPF building and emit ‘clean’ biofilter odours. Where poor biofilter performance may occur, there may be untreated FPF odours released to atmosphere that may result in malodour observations offsite.

The RRG’s CVC was compliant with **Condition 20**, which states that; *“The Licence Holder must ensure that odour emitted from the premises does not unreasonably interfere with the health, welfare, convenience, comfort or amenity of any person who is not on the premises”*.

Figures 3-1 and **3-2** to follow illustrate the OFA findings.

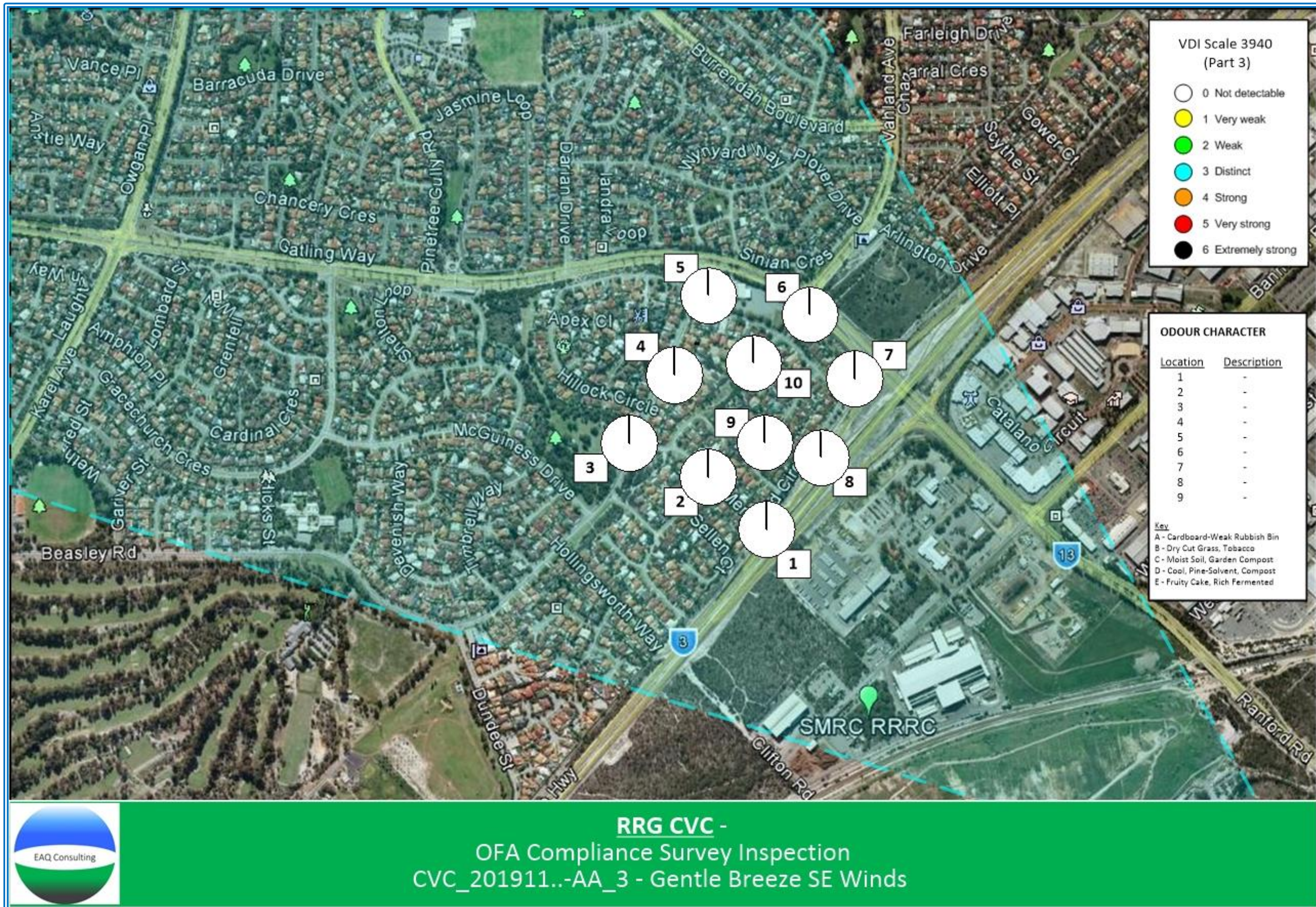


Figure 3-2: Assessment Area 3 - OFA Result



Figure 3-3: Assessment Area 4 – OFA Result