Attachment 7-1-3 Air Dust Emission Impact Assessment

Contents

1. Introduction

The applicant intends on using an existing quarry site as a material recovery facility. Namely, the applicant intends on accepting soil and stone on-site for backfilling of quarry void areas and C&D waste on-site for C&D recovery processing.

This document, prepared by Enviroguide Consulting, is based on the EIAR submitted on behalf of Sancom Ltd as part of the Planning process and describes and characterizes the existing air environment in the vicinity of the application site and assesses the impact the proposed waste activity will have upon the receiving air environment. The proposed waste activity will have the potential to generate fugitive dust emissions which may impact upon local air quality and nearby sensitive receptors. These dust emissions are the primary emission to air of concern. As such, this document primarily addresses potential dust related impacts associated with the activity. It also characterizes climate conditions associated with the region and evaluates the potential impacts the proposed activity will have on climate conditions.

Mitigation measures are identified where required, to eliminate and reduce any adverse impacts identified insofar as practical.

2. Baseline Environment

2.1 Site Context

The subject site is located in the townland of Graney West, approximately 2 kilometres southeast of the town of Castledermot and 12 kilometres west of the town of Baltinglass, in Co. Kildare. There is an established but disused sand and gravel pit at the subject site.

The site has historically been in use as a quarry. The site as it is, consists of an area consisting of residential and agricultural buildings, an area where plant and equipment used in connection with pre-existing quarrying and aggregate production activities are situated and a much larger area consisting of worked out quarry voids.

The applicant intends on backfilling soil and stone material into previously extracted quarry voids on-site in order to a achieve land restoration. In addition, the applicant intends on accepting C&D waste on-site for recovery processing. Processed materials will be resold as per market demand. Pre-existing plant and additional proposed plant will be used to process C&D waste materials.

The site is situated in rural location dominated by agriculture and interspersed with one off housing. There are a small number of residential developments in the vicinity of the site, mainly to the east, north and south of the application site. There are no significant tourism and recreational sites or areas in the local area surrounding the site. There is no commercial or industrial development in the vicinity of the site. There are no plans to develop any sites in the local area surrounding the site.

2.2 Baseline Air Quality

The EPA has established an ambient air quality monitoring network in Ireland. Baseline ambient air quality data for the region was obtained from a number of EPA monitoring stations situated in the region including Carlow, Kilkenny and Port Laoise monitoring stations to allow for a comprehensive understanding of baseline air quality. Between these monitoring stations the parameters PM_{10}, $PM_{2.5}$, NO_2, SO_2, Co, O_3 as well as BTEX compounds are measured. No limits prescribed in the Air Quality Standards Regulations 2011 for any of the relevant parameters have been exceeded. Generally, low levels of these pollutants have been recorded in the region. This is to be expected in a region that is predominantly rural in nature.

2.3 Baseline Dust Monitoring

Baseline dust monitoring using the Bergerhoff method was carried out at the application site over the month of May 2019 going into June 2019. Dust monitoring took place at three site boundary locations around the application site. These boundary locations were chosen on the basis of risk posed to off-site receptors in the vicinity of the site. These locations are as follows:

- D1 - adjacent to where the proposed site access road meets the site
- D2 - adjacent to where the existing site access roads meets the site
- D3 - Northeastern corner of the site adjacent to nearest sensitive receptor

Figure 2-1 shows the location of these dust monitoring location on-site.

The results of the dust monitoring undertaken are presented in the table 1.

Table 1: Dust deposition monitoring results

Location	Start Monitoring	End Monitoring	Date Analysed	Results ($mg/m^2/day$)
D1	01/05/2019	06/06/2019	14/06/2019	0.7
D2	01/05/2019	06/06/2019	14/06/2019	60.4
D3	01/05/2019	06/06/2019	14/06/2019	41

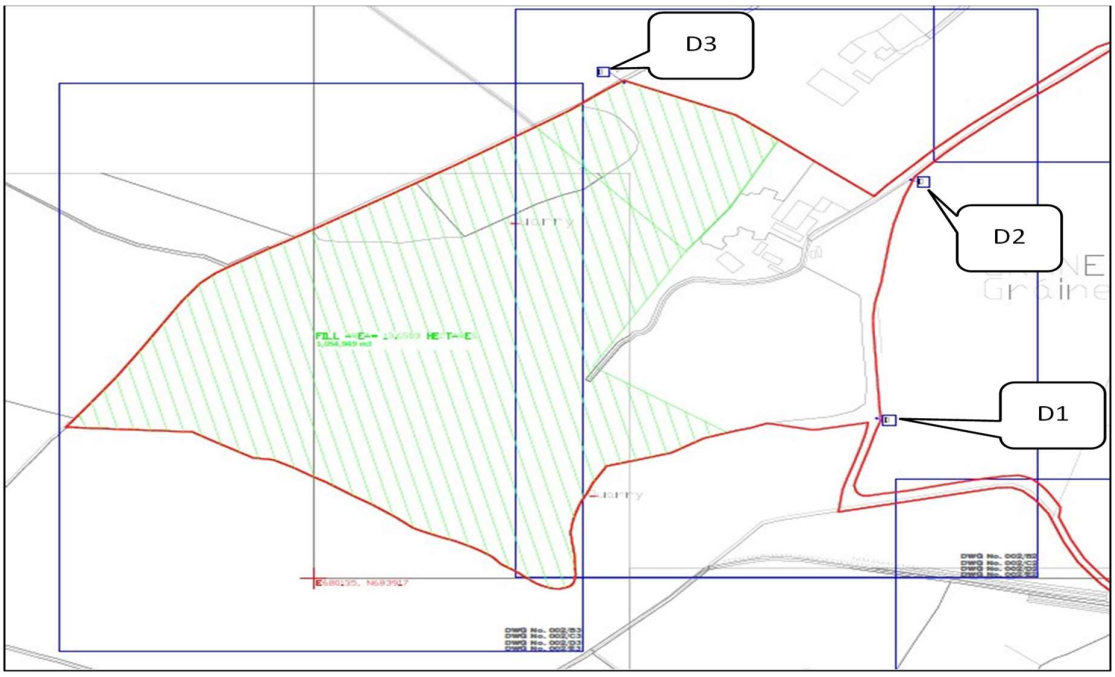

Figure 2-1 Dust monitoring locations

2.4 Meteorological Conditions

The proposed activity will exist within the context of a temperate, maritime Irish climate, characterized by mild temperatures and wet weather. The weather in the region is influenced by the Irish Sea, resulting in mild, moist weather dominated by cool air masses.

The nearest weather station to the site is the Met Eireann weather station at Oakpark, Co. Carlow which lies ca. 8 km to the southwest of the site. Monitoring at this station commenced in January 2007. Averages for relevant meteorological parameters since monitoring commenced are shown in the table 2.

Table 2 Meteorological data from Met Eireann's Oak Park weather station

Parameter	Average (since January 2007)
Mean Daily Rainfall (mm)	2.3
Mean Temperature (Degrees Celsius)	9.9
Mean Wind Speed (Knots)	7.4

The most important climate parameters which influence dust emissions are wind direction, wind speed and rainfall. Wind direction determines the broad transport of the emission and the sector of the compass into which the emission is dispersed. Wind speed will affect ground level emissions by increasing the initial content of particles in the emission. It will also affect the potential for dust entrainment.

A wind rose for average wind conditions recorded at Oakpark over a five year period from 01/7/2014 to 30/06/2019 is shown in Figure 2-2. The predominant wind direction is from the southwestern quadrant. Moderate to high-speed winds (>2 m/s) occur for 78.5% of the time.

Winds affecting the site are relatively warm winds from the Atlantic and frequently bring rain. Easterly winds are weaker and less frequent and tend to bring cooler weather from the northeast in spring and warmer weather from the southeast in summer. Rainfall can suppress dust at the source and eliminate the pathway to the receptor. According to Arup (1995)[1] rainfall greater than 0.2 mm per day is sufficient to suppress dust emissions. Daily average rainfall data from Oakpark weather station from the time monitoring commenced on 13/08/2003 to 30/06/2019 was obtained and analysed. 54.7% of days in this period had rainfall in excess of 0.2 mm. As such, natural dust suppression (from rainfall) exists for 54.7% of days.

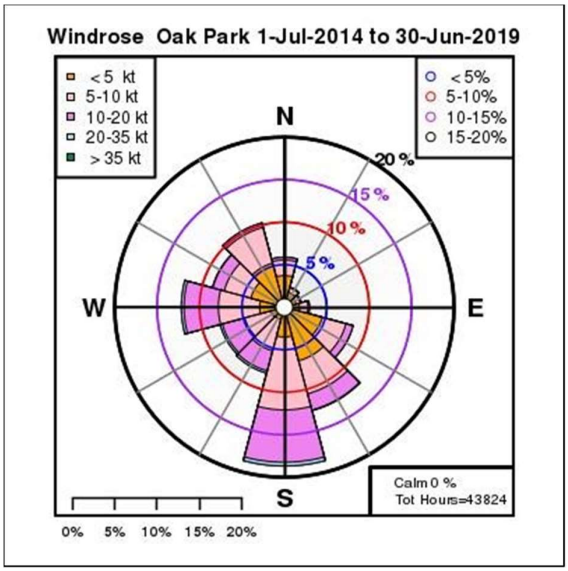

Figure 2-2 Wind rose for Oak Park from 01/07/2014 - 30/06/2019

2.5 Dust Sensitive Receptors

Sensitive receptors to dust constitute locations where people may be adversely affected by dust emissions. Locations with high sensitivity can include dwellings, hospitals, schools or areas of high amenity value.

Sensitive receptors within 500 metres of the site boundary have been identified. All sensitive receptors identified are residential dwellings. This is a cautious approach given that dust generating activities are located within the site rather than at the site boundary.

All receptors are shown on aerial photography overleaf and detailed in the table below this. A total of 12 sensitive receptors have been identified. The table included identifies the sensitive receptors, their sensitivity and their proximity to the nearest dust generating activity within the application site. The sensitivity of receptors has been valued with reference to established criteria detailed in the Institute

1 Arup Environmental. Environment Effects of Surface Mineral Workings. UK DoE, October 1995

of Air Quality Management's Guidance (IAQM) on the Assessment of Mineral Dust Impacts for Planning.

Figure 2-3 Dust sensitive locations within 500 metres of application site boundary

Table 3: Dust sensitive receptors within 500 metres of the site

Receptor Reference	Receptor	Sensitivity	Distance from site boundary (m)	Direction nearest dust generating site activity
A	Residential Dwelling	High	480	SW
B	Residential Dwelling	High	185	SE
C	Residential Dwelling	High	235	SE
D	Residential Dwelling	High	476	S
E	Residential Dwelling	High	124	NE

F	Residential Dwelling	High	195	E
G	Residential Dwelling	High	350	E
H	Residential Dwelling	High	500	E
I	Residential Dwelling	High	314	E
J	Residential Dwelling	High	500	N
K	Residential Dwelling	High	460	N
L	Residential Dwelling	High	317	NE

3. Impact Assessment

3.1 Operational Phase Dust Impacts

Dust emissions from proposed operating activities occurring have the potential to adversely impact upon sensitive dust receptors. The significance of impacts depends on the magnitude of emissions, meteorological conditions and the proximity of sensitive receptors to dust generating site activities.

A Dust Impact Assessment was carried out in accordance with the IAQM's *Guidance on the Assessment of Mineral Dust Impacts for Planning* (May 2016 (v1.1)) in order to identify and characterize dust impacts upon sensitive receptors. An overview of the assessment methodology is presented below. It should be noted the Dust Impact Assessment was carried out not having regard to any proposed mitigation measures.

3.1.1 Dust Impact Assessment Methodology

Step 1: Describe Site Characteristics and Baseline conditions.

A site and local area walkover and an analysis of proposed operations took place in order to characterize the baseline environment, identify the location and nature of dust sensitive receptors and identify and characterize proposed activities on-site that may give rise to dust emissions. Receptor Sensitivity was determined with reference to criteria prescribed in the aforementioned guidance document. Receptor Sensitivity can be classed as High, Medium or Low.

Step 2: Estimate Dust Impact Risk

The Dust Impact Risk for each receptor will be determined.

The risk with each site preparation and operational phase source activity was determined. Based on the scale, duration, intensity and nature of dust generating activities. Dust Emission Classes of Low, Medium or High were defined for each proposed activity. Dust Emission Classes were defined using professional judgement and having regard to guidance prescribed in Appendix 4 of the IAQM's *Guidance on the Assessment of Mineral Dust Impacts for Planning.* Where there is uncertainty as regards the Dust Emission Class, a precautionary approach is taken and the higher dust emission class is assigned.

Following this, the pathway effectiveness was determined. In other words, it was determined how easily dust could make its way to sensitive receptors. For each receptor within 500 m of the site boundary the frequency potentially dusty winds (defined as >5 m/s) from the direction of the nearest dust source on dry days was determined with reference to meteorological data for 5 years at Oak Park meteorological station in Co. Carlow. A Frequency Category was then assigned to each receptor in accordance with the criteria detailed in table 3-1 below and based on 36 x 10^{o} wind direction sectors.

Table 4: Frequency of potentially dusty winds

Frequency Category	Criteria
Infrequent	Frequency of winds (>5 m/s) from the direction of the dust source on dry days are less than 5%
Moderately frequent	The frequency of winds (>5 m/s) from the direction of the dust source on dry days are between 5% and 12%
Frequent	The frequency of winds (>5 m/s) from the direction of the dust source on dry days are between 12% and 20%
Very frequent	The frequency of winds (>5 m/s) from the direction of the dust source on dry days are greater than 20%

Receptor distance from sources was categorized in accordance with table 5 below.

Table 5 Receptor distance from source

Category	Criteria
Distant	Receptor is between 200 m and 400 m from the dust source
Intermediate	Receptor is between 100 m and 200 m from the dust source
Close	Receptor is less than 100 m from the dust source

The pathway effectiveness was then classified in Table 6 referring to the Frequency of Potentially Dusty Winds and the Receptor Distance from Source.

Table 6: Pathway effectiveness

		Frequency of Potentially Dusty Winds			
		Infrequent	**Moderately frequent**	**Frequent**	**Very frequent**
Receptor Distance Category	Close	Ineffective	Moderately Effective	Highly Effective	Highly Effective
	Intermediate	Ineffective	Moderately Effective	Moderately Effective	Highly Effective
	Distant	Ineffective	Ineffective	Moderately Effective	Moderately Effective

The Dust Emission Class and the Pathway Effectiveness were combined to predict the Dust Impact Risk as shown in table 7 below.

Table 7: Estimation of dust impact risk

		Dust Emission Class		
		Small	**Medium**	**Large**
Pathway Effectiveness	**Highly effective Pathway**	Low Risk	Medium Risk	High Risk
	Moderately effective pathway	Negligible Risk	Low Risk	Medium
	Ineffective pathway	Negligible Risk	Negligible Risk	Low Risk

Step 3: Estimate Likely Magnitude of Dust Effects

The likely effect at each receptor was determined from the Dust Impact Risk (table directly above) and the Receptor Sensitivity as shown in table 3-5 below.

Table 8: Descriptors for magnitude of dust effects

		Receptor Sensitivity		
		Low	**Medium**	**High**
Dust Risk Impact	**High Risk**	Slight Adverse Effect	Moderate Adverse Effect	Substantial Adverse Effect
	Medium Risk	Negligible Effect	Slight Adverse Effect	Moderate Adverse Effect
	Low Risk	Negligible Effect	Negligible Effect	Slight Adverse Effect
	Negligible Risk	Negligible Effect	Negligible Effect	Negligible Effect

3.1.2 Dust Impact Assessment

3.1.2.1 Assigning Dust Emission Classes for Proposed Dust Generating Activities

The Proposed Activity will involve the carrying out of the following dust generating activities.

- Haulage of materials to and from the site
- Internal material haulage and handling
- Infilling / Site Restoration
- C&D Material Processing
- Stockpiling

Table 9 details the Dust Emission Class assigned to each of these proposed activities.

Table 9: Assigning dust emission classes

Activity	Dust Emission Class	Basis for Dust Emission Class
Haulage of materials to and from the site	Medium	Moderate traffic levels (<250 >25 per day). Presence of Wheel Wash Facilities. Employment of an effective road sweeper
Internal material haulage and handling	High	Material haulage and handling a small distance from site boundary
Infilling / Site Restoration	High	Large working area, high volume of material movement
C&D Material Processing	High	High volume of material movement
Stockpiling	High	Long term stockpiles, frequent material transfers, stockpiles close to site boundary

Table 3-10

3.1.2.2 Frequency of Potentially Dusty Winds

Table 11 details the frequency of potentially dusty winds (≥2 m/s) from the direction of the nearest dust source on days without natural dust suppression (<0.2 mm of rainfall in a day).

Table 11: Frequency of potentially dusty winds

Receptor Reference	Receptor	Relative Wind Direction	Frequency of dusty winds (>2 m/s) from the direction of the dust source on dry days are less than 5% Note 1	Frequency of Potentially Dusty Winds Category
A	Residential Dwelling	20-30	0.35%	Infrequent
B	Residential Dwelling	360-10	0.94%	Infrequent
C	Residential Dwelling	60-70	0.32%	Infrequent
D	Residential Dwelling	20-30	0.35%	Infrequent
E	Residential Dwelling	220-230	1.95%	Infrequent
F	Residential Dwelling	250-260	2.82%	Infrequent
G	Residential Dwelling	260-270	1.76%	Infrequent
H	Residential Dwelling	270-280	3.39%	Infrequent
I	Residential Dwelling	240-250	2.25%	Infrequent
J	Residential Dwelling	160-170	4.23%	Infrequent
K	Residential Dwelling	180-190	5.11%	Moderately frequent
L	Residential Dwelling	210-220	1.79%	Infrequent

Note 1: Based on the frequency of moderate to high winds (≥.2m/s) which would cause dust to travel in the direction of the receptor. Adjusted for natural suppression in the form of rainfall > 0.2 mm occurring 54.7% of the time.

3.1.2.3 Receptor Distance from Source

Table 12 details the Receptor Distance from Source category for each identified sensitive receptor.

Table 12: Receptor distance from source

Receptor Reference	Receptor	Distance from site boundary (m)	Receptor Distance from Source Category
A	Residential Dwelling	480	Distant
B	Residential Dwelling	185	Intermediate
C	Residential Dwelling	235	Distant
D	Residential Dwelling	476	Distant
E	Residential Dwelling	124	Intermediate
F	Residential Dwelling	195	Intermediate
G	Residential Dwelling	350	Distant
H	Residential Dwelling	500	Distant
I	Residential Dwelling	314	Distant
J	Residential Dwelling	500	Distant
K	Residential Dwelling	460	Distant
L	Residential Dwelling	317	Distant

3.1.2.4 Determining Pathway Effectiveness for Sensitive Receptors

The Pathway Effectiveness for each sensitive receptor was determined with reference to the Frequency Category for potentially dusty winds detailed and Receptor Distance from Source category detailed in the tables above. Table 3-9 below details the Pathway Effectiveness for each sensitive receptor.

Table 13: Pathway effectiveness for sensitive re

Receptor Reference	Receptor	Frequency of Potentially Dusty Winds Category	Receptor Distance from Source Category	PathwayEffectiveness
A	Residential Dwelling	Infrequent	Distant	Ineffective
B	Residential Dwelling	Infrequent	Intermediate	Ineffective
C	Residential Dwelling	Infrequent	Distant	Ineffective

D	Residential Dwelling	Infrequent	Distant	Ineffective
E	Residential Dwelling	Infrequent	Intermediate	Ineffective
F	Residential Dwelling	Infrequent	Intermediate	Ineffective
G	Residential Dwelling	Infrequent	Distant	Ineffective
H	Residential Dwelling	Infrequent	Distant	Ineffective
I	Residential Dwelling	Infrequent	Distant	Ineffective
J	Residential Dwelling	Infrequent	Distant	Ineffective
K	Residential Dwelling	Moderately frequent	Distant	Ineffective
L	Residential Dwelling	Infrequent	Distant	Ineffective

3.1.2.5 Determining Dust Impact Risk for Sensitive Receptors

The dust impact risk was determined for each receptor with reference to the dust emission class of the nearest dust generating activity on-site and the pathway effectiveness of each receptor. Table 14 details the dust impact risk for each receptor.

Table 14: Dust Impact risk for receptors

Receptor Reference	Receptor	Nearest Dust Generating Activity	Dust Emission Class	Pathway Effectiveness	Dust Impact Risk
A	Residential Dwelling	Infilling/Site Restoration	High	Ineffective	Low Risk
B	Residential Dwelling	Haulage of materials to and from the site	Medium	Ineffective	Negligible Risk
C	Residential Dwelling	Haulage of materials to and from the site	Medium	Ineffective	Negligible Risk
D	Residential Dwelling	Haulage of materials to and from the site	Medium	Ineffective	Negligible Risk
E	Residential Dwelling	Infilling/Site Restoration	High	Ineffective	Low Risk
F	Residential Dwelling	Internal material haulage and handling	High	Ineffective	Low Risk
G	Residential Dwelling	Internal material haulage and handling	High	Ineffective	Low Risk

H	Residential Dwelling	Internal material haulage and handling	High	Ineffective	Low Risk
I	Residential Dwelling	Internal material haulage and handling	High	Ineffective	Low Risk
J	Residential Dwelling	Infilling/Site Restoration	High	Ineffective	Low Risk
K	Residential Dwelling	Infilling/Site Restoration	High	Ineffective	Low Risk
L	Residential Dwelling	Infilling/Site Restoration	High	Ineffective	Low Risk

3.1.2.6 Determining Magnitude of Dust Impacts

The Magnitude of Dust Impacts was determined in the table below with reference to the Receptor Sensitivity Category and Dust Impact Risk.

Table 15: Magnitude of Dust impacts on sensitive receptors

Receptor Reference	Receptor	Receptor Sensitivity	Dust Impact Risk	Magnitude of Dust Effect
A	Residential Dwelling	High	Low Risk	Slight Adverse Effect
B	Residential Dwelling	High	Negligible Risk	Negligible Effect
C	Residential Dwelling	High	Negligible Risk	Negligible Effect
D	Residential Dwelling	High	Negligible Risk	Negligible Effect
E	Residential Dwelling	High	Low Risk	Slight Adverse Effect
F	Residential Dwelling	High	Low Risk	Slight Adverse Effect
G	Residential Dwelling	High	Low Risk	Slight Adverse Effect
H	Residential Dwelling	High	Low Risk	Slight Adverse Effect
I	Residential Dwelling	High	Low Risk	Slight Adverse Effect
J	Residential Dwelling	High	Low Risk	Slight Adverse Effect
K	Residential Dwelling	High	Low Risk	Slight Adverse Effect
L	Residential Dwelling	High	Low Risk	Slight Adverse Effect

3.1.3 Discussion of Dust Impact Assessment Results

Generally, there is a negligible to low risk the proposed activity may adversely affect sensitive receptors surrounding the subject site.

The Dust Impact Assessment concluded however that a number of receptors in the receiving environment are likely to be subject to slight adverse dust effects as a result of dust generating activities associated with the proposed activity. It is important to note however that this assessment does not take into account proposed mitigation measures.

Mitigation measures to control and minimize dust emissions associated with proposed activity are detailed below.

3.2 Climate Impacts

The operation of heavy plant and mobile plant and machinery, and HGV movements associated with the proposed activity will result in the release of greenhouse gas emissions.

Heavy plant to be used in connection with the proposed activity will be powered by a 250 kva diesel generator. This generator considered to be minor emission sources with reference to EPA criteria on the definition of minor and main emissions (i.e. <250 kW for liquid fuels). As such, emissions from this source is not considered to be environmentally significant.

The impact of greenhouse emissions associated with proposed activity upon climate conditions is deemed to be imperceptible given the nature and scale of the proposed activity.

3.3 Odour Impacts

Most of the waste brought on-site will be inert construction and demolition waste. Such waste is unreactive both biologically and chemically and will not cause any odour. Biodegradable garden waste will be accepted on-site for composting. This type of waste is not malodourous in nature. This waste sill be transferred without delay to a bunded composting area on-site for curing/maturation.

Strictly no food waste or slurries will be accepted on-site for composting purposes. Waste Acceptance Procedures are in place to prevent the acceptance and processing of any malodorous, waste such as food waste or slurries.

Given that garden waste is being composted it is not envisaged that the composting windrows will be particularly odorous. Proper windrow aeration and moisture application will take place to prevent anaerobic conditions or the excessive generation of leachate which may give rise to odours. The nearest sensitive receptor is 120 metres north east of the site boundary so it is not expected there will be any noticeable odour impact on sensitive receptors.

Daily olfactory inspections will take place to ensure odours emanating from windrows are negligible. Odour incidents or complaints will be recorded and corrective/preventative actions will be planned and implemented, where necessary, although it is considered unlikely that incidents/complaints would occur.

Given the nature of waste being accepted on-site for composting, and the proximity of sensitive receptors relative to composting windrows which will be situated on-site, it is not anticipated there will be any adverse local odour impacts.

Malodourous waste identified upon arrival to the site or on-site will be transferred to the waste quarantine area before being dispatched to an authorized waste facility within 24 hours.

4. Operational Phase Mitigation Measures

The Operational Phase Dust Impact Assessment carried out concluded that a number of receptors in the receiving environment are likely to be subject to slight adverse dust effects as a result of dust generating activities associated with the proposed activity.

The following Mitigation Measures will be implemented in connection with the proposed activity in order to prevent and control airborne dust generation and ensure there are no adverse dust impacts upon sensitive receptors.

- Tall trees will be planted along the northern, eastern and south western boundaries of the site prior to the commencement of the development in order to minimize dust impacts on the nearest sensitive receptors to the site (Receptors B, E & F). The presence of these trees will also serve to minimize the generation of wind-blown dust on-site. These trees will be maintained at a height of 14 metres. Tall trees planted at the northern and eastern perimeters of the fill area will be placed on 2 metre high screening mounds. Existing vegetation along the western boundary of the site will also be retained. These trees will remain in place for the duration of the operational phase and will remain a part of the restored site as semi-mature trees.
- Dusty plant, namely the Soil Screening Plant and Concrete Crushing Plant, will be situated towards the centre of the site and a good distance away from the site boundary. This will ensure that there is a significant separation distance between dusty plant and sensitive receptors off-site. The aforementioned plant will also be situated in a sheltered location behind stockpiles in order to minimize the potential for wind-blown dust affecting off-site receptors.
- The following good housekeeping measures will be employed to minimize the generation of dust and dust impacts on sensitive receptors.
- All waste collected and accepted on-site and all materials being transported off-site will be in sealed or covered vehicles only to prevent dust emissions on local roads and internally on-site associated with dustfall from waste contained on vehicles.
- Roadsweeping will be carried out to ensure the access road to the site and internal haul roads are kept clean from dusty materials.
- Water spraying using water bowzers will take place on haul roads and stockpiles during dry and windy days to dampen dust and prevent airborne dust generation.
- A speed limit of 10 kph will be strictly enforced on-site to prevent the turning up of dust associated with traffic movements on-site.

- Long term exposed surfaces e.g. top soil and overburden storage mounds will be vegetated/planted to reduce dust emissions.
- Soil handling will be minimized during adverse weather.
- The timing of operations will be optimized having regard to meteorological conditions.
- Imported soil will be compacted in-situ immediately after being unloaded to minimize windblown dust.
- Drop heights will be minimized to minimize dust generation.
- Site access roads and internal haul routes will be regularly re-gravelled in order to prevent deterioration of road conditions and consequent dust generation due to traffic movement.
- Plant operatives will avoid working in windy locations insofar as practicable. Operations will be carried out primarily in more sheltered locations.
- Training on dust mitigation measures will be provided to plant operatives. Plant operatives will be made aware of the nearest sensitive receptors to the site and the good housekeeping practices that should be implemented to prevent dust impacting upon these receptors.
- The slopes and the crest of the fill areas will be reseeded on a phased basis as the project progresses in order to bind the soil and prevent dust blow off.

5. Residual Impacts

With the adoption of the above mitigation measures is deemed that dust generating activities associated with the proposed activity will not have a significant impact upon sensitive receptors in the baseline environment.

It is deemed that there will be no significant climate or odour impacts associated with the proposed activity.