Attachment I .1 Assessment of Atmospheric Emissions

Existing Conditions

The EU Air Quality Framework Directive (96/62/EC) requires Member States to identify 'Zones' and 'Agglomerations' for air quality assessment purposes. In Ireland, four zones, A, B, C and D are defined in the *Air Quality Standards (AQS) Regulations* (S.I. No 180 of 2011).

- Zone A – Dublin Conurbation
- Zone B – Cork Conurbation
- Zone C – Large Towns with a Population > 15,000
- Zone D – Remaining Area of Ireland

The Cappagh Road MRF is in Zone A. The EPA implements an air quality monitoring programme at a number of stations in Dublin, including one at Blanchardstown which is considered representative of air quality at the site. The Blandchardstown station conducts continuous monitoring for nitrogen oxides and PM_{10}, and the results indicate the air quality is good.

The current Waste Licence requires routine monitoring of dust deposition levels at two locations within the site boundary. The monitoring carried out in 2012 and 2013 confirmed that the dust emissions from on-site activities complied with the dust deposition limit specified in the Licence and were not a cause of nuisance.

Statement on Main Polluting Substances

Emissions of main polluting substances (as defined in the Schedule of EPA (Industrial Emissions) (Licensing) Regulations 2013, S.I. No. 137 of 2013) to the atmosphere are not likely to impair the environment.

Assessment of Impacts

Dust is not a significant issue at the facility, and while the increased traffic will add to the cumulative potential for dust emissions, the current mitigation measures will ensure that dust will not be a source of nuisance outside the site boundary. In addition, the residual and food waste handling will be carried out inside Building A1 where the odour control system will also effectively prevent fugitive dust emissions from the building.

The exahust emissions associated with the increased traffic movements in and out of the the site will add to the cumulative emissions from the traffic in the area, however these will be off-set by the reduction in total emissions from the household waste collection fleet that no longer have to travel to the Ballymount Waste Transfer Station.

While the increased traffic movements will give rise to additional vehicle exhaust gases and potentially dust, the overall adverse impact on air quality will be negligible.

Odour Monitoring Ireland (OMI) carried out air dispersion modelling to assess the impacts of odours associated with the acceptance of the residual waste and food waste. A copy of the OMI report in included in this Attachment. The modelling confirms that the ground level odour concentration will be less than 1.05 Odour Units and that there will be no impact on the closest sensitive receptor, which is the private residence 30m to the southeast of the site. Therefore in terms of odour, the proposed changes will have a neutral impact.

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DESKTOP ODOUR IMPACT ASSESSMENT OF PROPOSED ODOUR CONTROL SYSTEM TO BE INSTALLED IN PANDA WASTE SERVICES LTD, CAPPAGH RD, FINGLAS, DUBLIN 11

PERFORMED BY ODOUR MONITORING IRELAND ON BEHALF OF PANDA WASTE SERVICES LTD

REFERENCE NUMBER:	2013958(1)
ATTENTION:	Mr. Des Crinion
PREPARED BY:	Dr. Brian Sheridan
DATE:	21st Nov 2013
DOCUMENT VERSION:	Document Ver.001
Licence:	W00261-01

TABLE OF CONTENTS

This document is submitted as supporting information for a EIS chapter.

Respectively submitted,

Brian Sheridan B.Sc. M.Sc. (Agr) Ph.D (Eng).

For and on behalf of Odour Monitoring Ireland™

Document Amendment Record

Client: ***Panda Waste Services Ltd***

Project: Desktop odour impact assessment of proposed odour control system to be installed in Panda Waste Services Ltd, Cappagh Rd, Finglas, Dublin 11.

Project Number: 2013958(1)			**Document Reference:** Desktop odour impact assessment of proposed odour control system to be installed in Panda Waste Services Ltd, Cappagh Rd, Finglas, Dublin 11.		
2013958(1)	Document for review	JWC	BAS	JWC	21/11/2013
Revision	**Purpose/Description**	**Originated**	**Checked**	**Authorised**	**Date**

Executive summary

Odour Monitoring Ireland was commissioned by Panda Waste Services Ltd to perform a desktop odour impact assessment of the proposed odour control system to be installed on the waste transfer station to be located in Panda Waste Services, Cappagh Rd, Finglas, Dublin 11. Details and specifics describing the odour control system are contained in supporting information provided by the client.

The main aims of the study were to assess if the proposed odour control system would minimise odour impact in the vicinity of the proposed facility.

This document will provide information on the following:

- The expected odour treatment levels including the expected odour emission concentration from the proposed odour control system.
- Odour dispersion modelling of emissions from the stack and projected ground level concentrations as a result of operating the odour control system.

It was concluded from the study that:

- The proposed odour control system will treat approximately 45,936 m^3 [odourous air]/hr.
- The maximum proposed odour emission rate expected from the odour control system will be 5,903 Ou_E/s with a maximum odour concentration of 460 Ou_E/m^3 in the exhaust gas.
- Following detailed dispersion modelling assessment using AERMOD Prime (12060), all GLC's predicted at receptor locations at or beyond the facility boundary will be less than 1.50 Ou_E/m^3 at the 98th percentile of hourly averages over 5 years of screened hourly sequential meteorological data.

1. Introduction and scope

1.1 Introduction

Odour Monitoring Ireland was commissioned by Panda Waste Services Ltd to perform a desktop odour impact assessment of the proposed odour control system to be located in Panda Waste Services, Cappagh Rd, Finglas, Dublin 11.

This document presents the materials and methods, results, discussion of results, conclusions gathered throughout this desktop study.

The results conclude that the proposed odour control system will be adequate in minimising odours at or beyond the facility boundary with all predicted ground level concentrations of odour less than 1.50 Ou_E/m^3 at the 98^{th} percentile of hourly averages for 5 years of screened data.

1.2 Scope of the work

The main aims of the study were as follows:

- Provide data on the expected odour treatment levels including the expected odour emission concentration from the odour control system.
- To perform an odour dispersion modelling assessment to illustrate that the odour treatment system will not result in an odour impact at or beyond the boundary of the facility.

2. Materials and methods

2.1 Odour emission rate calculation

The odour emission rate calculation was performed using data gathered from information supplied by the client.

The total volume of air to be treated in the proposed odour control system is 45,936 m^3/hr or 12.76 m^3/s.

The guaranteed exhaust odour threshold concentration to be achieved on the odour control system exhaust is less than or equal to 460 Ou_E/m^3.

The building will be sealed to an integrity / building envelope leakage of less than or equal to 2 m^3/m^3/hr. Based on this value, the maximum extraction rate required to maintain the building under negative pressure is 8,720 m^3/hr (leakage rate by the total building envelope surface area).

The total volume of the building is 22,968 m^3 void volume. Based on an overriding requirement for comfort conditions inside the building for workers, the total extraction rate will be 45,936 m^3/hr thereby providing 2 AC/hr.

This is in excess of the building leakage rate so negative pressure will be maintained on the building envelope which in turn will prevent odour leakage from the building under a wind pressure in excess of 50 Pa minimum.

The maximum total odour emission rate as a result of operating the odour control system will be 5,903 Ou_E/s (Volume flow rate by the guaranteed odour threshold concentration).

2.2 Dispersion modelling

Any material discharged into the atmosphere is carried along by the wind and diluted by the turbulence, which is always present in the atmosphere. This dispersion process has the effect of producing a plume of polluted air that is roughly cone shaped with the apex towards the source and can be mathematically described by the Gaussian equation (Carney and Dodd, 1989). Atmospheric dispersion modelling has been applied to the assessment and control of odours for many years, originally using Gaussian form ISC (Industrial Source Complex) (Keddie et al., 1980) and more recently utilising advanced boundary-layer physics models such as ADMS (Atmospheric Dispersion Modelling Software) and AERMOD. Once the odour emission rate from the source is known, Ou_E s^{-1}, the impact on the vicinity can be estimated.

These models can be applied to facilities in three different ways:

1. To assess the dispersion of odours and to correlate with complaints;
2. To estimate which source is causing greatest impact;
3. In a “reverse” mode, to estimate the maximum odour emissions which can be permitted from a site in order to prevent odour complaints occurring (Zannetti, 1990; McIntyre et al., 2000; Sheridan, 2002).

In this latter mode, models can be employed to predetermine the amount of abatement required to prevent odour complaints, therefore reducing capital investment in abatement technologies (Sheridan et al., 2001).

2.3 Meteorological Data

Five years worth of hourly sequential meteorology data representative of the area will be used for the operation of Aermod Prime. This will allow for the determination of the worst-case scenario for the overall impact of odour emissions from the facility on the surrounding vicinity.

Odour Monitoring Ireland currently has licensed met data for the existing site. Dublin Airport 2002 to 2006 inclusive was used.

2.4 Terrain Data

There are no topographical features in the vicinity of the facility with the surrounding terrain relatively flat and less than half the actual stack height. Based on this, simple terrain prevails and therefore no topographical data was included in the model. Building wakes affects were accounted for within the dispersion modelling assessment through the use of the Prime algorithm.

2.5 Dispersion models used

For this study BREEZE AERMOD Prime (12060) was used.

2.5.1 AERMOD Prime

The AERMOD model was developed through a formal collaboration between the American Meteorological Society (AMS) and U.S. Environmental Protection Agency (U.S. EPA). AERMOD is a Gaussian plume model and replaced the ISC3 model in demonstrating compliance with the National Ambient Air Quality Standards (Porter et al., 2003) AERMIC (USEPA and AMS working group) is emphasizing development of a platform that includes air turbulence structure, scaling, and concepts; treatment of both surface and elevated sources; and simple and complex terrain. The modelling platform system has three main components: AERMOD, which is the air dispersion model; AERMET, a meteorological data pre-processor; and AERMAP, a terrain data pre-processor (Cora and Hung, 2003).

AERMOD is a Gaussian steady-state model which was developed with the main intention of superseding ISCST3 (NZME, 2002). The AERMOD modeling system is a significant departure from ISCST3 in that it is based on a theoretical understanding of the atmosphere rather than depend on empirical derived values. The dispersion environment is characterized by turbulence theory that defines convective (daytime) and stable (nocturnal) boundary layers instead of the stability categories in ISCST3. Dispersion coefficients derived from turbulence theories are not based on sampling data or a specific averaging period. AERMOD was especially designed to support the U.S. EPA's regulatory modeling programs (Porter at al., 2003)

Special features of AERMOD include its ability to treat the vertical in-homogeneity of the planetary boundary layer, special treatment of surface releases, irregularly-shaped area sources, a three plume model for the convective boundary layer, limitation of vertical mixing in the stable boundary layer, and fixing the reflecting surface at the stack base (Curran et al., 2006). A treatment of dispersion in the presence of intermediate and complex terrain is used that improves on that currently in use in ISCST3 and other models, yet without the complexity of the Complex Terrain Dispersion Model-Plus (CTDMPLUS) (Diosey et al., 2002).

2.6 Model assumptions

The approach adopted in this assessment is considered a worst-case investigation in respect of emissions to the atmosphere from the proposed scheduled emission point to be located within the operational plant. These predictions are therefore most likely to overestimate the GLC's that may actually occur for each modelled scenario. The assumptions are summarised and include:

1. All emissions were assumed to occur at maximum potential emission concentration and mass emission rates for each scenario and were assumed to occur for 100% of an operating year, simultaneously.

2. Five years of hourly sequential meteorological data from Dublin airport inclusive was used in the modelling screen which will provide statistical significant results in terms of the short and long term assessment. The worst case year 2004 was used for data analysis; this is in keeping with guidance presented in Environment Agency and Irish EPA publications. In addition, AERMOD incorporates a meteorological pre-processor AERMET PRO. The AERMET PRO meteorological pre-processor requires the input of surface characteristics, including surface roughness (z0), Bowen Ratio and Albedo by sector and season, as well as hourly observations of wind speed, wind direction, cloud cover, and temperature. The values of Albedo, Bowen Ratio and surface roughness depend on land-use type (e.g., urban, cultivated land etc.) and vary with seasons and wind direction. The assessment of appropriate land-use type was carried out to a distance of 10km from the meteorological station for Bowen Ratio and Albedo and to a distance of 1km for surface roughness in line with USEPA recommendations.
3. AERMOD Prime (12060) dispersion modelling was utilised throughout the assessment in order to provide the most conservative dispersion estimates;
4. All building wake affects were assessed within the dispersion model and taken into account within the assessment;
5. All receptors were established at normal breathing height of 1.8 m above ground level.

2.7 Odour impact criteria

An odour impact criterion of less than or equal 1.50 Ou_E m^{-3} at the 98th percentile was used for the odour impact assessment criterion in this instance.

3. Results

This section will present the results obtained during the survey.

3.1 Emission point characteristics and Dispersion modelling results

Table 3.1 presents the overall exhaust stream and source characteristics used within the dispersion modelling assessment. This data is inputted into the dispersion model whereby maximum downwind ground level concentrations (GLC's) of odour are predicted for 5 years of screened hourly sequential meteorological data (Dublin 2002 to 2006 inclusive). The 11.9 metre high recycling buildings throughout the site were incorporated into the dispersion model in order to take into account any building wake affects. Maximum ground level concentrations of odours are presented in tabular format in *Table 3.2*.

Table 3.1. Overall exhaust stream characteristics of odour control system located in Panda Waste Services Ltd and input data for dispersion model.

Identity	Exhaust stack characteristics for A2-1
X coordinate (m)	310481.7
Y coordinate (m)	240472.7
Stack base level (m)	2
Average outlet odour concentration for A2-1 (Ou_E/m^3)	460
Average Volumetric airflow rate for A2-1 (m^3/s)	12.76
Average Odour emission rate for A2-1 (Ou_E/s)	5,903
Average Exhaust air stream temperature (K)	293
Stack height for A2-1 (m)	14
Diameter of exit area for A2-1 (m)	1.0
Exit area for A2-1 (m^2)	0.7855
Efflux velocity A2-1 (m/s)	16.25
Breathing level of sensitive receptors (m)	1.80
Recycling building height above ground level (m)	2

Table 3.2 illustrates comparison of the predicted ground level concentrations and the proposed limit ground level concentration at the 98th percentile of hourly averages at or beyond the boundary of the facility. As can be observed, the predicted ground level concentrations are within the proposed limit values. In addition, *Appendix I* illustrate the odour contours generated by the dispersion model for the 98th percentile of hourly averages for 5 years of screened hourly sequential meteorological data.

Table 3.2. Predicted ground level concentrations using AERMOD Prime dispersion model.

Model used	Maximum GLC at the 98th percentile value at or beyond the facility boundary (Ou_E/m^3)	Limit values
AERMOD Prime (12060)	1.20	≤1.50 Ou_E m^{-3} at the 98th percentile

In addition to *Table 3.2*, odour contour plots are presented in *Appendix I* in order to allow visual interpretation of odour plume spread.

As can be observed the predicted maximum ground level concentrations of odour in the vicinity of the facility are in compliance with the odour impact criterion of less than or equal to 1.50 Ou_E/m^3 at the 98th percentile of hourly averages for 5 years of screened meteorological data.

4. Discussion of results

This section will describe the results obtained during the study.

4.1 Operational parameters

- The odour control system will treat approximately 45,936 Nm^3 [odourous air]/hr.

4.2 Odour emission rate of odour control system

- The average odour emission rate from the odour control system will be no greater than 5,903 Ou_E/s.
- The system will be expected to achieve an odour removal efficiency of between 75% to 85%.
- There is no predicted odour impact from the odour control system exhaust stack with all ground level odour concentrations less than 1.20 Ou_E/m^3 at the 98th percentile of hourly averages over 5 years of screened hourly sequential meteorological data.

5. Conclusions

The following conclusions were drawn:

1. The odour emission rate calculation was performed using data gathered from information provided by the client.
2. The total volume of air to be treated in the proposed odour control system was 45,936 m^3/hr or 12.76 m^3/s.
3. The guaranteed exhaust odour threshold concentration to be achieved on the odour control system exhaust is less than or equal to 460 Ou_E/m^3.
4. The building will be sealed to an integrity / building envelope leakage of less than or equal to 2 $m^3/m^3/hr$. Based on this value, the maximum extraction rate required to maintain the building under negative pressure is 8,720 m^3/hr (leakage rate by the total building envelope surface area).
5. The total volume of the building is 22,968 m^3 void volume. Based on an overriding requirement for comfort conditions inside the building for workers, the total extraction rate will be 45,936 m^3/hr thereby providing 2 AC/hr.
6. This is in excess of the building leakage rate so negative pressure will be maintained on the building envelope which in turn will prevent odour leakage from the building under a wind pressure in excess of 50 Pa minimum.
7. The maximum total odour emission rate as a result of operating the odour control system will be 5,903 Ou_E/s (Volume flow rate by the guaranteed odour threshold concentration).
8. The system will be expected to achieve an odour removal efficiency of between 75% to 85%.
9. There is no predicted odour impact from the odour control system exhaust stack with all ground level odour concentrations less than 1.20 Ou_E/m^3 at the 98th percentile of hourly averages over 5 years of screened hourly sequential meteorological data.

6. *Appendix I* – Desktop Odour Contour plots for the proposed odour control system to be installed in Panda Waste Services Ltd

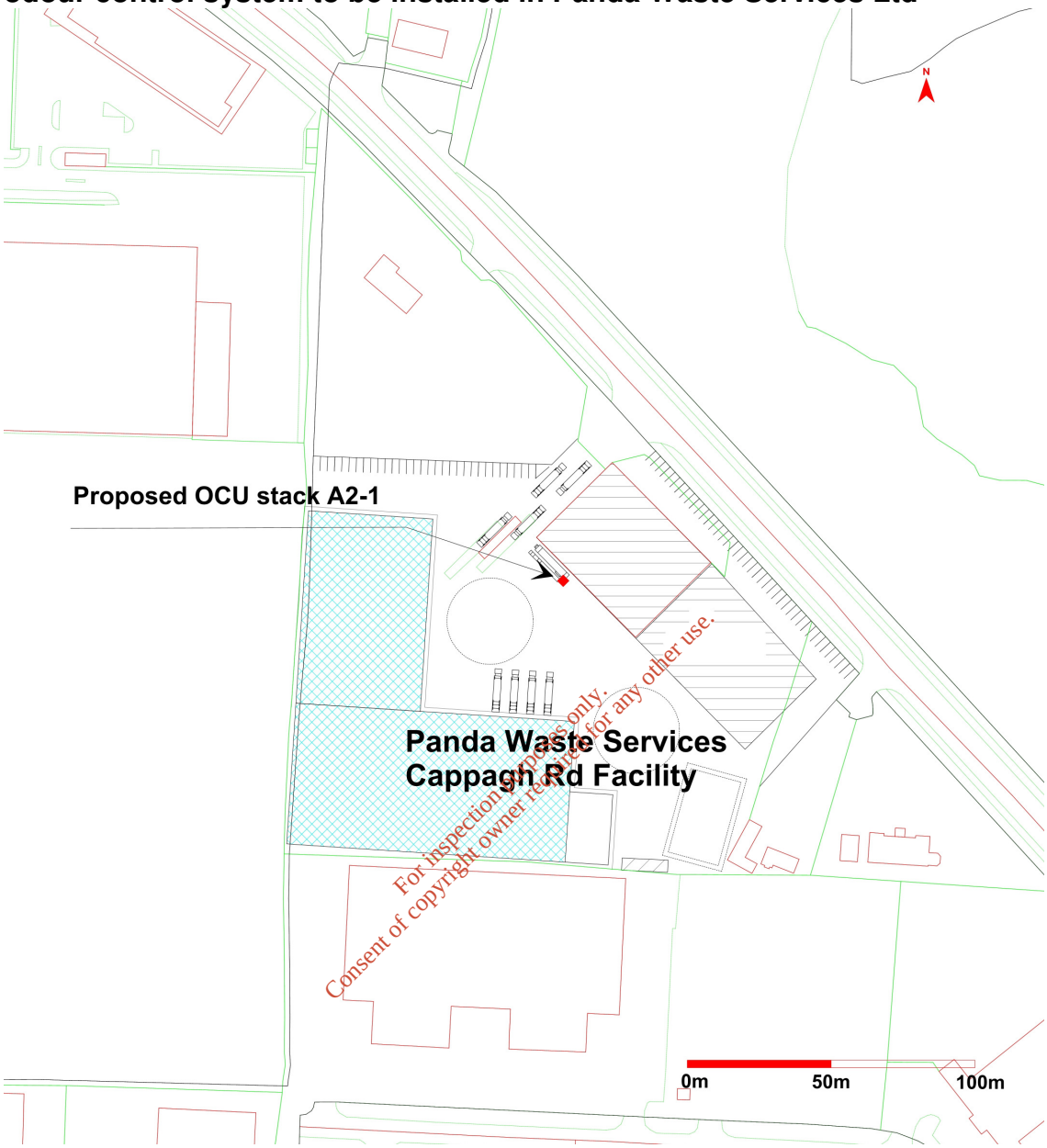

Figure 6.1. Schematic of Panda Waste Services site location and odour control stack location (•).

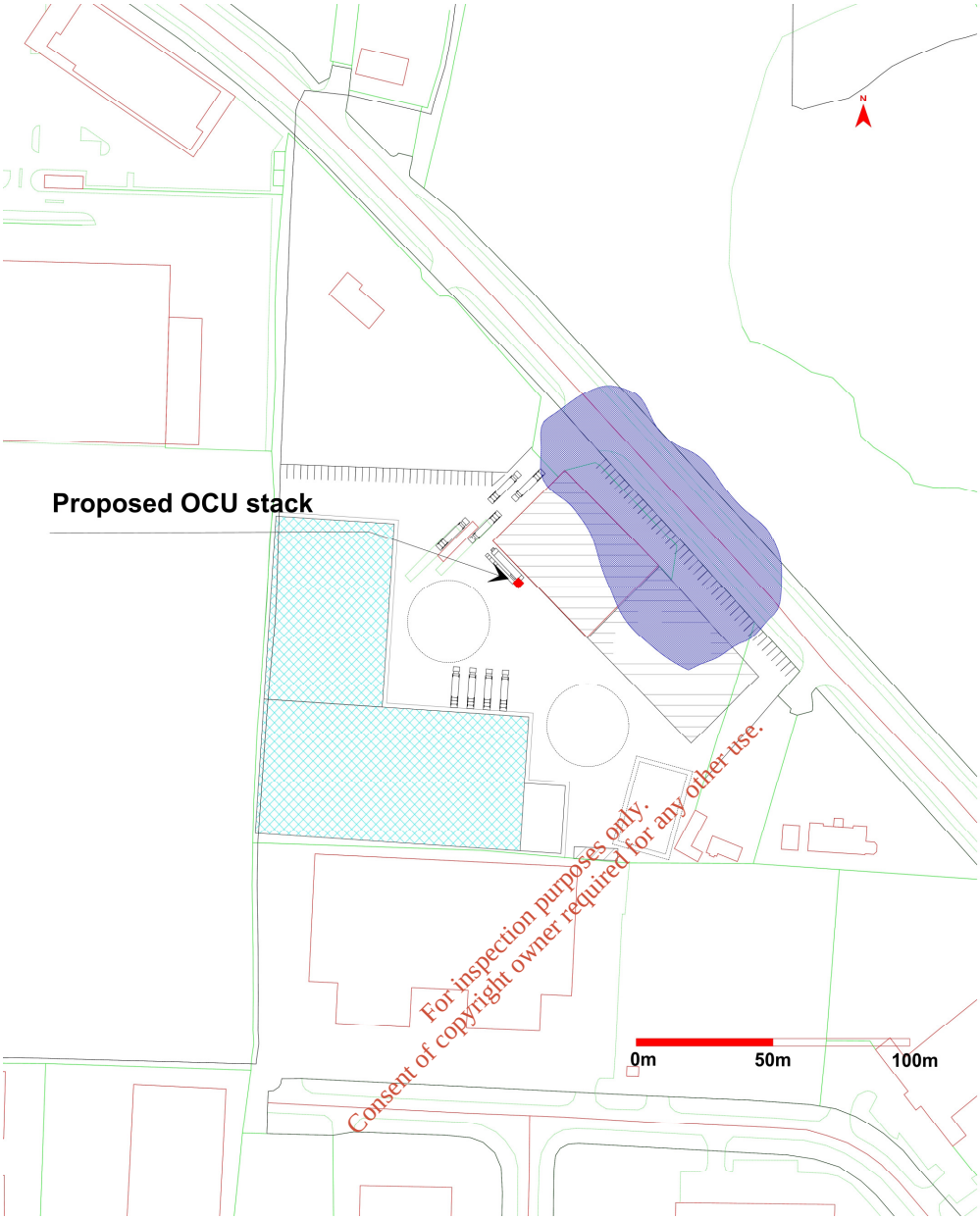

Figure 6.2. Predicted odour emission contribution of odour control unit operation for AERMOD Prime dispersion model for an odour concentration of less than or equal to 0.90 Ou_E m^{-3} (▬) at the 98th percentile of hourly averages for 5 years of screened hourly sequential meteorological data (Worst case year 2004).

Attachment I.2 Assessment of Impacts on Receiving Surface Water.

Existing Conditions

The site is located in the catchment of the Tolka River, whose main channel is approximately 2.5 kilometres to the south of the site. The closest significant water feature is a tributary of the Tolka which is approximately 1km to the west of the site.

The River Tolka is part of the IE_EA_Tolka Water Management Unit (WMU) designated in the ERBD Management Plan prepared under the EU Water Framework Directive (WFD). The WMU comprises various Water Bodies and the site is in the Tolka Lower River Water Body.

Reports have been prepared on the 'Status' of each water body. Status means the condition of the water in a watercourse and is defined by its ecological and chemical status, whichever is worse. Water bodies are ranked in one of five classes, High, Good, Moderate, Poor and Bad. The WFD requires measures to ensure waters achieve at least 'Good Status' by 2015 and that their current status does not deteriorate. Where necessary, for example in heavily impacted or modified watercourses, extended deadlines (2021 and 2027) can be set for achieving the following objectives:-

- Prevent Deterioration
- Restore Good Status
- Reduce Chemical Pollution
- Achieve Protected Areas Objectives

The objectives for particular watercourses are based on Pressure and Impact Assessments of human activity, including point and diffuse emissions, land use and morphological conditions on surface waters to identify those water bodies that are 'At Risk' of failing to meet the WFD objectives.

The Lower Tolka Water Body Status Report states that the overall status is 'Bad', and is considered 'At Risk' of not achieving its restoration objective of at least 'Good' status by 2027.

Statement on Main Polluting Substances

Emissions of main polluting substances (as defined in the Schedule of EPA (Industrial Emissions) (Licensing) Regulations 2013, S.I. No. 137 of 2013) to surface waters are not likely to impair the environment.

Compliance with EC Environmental Objectives (Surface Waters) Regulations 2009, S.I. No. 272 of 2009.

The activity complies with the requirements of the EC Environmental Objectives (Surface Waters) Regulations 2009, S.I. No. 272 of 2009.

Assessment of Impacts

The proposed use of rainwater as 'grey water' in the toilets and dust suppression system will reduce the volume of run-off to the storm sewer. The construction and operation of Building A1 will not result in any changes to quality of the surface water run-off from the site. Therefore, the proposed development will have a perceptible positive impact on surface water.

Attachment I.3 Assessment of Impact of Sewage Discharge.

Existing Conditions

Sanitary wastewater from the toilets and water from the canteen is collected in an underground storage tank. The tank is routinely emptied and the contents sent to the municipal wastewater treatment plant (WWTP) in Ringsend. Approximately 320m^3 of wastewater will be generated annually when the facility is operating at maximum capacity.

Compliance with Article 15 of the IED Directive.

The current Waste Licence does not set emission limit values on the sanitary wastewater. However, PANDA carries out the routine monitoring of the wastewater specified in the current Waste Licence. The results, which are submitted to the operator of the WWTP, confirm that the sanitary wastewater is suitable for treatment at the WTTP, which guarantees that an appropriate level of protection of the environment is provided and the treatment does not lead to higher levels of pollution in the environment.

Attachment I.4 Assessment of Impacts on Groundwater.

Existing Conditions

The site is located in the catchment of the Tolka River, whose main channel is approximately 2.5 kilometres to the south of the site. The closest significant water feature is a tributary of the Tolka which is approximately 1km to the west of the site.

The aquifer is part of the Dublin Area Groundwater Body (IE_EA_G_005). The condition of a groundwater Water Body is defined by its chemical and quantitative status, whichever is worse, and groundwater quality is ranked in one of two status classes: Good or Poor. The Dublin Area Water Body is categorised as being of 'Good' status, but is 'At Risk' of achieving its objective of protecting the existing status. At the time the application was prepared there was no available information on groundwater quality beneath the site.

Assessment of Impacts

The proposed development does not involve the provision of any additional hard surfaces that would reduce groundwater recharge within the site boundaries, supply and will not result in any new emission to groundwater. The rainwater harvesting will reduce the demand on the groundwater. Therefore there will be no impact on either the quantitative or qualitative status of the bedrock aquifer.

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Project				Job Ref.	
Panda Waste - Lands at Cappoge Road				V083	
Section				Sheet no./rev.	
Site Investigation				1	
Calc. by	Date	Chck'd by	Date	App'd by	Date
JMcE	22/07/05				

Report on Site Investigation

Introduction

A trial pit investigation was carried out to establish subsoil conditions at Cappagh Road, Finglas on 15th July 2005.

The days that preceded the opening of the trial holes were reasonably dry.

Trial pit locations are shown on the attached location map, No V083-E-010

Fieldwork

Trial pits were excavated using a JCB. A total of 7 No trial pits were undertaken.

A visual inspection only of the trial pits was made. The results of this inspection are recorded in the trial pit logs, which follow. No laboratory testing of the excavated materials was undertaken.

No running water was encountered in the trial pits.

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Project				Job Ref.	
Panda Waste - Lands at Cappoge Road				V083	
Section				Sheet no./rev.	
Site Investigation				2	
Calc. by	Date	Chck'd by	Date	App'd by	Date
JMcE	22/07/05				

Trial Pit No.1

Equipment & Methods: Machine (JCB) excavated trial hole

Location No.

Location: Lands at Cappoge Road

Carried out for: Panda waste Ltd

Ground Level: 83.1

Coordinates

Date: 15/07/05

Description	Reduced Level	Depth	Thickness	Sample	Test	
Building Waste (Crushed concrete Etc.)	83.1	0.00m	0.25m			
Vegetable Soil	82.85	0.25m	0.30m			
Light Brown Boulder Clay	82.55	0.55m				
Bottom of pit	81.5	1.60m	1.05m			No water visible
Dark brown/black hard Clay with stones Difficult to excavate						

Remarks:

Logged by JMcE

SCALE: NTS

Notes

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Panda Waste - Lands at Cappoge Road				V083	
Section				Sheet no./rev.	
Site Investigation				3	
Calc. by	Date	Chck'd by	Date	App'd by	Date
JMcE	22/07/05				

Trial Pit No.2

Equipment & Methods: Machine (JCB) excavated trial hole	Location No. Location: Lands at Cappoge Road
Carried out for: Panda waste Ltd	Ground Level: 83.00 Coordinates: Date: 15/07/05

Description	Reduced Level	Depth	Thickness	Sample	Test	
Vegetable Soil	83.00		0.25m			
Light brown clay	82.75	0.25m				
Bottom of pit	81.7	1.30m	1.05m			No water visible
Dark brown/black hard Clay with stones Difficult to excavate						

Remarks:

Notes

Logged by: JMcE

SCALE: NTS

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Project				Job Ref.	
Panda Waste - Lands at Cappoge Road				V083	
Section				Sheet no./rev.	
Site Investigation				4	
Calc. by	Date	Chck'd by	Date	App'd by	Date
JMcE	22/07/05				

Trial Pit No.3

Equipment & Methods: Machine (JCB) excavated trial hole	Location No. / Location: Lands at Cappoge Road
Carried out for: Panda Waste Ltd	Ground Level: 82.90 / Coordinates / Date: 15/07/05

Description	Reduced Level	Depth	Thickness	Sample	Test	
Vegetable Soil	82.90		0.30m			
Light brown clay	82.60	0.30m	0.60m			
Brown/grey mottled silty sandy stiff Clay (boulder clay)	82.00	0.90m				
Bottom of pit	81.40	1.50m	0.60m			No water visible
Dark brown/black hard Clay with stones Difficult to excavate						

Remarks:

Logged by JMcE

Notes

SCALE: NTS

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Project				Job Ref.	
Panda Waste - Lands at Cappoge Road				V083	
Section				Sheet no./rev.	
Site Investigation				5	
Calc. by	Date	Chck'd by	Date	App'd by	Date
JMcE	22/07/05				

Trial Pit No.4

Equipment & Methods:
Machine (JCB) excavated trial hole

Location No.

Location: Lands at Cappoge Road

Carried out for:
Panda Waste Ltd

Ground Level
82.87

Date
15/07/05

Description	Reduced Level	Depth	Thickness	Sample	Test	
Vegetable Soil	82.87		0.30m			
Light brown clay	82.57	0.30m	0.40m			
Brown/grey mottled silty sandy stiff Clay (boulder clay)	82.17	0.70m				
Bottom of pit	81.37	1.50m	0.80m			No water visible
Dark brown/black hard Clay with stones Difficult to excavate						

Remarks:

Logged by
JMcE

SCALE:
NTS

Notes

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Project				Job Ref.	
Panda Waste - Lands at Cappoge Road				V083	
Section				Sheet no./rev.	
Site Investigation				6	
Calc. by	Date	Chck'd by	Date	App'd by	Date
JMcE	22/07/05				

Trial Pit No.5

Equipment & Methods: Machine (JCB) excavated trial hole	Location No. Location: Lands at Cappoge Road
Carried out for: Panda Waste Ltd	Ground Level 83.65 — Coordinates — Date 15/07/05

Description	Reduced Level	Depth	Thickness	Sample	Test	
Vegetable Soil	83.65		0.30m			
Light brown clay	83.35	0.30m	0.50m			
Brown/grey mottled silty sandy stiff Clay (boulder clay)	82.85	0.80m				
Bottom of pit	82.45	1.20m	0.40m			No water visible
Dark brown/black hard Clay with stones Difficult to excavate						

Remarks:

Notes

Logged by JMcE

SCALE: NTS

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Project	Job Ref.
Panda Waste - Lands at Cappoge Road	V083
Section	**Sheet no./rev.**
Site Investigation	7

Calc. by	Date	Chck'd by	Date	App'd by	Date
JMcE	22/07/05				

Trial Pit No.6

Equipment & Methods:
Machine (JCB) excavated trial hole

Location No.

Location: Lands at Cappoge Road

Carried out for:
Panda Waste Ltd

Ground Level: 83.10

Coordinates

Date: 15/07/05

Description	Reduced Level	Depth	Thickness	Sample	Test	
Vegetable Soil	83.10		0.30m			
Light brown clay	82.80	0.30m	0.30m			
Brown/grey mottled silty sandy stiff Clay (boulder clay)	82.50	0.60m				
Bottom of pit	82.00	1.10m	0.50m			No water visible
Dark brown/black hard Clay with stones Difficult to excavate						

Remarks:

Logged by
JMcE

SCALE:
NTS

Notes

cpm engineering
River House
East Wall Road
Dublin 3
Tel 01 874 5411 Fax 01 835 5779

Project				Job Ref.	
Panda Waste - Lands at Cappoge Road				V083	
Section				Sheet no./rev.	
Site Investigation				8	
Calc. by	Date	Chck'd by	Date	App'd by	Date
JMcE	22/07/05				

Trial Pit No.7

Equipment & Methods: Machine (JCB) excavated trial hole	Location No. / Location: Lands at Cappoge Road	
Carried out for: Panda waste Ltd	Ground Level 82.90	Coordinates / Date 15/07/05

Description	Reduced Level	Depth	Thickness	Sample	Test	
Vegetable Soil	82.90		0.30m			
Light brown clay	82.60	0.30m	0.50m			
Brown/grey mottled silty sandy stiff Clay (boulder clay)	82.10	0.80m				
Bottom of pit	81.70	1.20m	0.40m			No water visible
Dark brown/black hard Clay with stones Difficult to excavate						

Remarks:

Logged by JMcE

SCALE: NTS

Notes

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East Wall Road
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Tel 01 874 5411 Fax 01 835 5779

Project				Job Ref.	
Panda Waste - Lands at Cappoge Road				V083	
Section				Sheet no./rev.	
Site Investigation				9	
Calc. by	Date	Chck'd by	Date	App'd by	Date
JMcE	22/07/05				

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BASELINE ASSESSMENT REPORT

PANDA WASTE SERVICES

WASTE RECYCLING FACILITY

CAPPOGUE

FINGLAS

DUBLIN 11

WASTE LICENCE NO. W0261-01

Prepared For: -

Nurendale Ltd T/a Panda Waste Services.
Cappagh Road,
Finglas,
Dublin 11

Prepared By: -

O' Callaghan Moran & Associates,
Granary House,
Rutland Street,
Cork

December 2013

Project	Baseline Assessment Report Panda Waste Services Cappagh Road.
Client	Panda Waste Services Ltd W0261-01

Report No	Date	Status	Prepared By	Reviewed By
138180202	15/12/2013	Draft	Sean Moran MSc, PGeol	Jim O'Callaghan MSc, CEnv, MCIWM, IEMA
		Final		

TABLE OF CONTENTS

1. INTRODUCTION

Nurendale Ltd, trading as Panda Waste Services (PANDA), operates its Materials Recovery Facility (MRF) at Cappagh Road under Waste Licence Reg. No.W0261-01 issued by the Environmental Protection Agency (Agency). PANDA intends to construct a new waste processing building at the site, which will be used to handle and process source segregated household food waste and residual waste and this requires Agency approval.

The Waste Licence already authorises the acceptance and processing of 35,000 tonnes of source segregated mixed dry recyclables, with a provision to increase the amount of this waste type subject to the overall annual limit of 200,000 tonnes not being exceeded.

PANDA is currently collecting mixed dry recyclables from 70,000 household customers in Fingal and intends to divert these wastes to the Cappagh facility upon completion of the on-going construction works, which is the 'Stage 2' Infrastructure referred to in Note 2 of Schedule A2 of the Licence.

This, in conjunction with the commercial and industrial dry recyclables, could increase the amount of dry recyclables accepted at the site to between 70,000 and 80,000 tonnes annually. The household dry recyclable bin contains a significant level of contaminants (between 20% and 30%) that are inadvertently placed in the bin by householder. Such materials are not suitable for recycling, but are suitable for the manufacture of refuse derived fuel (RDF).

Therefore there is a need to have approval to pre-treat waste for waste co-incineration, which is Class 11 4 (b)(ii) of the New First Schedule of the EPA Act 1992 to 2013. As this Class is one to which the Industrial Emissions Directive (IED) applies, PANDA must apply for an IED Licence.

In the case of an an application for an IED licence for an activity that involves the use, production or release of relevant hazardous substances (as defined in Section 3 of the EPA Act 1992 as amended), provide a baseline report in accordance with section 86B of the EPA Act 1992 as amended. The purpose of the report is to determine the state of soil and groundwater contamination at the site. As the existing facility operations involve the storage and use of diesel and gas oil, both of which are classified as hazardous substances, a baseline report is required.

PANDA appointed O'Callaghan Moran & Associates (OCM) to prepare the baseline report. OCM is an environmental consultancy, established in 1997, which provides environmental services to private and public sectors. OCM has been involved in the completion of environmental risk assessments for Waste Licensed and Integrated Pollution Prevention Control licensed facilities since 2001.

1.1 Methodology

OCM's assessment was based on the Environmental Liabilities Risk Assessment and Decommissioning Management Plan prepared for the facility in 2013 and which have been submitted to the Office of Environmental Enforcement.

1.2 Limitations

The current Waste Licence authorises the construction and operation of three separate waste processing buildings and to accept and process Construction and Demolition Waste, Dry Recyclable Household and Commercial and Industrial Waste and Paper & Cardboard.

The Licence authorises the acceptance of 200,000 tonnes of waste when the site is fully developed (when all three buildings are operational), but until then the annual intake is restricted to 70,000 tonnes.

PANDA has constructed the first of the three waste processing buildings, which takes in Construction and Demolition and Dry Recyclable Commercial and Industrial wastes. The other two buildings, which will house Dry Recyclables and Paper & Cardboard are under construction. These works also include paving the entire operational area and it is understood that this will be completed in 2014.

There is an on-site well that is used to supply water for the toilets and the dust suppression system. There is no available information on either the well construction or the quality of the groundwater

2. CURRENT USE

2.1 Facility Location

The site is located on the Cappagh Road, approximately 2.5km southwest of Dublin Airport.

2.2 Facility Layour

The site encompasses 2.53 ha and is occupied of site services, construction of perimeter security fencing, internal access roads and paved yards in the northern and central parts of the site, foul and surface water drainage system, weighbridge(s), Building A1 (1,760m^2) and an electrical substation. A 3m high acoustic wall was constructed at the south east boundary. Portacabin offices, canteen and staff welfare facilities have been temporarily located adjacent to the weighbridge at site entrance and at the south east side of the building.

The construction works that are underway, involves the construction of the Buildings B1 (2,800m^2) and B2 (4,680m^2), the completion of the paving of the open areas and the extension of the surface water drainage system.

2.3 Services

Electricity is supplied by Electric Ireland, which has an electrical substation on-site. Water is obtained from an on-site well. Sanitary wastewater is collected and stored in an underground tank pending removal off-site for treatment in a municipal wastewater treatment plant.

2.4 Waste Types & Volumes

The facility accepts predominantly skip waste from construction and demolition sites, household renovations/clearances and C&I Dry Mixed Municipal Waste. Source segregated baled cardboard, baled plastic and boxed plastic hangers are also accepted from a commercial customer who has nationwide outlets. No hazardous, putrescible or liquid wastes are accepted. The licence allows the acceptance of 200,000 tonnes annually.

2.5 Waste Acceptance & Handling Procedures

When the on-going construction works are complete, the mixed C&D and C&1 waste are handled in Building A1, the Dry Recyclables will be handled in Building B1 and the Paper and Cardboard will be handled in Building B2.

Current operations include the processing of C&D and C&I wastes inside Building A1; the bulking up of the plastic hangers into specially designed transport vehicle near the western site boundary; the storage of the source segregated baled cardboard and baled plastic in an open paved area along the southern site boundary and the storage of recovered waste electronic and electrical waste (WEEE) and timber on paved areas adjacent to Building A1.

The external storage of the wastes is a temporary measure and will stop following the construction of Buildings B1 and B2.

In Building A1 ferrous and non-ferrous metals, waste electrical and electronic equipment (WEEE), wood and bulky wastes are segregated manually and mechanically using a mechanical grab. The WEEE is stored in cages on a paved area at the rear of the processing building. The timber is stored in open bays formed by large concrete blocks on a paved area to the south west of the processing building. The remaining mixed waste is then bulked up and sent to PANDA's Beuaparc facility for processing.

In Building B1, the pre-segregated dry recyclables will be baled. The mixed recyclables will be separated manually and mechanically into the different waste streams (paper, cardboard, plastic, glass and metal) using a sorting line incorporating a loading hopper, conveyor, picking line, ballistic separators and magnets. The paper, cardboard, plastic and metal cans will be baled. The glass will be stored in a bin.

In Building B2, the higher value, low quantity paper will be sorted using a picking line comprising a conveyor that it passes over five open top bins. Each of the bins will be dedicated to a particular grade. As the waste paper passes along the conveyor, the sorting personnel will pick out the particular grade and deposit it into the appropriate bin. Any unsorted paper will fall into an end bin (the lowest value grade). When a bin is full it will be emptied on to a conveyor and sent to a baler.

Lower grades of mixed paper will not be sorted but will be baled. All the bales will be tied with wire. On average the weight of each bale is 750 kg, but this can vary from 500 kg to 1,000 kg depending on size, density, waste paper type and moisture content. The finished bales will be moved to the designated storage areas inside the building using a clamp truck.

2.6 Waste Storage

Waste electrical and electronic equipment (WEEE) recovered from the incoming wastes are stored externally in cages on a paved area at the rear of the processing building. Green waste recovered from the skips and C&D waste (predominantly timber) is stored in open bays formed by large concrete blocks on a paved area to the south west of the processing building.

The source segregated baled cardboard and baled plastic are stored in an open paved area along the southern site boundary pending consignment to other authorised waste recovery facilities.

The external storage of the wastes is a temporary measure pending the construction on Buildings B1 and B2.

2.7 Plant & Equipment

Facility operations require the use of a range of fixed and mobile plant which are listed in Table 2.3.

Table 2.3 Plant and Equipment

Type of Plant	Building 1
Front Loading Shovel	2
Trommel	1
Baler	1
Grabs	1
Conveyor	2
Bag Opener	1
Forklift	1
Yardsweeper	1

2.8 Vehicle Parking and Receptacle Storage

Employee vehicles are parked on the paved area to the west of the processing building. Empty bins and empty skips are stored in the unpaved areas in the east and south of the site.

2.9 Hazardous Substances

The only hazardous substances currently used are diesel, gas oil and adblu (a diesel additive). The diesel and gas oil are stored in above ground steel tanks located in a bund at the south east corner of Building A1. The dispensing pump sits in a drip collection tray.

Table 2.2 – Volume of Hazardous Materials

Products	Quantity Stored litres
Diesel Oil	20,000
Gas Oil	5,000
Adblu	1000

2.10 Emergency Response

PANDA has prepared and adopted an Accident Prevention Policy (APP) and Emergency Response Procedures (ERP). The APP addresses all potential hazards, with particular reference to the prevention of accidents that may cause damage to the environment. The ERP identifies all potential hazards at the site that may cause damage to the environment and also specifies roles, responsibilities and actions required to deal quickly and efficiently with all foreseeable major incidents and to minimise environmental impacts.

PANDA has a documented procedure on the handling and storage of potentially polluting substances used at the facility, e.g. oils. The procedure describes how filling the fuel storage tanks and refuelling/servicing the mobile plant should be carried out to minimise the risk of accidental spills and ensure that if these occur there is a rapid and effective response.

2.11 Risk Mitigation Measures

The Licence conditions require the provision of mitigation measures, both infrastructural and procedural, that effectively minimise the risk of environmental liabilities associated with unplanned events. Such measures, which are subject to regular review both by the licensee and in response to the findings of Agency inspections, include:

- Provision of an appropriately experienced Facility Management Team and implementation of appropriate staff programmes;
- Implementation of a site specific Environmental Management System (EMS), including an Environmental Management Programme (EMP) and Corrective Action Procedures;
- Adoption of site specific APP and ERP, which are reviewed annually;
- Provision of impermeable concrete surfaces in all areas of the facility associated with the movement, processing, handling and storage of waste;
- Provision and maintenance of attenuation tank and oil interceptor on the storm water system;
- Provision of appropriate bundling for all tank and drum storage areas, and routine integrity testing of these and underground tanks and pipework to ensure that the are fit for purpose;
- Provision and maintenance of appropriate spill response and clean-up equipment in areas where there is a risk of spills occurring;
- Regular site inspections and visual inspections of the surface water emissions from the site.
- Full time on-site security outside of operational hours

3. PAST USE

3.1 Site History

The site was initially developed in 2006. Prior to this the site had been used for agricultural purposes. Fingal County Council issued a Waste Permit for the facility in May 2006. The facility opened in October 2006 and has been in continuous operation since then. The Agency granted the Waste Licence August 2010.

3.2 Incident History

There have been no incidents (spills, fires, leaks etc) since PANDA began operations at the site that had potential to cause soil or groundwater pollution.

4. SOILS & GROUNDWATER ASSESSMENT

4.1 Geology

A site investigation was carried out at in 2005 to determine the type and thickness of the soils and subsoils prior to the start of construction of the existing facility. The investigation comprised the excavation of seven (7 No.) trial pits across the site.

The pits revealed approximately 25 cm of top soils overlying a boulder clay that ranges in thickness from 0.8 to 1.35 m and is underlain by the bedrock. There was no visual evidence of any soil contamination and groundwater was not encountered. The trial pit logs are in Appendix 1. The underlying bedrock locally comprises nodular muddy limestone and shale.

4.2 Hydrogeology

The subsoils are poorly permeable and are not significantly water bearing. The bedrock is classified by the Geological Survey of Ireland (GSI) as being Moderately Productive only in local zones (**Ll**). There is one on-site well that supplies water for the welfare facilities and dust suppression system. There is no record of any groundwater abstraction wells within 2 kilometres of the site.

Based on the available information on the type and thickness of the subsoil, the vulnerability of the bedrock aquifer ranges from High to Extreme across the site. The local direction of groundwater flow is to the south, but is likely to be greatly influenced by the large scale quarrying immediately to the east of the site (Huntstown Quarry).

4.3 Soil and Groundwater Quality

There is no evidence to indicate that past and current uses have caused soil or groundwater contamination. The site investigation carried out in 2005 before the site was developed did not identify any evidence of soil contamination.

The aquifer beneath the site is part of the Dublin Area Groundwater Body (IE_EA_G_005). The condition of a groundwater Water Body is defined by its chemical and quantitative status, whichever is worse, and groundwater quality is ranked in one of two status classes: Good or Poor. The Dublin Area Water Body is categorised as being of 'Good' status, but is 'At Risk' of achieving its objective of protecting the existing status.

At the time this report was prepared there was no available information on groundwater quality beneath the site.

APPENDIX 1

Attachment I.6 Assessment of the Environmental Impact of On-Site Waste Recovery/Disposal.

The majority of the wastes accepted at the facility are processed and transferred for recovery, with a minority going for disposal. No wastes are disposed of at the site. A detailed assessment of the environmental impacts of the on-site waste processing activities is presented in the Environmental Impact Statement that accompanies this application.

Attachment I.7 Noise Impact.

A detailed assessment of impacts, which included an ambient noise survey and predictive assessment, is presented in the report prepared by Noise & Vibration Consultants, which is included in this Attachment.

1 Noise

1.1 Introduction

This report deals with the potential noise emission impacts associated with a proposed extension to the existing materials recycling facility at Cappagh Rd, Finglas, Co. Dublin.
Panda currently have permission to operate three main processing buildings; A1 construction and demolition waste (C & D), B1 commercial and industrial waste (C & I) and B2 (Dry Recyclables). The aforementioned facilities involve the collection and processing of 200,000 tonnes of waste annually.

Building A1 has been constructed and is currently used for the recovery of up to 50,000 tonnes per annum of C & D and C & I wastes. Construction works have commenced on Building B1 which will process household and commercial dry recyclables, while Building B2 will process source segregated and mixed cardboard and plastics. It is proposed to transfer the activity currently associated with Building A1 to Building A2.

The current planning permit and waste licence specifies the hours of acceptance and operation as 08.00 to 20.00 hrs Monday to Friday and 08.00 to 16.00hrs on Saturday.

The current proposal is to construct a new building (Building A2 adjacent to Building A1 which will accept process and transfer segregated residual household waste (black bin) and accept and transfer source segregated food waste (brown bin). This proposal seeks to increase the overall permitted tonnage from 200,000 tonnes to 250,000 tonnes annually. It is proposed to change the waste acceptance hours to 06.00 and 23.00 hrs Monday to Friday and operation hours to 07.00 to 22.00hrs Monday to Saturday.

The purpose of this study is to:

- establish existing noise levels in the environs surrounding the proposed development prior to the proposed activity
- project the noise levels generated by construction and completed development
- specify mitigating measures where deemed necessary

Acoustic Terminology

Sound is simply the pressure oscillations that reach our ears. These are characterised by their amplitude, measured in decibels (dB), and their frequency, measured in Hertz (Hz). Noise is unwanted or undesirable sound, it does not accumulate in the environment and is normally localised. Environmental noise is normally assessed in terms of A-weighted decibels, dB(A), where the A weighted filter in the measuring device elicits a response which provides a good correlation with the human ear. The criteria for environmental noise control are of annoyance or nuisance rather than damage. In general a noise level is liable to provoke a complaint whenever its level exceeds by a certain margin the pre-existing noise level or when it attains an absolute level. A change in noise level of 2 dB(A) is 'barely perceptible', while an increase in noise level of 10 dB(A) is perceived as a twofold increase in loudness.

2.0 The Receiving Environment

2.1 Baseline Noise Survey

A noise survey was carried out at locations along the perimeter of the existing facility and close to the nearest residents in the environs of the proposed development. Continuous monitoring was undertaken over a period from 28th to 30th November 2011. Weather was dry during the survey with average wind speeds less than 3m/s. The following conditions were adhered to in undertaking the survey:

- Measurement of ambient noise levels was undertaken during varied weather conditions using instruments of Type 1 specification.
- Monitoring locations were selected to coincide with local residences.
- Measurements were undertaken during weekday and weekend periods.
- The survey was carried out in accordance with ISO 1996 Part 1 (Description and Measurement of Environmental Noise - Part 1: Basic Quantities and Procedures)

Instrumentation Used

The following instrumentation was used in the baseline survey:

- Two Larson Davis 812 Precision Integrating Sound Level Analyser/Data logger
- One Larson Davis 831 Precision Integrating Sound Level Analyser/Data logger
- Wind Shields Type: Double Skinned Windscreen.
- Calibration Type: Larson Davis Precision Acoustic Calibrator Model CA 250.

Measurement Procedure

Noise monitoring was carried out at four locations (see figure in Appendix) using environmental noise analysers with data logging facilities set on real time, the logged data was downloaded via a personal computer using computer software. The measurement location was as follows;

N1: Located at 15m from road edge as shown on map, close to ANSL1
AN2: Located in corner of site as shown on map
AN3: Located 40m from road edge as shown on map
ANSL2: Located at entrance to derelict house

At monitoring location the microphone was located at 1.5m above ground level and away from reflecting surfaces. All acoustic instrumentation was calibrated before and after each survey and the drift of calibration was less than 0.2dB (calibration level 114 dB at 250 Hz).

2.2 Results of Noise Survey

The existing noise levels were established during a period of continuous monitoring at a location along the boundary of the road traffic noise dominates the local environment. The complete dataset from the baseline study is given in the Appendix. A summary of the 30 minute intervals (mean values) measurements are given in Table 2.1 below.

Table 2.1 Baseline noise levels mean values – 30 minute interval data

		Day-time			Night-time		
Location	Date	Leq	L10	L90	Leq	L10	L90
N1	28th - 29th Nov'13	61.2	65	42.9	53.3	48	36.8
	29th - 30th Nov'13	63.5	67.6	48.8	51.4	47.2	37.6
	30th Nov'13	59.9	63.5	43.7			
ANSL2	28th Nov'13	67.6	67.8	52.6			
AN1	28th - 29th Nov'13	49.2	50.5	45.7	47.1	48.1	43.2
	29th - 30th Nov'13	54.2	56.3	49	44.8	45.3	40.9
	30th Nov'13	51.3	53.6	45.3			
AN2	28th - 29th Nov'13	55.5	57.3	47.1	47.9	48.6	43.3
	29th - 30th Nov'13	59.2	60.3	51.3	56.9	53	42.6
	30th Nov'13	60.4	62.3	51.4			

Note Levels quoted are for mean (arithmetic average) for specified periods
Day-time is 07.00 to 22.00 hrs, night-time is 22.00 to 07.00 hrs

3.0 Characteristics of Proposal

The current activity associated with building A1 will be transferred to building A2. The main noise sources in the proposed development (shredder, trommel screen, conveyor, grab, forklift and front-end loaders) will be contained inside building A1. The fans for the odour control system /negative pressure will be housed outside existing building A1. A yard sweeper will operate inside and outside the building for periods. The noise levels associated with this development will be from construction of Building A2 and the operation of new plant in Building A1. There will be an increase in traffic flow generated on the local road network from the completed development.

4.0 Potential Impacts of the Proposal

The proposed development consists of:

- construction of building A2
- the operation of the new activity in Building A1
- road traffic generated from activity associated with Building A1

Noise Limits

For outdoor noise at residential properties the basic criterion for night-time is normally less than 45 dB(A), while the day-time criterion is normally less than 55 dB(A). Local Authorities throughout Ireland and the EPA through their Licensing apply the aforementioned limits. The existing facility has a waste licence and the aforementioned limits are set under conditions by the EPA. These are:

- night-time (22.00 to 08.00 hrs) 30 minute Leq limit of 45 dB(A)
- day-time (08.00 to 22.00 hrs) 30 minute Leq limit of 55 dB(A) and,

'There should be no clearly audible tonal component or impulsive component in the noise emission from activity at any noise sensitive location'.

For this proposal the existing noise limits are proposed with night-time from 22.00 to 07.00hrs and day-time from 07.00hrs to 22.00hrs. The dominant noise at the nearest NSL's is road traffic noise and as can be seen from the baseline noise survey data there should be a negligible noise impact due to a 07.00hrs start of operation activity inside the buildings.

4.1 Typical Construction Noise Sources and Noise Levels

Leq measurements were taken of construction noise sources at other sites within the country at 20m from the geometric centre of activity when the equipment was in continuous operating mode. Noise levels of these noise sources are given in Table 4.1 and were as follows:

Table 4.1 Noise levels from construction activity at 20m

Noise Source	Noise Level Leq 1 hour
Readymix truck	70 dB(A)
Large Excavator	73 dB(A)
Vibratory Roller	68 dB(A)
Dump truck	71 dB(A)

4.2 Calculation and Prediction of Construction Noise

Methodology

The predicted noise levels generated by construction activity (or indeed any noise source) at a particular location can be calculated according to the following formula:

$Lp2 = Lp1 + \Delta L\psi - \Sigma\Delta L$ where,

Lp2 = Sound Pressure level in decibels at Residence.

Lp1 = Sound pressure level in decibels at 20 metres.

$\Delta L\psi$ = correction for direction effects in a horizontal plane,

$\Sigma\Delta L = \Delta Ld + \Delta La + \Delta Lr + \Delta Ls + \Delta Lv + \Delta Lg + \Delta Lw$, and where,

ΔLd = geometric spreading (spherical radiation) and is calculated according to:

$\Delta Ld = 20 \log_{10} (d1/d2)$, where, d1 is the residence distance in metres, while d2 is 20 metres.

ΔLa = air absorption

ΔLr = reflection and diffraction

ΔLs = screening

ΔLv = vegetation

ΔLg = ground absorption

ΔLw = wind gradients

The attenuation effects due to air absorption, reflection, refraction and vegetation is small within distances of 100m and in the predictive calculation the attenuation from these factors is assumed to be zero at such distance. The other attenuating factors (geometric spreading,

screening) have been taken accounted for in the proposed development. The predicted levels are given in Table 4.2

Table 4.2 Predicted noise levels at key locations from construction activity

Receiver Position	Predicted Maximum Levels L_{AeqT} - 1 hour dB(A)	Predicted Typical Levels L_{AeqT} - 1 hour dB(A)
ANSL1	59.9	<50
ANSL2	57.9	<50

Note: A 3m high wall which is located between the construction source will reduce the noise emissions at ANSL1 locations by more than 10dBA. The maximum Leq noise levels will pertain for short periods (less than two-week equivalent at any location for the entire project), while typical noise levels are for a period in excess of 50% of the total construction period.

Commentary

All construction will be carried out in accordance with BS 5228: Part 1: 2009[1]. All construction traffic to be used on site should have effective well-maintained silencers. Operators of all mobile equipment will be instructed to avoid unnecessary revving of machinery and limiting the hours of site activities that are likely to give high noise level emissions. Where possible the contractor will be instructed to use the least noisy equipment. With efficient use of well maintained mobile equipment considerably lower noise levels (3-6 dB(A)) than those predicted can be attained. The Project Engineer will closely supervise all construction activity. Construction activity due to its nature is a temporary activity and thus any impacts will be short term. All construction works will be carried out during daytime periods.

4.3 Noise Impacts from Operation of Extension to Facility

The main noise sources associated with Building A1 are inside a building structure. Table 4.3 gives the main noise sources and associated noise levels.

[1] Noise and Vibration Control on Construction and Open Sites BS5228- Part 1: 2009 *Code of Practice for Basic Information and Procedures for Noise Control*)

Table 4.3 Main noise sources and associated noise levels with Building A1

Item of Plant	Noise Level dBA @ 2m	Comment
Odour control fans 2 x25Kw	73	Fans will be houses inside
		acoustic enclosure
Shredder	90	Measurement inside building
Trommel screem	89	Measurement inside building
Transfer conveyor X 2	84	Measurement inside building
Front-end loader x 2	87	Measurement inside building
Forklift	85	Measurement inside building
Yardsweeper	80	
Grab	87	Measurement inside building

The items of plant listed in Table 4.3 at 2m equates to 95.1dBA equivalent with all plant operating together. The current operation (Grab, Front-end loader, Forklift) at 2m equates to 91.2dBA equivalent and is inaudible at ANSL1 and ANSL2 at less than 42 dBA.

Prediction of Operational noise

The predicted noise levels associated with the operation of Building A1 are given in Table 4.4 for day-time hours of operation (07.00 to 22.00hrs). The night-time hours of acceptance (22.00 to 23.00hrs and 06.00 to 07.00hrs). During night-time the waste acceptance activity will be restricted to vehicles exiting and entering the site.

In the prediction a transmission loss of 35 dBA by the superstructure (Building A1 and Building A2) was taken into consideration. The distance between Building A1 and NSL1 is just over 80m and there is a 3m high concrete wall between buildings A1, A2 and NSL1. Attenuation by distance and the barrier effect of the existing wall is calculated conservatively at 11dBA.

Table 4.4 Predicted noise levels from operation of Building A2 extension

Receiver Position	Day time L_{AeqT} – 30min dB(A)	Night time L_{AeqT} – 30min dB(A)
ANSL1	49.1	<45
AN1	52.5	<45
AN2	36.1	<45
ANSL2 (derelict)	37.0	<45

NB: Day-time operational hours 07.00 to 22.00 hrs and night-time 22.00 to 07.00hrs

Cumulative effects of other permitted buildings and associated activities

Table 4.5 gives a list of plant inside the already permitted buildings. The baler and air compressor is not considered as main noise sources.

Table 4.5 gives a list of the plant activity in permitted buildings.

Item of Plant	Building A1 Existing	Building B1	Building B2
Front-end loader	1	1	
Graps	1	1	1
Baler		2	2
Air compressor			1
Shredder		1	
Conveyor		2	2
Forklift	1	2	

The cumulative effects of the activity included in Table 4.5 will result in an increase in noise levels at ANSL1 and ANSL2 of less than 1.5dBA from that given in Table 4.4.

5.0 Road Traffic Impacts

Two separate short traffic counts with a noise survey at N1 which is located 15m from the Cappagh Rd gave figures as given in Table 4.6.

Table 4.6 Road traffic flow on Cappagh Road with resulting noise levels

Date	Time	Flow	dBA	No of HCV's	No of Panda
28th Nov'13	15.00 - 16.00hrs	384	63.9	26	6
30th Nov'13	16.00 -17.00hrs	351	63.7	24	7

The traffic flow in above table was approx. equal in both SE and NW directions. The rate of aircraft flyovers (or nearby flyovers) was approx. 8/hr.

When operating at current approved capacity (200,000tonnes/annum) the facility has the potential to generate 278 vehicles movement /day based on a working year of 272 days (08.00 to 20.00hrs). This equates to an average hourly HCV flow of 23. When operating at a proposed maximum 250,000 tonnes/annum, the facility has the capacity to generate 344 vehicles movement /day. This equates to average hourly HCV flow of 29.

Building A1 which has been constructed is currently used for recovery of 50,000 tonnes/annum of C & D and C & I waste. The current flow on the Cappagh Road includes the traffic generated from this activity and would equate to an average of 6 HCV's /hr.

The Building A1 activity which generates 6 HCV's /hr will be transferred to Building A2 and the new activity in Building A1 will also generate 6 HCV's /hr. The net result of the proposal will increase the HCV traffic flow from Panda by an average of 6 HCV's /hr.

There is a logarithmic relationship between road traffic flow and generated noise levels. The doubling of road traffic flow will typically increase the noise levels by 3dBA.

Using a current road average traffic flow of 384 veh/hr on the Cappagh Rd an increase of 6 HCV's would give a negligible noise increase.

Cumulative increase

Increasing the road traffic flow from the Panda facility from the current hourly average flow of 6HCV's/hr to 29 HCV's will result in an increase of 23HCV's /hr. If 1 HCV is assumed to generate the equivalent of 3 light vehicles, then the increase in road traffic on the Cappagh Rd becomes less than 20% equivalent. A less than 20% increase in road traffic will result in a noise level increase of less than 1dBA. The cumulative increase in noise levels from road traffic generated by the Panda waste facility will be negligible.

6.0 Ground Vibration

Ground vibration can be generated from construction traffic, light vehicles on the roadway and by construction activity. The level of ground vibration generated by the development will be below the threshold of perception (0.2-0.3mm/sec) at any residence

7.0 Mitigating Measures for Noise Control

The following mitigating measure is in place:

- A 3m high concrete wall is constructed along the SE boundary of the facility (between Building A2 and the nearest residence, a bungalow which is listed as NSL1 in existing licence).

The following mitigating measure will be in place:

- Operators of all mobile equipment will be instructed to avoid unnecessary revving of machinery, turn off equipment / plant when not in use.

- All extraction fans, openings for cooling units/vents to the outside of the main building (superstructure) will be acoustically treated (by acoustic louvers or alternative) so that noise emissions at the complex boundary will be less than 45 dB(A) at the neaerst residences (with no clearly audible tonal component).

- The housing envelope of Building A2 will have a concrete wall with a minimum height of 3m and minimum thickness of 225mm with a finished height and roof, of Kingspan cladding, or equivalent. (a concrete wall of mass per unit area of 430kg/m^2 (thickness of 195mm) will give an average transmission loss of 54 dB[2] while Kingspan cladding of 60mm thickness (18Kg/m^2) with no lining will give an sound average transmission loss of 25 dB).

- All doors (including the roller shutter doors) to the main building will be kept shut during operations.
- Any openings for cooling or forced ventilation will have acoustic louvers or equivalent fitted.
- Fans will be housed inside an enclosure and will be located in front of Building A1 and away from the nearest residence.
- There will be no openings on the side/wall of Building A2 which is alongside the boundary of the nearest residence.

8.0 Assessment and Conclusion

The maximum noise levels predicted will occur during the construction phase of the development and will pertain for short periods only. The noise impact from the operation of the completed facility will have a negligible noise impact by day and by night at all NSL's.
The increase in road traffic from the completed development should be negligible at all NSL'S

[2] Encyclopaedia of Acoustics, Vol 3, Architectural Acoustics, M. J. Crocker (1997)

APPENDIX

TABLE OF CONTENTS

N & V

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NOISE EIS REPORT

Prepared For: Panda Waste

Extension to Existing Waste Facility at Cappagh Road

Report Prepared by: Brendan O'Reilly, Noise & Vibration Consultants Ltd
(December 2013)

Table 1 **Locn N1**

Model 812 Interval Report

From File: CAPP6.870 Mon 02Dec2013 22:41:59

Period = 00:30 (hh:mm)

Date	Time	Duration	Leq dBA	Lmin dBA	Lmax dBA	L1 dBA	L5 dBA	L10 dBA	L50 dBA	L90 dBA
28Nov2013	15:50:28	09:32.0	64.2	44	83.7	74.5	71.2	69.4	53.7	46.6
28Nov2013	16:00:00	30:00.0	64	43.1	79.7	72.9	70.5	69	57	47.6
28Nov2013	16:30:00	30:00.0	65	43	80.5	73.5	71	69.5	60.3	48.7
28Nov2013	17:00:00	30:00.0	65	41.7	76.5	72.9	70.7	69.4	61.2	48.2
28Nov2013	17:30:00	30:00.0	65	43.7	77.7	73.4	71	69.7	59.6	49.2
28Nov2013	18:00:00	30:00.0	63.2	40.7	77.7	72.7	69.9	68	55.2	46.3
28Nov2013	18:30:00	30:00.0	61.8	41.7	78	72.5	69.2	66.9	51.1	44.2
28Nov2013	19:00:00	30:00.0	61	37.7	79	72.5	68.7	65.5	48	41.2
28Nov2013	19:30:00	30:00.0	59.6	36.1	74.7	71.5	67.5	64	46.1	39
28Nov2013	20:00:00	30:00.0	59.1	35	76	71.7	66.7	61.7	42.7	36.8
28Nov2013	20:30:00	30:00.0	56.7	35.2	73.2	69.2	64.9	60	40.1	36.6
28Nov2013	21:00:00	30:00.0	57.2	35.2	73.9	70.7	64.9	57.8	39.3	37.1
28Nov2013	21:30:00	30:00.0	54.5	35.2	72.5	68.2	61.6	54.7	38.2	37
28Nov2013	22:00:00	30:00.0	54.8	34.7	73.4	69	60.7	54.7	38.7	36.2
28Nov2013	22:30:00	30:00.0	57.6	34.2	79.2	70.5	62.8	55.6	38.1	36
28Nov2013	23:00:00	30:00.0	52.7	33.7	73.4	67.4	55.6	47.8	37.2	35.5
28Nov2013	23:30:00	30:00.0	50.5	34	75.7	63.8	46.8	40.5	36.7	35.3
29Nov2013	00:00:00	30:00.0	47.5	33.2	71.9	59.6	43	40.7	37.1	35.1
29Nov2013	00:30:00	30:00.0	51.7	32.5	74.7	66	51.7	44.2	37	34.7
29Nov2013	01:00:00	30:00.0	51	31.5	75.2	64.2	45.5	37.6	34.8	33.2
29Nov2013	01:30:00	30:00.0	48.7	31.3	71.5	63.2	46.2	38.1	34.7	33.1
29Nov2013	02:00:00	30:00.0	55	31.5	81.2	68.9	51.2	40.5	35.2	33.2
29Nov2013	02:30:00	30:00.0	44.7	31.3	70.5	51.6	37.8	36.5	34.5	33.1
29Nov2013	03:00:00	30:00.0	48.2	31.8	74.7	59.7	43.7	40.2	36.6	34.5
29Nov2013	03:30:00	30:00.0	53	34	76	67.2	53.5	46.5	38.7	36.5
29Nov2013	04:00:00	30:00.0	50.7	33.8	77.2	63.7	46.8	43.3	39.2	36.7
29Nov2013	04:30:00	30:00.0	54.3	36.1	73.7	68.7	58.3	50.6	40.2	38.2

29Nov2013	05:00:00	30:00.0	55.8	36.7	76.2	70.5	59.5	52.2	40.7	38.6
29Nov2013	05:30:00	30:00.0	59.5	39.5	77.2	71.7	67.2	63.6	46.6	42.2
29Nov2013	06:00:00	30:00.0	62.1	41.5	85.2	72.9	68.7	65.9	51	44.7
29Nov2013	06:30:00	30:00.0	62	44.2	78.9	72.7	69	66.5	53.5	48.5
29Nov2013	07:00:00	30:00.0	64	45.3	81.5	74	71	69	57.2	48.5
29Nov2013	07:30:00	30:00.0	64.5	45.1	76.9	73.5	70.9	69.5	58.7	49.8
29Nov2013	08:00:00	30:00.0	65	45.8	77.4	73.5	71.2	69.5	60.2	51.2
29Nov2013	08:30:00	30:00.0	65.9	47.6	82.9	74.2	71.5	70	60.7	52.3
29Nov2013	09:00:00	30:00.0	66	48.3	76	73.9	71.9	70.5	62.2	52.3
29Nov2013	09:30:00	30:00.0	65.5	45.6	77.9	74.9	71.9	70.2	59.3	50.5
29Nov2013	10:00:00	30:00.0	64	45	76.5	73.5	71	69	56.7	48.5
29Nov2013	10:30:00	30:00.0	64.5	45.2	76.5	74	71.5	69.7	57.7	49.6
29Nov2013	11:00:00	30:00.0	64.5	46	82	74	71.2	69	57.5	49.5
29Nov2013	11:30:00	30:00.0	64.5	47.2	76.4	73.7	71	69.2	58.8	51.2
29Nov2013	12:00:00	30:00.0	64.9	47.8	78.5	74	71.2	69.5	59.1	51.7
29Nov2013	12:30:00	30:00.0	65.4	47.1	78.9	74.4	71.5	70	60.1	51.6
29Nov2013	13:00:00	30:00.0	65.2	46.3	78.4	73.5	71	69.7	60.8	51.7
29Nov2013	13:30:00	30:00.0	65	47.2	79.2	73.9	71.4	69.5	59.1	52
29Nov2013	14:00:00	30:00.0	64.7	46.8	77.9	74	71.2	69.4	58.5	51.5
29Nov2013	14:30:00	30:00.0	64.7	47.2	78.5	74.2	71	69.5	58.2	51
29Nov2013	15:00:00	30:00.0	65.2	46.1	84.5	74.7	71	69.4	59.2	51
29Nov2013	15:30:00	30:00.0	65.7	47.1	80.4	74.7	72	70.2	60.7	52
29Nov2013	16:00:00	30:00.0	64.7	47.7	76.9	73.5	70.7	69.4	59.6	51.7
29Nov2013	16:30:00	30:00.0	64.5	46.7	77	73	70.7	69.2	59.7	51.7
29Nov2013	17:00:00	30:00.0	65	47.1	78.5	72.9	70.5	69.2	61.6	53
29Nov2013	17:30:00	30:00.0	63.1	43.6	76.7	72.5	69.7	68	56.3	48.1
29Nov2013	18:00:00	30:00.0	63.5	43.6	78	73.5	70.2	68.2	56.2	48.1
29Nov2013	18:30:00	30:00.0	62.2	43.1	80	72.7	69.5	66.9	53.2	46
29Nov2013	19:00:00	30:00.0	61.7	41.7	87.4	72	67.9	64.7	50.6	44.1
29Nov2013	19:30:00	30:00.0	58.8	39	76	71.2	66.4	62.3	48.5	42.7
29Nov2013	20:00:00	30:00.0	59.2	38.8	76.4	71.2	66.7	62.6	45.2	41.2
29Nov2013	20:30:00	30:00.0	57.8	40	76	69.7	65.7	61.2	46.2	42.1
29Nov2013	21:00:00	30:00.0	57.3	38.7	78	70.5	63.5	57.7	43.7	40.7

29Nov2013	21:30:00	30:00.0	57.2	36.2	79.7	70.2	62.6	56.8	42.1	39.1
29Nov2013	22:00:00	30:00.0	57	36.1	74.7	70.7	63.7	58.1	41.7	38.6
29Nov2013	22:30:00	30:00.0	54.8	36.2	75.5	69	59.7	53.1	40.5	38.1
29Nov2013	23:00:00	30:00.0	52.7	35.2	75.5	67	50.3	43.8	39.7	37.6
29Nov2013	23:30:00	30:00.0	49.6	35.1	74.2	64.2	47.6	42.8	39.2	37.6
30Nov2013	00:00:00	30:00.0	52.2	35.6	75.5	66	55	48	39.7	38
30Nov2013	00:30:00	30:00.0	55.5	34	78.2	70	58.7	50.6	40.1	37.2
30Nov2013	01:00:00	30:00.0	43.2	34.2	68.7	49.5	43.8	42.6	39.2	36.8
30Nov2013	01:30:00	30:00.0	49.7	34.2	75.2	62	45.3	42	38.7	36.5
30Nov2013	02:00:00	30:00.0	39.2	33.8	54.7	44.1	41.7	40.8	38.6	36.6
30Nov2013	02:30:00	30:00.0	50.6	32.6	74.5	65.4	49.6	44.7	39.2	36.5
30Nov2013	03:00:00	30:00.0	45.8	33.2	72.9	50.1	41.7	40.8	38.6	35.7
30Nov2013	03:30:00	30:00.0	52.5	33.2	75.2	67.2	51.2	45	38.7	36.1
30Nov2013	04:00:00	30:00.0	53.1	33.3	77.7	66.7	50.6	44.2	38.5	36.5
30Nov2013	04:30:00	30:00.0	50.2	34.5	72.2	65.2	48.7	43.2	39	36.7
30Nov2013	05:00:00	30:00.0	50.7	33.2	73.9	64.2	46.5	41.7	38	36.2
30Nov2013	05:30:00	30:00.0	57	35.8	76.4	71.2	63.1	54.2	41.6	38.8
30Nov2013	06:00:00	30:00.0	53.8	37.5	73.5	68.5	57.7	53.7	43.3	40.6
30Nov2013	06:30:00	30:00.0	57.7	41.3	78.2	70	63.1	59.7	50.8	45.5
30Nov2013	07:00:00	30:00.0	58.8	43.2	77.7	71.2	65.5	61.1	50.2	45.3
30Nov2013	07:30:00	30:00.0	59.5	44.2	76.5	71.4	66.7	63	51.3	47.2
30Nov2013	08:00:00	30:00.0	61.6	44.5	76	73	68.9	66.2	53.5	48.5
30Nov2013	08:30:00	30:00.0	60.7	45.2	78.7	72.2	68	64.9	52.2	47.7
30Nov2013	09:00:00	30:00.0	60.7	45.6	75.7	72.5	68.5	64	52.3	49
30Nov2013	09:30:00	30:00.0	60	47.1	77	71.7	67	63.7	52.2	50
30Nov2013	10:00:00	30:00.0	61.1	48.2	78	72.2	68.9	65.2	53	50.2
30Nov2013	10:30:00	30:00.0	62.1	45.5	77.2	73.2	69.5	66.7	52.8	48.5
30Nov2013	11:00:00	30:00.0	61.5	44.6	75.2	72.5	68.5	65.9	54.1	48.7
30Nov2013	11:30:00	30:00.0	62	44.2	79.7	72.7	69.2	66.5	53.1	47.1
30Nov2013	12:00:00	30:00.0	62.2	40.8	75.4	72.7	69.9	67.4	52.7	44.8
30Nov2013	12:30:00	30:00.0	59.2	40.6	73.7	69.7	66	63.7	52.3	45
30Nov2013	13:00:00	30:00.0	55	40.2	70.9	64	60.5	58.7	51.3	46.2
30Nov2013	13:30:00	30:00.0	60.2	34.1	77.2	71.5	67.5	64.5	49.7	37

30Nov2013	14:00:00	30:00.0	62.6	34	88.5	71.7	68.5	66	50.7	36.8
30Nov2013	14:30:00	30:00.0	61	34.3	74	71.9	68.7	66	49.7	37.3
30Nov2013	15:00:00	30:00.0	60.7	34.8	78	71.5	67.5	65.2	49.8	39.6
30Nov2013	15:30:00	30:00.0	62.7	35.1	90.4	72	69	66	51.7	40.7
30Nov2013	16:00:00	30:00.0	63.1	43.6	74.7	72.6	69.9	68.2	56.4	48.2
30Nov2013	16:30:00	30:00.0	62.1	41.9	78.5	72.7	69.4	67.1	51.3	44.4
30Nov2013	17:00:00	30:00.0	62	42.9	79.1	72.5	69.3	66.7	53	45.7
30Nov2013	17:30:00	30:00.0	61.5	41.6	84.4	71.3	67.5	64.4	50.3	44
30Nov2013	18:00:00	30:00.0	58.2	39.1	75	71.2	66.4	62.3	48.5	42.5
30Nov2013	18:30:00	30:00.0	58.5	38.9	75.3	71	66.5	62.4	45.1	41.8
30Nov2013	19:00:00	30:00.0	57.7	40.1	74	69.3	65.4	61.3	46.1	42.3
30Nov2013	19:30:00	30:00.0	57.1	38.6	76.2	70.4	63.6	57.8	43.4	40.8
30Nov2013	20:00:00	30:00.0	57	36.1	77.8	70.1	62.7	56.7	42.3	39.3
30Nov2013	20:30:00	30:00.0	56.4	35	71.8	69.3	64.6	60.4	40.2	36.2
30Nov2013	21:00:00	30:00.0	56.3	37.9	76	70.6	63.2	57.4	43.6	40.3
30Nov2013	21:30:00	30:00.0	56.4	35.9	77.7	69.3	62.1	56.6	41.8	38.2

Table 3

Table 2 **Locn** **AN2**

Model 812 Interval Report

From File: CAPP8.870 Sun 01Dec2013 13:28:35

Period = 00:30 (hh:mm)

Date	Time	Duration	Leq dBA	Lmin dBA	Lmax dBA	L1 dBA	L5 dBA	L10 dBA	L50 dBA	L90 dBA
28Nov2013	16:00:00	30:00.0	55.1	47.5	73.5	62.8	59.6	57.8	53	49.7
28Nov2013	16:30:00	30:00.0	55.7	46.6	75.4	63.8	60.2	58.7	53.2	50.1
28Nov2013	17:00:00	30:00.0	53.7	46.3	66	60.7	58.2	56.7	52.1	48.7
28Nov2013	17:30:00	30:00.0	62	45.8	83.7	74.2	67.9	63.2	55.7	51.6
28Nov2013	18:00:00	30:00.0	62.1	49	86.7	74.7	65.5	61.2	54.6	51
28Nov2013	18:30:00	30:00.0	52.6	44.2	69.9	60.7	57.7	55.8	50.2	46.1
28Nov2013	19:00:00	30:00.0	53.5	41.8	72.2	63.7	59.2	56.7	48.6	45.2
28Nov2013	19:30:00	30:00.0	60.7	43.1	87.7	68.9	61.7	60.2	53.5	46
28Nov2013	20:00:00	30:00.0	53.7	41.7	81.7	61.7	57.7	55.6	47.8	44.2
28Nov2013	20:30:00	30:00.0	54.2	42.2	82.2	63.5	58.2	57.3	48	44.2
28Nov2013	21:00:00	30:00.0	53.8	42.3	79.5	63.6	55.3	52.6	45.7	44.1
28Nov2013	21:30:00	30:00.0	49.3	43.2	67.4	60.5	54	51.2	46	44.8
28Nov2013	22:00:00	30:00.0	52.7	41.5	80.4	61.8	55.2	51.3	44.7	43.2
28Nov2013	22:30:00	30:00.0	48.6	41.7	65.9	59.7	53.8	49.8	45.3	43.7
28Nov2013	23:00:00	30:00.0	45	41.3	58	51.6	48	46.1	44.2	43.1
28Nov2013	23:30:00	30:00.0	44	39.7	58.7	50.3	45.7	44.8	43.2	41.7
29Nov2013	00:00:00	30:00.0	42.2	38.7	55.6	48.7	44.2	43.3	41.5	40.2
29Nov2013	00:30:00	30:00.0	44.1	38	62.1	54.6	49.1	44.5	41.5	40
29Nov2013	01:00:00	30:00.0	42.1	37.7	57.3	50	43.7	42.7	41.1	39.5
29Nov2013	01:30:00	30:00.0	41.1	36.6	56.5	49.2	43.2	41.8	40.2	38.7
29Nov2013	02:00:00	30:00.0	43.3	37.7	62.2	54.3	44.1	42.7	40.7	39.3
29Nov2013	02:30:00	30:00.0	41.5	37.2	57.5	47.7	43.2	42.6	40.7	39.2
29Nov2013	03:00:00	30:00.0	45.6	37.5	77.7	51.7	45.6	43.7	41.1	39.3
29Nov2013	03:30:00	30:00.0	53.2	38.2	80	64	55	51.2	44.5	41.2
29Nov2013	04:00:00	30:00.0	47.2	40	67.5	57.5	51.5	47.7	43.1	41.6
29Nov2013	04:30:00	30:00.0	48.3	40.8	69.5	56.6	52.8	51.2	46.1	43.6

29Nov2013	05:00:00	30:00.0	49.1	42.2	65	58.8	54	51.3	46.3	45.1
29Nov2013	05:30:00	30:00.0	54.3	45.2	74.5	61.2	58.7	56.7	53.3	49.6
29Nov2013	06:00:00	30:00.0	60.1	54.2	77.5	67	63.7	62	59	56.3
29Nov2013	06:30:00	30:00.0	60	51	76.5	68.4	64.2	62.5	58.5	53.7
29Nov2013	07:00:00	30:00.0	59.2	51.7	80.2	70.5	62.2	60.5	55.8	53.5
29Nov2013	07:30:00	30:00.0	57.8	51	74.5	64.5	61.2	60	56.6	54.5
29Nov2013	08:00:00	30:00.0	57.3	51.1	75.5	64.2	60.8	59.6	56.1	53.6
29Nov2013	08:30:00	30:00.0	57.7	51.2	80.2	66	61.1	59.2	55.5	53.2
29Nov2013	09:00:00	30:00.0	57.5	50.2	73.5	64.7	61.6	60	55.8	53.2
29Nov2013	09:30:00	30:00.0	55.8	48.7	69.9	62.2	59.7	58.6	54.6	51.6
29Nov2013	10:00:00	30:00.0	55.7	50.5	69.7	62.3	59.3	58	54.6	52.3
29Nov2013	10:30:00	30:00.0	56	49.5	72.4	61.6	59	57.8	55.1	52.7
29Nov2013	11:00:00	30:00.0	57.6	50.6	76.2	66.5	62	60	55.1	52.7
29Nov2013	11:30:00	30:00.0	66.4	51.2	87	72.4	71.5	70.9	60.3	53.7
29Nov2013	12:00:00	30:00.0	62.2	51.7	75	71	69.5	66.7	58.3	55.5
29Nov2013	12:30:00	30:00.0	63.6	52.5	75.7	69.9	68.5	67.7	61.5	55.7
29Nov2013	13:00:00	30:00.0	61.5	53.1	82.5	68.5	65.5	64.7	59.1	55.7
29Nov2013	13:30:00	30:00.0	62.5	51.2	82	71.7	67.7	65	59.7	54.5
29Nov2013	14:00:00	30:00.0	58.7	48.8	82.2	67.9	62.2	60.5	55.7	52.2
29Nov2013	14:30:00	30:00.0	57	49.2	81.2	64	59.8	58.6	54.7	52.1
29Nov2013	15:00:00	30:00.0	57.6	48.7	81.9	65.7	62.2	60.7	54.3	51.2
29Nov2013	15:30:00	30:00.0	61.2	49.5	84.4	73	63.8	61.2	56.2	52.2
29Nov2013	16:00:00	30:00.0	59.2	49.3	87.7	65.5	62	60.5	57.3	53.3
29Nov2013	16:30:00	30:00.0	57.2	48.8	83.7	64.7	60.8	59.2	54.3	51.2
29Nov2013	17:00:00	30:00.0	57.6	49.1	84.7	64	60.5	58.8	54.7	51.3
29Nov2013	17:30:00	30:00.0	57.6	46.2	82.7	65.5	60	58.2	54.3	50.1
29Nov2013	18:00:00	30:00.0	57.6	47.8	84	65.5	61	59	53.3	50
29Nov2013	18:30:00	30:00.0	57.3	47.1	75.5	64	61	59.7	56.5	50.2
29Nov2013	19:00:00	30:00.0	59	44.8	85.2	71.7	61.5	59.1	51.7	47.3
29Nov2013	19:30:00	30:00.0	70	43.6	99.2	82	69.5	60.1	50.6	45.7
29Nov2013	20:00:00	30:00.0	68.9	43.3	95.2	82.7	63.3	59.2	47.8	45
29Nov2013	20:30:00	30:00.0	65.5	44.1	95.2	78.5	63.6	57.7	50.1	46.6
29Nov2013	21:00:00	30:00.0	52.8	42.8	70.2	62.7	57.7	55.7	49.5	45

29Nov2013	21:30:00	30:00.0	48.8	40.8	68.2	59.8	54.2	51.5	44.3	42.7
29Nov2013	22:00:00	30:00.0	50.7	39.8	74.7	62.6	55.6	52.2	44.5	42.3
29Nov2013	22:30:00	30:00.0	45.6	40	65.7	54.7	50.8	47.7	43.2	41.7
29Nov2013	23:00:00	30:00.0	44.7	40.2	60.7	53.8	46.7	45.5	43.6	42.2
29Nov2013	23:30:00	30:00.0	51.2	41.2	76.2	62	48.7	46.2	44.1	43
30Nov2013	00:00:00	30:00.0	55.7	41.5	79	71	55.7	50.2	44.2	42.8
30Nov2013	00:30:00	30:00.0	71.5	41.2	98	85.2	70.4	55.8	44.1	42.7
30Nov2013	01:00:00	30:00.0	82	39.8	100.7	95.2	89.5	85.2	43.8	41.2
30Nov2013	01:30:00	30:00.0	79.7	39.3	110	93	73.7	54	42.2	40.7
30Nov2013	02:00:00	30:00.0	74.9	40	99	89.5	76.5	53.3	42.6	41.2
30Nov2013	02:30:00	30:00.0	44.2	38.8	62.1	53.8	46.7	44.7	42.6	40.7
30Nov2013	03:00:00	30:00.0	41.6	37.5	56.5	46.1	43.6	42.7	40.8	39.2
30Nov2013	03:30:00	30:00.0	67.7	37	99.2	74.7	50.7	48.7	41.2	39.1
30Nov2013	04:00:00	30:00.0	49.3	47.1	62.2	54.7	50.6	49.8	48.8	48.1
30Nov2013	04:30:00	30:00.0	48.2	43.6	67.5	53.2	49.8	49.6	47.8	45.3
30Nov2013	05:00:00	30:00.0	48.7	43.2	67.2	58.7	57.6	46.8	45.1	44.2
30Nov2013	05:30:00	30:00.0	54	41.2	72.5	62.8	59.2	58.2	49.2	43.7
30Nov2013	06:00:00	30:00.0	58.3	41.2	74	66.7	65.7	64.9	45.1	42.7
30Nov2013	06:30:00	30:00.0	55.7	43.2	81.2	65	60.1	58.1	50.6	46.7
30Nov2013	07:00:00	30:00.0	53.7	45.7	76.5	62.3	58.8	56.8	50.7	47.6
30Nov2013	07:30:00	30:00.0	57.6	45.3	84.2	64.7	61.7	60.7	52.8	47.7
30Nov2013	08:00:00	30:00.0	58.2	45.3	82.9	65.7	61.2	60	56.2	50.1
30Nov2013	08:30:00	30:00.0	60	46.6	75	66.4	63.7	62.7	60	49.7
30Nov2013	09:00:00	30:00.0	70.2	59.2	79.7	78.7	77.5	70.9	69	61.6
30Nov2013	09:30:00	30:00.0	71.9	59.2	81.2	78.9	78.5	78.2	64.2	61.6
30Nov2013	10:00:00	30:00.0	59.6	49.2	69.5	65.2	64.4	63.7	56.3	52
30Nov2013	10:30:00	30:00.0	63.6	48.2	95.5	67.5	65.5	64.7	59.6	54.5
30Nov2013	11:00:00	30:00.0	66.5	51.7	91.4	78.9	70.2	65.9	61.8	58.3
30Nov2013	11:30:00	30:00.0	59.7	54	81.2	67.5	62.7	61	57.7	55.5
30Nov2013	12:00:00	30:00.0	57.6	46.2	76.2	65.2	60.8	59.7	56.3	53.1
30Nov2013	12:30:00	30:00.0	58.7	45.5	79	69	62	60.3	55.5	51
30Nov2013	13:00:00	30:00.0	58.7	38.8	84.5	71.5	57.8	55.1	48.2	42.8
30Nov2013	13:30:00	30:00.0	53.7	38.8	77.5	63	59	57.1	51	43.7

30Nov2013	14:00:00	30:00.0	56.2	37.5	83.2	67	59.8	57.2	48.1	42

Table 3 **Locn** **AN1**

Model 831

Date	Time	Duration	LAeq	Lmin	Lmax	L1	L5	L10	L33	L50	L90
2013/11/28	16:06:20	00:23:39.4	52.3	45.0	81.4	60.2	55.4	52.9	48.7	48.0	46.8
2013/11/28	16:30:00	00:30:00.0	50.1	44.5	66.7	59.5	55.8	53.0	47.8	47.0	45.8
2013/11/28	17:00:00	00:30:00.0	49.1	45.0	65.5	57.9	53.4	50.8	47.7	47.2	46.3
2013/11/28	17:30:00	00:30:00.0	49.1	44.8	65.1	57.9	53.3	50.4	47.7	47.3	46.4
2013/11/28	18:00:00	00:30:00.0	49.8	44.0	66.5	58.8	55.1	52.5	47.7	47.2	46.0
2013/11/28	18:30:00	00:30:00.0	48.7	43.3	63.9	58.5	54.1	50.5	46.5	46.0	45.0
2013/11/28	19:00:00	00:30:00.0	49.5	43.9	68.4	60.6	54.2	50.3	46.7	46.2	45.2
2013/11/28	19:30:00	00:30:00.0	48.0	43.0	65.2	58.0	52.7	49.0	46.2	45.7	44.7
2013/11/28	20:00:00	00:30:00.0	48.3	43.0	64.4	58.1	52.2	48.4	46.8	46.3	45.4
2013/11/28	20:30:00	00:30:00.0	49.4	43.6	71.0	60.1	53.9	51.0	46.6	46.1	45.0
2013/11/28	21:00:00	00:30:00.0	48.0	44.1	65.2	56.9	50.7	48.1	47.1	46.6	45.5
2013/11/28	21:30:00	00:30:00.0	48.7	44.0	66.3	58.7	51.7	48.5	47.1	46.8	45.8
2013/11/28	22:00:00	00:30:00.0	48.0	42.0	66.9	58.7	51.4	48.0	45.8	45.3	43.9
2013/11/28	22:30:00	00:30:00.0	47.0	42.4	65.3	57.2	47.5	46.9	46.0	45.6	44.4
2013/11/28	23:00:00	00:30:00.0	45.0	41.9	53.6	47.7	46.6	46.2	45.3	44.9	43.7
2013/11/28	23:30:00	00:30:00.0	44.5	40.4	56.5	50.4	46.0	45.4	44.4	44.0	42.5
2013/11/29	00:00:00	00:30:00.0	42.5	38.9	56.8	45.9	44.4	43.8	42.6	42.1	40.9
2013/11/29	00:30:00	00:30:00.0	44.0	39.2	60.7	52.8	47.2	45.0	43.1	42.5	40.9
2013/11/29	01:00:00	00:30:00.0	43.3	39.0	58.7	49.8	46.6	44.6	42.7	42.2	40.8
2013/11/29	01:30:00	00:30:00.0	46.8	37.7	66.2	60.7	50.7	44.0	41.8	41.3	40.0
2013/11/29	02:00:00	00:30:00.0	41.9	38.7	47.2	44.7	43.4	42.9	42.1	41.7	40.6
2013/11/29	02:30:00	00:30:00.0	42.6	39.1	52.9	50.4	44.7	43.6	42.4	41.9	40.7
2013/11/29	03:00:00	00:30:00.0	45.5	38.5	61.7	53.7	49.9	48.2	44.8	43.6	40.6
2013/11/29	03:30:00	00:30:00.0	52.6	39.1	69.9	64.6	62.6	54.7	43.9	43.2	41.4
2013/11/29	04:00:00	00:30:00.0	48.1	40.2	62.8	57.1	56.0	50.3	45.6	44.0	42.4
2013/11/29	04:30:00	00:30:00.0	47.8	41.2	65.2	62.3	47.5	46.7	45.2	44.6	43.1
2013/11/29	05:00:00	00:30:00.0	46.6	42.6	62.5	51.7	48.7	48.0	46.3	45.7	44.5
2013/11/29	05:30:00	00:30:00.0	50.5	43.7	68.4	58.0	54.3	53.0	50.2	48.6	46.1
2013/11/29	06:00:00	00:30:00.0	54.5	47.1	71.7	64.2	58.6	56.4	53.1	52.1	49.8
2013/11/29	06:30:00	00:30:00.0	56.3	49.5	75.2	65.2	60.7	58.7	54.6	53.5	51.7

2013/11/29	07:00:00	00:30:00.0	56.8	49.7	77.6	64.6	60.0	58.4	54.8	53.7	52.0
2013/11/29	07:30:00	00:30:00.0	54.9	50.2	67.3	61.2	58.7	57.3	54.6	53.7	52.1
2013/11/29	08:00:00	00:30:00.0	63.8	50.2	89.9	76.4	67.8	63.4	57.9	56.0	52.3
2013/11/29	08:30:00	00:30:00.0	70.0	51.5	98.7	82.7	70.6	65.8	59.0	56.5	53.4
2013/11/29	09:00:00	00:30:00.0	56.0	51.4	69.2	62.4	59.9	58.6	55.5	54.4	53.0
2013/11/29	09:30:00	00:30:00.0	54.8	47.3	71.4	61.7	58.9	57.5	54.4	53.4	49.9
2013/11/29	10:00:00	00:30:00.0	54.3	50.4	72.8	61.2	57.8	56.2	53.4	52.8	52.0
2013/11/29	10:30:00	00:30:00.0	53.2	46.4	69.6	61.3	57.4	55.3	52.8	52.0	48.7
2013/11/29	11:00:00	00:30:00.0	55.4	46.6	71.2	64.1	60.9	58.9	54.1	52.5	48.6
2013/11/29	11:30:00	00:30:00.0	55.9	50.3	76.6	63.5	60.1	58.2	55.0	53.9	52.3
2013/11/29	12:00:00	00:30:00.0	56.1	50.8	74.7	63.0	59.8	58.5	55.7	54.7	52.8
2013/11/29	12:30:00	00:30:00.0	57.1	49.4	74.1	66.1	61.4	59.4	56.1	54.9	52.2
2013/11/29	13:00:00	00:30:00.0	55.2	48.0	68.5	63.4	59.5	57.6	54.5	53.4	51.1
2013/11/29	13:30:00	00:30:00.0	52.6	47.0	67.7	61.3	57.6	55.4	51.1	50.2	48.7
2013/11/29	14:00:00	00:30:00.0	52.6	47.0	69.0	61.2	57.3	55.0	51.3	50.5	49.1
2013/11/29	14:30:00	00:30:00.0	52.9	47.6	83.8	59.6	55.2	53.3	51.1	50.4	49.2
2013/11/29	15:00:00	00:30:00.0	54.2	47.1	69.9	61.8	58.4	56.5	53.6	52.9	49.3
2013/11/29	15:30:00	00:30:00.0	55.7	47.5	71.5	64.1	60.5	58.5	54.7	53.6	50.9
2013/11/29	16:00:00	00:30:00.0	55.5	47.9	70.8	63.4	60.0	58.3	54.6	53.4	50.2
2013/11/29	16:30:00	00:30:00.0	53.5	46.6	72.1	62.3	58.7	56.7	51.7	50.7	48.6
2013/11/29	17:00:00	00:30:00.0	52.5	46.7	68.2	61.4	57.4	55.4	50.7	49.8	48.3
2013/11/29	17:30:00	00:30:00.0	50.4	45.3	66.2	58.9	55.3	52.5	49.1	48.5	47.1
2013/11/29	18:00:00	00:30:00.0	52.9	45.5	69.0	62.4	58.6	56.4	50.6	48.6	46.9
2013/11/29	18:30:00	00:30:00.0	50.6	44.3	67.5	60.3	56.2	53.6	48.0	47.3	46.0
2013/11/29	19:00:00	00:30:00.0	51.0	42.8	70.1	61.6	57.1	54.2	46.9	46.2	45.0
2013/11/29	19:30:00	00:30:00.0	49.4	42.8	67.7	59.9	55.1	51.9	46.3	45.6	44.4
2013/11/29	20:00:00	00:30:00.0	51.8	42.8	71.1	63.0	58.4	55.2	46.6	45.6	44.3
2013/11/29	20:30:00	00:30:00.0	51.0	42.6	71.3	62.5	56.1	53.2	46.3	45.5	44.2
2013/11/29	21:00:00	00:30:00.0	48.7	40.9	68.1	60.5	54.2	49.3	45.0	44.5	43.3
2013/11/29	21:30:00	00:30:00.0	47.2	41.1	68.4	58.7	51.6	47.3	44.3	43.7	42.6
2013/11/29	22:00:00	00:30:00.0	48.6	39.9	67.9	60.5	55.2	49.2	44.1	43.5	41.9
2013/11/29	22:30:00	00:30:00.0	42.8	40.1	54.2	45.8	44.4	43.9	42.9	42.5	41.6
2013/11/29	23:00:00	00:30:00.0	42.6	39.6	49.4	45.3	44.2	43.6	42.8	42.4	41.3

2013/11/29	23:30:00	00:30:00.0	42.4	39.4	50.5	46.5	44.2	43.6	42.5	42.1	41.0
2013/11/30	00:00:00	00:30:00.0	44.9	39.0	60.8	56.2	49.9	44.6	42.4	41.9	40.7
2013/11/30	00:30:00	00:30:00.0	42.3	39.0	59.4	45.6	43.9	43.4	42.3	41.9	40.7
2013/11/30	01:00:00	00:30:00.0	49.1	37.9	66.8	62.9	55.2	44.5	42.1	41.5	40.3
2013/11/30	01:30:00	00:30:00.0	42.3	38.1	64.8	50.3	43.7	42.7	41.5	41.0	39.8
2013/11/30	02:00:00	00:30:00.0	43.8	37.9	62.3	56.6	45.9	43.1	41.5	41.0	39.8
2013/11/30	02:30:00	00:30:00.0	44.1	37.7	59.9	56.5	46.5	44.4	41.9	41.3	40.0
2013/11/30	03:00:00	00:30:00.0	42.5	37.6	64.5	48.9	44.4	43.6	41.9	41.2	39.7
2013/11/30	03:30:00	00:30:00.0	49.6	38.3	69.2	64.8	49.8	45.4	42.5	41.7	40.1
2013/11/30	04:00:00	00:30:00.0	43.9	38.3	59.7	50.7	46.5	45.3	44.0	43.3	40.4
2013/11/30	04:30:00	00:30:00.0	41.9	38.5	51.2	48.1	44.3	43.3	41.8	41.2	40.0
2013/11/30	05:00:00	00:30:00.0	42.5	38.2	57.7	48.7	45.5	44.2	42.2	41.6	39.9
2013/11/30	05:30:00	00:30:00.0	44.7	39.1	56.0	51.7	49.3	47.7	43.9	43.1	41.0
2013/11/30	06:00:00	00:30:00.0	46.3	40.4	65.2	57.5	51.0	46.5	43.9	43.3	42.0
2013/11/30	06:30:00	00:30:00.0	51.9	41.3	69.1	61.3	57.7	55.5	49.8	48.1	45.3
2013/11/30	07:00:00	00:30:00.0	51.0	42.9	67.9	60.2	56.6	54.4	49.2	47.6	45.5
2013/11/30	07:30:00	00:30:00.0	51.1	44.7	65.0	58.8	55.8	53.9	50.3	49.1	46.8
2013/11/30	08:00:00	00:30:00.0	53.5	45.3	74.6	61.7	57.5	55.6	50.4	49.4	47.6
2013/11/30	08:30:00	00:30:00.0	53.1	46.0	72.6	63.5	58.5	55.4	50.6	49.5	47.8
2013/11/30	09:00:00	00:30:00.0	51.3	45.9	71.0	60.2	55.4	53.0	50.2	49.5	48.0
2013/11/30	09:30:00	00:30:00.0	52.2	47.0	65.0	60.1	56.4	54.4	51.2	50.6	49.1
2013/11/30	10:00:00	00:30:00.0	51.9	46.7	66.0	59.8	56.4	54.3	50.9	50.3	48.9
2013/11/30	10:30:00	00:30:00.0	50.5	44.8	69.7	60.3	54.1	51.2	48.9	48.3	46.8
2013/11/30	11:00:00	00:30:00.0	52.9	45.1	69.3	63.0	58.4	55.8	50.7	49.8	47.7
2013/11/30	11:30:00	00:30:00.0	52.6	44.6	75.4	61.3	57.1	54.9	49.8	48.7	46.7
2013/11/30	12:00:00	00:30:00.0	51.2	43.0	71.4	63.1	55.1	52.1	47.4	46.5	44.9
2013/11/30	12:30:00	00:30:00.0	50.7	40.8	71.3	62.4	56.0	51.8	47.0	45.8	42.7
2013/11/30	13:00:00	00:30:00.0	48.9	40.9	65.1	59.9	54.7	51.6	45.6	44.5	42.9
2013/11/30	13:30:00	00:30:00.0	49.1	39.9	65.9	60.6	56.1	52.4	44.0	43.1	41.5
2013/11/30	14:00:00	00:30:00.0	51.8	41.0	71.1	63.1	58.0	55.2	46.8	45.2	43.3
2013/11/30	14:30:00	00:30:00.0	51.2	39.7	72.8	63.6	55.4	51.5	44.3	43.4	41.7
2013/11/30	15:00:00	00:30:00.0	49.2	39.0	72.0	60.9	55.5	51.3	44.0	43.0	41.0
2013/11/30	15:30:00	00:19:12.5	51.9	40.0	72.2	63.0	58.1	55.5	46.0	43.9	41.8

Attachment I.8 Environmental Considerations and BAT

When PANDA first applied for planning permission at the site it was intended that the facility would be developed in three stages. Stage 1-C&D and C&I processing with an annual capacity of 50,000 tonnes; Stage 2-Dry Recyclables processing with an annual capacity of 200,000 tonnes, and Stage 3-MSW processing bringing the total capacity to 250,000 tonnes/year.

The staged development was based on the planned progressive expansion of PANDA's business in the Greater Dublin Region, with an initial focus on the C&D market where there was a clear opportunity, but with an overall objective of allowing of rolling out source segregated waste collection services to household and commercial customers.

In December 2005 planning permission was granted solely for the development of Stage 1 due to the condition of the local road network at the time. Following the completion of the road upgrades in 2007 PANDA applied for permission for Stages 2 and 3. In December 2007 planning permission was granted for the development of Stage 2; however approval was not granted for Stage 3.

PANDA expanded its source segregated commercial waste service and in 2008 and 2009 began the roll out household waste collection service in Fingal. In 2011 PANDA won the tender awarded by Fingal County Council to collect household waste.

PANDAs household collection service includes a three bin system for dry recyclables, mixed residual waste and food waste to over 70,000 households in Fingal and PANDA continues to operate the waiver system introduced by the Council.

The provision of source segregation collection to households is an integral part of national waste management strategy and its purpose is to maximise recovery and minimise disposal. The breakdown of the household waste collected by PANDA annually in Fingal is:

Dry Recyclables	16,200 tonnes
Food Waste	18,900 tonnes
Residual Waste	28,000 tonnes

As the household residual and food waste cannot be accepted at the Cappagh Road facility, it must be transported to the nearest PANDA operated waste facility (Ballymount Waste Transfer Station) in the kerbside collection vehicles that then return to their collection routes.

The requirement to drive the collection vehicles directly to the Balymount Transfer Station generates an annual total travel distance of 427,744 kilometres, comprising the trips from the Cappagh Road facility to the collection routes and from the collection routes to the Ballymount Transfer Station. This does not include the distance covered during the kerbside collection.

At an estimated fuel consumption rate of 2.55 kilometres per litre, the refuse collection vehicle travel between the Cappagh Road MRF and the Ballymount Transfer Station uses 167,743 litres annually. At 2.68kg of carbon dioxide (CO_2) per litre of diesel consumed, this equates to an annual greenhouse gas (GHG) emission of 449,551kgs of CO_2. If the Cappagh

Road facility could take household waste, the CO_2 emissions from kerbside collection would be 190,505kgs, which equates to a 42% reduction in GHG emissions.

The facility is ideally suited for the recovery and recycling of these types of waste for the following reasons:

- Excellent local road network that facilitates easy access to the household kerbside waste collection routes in Fingal and to the National Primary routes for the onward transfer of recyclables and other recovered materials;
- Site size is more than adequate to accommodate the scale of the activities;
- The waste recovery activities are compatible with the Land Zoning and the current land use in the surrounding area
- Existing ground conditions (soil type/geology/hydrology) and distances from sensitive environmental receptors minimise the risk of unexpected emissions given rise to pollution

Alternatives

Alternative Locations

Following the refusal by the planning authority in 2008 to approve the acceptance of MSW, PANDA carried out a search for other potentially suitable sites in Fingal.

The one potentially suitable site was at Kilshane Cross and owned by Fingal County Council. It is approximately 3km to the north east of the Cappagh Road MRF and has planning approval and a Waste Licence to operate as an Integrated Waste Management Facility, including the acceptance and processing of household residual and food waste. Site services (security fence, internal access roads, power and water) have already been provided, meaning there would be a very short lead in time before the facility could be operational.

PANDA engaged in the recent public tendering process for the site, but were not successful. This means that the only alternatives to the proposed development are to continue to transport the household waste collected in Fingal to the Ballymount Transfer Station, or to develop a new standalone waste management facility in Fingal.

The former means the continued generation of GHG emissions from the kerbside collection vehicle movements to and from the Ballymount Transfer Station. The latter would require the acquisition of land, the construction of a new waste processing building and supporting infrastructure (offices, maintenance workshops, weighbridge) and the provision of new site services (surface water, foul water, power, water supply, security etc.). The development of such a new facility offers no environmental advantages compared to development at the existing Cappagh Road MRF.

Alternative Site Layout & Processes

The residual waste and food waste could be handled in Building A2, as it will have the capacity to accept the quantities involved. However A2 is close to the southern site boundary and the nearest private residence to the site is 30m south east of the boundary.

Although an effective odour control system will be provided, as a precautionary measure it was decided not to use the new building for residual and food waste handling, but to locate this operation in Building A1, which is furthest away from the private residence.

PANDA is one of the leading innovators in the use of waste recovery MRF in Ireland. The proposed site layout and processes designed to achieve the most economically and environmentally efficient way to process the wastes and there are no practically viable alternatives.

BAT

The design and method of operation of both the existing facility and proposed development are based on the requirements of the European Commission's Reference Document on Best Available Techniques for the Waste Treatment Industries 2006 (BREF), which specifies the Best Available Techniques (BAT) for Waste Management Facilities and the Agency's Final Draft BAT Guidance on Best Available Techniques for the Waste Sector: Materials Recovery and Transfer.

BREF

The BREF addresses design, operational and procedural matters, including efficient processing, waste acceptance, emission controls and environmental management systems (EMS). Section 2.1 describes the Common Techniques that are applied in the sector. It requires the provision of appropriate waste reception and acceptance measures (2.1.1); appropriate management techniques (2.1.2); energy systems (2.1.3); storage and handling measures (2.1.4); blending and mixing (2.1.5); facility decommissioning (2.16) and baling (2.1.9).

Section 2.5.1 describes the treatment aimed at producing materials for use as a fuel or improving its calorific value, including the preparation of solid waste fuel by the mechanical separation of non-hazardous solid waste (2.5.1.1). This type of fuel is manufactured by sorting wastes mainly to leave a combustible material, by mainly removing wet putrescibles and heavy inerts (stones, glass, scrap metals, etc.) from the wastes. Other operations used are for example sieving, separators, crushers, screening and picking.

BAT for the preparation of solid waste fuels from non-hazardous waste is described in Section 5.2 of the BREF (BAT 117, 118, 119 and 122 to 126), which deals with the techniques to be applied in the inspection and separation of the mixed wastes and the production of different types of fuel depending on end use.. Section 4.6.22 describes the appropriate odour reduction techniques.

Agency BAT Guidance

Chapter 4 of the Agency's BAT Guidance describes the risks to the environment and appropriate control techniques for materials recovery and transfer. It identifies the key issues as being site location (4.1.2.1); design considerations, which include odour and water controls and emergency planning (4.1.2.2); decommissioning (4.1.2.3); EMS (4.1.3); waste acceptance (4.1.4), and waste dispatch (4.1.5)

Section 4.2 describes the potential risks to the environment which include emissions to air (4.2.1) and to water and land (4.2.2). Section 4.3 identifies the range of control techniques that may be applied including prevention and minimisation of resource consumption (4.3.1) and the prevention and minimisation of emissions (4.3.2) including dust and odours (Section 4.3.2.1) and surface water (4.3.2.2) and oil storage(4.3.2.3).

Section 4.3.3 identifies the techniques that may be applied to minimise nuisances, including litter (4.3.3.1; noise and vibration (4.3.3.2); vehicles (4.3.3.3);mud(4.3.3.4); vermin and insects (4.3.3.5), and chemical storage (4.3.3.6).

Chapter 5 of the Agency's BAT Guidance describes BAT for Materials Recovery and Transfer facilities. Section 5.1 states that the key environmental issues for the waste transfer stations and materials recovery facilities sector are air emissions and soil contamination. The following primary measures are considered BAT for the handling and recovery/disposal of waste at a transfer station/materials recovery facility:

An EMS that incorporates the following features:

- Management and Reporting Structure.
- Schedule of Environmental Objectives and Targets.
- Annual Environmental Report (AER).
- Environmental Management Programme (EMP).
- Documentation System.
- Corrective Action Procedures.
- Awareness and Training Programme.
- Communications Programme.
- Waste acceptance procedure.
- Waste management system for all incoming wastes and wastes on-site.
- Appropriate storage and handling.
- Wastewater management.
- For hazardous waste transfer, the use of an extractive vent system linked to abatement equipment where applicable.
- The provision of an impermeable surface across all areas of the facility where waste is handled and stored, with kerbing or sloping to protect any adjacent permeable areas.
- The minimisation of underground tanks and pipework.

Section 5.2 deals with emissions to air, which generally occur as fugitive emissions from materials movements/treatment/processing on site, and vehicles. BAT is to carry out the management and control techniques outlined in Section 4.3.2.1.

Section 5.3 addresses emissions to water. In relation to the discharge to surface water it is BAT to ensure:

- only uncontaminated water such as roof-water is appropriate for direct discharge to surface waters.
- foul water is discharged to surface water following appropriate treatment only.
- other surface water discharges must be passed through a silt trap and interceptor (I.S. EN 858-2:2003 Part 2).
- an up to date drainage survey and site drainage system map is retained on-site.

In relation to discharges to sewer either directly or by tanker it is BAT to ensure that foul water/final effluent is treated adequately to meet the standards, as set by the Water Services Authority/EPA in relation to the water discharged to the waste water works.

Section 5.3.3 relates to discharges to groundwater and BAT is to:

- Prohibit direct emissions to groundwater of effluents containing certain hazardous substances (List I), and to have strict controls to prevent indirect emissions of substances scheduled in List II of the Directive.
- Maintain an inventory of authorisations given for direct discharge of List II substances to groundwater.
- Remove risks of emissions to groundwater through appropriate controls such as containment, bunding, as described in Chapter 4.
- Provide groundwater monitoring to enable early detection of any contamination of groundwater that may arise from the facility and the setting of its upper limits.

Existing BAT Measures

Condition 2 of the current Waste Licence requires PANDA to develop and implement an EMS for the facility. The scope of the EMS is consistent with Chapter 5 of the Agency's BAT Guidance Note and BAT 1 to 6 in Sections 5.1.1 to 5.1.6 of the BREF. It requires PANDA to prepare operational control procedures for all waste activities and ensure that facility staff are provided with the appropriate skills and training to perform their assigned functions.

The Licence conditions require the implementation of BAT 7 to 33 and BAT 57 to 61 of the BREF, in so far as they apply to non-hazardous solid waste processing, and BAT 62 to 64 as regards prevention of soil contamination. The conditions also specify the relevant control techniques referenced in Sections 4.3.1, 4.3.2.1, 4.3.2.2, 4.3.2.3, 4.3.3.1, 4.3.3.2, 4.3.3.3, 4.3.3.4, 4.3.3.5 and 4.3.3.6 of the Agency's BAT Guidance

Proposed BAT Measures

The proposed changes take into consideration the requirements of Sections 5.2 and 4.6.22 of the BREF and Section 4.3.2.1 of the Agency's BAT Guidance. In particular;

- The collection and treatment of odorous air from Building A1, which will handle the household residual and food waste. This will be achieved by a combination of building design and construction; provision of a negative air system, and the treatment of the odorous air in appropriately designed and operated treatment plant.

- For the preparation of waste for use of a solid waste fuel BAT requires the development of a close relationship with the solid fuel user to ensure user in order that a proper transfer of the knowledge of the waste fuel composition is carried out; have a quality assurance system to guarantee the characteristics of the waste fuel produced, and to manufacture different type of waste fuels according to the type of user (e.g. cement kilns, power plants).

- For the preparation of a solid fuel from non-hazardous waste it is BAT to visually inspect the incoming waste to sort out the bulky metallic or non-metallic parts; use magnetic ferrous and non-ferrous metal separators and use a combination of shredder systems and pelletisers suitable for the preparation of the specified size waste fuel.

Risk of Pollution

The facility design and method of operation are based on BAT. The facility when operated in accordance with the Licence conditions, which includes compliance with the emission limit values, will not give rise to significant pollution

Waste Production

The facility operations generate relatively small quantities of waste, primarily office and canteen. PANDA has a source segregation policy designed to ensure that the maximum possible amount of these wastes are recycled/recovered.

Energy and other Resource Consumption;

Details on energy efficiency measures and resource consumption are described in Section G of the Licence Application.

Measures to prevent accidents and limit their consequences;

The measures to prevent accidents and limit their consequences are described in Section J of the Licence Application.

Measures to be taken upon definitive cessation of activities to avoid any pollution risk and return the site of operation to a satisfactory state.

These measures are detailed in Section K of the Licence Application.

Table I.8 (i) CONCLUSIONS ON BAT

Title of Document			
BAT reference Number	**Waste Industries Treatment BREF**	**Applicability to installation**	**Proposed/ in place**
BAT 1	BAT is to implement and adhere to an environmental management system (EMS)….	Applicable	EMS specified in Condition 2 of the Licence is in place
BAT 2	BAT is to ensure the provision of full details of the activities carried out on-site.	Applicable	In place. Provided in Licence Application and EIS
BAT 3	BAT is to have a good housekeeping procedure in place, which will also cover the maintenance procedure, and an adequate training programme, covering the preventive actions that workers need to take on health and safety issues and environmental risks	Applicable	Operational procedures in place: Training programme in place; Health & Safety Policy in place
BAT 4	BAT is to try to have a close relationship with the waste producer/holder	Applicable	In place. PANDA regularly liaises with its commercial customers and waste contractors that deliver wastes to the facility
BAT 5	BAT is to have sufficient staff available and on duty with the requisite qualifications at all times. All personnel should undergo specific job training and further education	Applicable	In place. Site Manager and/or Deputy Manager have appropriate qualifications and are on site at all times. Staff training programme in place
BAT 6	BAT is to have a concrete knowledge of the waste IN	Applicable	Waste acceptance procedure in place that specifies the wastes that can be accepted
BAT 7	BAT is to implement a pre-acceptance procedure	Not Applicable	Given the nature of the wastes accepted and the types of processing carried out, pre-acceptance procedures are not required for all of the wastes. PANDA has a procedure (SOP 18) on Third Party Customer Profiling
BAT 8	BAT is to implement a waste acceptance procedure	Applicable	Waste acceptance procedures in place (SOP 8 and 13)
BAT 9	BAT is to implement different sampling procedures for all different incoming waste vessels	Not Applicable	Given the nature of the wastes accepted and the types of processing carried out, sampling procedures are not required
BAT 10	BAT is to have a reception facility that includes inter alia a quarantine area;	Applicable	In place. Quarantine areas provided

BAT 11	BAT is to analyse the waste OUT according to the relevant parameters important for the facility. If RDF is manufactured the processed materials will be tested to confirm they meet customer/regulatory requirement	Applicable	In place. All wastes consigned are recorded using EWC codes
BAT 12	BAT is to have a system in place to guarantee the traceability of waste treatment	Not Applicable	Given the nature of the wastes accepted and the types of processing carried out, traceability of waste treatment is not required
BAT 13	BAT is to have and apply mixing / blending rules	Not applicable	Given the nature of the wastes accepted and the types of processing carried out, mixing and blending rules are not required.
BAT 14	BAT is to have a segregation and compatibility procedure in place	Applicable	In place. Waste acceptance procedures (SOP 13) to remove and store non suitable wastes in quarantine area
BAT 15	BAT is to have an approach for improving waste treatment efficiency	Applicable	In place. PANDA regularly reviews performance efficiency
BAT 16	BAT is to produce a structured accident management plan	Applicable	In place. Accident Prevention Policy and Health & Safety Statement prepared (Ref Attachment J).
BAT 17	BAT is to have and properly use an incident diary.	Applicable	In place. Incident diary maintained.
BAT 18	BAT is to have a noise and vibration management plant in place as part of the EMS	Not Applicable	Noise and vibration are not an issue at the site
BAT 19	BAT is to consider future decommissioning	Applicable	Decommissioning Management Plan prepared and submitted to the OEE.
BAT 20	BAT is to provide a breakdown of the energy consumption and generation	Applicable	In place. Energy consumption recorded and reported in the AER
BAT 21	BAT is to continuously increase the energy efficiency of the installation	Applicable	In place. PANDA reviews energy usage annually and has carried out energy audit (Ref Attachment G) to identify where efficiencies can be made.
BAT 22	BAT is to carry out an internal benchmarking (e.g. on an annual basis) of raw materials consumption	Applicable	In place. PANDA monitors material consumption and reports on same annually in the AER.

BAT 23	BAT is to explore the options for the use of waste as a raw material for the treatment of other wastes	Not Applicable	Given the nature of the wastes accepted and the types of processing carried out, the use of waste as a raw material is not applicable.
BAT 24	**Storage and Handling**		
a)	BAT is to ensure storage areas are away from watercourses and sensitive perimeters, and located to eliminate or minimise the double handling of wastes within the installation	Applicable	In place
b)	BAT is to ensure that the storage area drainage infrastructure can contain all possible contaminated run-off and that drainage from incompatible wastes cannot come into contact with each other	Applicable	In place. Contaminated run-off not generated inside the buildings. Run-off from open yards passes through attenuation tank and oil interceptor.
c)	BAT is to ensure use of a dedicated area/store equipped with all necessary measures related to the specific risk of the wastes for sorting and repackaging laboratory smalls or similar waste.	Not applicable	Laboratory wastes not accepted or generated at the site.
d)	BAT is to handle odorous materials in fully enclosed or suitably abated vessels and storing them in enclosed buildings connected to abatement	Not Applicable	This relates to odorous liquid wastes, which are not accepted at the site
e)	BAT is to ensure that all connections between the vessels are capable of being closed via valves.	Not Applicable	No waste liquid storage vessels on-site
f)	BAT is to ensure measures are available to prevent the building up of sludges higher than a certain level and the emergence of foams that may affect such measures in liquid tanks,	Not Applicable	No liquid waste tanks on site.
g)	BAT is equipping tanks and vessels with suitable abatement systems when volatile emissions may be generated.	Not Applicable	Liquid organic wastes not accepted at the site
h)	BAT is to store organic waste liquid with a low flashpoint under a nitrogen atmosphere to keep it inertised	Not Applicable	Organic waste liquids not accepted at the site
BAT 25	BAT is to separately bund the liquid decanting and storage areas using bunds which are impermeable and resistant to the stored materials	Applicable	In place. Diesel and gas oil storage tank bunds
BAT 26	**Tank and Process Pipework**		
a)	BAT is to clearly label all vessels with regard to their contents and capacity	Applicable	In place. Diesel and gas oil tanks labelled.

b)	BAT is to ensure the label differentiates between wastewater and process water, combustible liquid and combustible vapour and the direction of flow.	Applicable	In place. Surface water gullies and foul water inspection chambers colour coded
c)	BAT is to keep records for all tanks, detailing the unique identifier; capacity; its construction, including materials; maintenance schedules and inspection results; fittings; and the waste types which may be stored / treated in the vessel, including flashpoint limits	Not Applicable	
BAT 27	BAT is to take measures to avoid problems that may be generated from the storage/accumulation of waste	Applicable	In place. Licence limits on site storage of waste to 72 hours.
BAT 28	**Waste Handling Techniques**		
a)	BAT is to have systems and procedures in place to ensure that wastes are transferred to the appropriate storage safely.	Applicable	In place (SOP 13)
b)	BAT is to have a management system for the loading and unloading of waste in the installation, which also takes into consideration any risks that these activities may incur.	Applicable	In place. Waste handling procedure SOP 13 and risks assessed as required by Health and Safety Statement
c)	BAT is to ensue that a qualified person attends the site to check the laboratory smalls, the old original waste, waste from an unclear origin or undefined waste (especially if drummed), to classify the substances accordingly and to package into specific containers.	Not Applicable	The site does not have a laboratory and does not accept hazardous waste
d)	BAT is to ensure that damaged hoses, valves and connections are not used	Not Applicable	The site does not accept liquid wastes
e)	BAT is to collect exhaust gas from vessels and tanks when handling liquid waste	Not Applicable	The site does not accept liquid wastes
f)	BAT is to unload solids and sludge in closed areas which are fitted with extractive vent systems linked to abatement equipment when the handled waste can potentially generate emission to air (e.g. odours, dust, VOCs)	Applicable	Proposed. Given proximity to sensitive receptor (private dwelling 30m south of boundary) the building handling the residual waste and food waste will be provide with an active odour control system.
g)	BAT is to use a system to ensure the bulking of different batches only takes place with compatibility testing	Not Applicable	Given the nature of the wastes accepted and the types of processing carried out, compatibility testing is not required.

BAT 29	BAT is to ensure that the bulking /mixing to or from packaged waste only takes place under instruction and supervision and is carried out by trained personnel	Applicable	In place. All waste handling, including baling, is carried out by trained personnel.
BAT 30	BAT is to ensure that chemical incompatibilities guide the segregation required during storage	Not Applicable	Chemically incompatible wastes are not accepted at the site.
BAT 31	**Handling of Containerised Waste**	Not Applicable	Wastes are not stored in drums or other containers.
BAT 32	BAT is to perform crushing, shredding and sieving operations in areas fitted with extractive vent systems linked to abatement equipment when handling materials that can generate emission to air (e.g. odours, dust, VOCs)	Not Applicable	Wastes are not crushed, shredded or sieved at the site
BAT 33	BAT is to perform crushing/shredding operations under full encapsulation and under an inert atmosphere for drums/containers containing flammable or highly volatile substances.	Not Applicable	Wastes are not crushed, shredded or sieved at the site
BAT 34	**Washing Processes**		
a)	BAT is to identify the components that may be present in the items to be washed (e.g. solvents)	Not Applicable	
b)	BAT is to transfer washings to appropriate storage and then treating them in the same way as the waste from which they were derived	Not Applicable	Waste are not washed at the site
c)	BAT is to use treated waste water from the WT plant for washing instead of fresh water	Not Applicable	No on-site WT plant.
	Air Emission Treatment		
BAT 35	BAT is to restrict the use of open topped tanks, vessels and pits	Not Applicable	There are no open topped tanks, vessels or pits at the site.
BAT 36	BAT is to use an enclosed system with extraction, or under depression, to a suitable abatement plant. This technique is especially relevant to processes which involve the transfer of volatile liquids, including during tanker charging/discharging	Not Applicable	Volatile liquid waste are not accepted at the facility.
BAT 37	BAT is to apply a suitably sized extraction system which can cover the holding tanks, pre-treatment areas, storage tanks, mixing/reaction tanks and the filter press areas, or to have in place a separate system to treat the vent gases from specific tanks	Not Applicable	Liquid wastes are not accepted at the site
BAT 38	BAT is to correctly operate and maintain the abatement equipment,	Applicable	Proposed. An operational maintenance programme

	including the handling and treatment /disposal of spent scrubber media.		will be put in place for the odour control system.
BAT 39	BAT is to have a scrubber system in place for the major inorganic gaseous releases from those unit operations which have a point discharge for process emissions	Not Applicable	Process will not generated major inorganic gaseous emissions.
BAT 40	BAT is to have leak detection and repair procedures in place in installations a) handling a large number of piping components and storage and b) compounds that may leak easily and create an environmental problem	Not Applicable	The site does not handle a large number of piping components or use compounds that leak easily.
BAT 41	BAT is to reduce air emission to the following levels VOC 7-20mg/$Nm^3$and PM to 2-20mg/Nm^3	Not Applicable	The site does not have point emission sources for either VOC or PM
	Wastewater Management		
BAT 42	Reduce the water use and the contamination of water		
a)	BAT is to apply site waterproofing and storage retention methods.	Applicable	In place. The site is covered by paved yards and buildings. Bunds provided around oil storage tanks.
b)	BAT is to carry out regular checks of the tanks and pits especially when they are underground	Applicable	In place. Waste licence requires regular checks and integrity testing of bunds, tanks and containers.
c)	BAT is to apply separated water drainage according to the pollution load (roof water, road water, process water)	Applicable	In place. Separate collection systems provided for sanitary waste water and surface water run-off.
d)	BAT is to apply a security collection basin	Not Applicable	
e)	BAT is to performing regular water audits, with the aim of reducing water consumption and preventing water contamination	Applicable	In place and proposed. PANDA reviews water consumption annually as part of the preparation of the AER. Rainwater form the roofs of the new building will be harvested for use as grey water. PANDA also carries out regular inspections of the drains
f)	BAT is to segregate process water from rainwater	Applicable	In place(ref BAT 42c)
BAT 43	BAT is to have procedures in place to ensure that the effluent specification is suitable for the on-site effluent treatment system or discharge	Not Applicable	No on-site effluent treatment system and no on-site discharge to sewer.

BAT 44	BAT is to avoid the effluent by-passing the treatment plant systems	Not Applicable	No on-site effluent treatment system.
BAT 45	BAT is to have in place and operate an enclosure system whereby rainwater falling on the processing areas is collected along with tanker washings, occasional spillages, drum washings, etc. and returned to the processing plant or collected in a combined interceptor	Not Applicable	All waste processing is carried out inside the buildings.
BAT 46	BAT is to segregate the water collecting systems for potentially more contaminated waters from less contaminated water	Applicable	Proposed. Roof water from the new buildings will be harvested and diverted from the surface water drainage system
BAT 47	BAT is to have a full concrete base in the whole treatment area, that falls to internal site drainage systems which lead to storage tanks or to interceptors that can collect rainwater and any spillage. Interceptors with an overflow to sewer usually need automatic monitoring systems, such as pH checks, which can shut down the overflow	Applicable	In place. All waste processing carried out inside the buildings. Drainage from operational yards passes through an attenuation tank and oil interceptor.
BAT 48	BAT is to collect the rainwater in a special basin for checking, treatment if contaminated and further use	Not Applicable	
BAT 49	BAT is to maximise the re-use of treated waste waters and use of rainwater in the installation	Applicable	Proposed. Rainwater from the building roofs will be harvested and used to reduce demand on the well. There is no is no on-site WT plant.
BAT 50	BAT is to conduct daily checks on the effluent management system and to maintain a log of all checks carried out, by having a system for monitoring the effluent discharge and sludge quality in place	Not Applicable	There is no on-site WT plant
BAT 51	BAT is to firstly identify waste waters that may contain hazardous compounds, secondly segregate the previously identified wastewater streams on-site and thirdly, specifically treat waste water on-site or off-site	Applicable	The process does not generate a process waste water. Sanitary wastewater is separated from the surface water drainage system and sent off site or treatment.
BAT 52	BAT is to ultimately after the application of BAT number 42, select and carry out the appropriate treatment technique for each type of waste water	Applicable	In place. Sanitary waste water is sent to a municipal wastewater treatment plant.
BAT 53	BAT is to implement measures to increase the reliability with which the	Not Applicable	No on-site WT plant

	required control and abatement performance can be carried out.		
BAT 54	BAT is to identify the main chemical constituents of the treated effluent and to then make an informed assessment of the fate of these chemicals in the environment	Not Applicable	No on-site WT plant
BAT 55	BAT is to only discharge the waste water from its storage after the conclusion of all the treatment measures and a subsequent final inspection	Applicable	The sanitary wastewater collected in the storage tank is routinely tested to confirm it is suitable for treatment in the off-site municipal wastewater treatment plant.
BAT 56	BAT is to achieve the following water emission values before discharge Water parameter Emission values associated with the use of BAT (ppm) COD 20 – 120 BOD 2 – 20 Heavy metals (Cr, Cu, Ni, Pb, Zn) 0.1 – 1 Highly toxic heavy metals: As <0.1 Hg 0.01 – 0.05 Cd <0.1 – 0.2 Cr(VI) <0.1 – 0.4	Not applicable	No on-site WT plant.
	Management of Process Related Residues		
BAT 57	BAT is to have a residue management plan as part of the EMS including a) basic housekeeping techniques and b) internal benchmarking techniques	Applicable	In place. PANDA has procedures to manage waste arising from site activities, which include canteen and office waste and waste oils
BAT 58	BAT is to maximise the use of re-usable packaging (drums, containers, IBCs, palettes, etc.)	Applicable	In place.
BAT 59	BAT is to re-use drums when they are in a good working state. In other cases, they are to be sent for appropriate treatment	Not Applicable	The site does not accept drums
BAT 60	BAT is to keep a monitoring inventory of the waste on-site by using records of the amount of wastes received on-site and records of the wastes processed	Applicable	In place. PANDA keeps records of all of the wastes accepted and consigned from the site.
BAT 61	BAT is to re-use the waste from one activity/treatment possibly as a feedstock for another	Not Applicable	Given the nature of the wastes accepted and the type of processing carried out, there is no opportunity to re-use waste on-site.
	Soil Contamination		

BAT 62	BAT is to provide and then maintain the surfaces of operational areas, including applying measures to prevent or quickly clear away leaks and spillages, and ensuring that maintenance of drainage systems and other subsurface structures is carried out	Applicable	In place/Proposed. All operational and waste storage areas will be paved. PANDA has a procedure to deal with spills (SOP 14) Licence requires regular inspection of drainage systems.
BAT 63	BAT is to utilise an impermeable base and internal site drainage	Applicable	In place/Proposed. All operational and waste storage areas will have an impermeable base. Surface water and foul drainage systems provided.
BAT 64	BAT is to reduce the installation site and minimise the use of underground vessels and pipework	Applicable	In place. There is one underground tank used to store sanitary wastewater and one attenuation tank on the surface water drainage system.