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3.1 ENVIRONMENTAL NUISANCES AND MONITORING

3.1.1 Introduction

As with any waste facility it is possible that some environmental nuisances may occur within the site, and within the environs. However this impact will be minimal due largely to the mitigation measures adopted on site to combat the effect of these environmental nuisances. Strict adherence to the conditions of the waste license, good management practises, control over individual procedures, and maintenance of the odour abatement systems are essential to ensure the site will not impact on sensitive receptors in the area. The existing site has a good environmental record which O'Toole Composting Ltd. strives to maintain.

3.1.2 Baseline Description

The subject site is located in Ballintrane Co. Carlow just off the N80 which is the main Carlow to Wexford road. The surrounding area is mainly rural with agriculture the predominant activity. There are some industrial operations located along the N80 with the nearest one being Carlow Precast approximately 1.2 kilometres east of the OTCL Facility along this road. The facility is well served by the existing road network and adjoins the N80 approximately 6 km from Carlow Town and approximately 4 km from the M9 motorway. O'Toole Composting Ltd. currently operates a composting facility and a dry recyclables, general skip waste, and construction and demolition waste transfer facility at the subject site under Waste Facility Permit number WFP-CW-10-0003-01 as reviewed by WFP-CW-14-5.

There are potential environmental issues associated with any proposed waste infrastructure however, mitigation measures such as those listed below will be employed on site so that the proposed development will not present a risk to the local environment. The facility is designed and will continue to operate in a manner that will eliminate or minimise the risk of any environmental nuisance. Figure 1 below shows existing monitoring locations on site. Specific measures are already in place on-site to combat the effect of any potential environmental nuisance and these are listed below. It is proposed that these measures will be increased should they be required as part of the new license issued by the EPA.

Potential environmental issues associated with the day to day operation of the existing and proposed development are as follows;

- Noise
- Vermin and Pest Control
- Bird Control
- Odour Control and Emissions to Air
- Dust Emissions
- Litter Control
- Other

Figure 1: On-Site Monitoring Locations

- Air Sensitive Receptors
- Dust Monitoring Locations
- PM10 Monitoring Locations
- Noise Monitoring Locations
- Surface Water Monitoring Locations

Figure 2: Off-site Monitoring Locations

A = Air Sensitive Receptors
N = Noise Sensitive Receptors

3.1.3 The Predicted Impacts

3.1.3.1 Noise

The potential impact of the proposed development to noise levels is described in greater detail in Section 3.6 Noise. In summary noise monitoring is a requirement of the current Waste Facility Permit (WFP-CW-10-0003-01 as reviewed by WFP-CW-14-5) for the site and control measures will be maintained to regulate noise emissions in compliance with any new EPA Licence for the facility which will take account of the proposed new development. Baseline noise measurements are included in Section 3.6. These highlight that noise levels on site are below the emission limit values.

The main sources of noise at the facility will come from the following sources:

- Traffic Movement On-Site
- Vehicle Tipping
- Plant and Machinery
- Construction Plant and Machinery
- Processes in the composting and skip buildings.
- Operation of the Bring Centre for Municipal Waste

Specific mitigation measures proposed include the following: All vehicles will be required to enter and leave the facility at the speed limit of 10km/hr as per the Waste Acceptance Procedures. All composting treatment and handling operations will be conducted inside the buildings which are totally enclosed, thus the emission of noise from mobile and stationary equipment is dramatically reduced. In the Bring Centre waste containers for glass will have rubber baffles. All plant, and machinery associated with facility operations will be designed to produce minimum noise and will be maintained to a high standard to ensure continued compliance with emission limit values of the EPA Licence. Noise levels may increase in the immediate vicinity during the construction period due to increased traffic and construction work. Any noise effects are likely to be related mainly to annoyance. The short-term construction period minimises the risk of any health effects. Adequate soundproofing measures will be employed with the engines for electricity generation as part of their installation.

3.1.3.2 Vermin and Pest Control

Vermin and insects can potentially be a problem where putrescible waste is not handled properly. However, this usually arises where waste is either being disposed of such as to landfill or where it is being stored for long periods of time. Control of rodents is a mandatory prerequisite for any waste management facility and strict mitigation measures will be put in place to control vermin and pests on the site. A Pest control system is currently in place with eleven bait points positioned around the facility. The bait stations are monitored by on-site staff and vermin is monitored during daily facility inspections as per the Environmental Management System (EMS) for the facility. At present these control measures are considered sufficient as there is no vermin activity on-site. If vermin are found present at the facility an external contractor can be employed at the facility.

Current pest control measures on site consist of;

- Cleaning of the shed floors as per Animal By-Products (ABP) Regulations.
- The laying of bait at various locations around the site to control vermin.
- Bait shall be laid at various locations around the site to control vermin. The Facility Manager shall decide where these are to be laid or may employ the services of a Pest Control Company if considered necessary.
- On a daily basis the facility and surrounding areas are checked for vermin nuisance by the Facility Manager or nominated deputy and a daily inspection form is filled in. If a vermin nuisance is detected during this monitoring, then a more intensive baiting program is undertaken.
- If any staff member notices any vermin during the course of his/her work then he/she informs the Facility Manager.
- Fly nuisance is minimised on site by the removal of degradable waste off-site, the washing of the floor of each of the operations buildings and ensuring all skips stored outside are kept empty and clean.

There will be no long term storage of waste on-site. The treatment processes are enclosed. The floor of the building will be swept and washed down at regular intervals. Fly nuisance will be minimised in summer months by spraying waste processing buildings with biodegradable insecticide if considered necessary.

3.1.3.3 Bird Control

Birds will be attracted to waste management facilities where there is available food for them to scavenge. Waste handling procedures on site will be such that waste is exposed only within the composting building or waste transfer building. The waste buildings have been designed so that shed doors can remain closed to prevent bird access. Composing material is stored within composting tunnels. Any waste exposed i.e. in the Bring Centre, will be dry waste which would not attract birds as it would not be a suitable food source for example wood or metal. As a result bird control measures are not deemed necessary.

3.1.3.4 Odour Control and Emissions to Air

The potential impact of the proposed development on odour levels within the area is described in Section 3.3.9 Human Beings and Odour. In summary Odour is the most significant potential environmental impact associated with the proposed development and has the greatest potential to create a local nuisance and deterioration of quality of life. Therefore OTCL have undertaken a number of mitigation measures to minimise any impact. The primary mitigation measure is the proposed odour control system which is based on bio-filters and will be a simple and effective way of controlling the odour of the waste air coming from the buildings. OTCL have a mobile atomised probe unit at the facility. This unit is a self-contained transportable system which is

powered by a motor and disperses odour neutraliser to give immediate odour suppression to confined areas if odour is detected. This is dealt with in more detail in Chapter 3.4.4.2. In order to ensure the full potential of the negative ventilation system various containment principles will be implemented within the proposed building. These will include;

- Ensuring where possible that the building is constructed without any gaps in the building fabric using combined flashing and expanding foam,
- Installation of roller doors on the entrance and exit of the waste reception hall,
- Give consideration to the installation of PVC plastic curtains inside the doors to reduce the available door area once the roller door is opened if necessary,
- Zoned extraction within the building to remove odorous air from the most odorous sources within the building.

As all processes will take place in the fully enclosed building which will be kept under negative air pressure at all times it will therefore avoid any odour nuisance. An odour dispersion model was carried out by RPS Consulting Engineers and is also detailed in Section 3.4 and Volume 3: Appendix 4. The model predicts that the emissions from the proposed development will not give rise to reasonable cause for odour annoyance once the proposed mitigation measures are put in place.

3.1.3.5 Dust Emissions

Waste handling operations on the site ensure that all tipping of waste occurs within the buildings where possible and any dust emissions are therefore contained. Dust curtains will be installed on the entry/exit points to the proposed shed to minimise fugitive dust emissions. The negative extraction odour control with bio filter unit will result in the removal of dust particles from the air in the building before it is released through the bed or stack. In dry weather the yard will be sprayed with water and as when required to minimise airborne dust nuisance. OTCL will implement additional dust monitoring and control procedures at the facility as per the monitoring requirements of the EPA licence.

Waste at the Bring Centre will be stored in enclosed containers and monitored daily to ensure it is not giving rise to dust at the facility. Dry dusty materials will be dampened down where necessary.

3.1.3.6 Litter Control

Litter procedures are currently in place to prevent litter nuisance at the facility or in the immediate area of the facility. Site practices for the proposed development will include the following;

- The road network is kept free from debris caused by vehicles entering or leaving the facility, any debris is removed immediately.
- Daily litter patrols of the overall site and the access roads are carried out.
- Waste collection vehicles entering and exiting the facility will be covered to prevent any fugitive litter.

3.1.3.7 Other

In addition to the measures and controls outlined above, OTCL will implement strict and responsible operational procedures at the facility, to ensure safe, efficient, and environmentally safe activities. All areas of operation including waste acceptance, waste transfer and waste treatment/processing, equipment operation and maintenance and health and safety and training will be carried out in such a way that is in compliance with the Local Authority Permit or EPA Licence and does not pose any significant risk to the environment. Emphasis will be placed on energy reduction and emission control. All staff will follow a strict reporting structure with clear and open channels of communication through line management.

3.1.4 Mitigation Measures

The table below presents the potential impacts from the proposed development, the mitigation measures proposed by OTCL and the resulting risk assessment.

Table 1: Potential Impacts & Mitigation Measures

Source of Impact	Potential Receptor	Mitigation	Risk After Controls	Further Comment
Noise	Local Residents Site Workers	Indoor processing & buffered machinery Personal Protection Equipment (PPE)	Low	**Noise Survey included in Section 3.6 Compliance with Health & Safety Legislation**
Traffic	Local Residents	Adequate site lines at entrance Internal entrance roadway so no queuing outside site	Low	**Well established existing entrance with no queue delays. TIA included in Section 3.7.**
Use of Services	Local Residents	Existing site with established services	Remote	**OTCL has provided adequate services such as foul, sewerage and mains water**
Vermin	Local Residents	Specific control measures, procedures and baiting.	Low	**Compliance with EPA Licence will ensure that controls are maintained.**
Fire Hazard	Site Workers & Local Residents	Operational Procedures and firewater retention	Low	**Compliance with Health and Safety legislation**
Employment	Local Population	Positive Impact	Certain	**The additional facility will require two additional personal to operate.**
Odour, Dust, PM_{10} and aerosols	Local Residents Site workers	Containment & Extraction Air conditioned cab units on vehicles on-site.	Low	**See Volume 3: Appendix 3.1 for Odour Model**
Litter	Local Residents	Covering of loads entering and leaving the facility	Low	**Refer to Volume 3, Section 3.1.3**

Due to the current mitigation measures and good management practices in place at OTCL the environmental impact of the potential impacts/nuisances are of low risk and considered to be controlled and acceptable.

3.2 HYDROLOGY

Enviroguide Consulting have prepared this section of the EIS, which assesses the impact of the proposed development on the hydrological environment during the construction and operational phases of the proposed facility expansion. Mitigation measures are also discussed to prevent any possible sources of pollution from each phase.

3.2.1 Study Methodology

This report has been prepared using the recommendations set out in the Environmental Protection Agency (EPA) document 'Guidelines on Information to be contained in Environmental Impact Statements' (2002).

This section describes the hydrological and hydrogeological setting of the site and refers to the information available from a number of published sources.

The information contained in this section has been divided into sub-sections, so as to describe the various aspects pertaining to the water environment. In the preparation of this section the following protocols were used in order to assess the hydrological and hydrogeological context and character of the site:

- The site was assessed using published information and regional hydrological data;
- All available information was collected from the Environmental Protection Agency with respect to historical water quality in this region;
- All available information from the Geological Survey of Ireland was assessed and collated;
- Site specific information with respect to the existing services; and,
- This Water Report (Surface Water, Groundwater, Water supply and Wastewater) was prepared following the interrogation and collation of all available information.

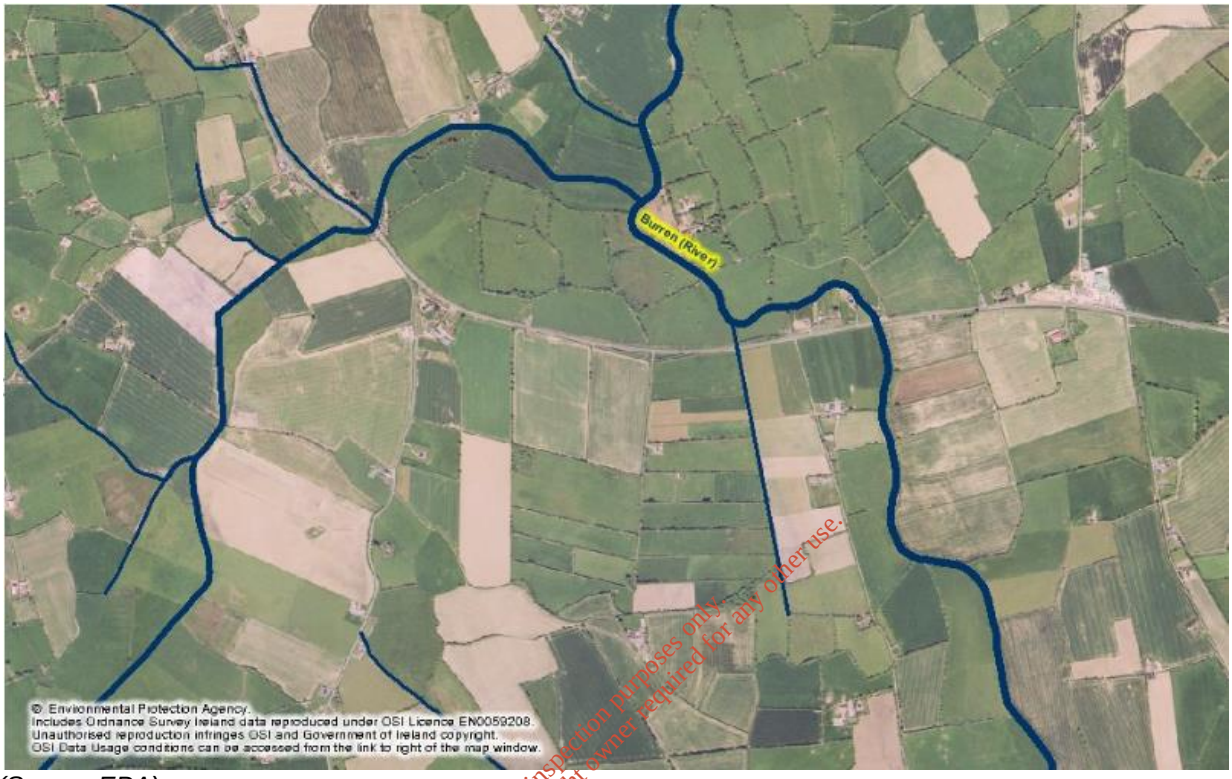
All projects and developments that require an EIS are of a scale or nature that they have the potential to have an impact on the environment. It is therefore crucial that the significance of the potential impact is determined. In this section the potential impact on the surface water environment resulting from the construction of the waste facility extension at the proposed site is assessed and appropriate mitigation measures are submitted.

The site of the proposed development is located at Ballintrane, Fenagh, Co Carlow. The existing waste facility is located in a mixed rural and industrial area immediately adjacent to the N80 road.

The total site area is 4.87 hectares. The site is located in the River Barrow Catchment [Hydrometric Area 14], within the South Eastern River Basin District (SERBD). The River Burren (EPA Ref: 09-1252) flows in a north, north-westerly direction along the eastern site boundary.

The Graiguealug stream flows in an easterly direction to the north of the site and joins the River Burren.

Figure 3: River Id's and Locations



(Source EPA)

3.2.2 The Existing Environment

3.2.2.1 Surface Water Quality

A surface water monitoring schedule has been assigned to the facility in the Environmental Management System. A full data set for surface water monitoring is available in Volume 3: Appendix 3.1.4. Surface water samples were obtained from the surface water discharge points SW1 and SW2 along the eastern site boundary. Table 2 below details the results for December 2013. These figures show that concentrations for pH, BOD, Temperature and COD are all below suggested limit levels. Mineral Oil concentrations were below the laboratory detection limit (<10mg/l) during all monitoring events.

Suspended solid concentrations were very low at the OTCL facility during the 2012 and 2013 monitoring events. During the most recent monitoring in December 2013 suspended solid (SS) concentrations at SW1, and at SW2 were less than 1.0mg/l as indicated in Table 2 below.

Table 2: Surface Water Monitoring Results 18/12/2013

Location	BOD	COD	pH	SS
SW 1	2mg/l	8mg/l	7.6	<1mg/l
SW2	<1mg/l	<1mg/l	7.7	<1mg/l

3.2.2.2 Biotic Indices (Q values)

The EPA monitors the quality of Ireland's surface waters and assesses the quality of watercourses in terms of 4 no. quality categories; 'unpolluted', 'slightly polluted', 'moderately polluted', and 'seriously polluted'. These water quality categories and the water quality monitoring programme are described in the EPA publication 'Water Quality in Ireland, 1998-2000'.

The water quality assessments are largely based on biological surveys. Biological Quality Ratings or Biotic Indices (Q values) ranging from Q1 to Q5 are defined as part of the biological river quality classification system. The relationship of these indices to the water quality classes defined above, are set out in Table 3.

Table 3: Relationship between Biotic Indices and Water Quality Classes

Biotic Index	Quality Status	Quality Class
Q5, 4-5, 4	Unpolluted	Class A
Q3-4	Slightly Polluted	Class B
Q3, 2-3	Moderately Polluted	Class C
Q2, 1-2, 1	Seriously Polluted	Class D

The relevant water quality monitoring stations are located on the Burren River at 'Ballintrane Bridge' and Rathtoe. No river water monitoring data was available for the Graiguealug stream.

The Ballintrane Bridge (Station Code: 14B050200) conferred a Q3 status on the Burren River upstream of the facility. The Rathtoe (Station Code: 14B050300) downstream of the OTCL Facility reported a river water quality value of Q3 - 4.

Table 4: EPA summary data for Burren River, copyright EPA

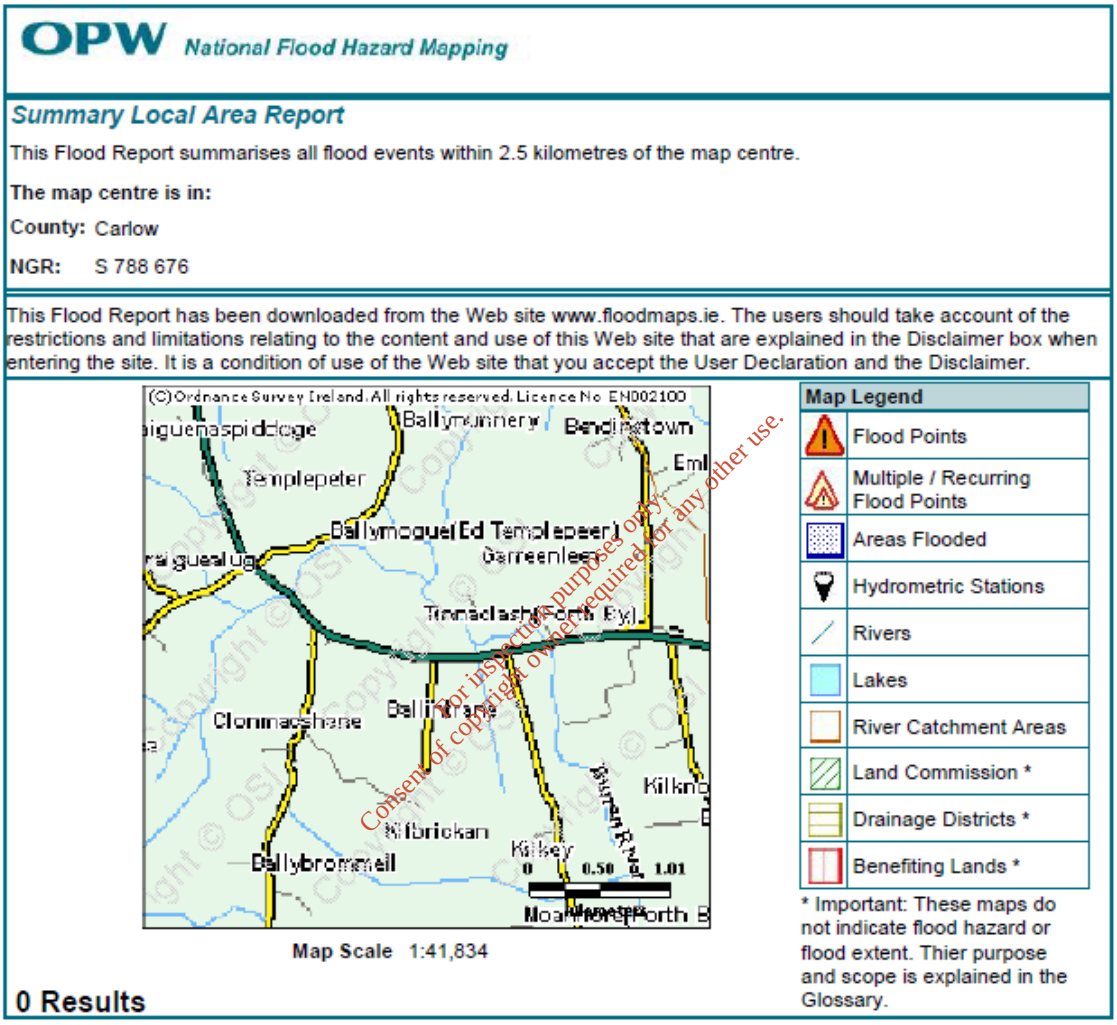
Station Location	Location Code (HA09)	Status
Ballintrane Bridge	14B050200	Q3
Rathtoe Bridge	14B050300	Q4

The EPA Water Quality Database indicates that the biotic water quality in the Burren River upstream of the facility at 'Ballintrane Bridge' remained constant with a value of Q3 – Moderately Polluted. The Biotic water quality downstream of the subject site at 'Rathtoe Bridge' has a current status of Q4 - good status. As this facility has been operational since 2005 and there have been no impacts on the surface water, it is not expected that any increase in level of activity on site will increase pressure on this river. The environmental controls on site will be amended to ensure the same strict compliance levels will apply. Under the Water Framework Directive, the River Burren and tributaries are classed overall moderate status and as '1a', i.e., at risk of failing to meet 'good status' by 2015. The principle pressures on the Burren River are classed as RD1 by the EPA namely general diffuse pollution of the River Burren and its tributaries.

3.2.2.3 Hydrometric Data

There are no recorded recent floodings within 2.5 km of the facility (www.floodmaps.ie;).

Figure 4: Flood Map



3.2.2.4 Groundwater

Regional Details were identified from the following resources:

- The EPA (http://maps.epa.ie/internetmapviewer/mapviewer.aspx)
- The Geological Survey of Ireland (http://www.gsi.ie).

The main points are as follows:

1. There are no proposed discharges to groundwater from the site
2. The site is located in the in the South Eastern Barrow HA 14 District
3. The aquifer is categorised as a Poor Aquifer – Bedrock which is Generally Unproductive except in local zones (P***l***).
4. The Groundwater Vulnerability within the site boundary is categorised as Low to Moderate.
5. There are no source protection zones delineated by the GSI in the vicinity of the subject site.
6. The draft groundwater WFD status is considered as good - 2a - 'Probably not at risk of not achieving good status' (www.wfdireland.ie). Region Ref: New Ross_S_IE_SE_G_103

3.2.2.5 Aquifer Classification and Flow Type

The aquifer is categorised as a Poor Aquifer – Bedrock that is Generally Unproductive except in local zones (*Ll)* (DoEHLG/EPA/GSI 2010).

3.2.2.6 Groundwater Vulnerability

Groundwater Vulnerability guidelines are given in Table 5 below. Groundwater vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. The vulnerability category is based on the relative ease with which infiltrating water and potential contaminants may reach groundwater in a vertical or sub-vertical direction. The permeability and thickness of the subsoil, which influence the attenuation capacity of subsoil, are important aspects in determining the vulnerability of groundwater.

Table 5: Groundwater Vulnerability Guidelines (DoEHLG, EPA, GSI (1999))

Vulnerability Rating	Hydrogeological Conditions				
	Subsoil Permeability (Type) and Thickness			Unsaturated Zone	Karst Features
	High permeability (sand/gravel)	Moderate permeability (e.g. Sandy subsoil)	Low permeability (e.g. Clayey subsoil, clay, peat)	(Sand/gravel aquifers only)	(<30 m radius)
Extreme (E)	0 - 3.0m	0 - 3.0m	0 - 3.0m	0 - 3.0m	-
High (H)	>3.0m	3.0 - 10.0m	3.0 - 5.0m	>3.0m	N/A
Moderate (M)	N/A	>10.0m	5.0 - 10.0m	N/A	N/A
Low (L)	N/A	N/A	>10.0m	N/A	N/A

Notes: (1) N/A = not applicable.
(2) Precise permeability values cannot be given at present.
(3) Release point of contaminants is assumed to be 1-2 m below ground surface.

According to the available sources, the groundwater vulnerability underlying the proposed extension is categorised as Low to Moderate.

There are no boreholes installed on the site for groundwater monitoring as there are no proposed or existing discharges to ground at the site. There is a private well on site for general use and the quality of the water is tested on a regular basis.

There will be no discharge to ground from the facility as all surface water runoff is directed to the surface water network and all foul water is discharged to a Bio-cycle system. Therefore there will be no impact from the proposed development on groundwater quality.

3.2.2.7 Resource Protection Zones

From the Groundwater Protection Schemes (DoEHLG, EPA and GSI, 1999), a combination of aquifer classification and vulnerability rating give rise to the resource protection zones (RPZ). The purpose of these zones is to place a control on the activities practised within a zone and thus provide protection to any underlying groundwater resources. Therefore the RPZ for the subject site is Pl/M (Poor aquifer with moderate vulnerability). There is no source protection zone delineated in the vicinity of the site.

3.2.2.8 Groundwater Quality

There is no requirement in Waste Facility Permit for groundwater sampling as there are no discharges to groundwater.

3.2.2.9 Groundwater Flow Direction

The groundwater flow direction is based on an assessment of the drainage patterns, the aquifer flow type and the assumption that the water table is generally a subdued reflection of the topographic surface. There is no on site boreholes to assess the water table height and slope. As groundwater flow paths are generally a subdued reflection of the surface water drainage pattern it is assumed that the general groundwater flow path follows the site slope in a general northeast direction.

3.2.2.10 GSI Well and Karst Data

A GSI well search was conducted within 1km radius of the site. 1 no. wells are located approximately 0.9km west of the development.

No known karst feature is recorded in the GSI karst databases within a 10 km radius search of the site.

3.2.2.11 Water Supply

The water usage at the site is considered low. The facility has a private well on site and uses this as a source of water for the facility. There is a holding tank on site with a capacity of 20,000 litres.

This water is used for washing trailers, equipment and floors. In general no water is used in the process as the incoming material contains excess moisture. However in exceptional circumstances when water is required as part of the process, grey water from rainfall is collected and used.

Six 5,000 Gallon concrete tanks have been installed at the facility. These tanks are for the storage of water for firefighting purposes at the facility in the event of a fire occurring at the site.

3.2.2.12 Wastewater Treatment

Wastewater from the facilities operations is collected in a holding tank on site and either re-used in the composting process or tankered off site to the Local Authority Wastewater Treatment Plant.

Standard EPA Emission Limit Values to sewer are set out in Table 6 below.

Table 6: EPA Waste License Effluent Limits

Parameter	Emission Limit Value	
Temperature	^{o}C	42
pH	pH Units	6 – 10
BOD	mg/l	1000
COD	mg/l	3000
Suspended Solids	mg/l	1000
Sulphates (as SO4)	mg/l	1000
Oils, Fats & Greases	mg/l	100
Mineral Oils	mg/l	10
Detergents	mg/l	100
Zinc	mg/l	5
Copper	mg/l	5

Foul water from the offices is all diverted to the septic tank on-site.

3.2.3 Potential Impacts of the Development

3.2.3.1 Construction Phase

The proposed development will not significantly alter the existing setting of the site. Ground works will be minimal and there will be a slight increase in hardstand area.

During the construction period, little potential exists for discharge of sediment-laden water from the site. Any sediment-laden water generated due to exposure of soil surfaces will be contained within the site boundary, as there is an earth berm at the site boundary. Alternatively, surface water runoff can discharge through the existing site drainage system where it will pass through a grit trap/oil interceptor prior to discharge.

3.2.3.2 Operational Phase

The construction of the hardstanding will slightly alter the current hydrological setting of the site, whereby overland surface water runoff may potentially increase. This generation of increased runoff, as a result of the slight increase in hardstanding area, is a direct and long-term impact of the development. Without mitigation measures the magnitude of this ancillary development is considered *'moderate'*.

Appropriate mitigation measures are proposed to ensure that discharges from the site are managed and regulated, to reduce/eliminate the potential impact of increase runoff.

Due to the nature of activity, there is a potential for surface water runoff from hardstand areas to absorb contaminants from the surfaces, i.e. spillages or leakages from vehicles, machinery, etc. The runoff could also be sediment laden. Discharge of such runoff to receiving watercourses has the potential to have a negative impact on water quality. This is a direct potential impact of the development, however the potential magnitude from this proposed development is considered 'low to moderate'. Appropriate mitigation measures such as attenuation tanks, grit traps and hydrocarbon interceptors are proposed to ensure that surface waters are protected against accidental discharges to the drainage network. An Environmental Management System is in place at the facility to ensure that all spillages are dealt with, thus reducing the risk of contamination initially.

The generation of some additional runoff is a direct, long-term effect but if appropriate mitigation measures are incorporated, it will not result in a negative impact.

The waste to be handled within the facility will not come into contact with rainfall. The floor of the facility will be cleaned regularly. The facility is designed so that runoff from incoming material will be captured within the building. Any runoff thus captured will be regarded as wastewater

and will be diverted to the leachate tank which will be reused this water in the composting process. Excess waste water will be tankered offsite to a waste water treatment plant.

Diesel tanks on site could have the potential to cause groundwater contamination due to accidental leakages. The correct design of bunded areas for the storage of diesel tanks will be used to prevent groundwater contamination as a result of accidental spillages from the Waste Facility.

3.2.3.3 Groundwater

According to the Geological Survey Ireland (GSI) one well is recorded within 1 km of the site. It is not envisaged that the implementation of the proposed development will have any adverse impact on groundwater resources.

The proposed development could possibly have a potential to cause groundwater contamination from leakages from the wastewater collection and disposal systems and from vehicular fuel spillages or leakages on roads and car parking areas. However, the existing surface water and wastewater disposal systems on site are built in accordance with best practice and will prevent the occurrence of contaminated leakage or runoff from the site.

In summary the potential impact on the surface water and groundwater environment is assessed as *'low'*.

3.2.4 Remedial or Mitigation Measures

3.2.5 Construction Phase

All site works will be conducted in an environmentally responsible manner so as to minimise any adverse impacts on the soils and water, which may occur as a result of works associated with the construction phase.

With regard to on-site storage facilities and activities, any raw materials, fuels and chemicals, will be stored within structurally sound warehousing buildings and/or bunded areas if appropriate to guard against potential accidental spills or leakages. All equipment and machinery will have regular checking for leakages and quality of performance.

Appropriate measures are already in place prior to the construction phase to ensure that any potential run off is diverted through the existing site settlement tanks and grit traps.

3.2.6 Operational Phase

The design of the proposed development has taken into account the potential impacts associated with the construction and operation of the development on the water environment.

3.2.6.1 Surface water

In terms of surface water runoff, in order to prevent potential contamination of soil, surface water or groundwater media with water that may be contaminated with oil/solids, it is proposed that an appropriately sized hydrocarbon interceptor and grit trap is installed at the outfall from the surface water collection systems prior to discharge. All surface water from the runoff of the site or from the on-site sediment tank will be diverted to this interceptor prior to discharge.

3.2.6.2 Groundwater

Waste water runoff and leachate from the composting process is retained in underground sumps at the facility. This waste water is reused in the composting process. Excess waste water and leachate is tankered offsite to a waste water treatment facility. No waste water is discharged at or from the facility. The correct design, construction and maintenance of wastewater collection and disposal systems will be used to prevent discharge to ground potentially leading to groundwater contamination.

3.2.6.3 Water Supply

The facility has a private well on site and uses this as its primary source of water for the facility. There is a holding tank on site with a capacity of 20,000 litres.

Within the proposed development, a water supply will be required for washing down the facility. It is proposed to provide a 100mm diameter spur from the existing water supply to service the additional proposed units.

Six 5,000 gallon concrete water tanks have been installed on-site. These water tanks are for the storage of water for firefighting purposes in the event of a fire occurring at the facility.

The watermain layout and specification to be in accordance with the Building Regulations TGD B & Specifications for the Laying of Water Mains and Drinking Water Supply (Nov 2009).

3.2.6.4 Wastewater

All wastewater from the process will be collected on site in a specially constructed holding tank. If it cannot be re-used as part of the composting process then it will be tankered off site to Carlow County Council's Wastewater Treatment Facility or another suitable facility.

All foul water from the offices and canteen are treated in the existing septic tank system.

3.2.7 Residual Impacts

3.2.7.1 Construction Phase

During any construction period, significant potential exists for fugitive discharge of sediment-laden water from the site. Any sediment-laden water generated due to exposure to soil surfaces will either be attenuated within the earthen berm of the site boundary or within the existing surface water drainage system. During this attenuation period suspended materials will be allowed fall out of suspension prior to discharge to the surface water network. With the incorporation of these remedial measures the predicted impact of the construction phase on surface water quality is minimal.

3.2.7.2 Operational Phase

The construction of the new facility and ancillary hardstanding will alter the natural hydrological setting of the site, whereby overland surface run-off will be increased and natural runoff flow paths disrupted. This generation of increased runoff from the facility is a direct and long-term impact. Without mitigation measures the magnitude of this impact is considered 'Low'.

If the remedial and reductive measures set out above failed, uncontrolled storm discharges from the proposed increased hardstanding area of the site would result in short pulses of high water volumes to the surface water network. However, best practice drainage design and the full implementation of proposed remedial and reductive measures will ensure that such a scenario will not arise.

3.2.7.3 Monitoring

During the works undertaken at the outset of the project, strict monitoring of all potential polluting materials used will be maintained. Current monitoring as per Waste Facility Permit Number WFP-CW-10-0003-01 as amended by WFP-CW- will continue at the facility. The existing discharge point to surface water will remain in use and runoff from the proposed development will discharge at this location also. Any monitoring from this point will be representative of water quality from the existing facility and proposed development. The silt trap and oil interceptor will require periodic maintenance.

3.2.7.4 Reinstatement

Subject to the development of the site in line with the proposed plans, there is no scope for reinstatement. The site will be permanently altered as a result of the development.

The proposed development will have no noticeable impact on the surrounding water environment; therefore there will be no short to long-term impacts outside the site boundary.

3.3 HUMAN BEINGS

3.3.1 Introduction

Human beings are one of the most important elements of the 'environment' to be considered. One of the principle concerns in any proposed development is that the local population experiences no reduction in the quality of life as a result of the development on either a permanent or temporary basis. All the effects of a development on the environment may impinge upon human beings. Any significant impact on the status of humans that may be potentially caused by a proposed development must, therefore, be comprehensively addressed. Air quality, water quality, noise and landscape impact directly while flora, fauna, and traffic impact indirectly.

3.3.2 The Existing Environment

The proposed development is located within the existing site facility just off the N80 the main Carlow to Wexford road. The local area is predominantly rural-agricultural although there are a number of heavy industrial installations along the N80 close to this site.

The nearest dwelling house is located approximately 170 meters from the site to the south. The site has a low visibility impact on the residences due to the screening employed by OTCL. There are numerous other industrial premises located along the N80 within 1km of the OTCL facility.

3.3.3 The Predicted Impacts

The proposed development will be operated under a waste licence in accordance with the Waste Management (Licensing) Regulations, 2004 (S.I No. 395/2004) as amended, which derive from the Waste Management Act, 1996 which was amended by the Protection of the Environment Act, 2003 and the European Communities (Waste Directive) Regulations, 2011, (S.I. No. 126 of 2011). Section 32(1) of the Act (as amended) states that a person shall not 'hold, transport, recover or dispose of waste, or treat waste, in a manner that causes or is likely to cause environmental pollution'. Environmental pollution is defined to include 'nuisance through noise, odours or litter' and therefore has a bearing on emission to air.

3.3.4 Noise

Noise is an identified form of air pollution and uncontrolled it can cause nuisance or deterioration of amenities. The potential impact of the proposed development on noise levels in the area is described in Section 3.6. Noise. Baseline Noise measurements are included in that section.

Noise levels are expected to increase in the immediate vicinity of the site during the construction period. However as most of the infrastructure including buildings are already in place, the short-term construction period required for the proposed development minimises the risk of any health effects.

In summary due to existing background noise levels caused primarily by the surrounding road network, a significant increase in ambient noise levels is not predicted. In particular noise levels at the nearest sensitive locations (i.e. occupied residences) will not significantly deviate from the current background daytime noise levels. Any noise sensitive location is more likely to be impacted by traffic from the N80 than by the proposed development.

3.3.5 Traffic

Enviroguide Consulting carried out a traffic survey in order to assess the potential impacts from additional traffic movements resulting from the proposed development and the impact the proposed development will have on the existing road network (Section 3.5 Traffic). Full details of these traffic counts are available in Volume 3: Appendix 3.5. The traffic impact assessment concluded that the proposed development will constitute less than 1% of traffic at the junctions affected, which is considered a negligible impact

3.3.6 Fire Safety

Prior to commencement of expanded operations a fire safety audit of the site will be undertaken to determine the fire extinguishing requirements of the site. The recommendations of this report shall be implemented within the site. In addition to these recommendations there will be two fire extinguishers located at each door of the waste buildings, namely powder and foam. Designated staff on site are trained in fire prevention, fighting and evacuation. Fire prevention measures to be implemented shall include;

- The provision of six 5,000 Gallon water tanks for holding water specifically for firefighting purposes;
- The provision of appropriate fire extinguishers as recommended by a specialist supplier to deal with types of fire sources that may be encountered on site. Regular inspections will be carried out and any missing, damaged, defective or out of date appliances replaced as a priority;
- Provision of sand bunkers at appropriate locations for use in dousing fires;
- Fire suppression equipment on machines is to be checked daily by the driver operator and any faults reported;
- Training of employees in the correct selection and use of fire extinguishing media for the range of types of fire incidents that may be encountered on site;
- The enforcement of a strict no smoking policy on site except in the designated smoking shelter;
- The enforcement of no fires/burning on site;

- A contract for maintenance of fire equipment with specialist suppliers;
- A maintenance and defect reporting system for all portable and fixed plant and for all electrical appliances;
- Training of evacuation procedures and the identification of the location of assembly points.

3.3.7 Human Health

A variety of air pollutants have known or suspected harmful effects on human health and the environment. In many similar developments these pollutants are principally the products of combustion from power generations or from motor vehicle traffic. The primary potential air pollutants derived from the proposed developments are detailed further in section 3.4.

Primary pollutants derived from traffic includes the following; sulphur dioxide (SO_2), particulate matter, lead, oxides of nitrogen (NO_x), carbon dioxide (CO_2) and volatile organic compounds (VOC's).

The objective of air pollution control is to prevent adverse responses to all receptor categories (human, animal, plant) exposed to the atmosphere. The adverse responses have characteristics response times- short term (seconds or minutes), intermediate term (hours or days) and long term (months or years). Pollutants such as nitrogen dioxide (NO_2), sulphur dioxide (SO_2) and carbon monoxide (CO) can have potential health impacts. NO_2 is a respiratory irritant, which may exacerbate asthma and possibly increase susceptibility to infections. CO reduces the capacity of blood to carry oxygen around the body at levels >9.9mg/m^3 (8 hour average) and this may increase the risk of problems in those with angina and disease of the coronary arteries. At high levels, SO_2 is a strong irritant to the eyes and mucous membranes, producing narrowing of the airways and stimulating coughing. While the effects are generally transient and easily reversible in healthy people, the consequences can be more serious for people who suffer from weakened cardio-respiratory systems.

The future contributions of sulphur dioxide and the oxides of nitrogen associated with the increased traffic movements due to the proposed development will be within the recommended limit values at the nearest sensitive receptor and it is unlikely that they will have adverse human impacts at that point. Predicted levels of VOC's, $PM_{10,}$ and carbon monoxide are also within the recommended limit values (See Section 3.4: Air). Predicted concentration levels indicate that air pollutants will increase marginally due to traffic movements from the proposed development. However, any such increase is not considered significant and will be well within relevant ambient air quality standards.

3.3.8 Land Use

Any potential impacts from the proposed additional infrastructure on the existing land uses of the area are not considered significant. The subject site has been operating as a waste management facility since 2005. OTCL are not proposing any alterations to the existing land use on site but are simply proposing to extend their existing operations. The landscape of the area will not change as a result of the proposal and the existing topography will remain as low lying land in an agricultural setting adjacent to a national road. The site itself is well screened due to extensive planting of trees and bushes in keeping with the company's green profile.

Following cessation of the waste recycling and processing facility, site restoration will commence in line with the aftercare management plan specific to the site and in accordance with the waste license conditions. As a result of the above measures the impact of the purposed development on the land use character of the area is considered minimal.

3.3.9 Odour

Odour from the proposed development has the potential to cause the greatest impact to Human Beings. Therefore a number of steps have been taken by OTCL in the design of the proposed development to prevent any impact to Human Beings from Odour. Currently a negative air pressure extraction system is in place in the Composting Building where air is passed through a bio filter bed. It is proposed to construct an extension to the composting building to install a new bio filter. An extension for the purpose of installing a bio filter is also proposed for the waste transfer building. Should it be deemed necessary it is proposed to extract odorous air from the waste transfer building using a negative air system and to treat the air through the bio filter. Other measures include a truck air/lock, roller doors and good housekeeping to reduce the risk of fugitive emissions.

A desktop assessment of the potential odour impact from the proposed extension to operations at the O'Toole Composting Facility was carried out by RPS using advanced dispersion model techniques (Volume 3: Appendix 4). The model predicts that the emissions from the bio-filter bed or stack will not give rise to reasonable cause for odour nuisance at the nearest sensitive receptors once it is operated to the design parameters.

3.3.10 Socio-Economic

It is considered that the proposed development will have a very limited direct social and economic effect. The proposed development is unlikely to stimulate additional development in the area and will not reduce the potential for the expansion of economic activities in the area. Therefore the proposed will have a minimal impact on the existing population structure of the area. The proposed changes are also in keeping with existing and proposed land use patterns.

However it is perhaps the indirect impacts that will benefit the local and regional community the most. The additional services provided by the processing facility and the proposed Bring Centre will not only benefit the public but will increase the recovery potential of waste that would normally be directed to landfill.

The proposed development will support the policies and objectives of the current County Development Plan for Carlow states that '*it is the objective of the County Council to ensure that the provision of quality cost effective waste infrastructure and services, which reflect and meet the needs of the community and to ensure that the 'polluter pays' principle is adhered to in all waste management activities'.*

3.3.11 Mitigation Measures

Waste facilities such as the proposed can impact on human health if uncontrolled. Table 7 below presents the potential impact on human health from the proposed development, the mitigation measures proposed by the developer and the resulting risk assessment.

Table 7: Risk Assessment: Potential Impact on Human Health from Proposed Development

Source of Impact	Potential Receptor	Mitigation	Risk After Controls	Further Comment
Noise	Local Residents Site Workers	Indoor processing & buffered machinery Personal Protection Equipment (PPE)	Low	Noise Survey included in Section 3.6 Compliance with Health & Safety Legislation
Traffic	Local Residents	Adequate site lines at entrance Internal entrance roadway so no queuing outside site	Low	Well established existing entrance with no queue delays. TIA included in Section 3.7.
Use of Services	Local Residents	Existing site with established services	Remote	OTCL has provided adequate services such as foul, sewerage and mains water
Vermin	Local Residents	Specific control measures, procedures and baiting.	Low	Compliance with EPA Licence will ensure that controls are maintained.
Fire Hazard	Site Workers & Local Residents	Operational Procedures and firewater retention	Low	Compliance with Health and Safety legislation
Employment	Local Population	Positive Impact	Certain	The additional facility will require two additional personal to operate.
Odour, Dust, PM_{10} and aerosols	Local Residents	Containment & Extraction	Low	See Volume 3: Appendix 4 for Odour Model
Litter	Local Residents	Covering of loads entering and leaving the facility	Low	Refer to Volume 3, Appendix 4

In consideration of the factors detailed above and providing that the mitigation measures are enforced by OTCL and the regulatory agencies such as EPA, HSA and Carlow County Council the risks to human health posed by the development are low and are considered acceptable.

3.4 AIR QUALITY

3.4.1 Introduction

This chapter examines the potential for the proposed development to impact upon air quality within the vicinity of the subject site. The chapter describes the current baseline conditions at the site using existing monitoring data carried out in compliance with the conditions of the Waste Facility Permit: WFP-CW-10-0003-01 as reviewed by WFP-CW-14-5. This chapter also describes the assessment methodology, the likely significant environmental effects, the mitigation measures required to prevent, reduce or offset any significant adverse effects after these measures have been employed. It has been written with regard to current advice notes from the EPA for preparation of an Air Quality Chapter in an EIS.

In 1996, the Environment Council adopted the Framework Directive 96/62/EC on Ambient Air Quality Assessment and Management (AAQ&M). The Directive sets a general policy framework for dealing with ambient air quality. Instead of looking first at the sources of the pollution, the Directive looks at the effects of the air pollution on human health and environments, and then shifts the focus to those sources that contribute the most to the effects. The main objectives of the Air Quality Framework Directive are:

- Sets out an EU-wide system for setting binding air quality objectives for specific pollutants to protect human health and environment;
- Requires Member States to put in place systems for assessing the quality of the ambient air based upon common methods and criteria;
- Requires Member States to maintain ambient air quality where it is good and improve it in other cases, by means of plans and programmes of action and
- Lays down provisions for a system of gathering, reporting and publicising information. This includes both data to be reported to the European Commission and information to be disseminated to the public.

The Directive was incorporated into the EPA Act, 1992 (AAQ & M) Regulations, 1999 (S.I. No. 33 of 1999) and it covers the revision of previously existing legislation and the introduction of new air quality standards for previously unregulated air pollutants, setting the timetable for the development of daughter directives on a range of pollutants.

The Directive deals with each EU member state in terms of "Zones" and "Agglomerations". For Ireland, four zones are defined in the Air Quality Regulations (2002), amended by the Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air Regulations (2009).

The main areas defined in each zone are:

- **Zone A:** Dublin Conurbation
- **Zone B:** Cork Conurbation
- **Zone C:** Other cities and large towns comprising Galway, Limerick, Waterford, Clonmel, Kilkenny, Sligo, Drogheda, Wexford, Athlone, Ennis, Bray, Naas, Carlow, Tralee, Dundalk, Navan, Letterkenny, Celbridge, Newbridge, Mullingar and Balbriggan.
- **Zone D:** Rural Ireland, i.e. the remainder of the State excluding Zones A, B and C.

Air Quality for Zone D is currently classified as Very Good. The index is calculated by the EPA at their numerous monitoring stations around the country and is based on the latest available measurements of ozone, nitrogen dioxide, PM10 and sulphur dioxide in Zone D.

Daughter directives of the Act set limits for specific pollutants. The first two of the directives cover: Sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead, carbon monoxide and benzene. These two directives became Irish Law as the Air Quality Standards Regulations 2002 (SI No. 271/2002). The regulations;

- Establish limit values and as appropriate, alert thresholds for concentrations of certain pollutants in ambient air intended to avoid, prevent or reduce harmful effects on human health and the environment as a whole;
- Provide for the assessment of concentrations of certain pollutants in ambient air on the basis of methods and criteria common to the Member states of the EU;
- Provide for the obtaining of adequate information on concentrations of certain pollutants in ambient air and ensure that it is made available to the public, inter alia by means of alert thresholds and;
- Provide for the maintenance of ambient air quality where it is good and the improvement of ambient air quality in other cases with respect to certain pollutants.

These daughter directives set down limit values for Sulphur Dioxide, Nitrogen Dioxide, Oxides of Nitrogen and Benzene as outlines in Table 8 below.

Table 8: Limit Values from Directive 19999/30/EC & Directive 2000/69/EC

	Average Period	Limit Value	
Hourly limit value for the protection of human health	1 Hour	200 μg/m^3 No_2	350 μg/m^3 So_2
Annual limit value for the protection of human health	Calendar year	40 μg/m^3 No_2	5 μg/m^3 Benzene
Daily limit value for the protection of health	24 hour	-	125 μg/m^3 So_2
Annual limit value for the protection of vegetation	Calendar year	30 μg/m^3 No_x	20 μg/m^3 So_2

Two more daughter directives deal with:

- Ozone (in Irish law as the Ozone in Ambient Air Regulations 2004)
- Polyaromatic hydrocarbons, arsenic, nickel, cadmium and mercury in ambient air (in Irish law as the Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air Regulations 2009)

The Clean Air For Europe (CAFE) Directive was published in May 2008. When it enters into force it will replace the Framework Directive and the first, second and third Daughter Directives. The fourth Daughter Directive will be included in CAFE at a later stage.

The primary national legislation for the control of air pollution is the Air Pollution Act, 1987 (SI No. 6/1987). This act provides a comprehensive statutory framework for the control of air quality by local authorities, specifically through 'orders' or 'plans' produced under Part IV Special Control Areas and Part V of Air Quality Management Plans and Standards to which Local Authorities must have regard to in planning or Waste Licence decisions. Part V of the Act also makes provision for transposing Air Quality Standards into law. The Act refers specifically to potential emissions of dust and or odours in section 24(2) which states 'The occupier of any premises shall not cause or permit an emission from such premises in such a quantity or in such a manner as to be a nuisance'.

Traffic derived pollutants, Oxides of Nitrogen, Volatile Organic Compounds, PM_{10}, odour and the generation of dust are considered the main potential pollutants that may impact on the air quality during the construction and operational phases of the proposed development. Of particular importance in the instance of the subject proposal is the potential for the generation of odour and its impact on the air quality of the surrounding area.

3.4.2 The Existing Environment

3.4.2.1 Dust & PM_{10}

Dust is defined as particulate matter in the range 1-75µm. The particles of dust between 1 and 10 µm are known as particulate matter <10 µm or 'suspended particles'. Particulate matter varies widely in its physical and chemical composition, source and particle size. Particulate matter arises from both man-made and natural sources. Natural sources include windblown dust, sea-salt and biological particles such as pollen. Man-made sources include large carbon particles from incomplete combustion, ash, dust particles from quarrying and construction activities and dust generated from road traffic. In general large particles do not stay in the atmosphere for long and are deposited close to their source, whereas small particles can be transported long distances. Particles, which are deposited to ground, give rise to problems such as soiling of buildings and other materials and also cause a general nuisance. In general the recommended guideline value for dust emissions is 350 mg/m^2/day.

In accordance with the Waste Facility Permit Number WFP-CW-10-0003-01 as reviewed by WFP-CW-14-5, dust monitoring is carried out biannually and at least once during the period May to September (See Volume 3: Appendix 4 for Monitoring Reports, 2010 -2013). The limit laid out in the permit for dust is 350mg/m^2/day. The sampling was carried out for O'Toole Composting by Axis Environmental Services in 2012 and 2013, IAS Laboratories in 2011, and Tel Labs in 2010. An analysis for environmental dust deposition on the site is given below in Table 9. Annual samples were required for 2010 and 2011 whilst in 2012 and 2013 the Waste Permit required bi-annual monitoring. The sampling was carried out in accordance with VDI 2110 Part 2 using Bergerhoff dust deposition gauges (German environmental standard for the monitoring of dust recognized by the EPA) at three locations shown on Figure of this document. The method works by leaving out onsite dust jars for a period of 30 days. The samples were analysed at IAS laboratories and Tel Labs respectively.

Table 9: Dust Monitoring Results for the O'Toole Facility

mg/m^2/day	D1	D2	D3
Results 1 (June 2010)	45	51	55
Results 2 (July 2011)	17	10	47
Results 3 (April 2012)	33	0.4	0.8
Results 4 (Aug 2012)	0.3	4	7
Results 5 (May 2013)	115	88	165
Results 6 (Nov 2013)	0.2	0.2	0.8

As can be seen from the above table the level of deposition seen at all available locations is below the EPA guideline of 350mg/m^2/day deposition. All results are within the emission limit values as outlined in Waste Facility Permit Number WFP-CW-10-0003-01 which indicates that current dust mitigation measure are effective.

In general dust from waste processing activities on site is contained within the enclosed sheds. The main factors which affect the potential for airborne dust to be created and dispersed to sensitive receptors beyond the site boundary are road traffic and traffic on site. Although still well within the recommended limits dust levels on site increase in the summer months due to truck movements along the eastern portion of the site which is not fully covered in hard standing.

Particulate matter with an aerodynamic diameter less than 10 microns is commonly known as PM_{10}. PM_{10} arises from direct emissions of primary particulate such as black smoke and formation of secondary PM in the atmosphere by reactions of gases such as sulphur dioxide and ammonia. The main sources of primary PM_{10} are incomplete burning of fossil fuels such as coal, oil and peat and emissions from road traffic, in particular diesel engines. Other sources of particulates include re-suspended dust from roads.

Directive 1999/30/EC (CEC, 1999) established limit values for PM_{10} levels as follows; the PM_{10} daily mean limit of 50 µg/m^3 should not be exceeded more than 35 times per calendar year. The annual mean PM_{10} limit value is 40 µg/m^3.The current EPA data gives the air quality as very good.

PM_{10} monitoring on site for 2010, 2011, 2012 and 2013 was carried out by BHP Laboratories in 2010 and 2011 and Axis Environmental Services in 2012 and 2013. Monitoring occurred at the three primary monitoring locations in all instances. The monitors were set up to sample PM_{10} particles, i.e. inhalable dust, by attaching a 10µm particle knock out. As can be seen from Tables 9, 10 and 11 and 12 below, the concentration levels of PM_{10} dust recorded at all 3 monitoring locations are below the limit values set down in the Air Quality Directive. However the results are not entirely comparable as the averaging period for each of the measurements was typically 15 minutes and thereby different to the averaging periods expressed in the Directive.

3.4.2.2 Odour and Hydrogen Sulphide

In general the odours associated with waste are considered to be unpleasant and if detected at sensitive receptor locations may potentially lead to loss of amenity. Hydrogen sulphide is one of the key odour compounds that can cause nuisance impacts from waste facilities. H_2S is a colourless, flammable, extremely hazardous gas with a “rotten egg” odour. It occurs naturally in crude petroleum and natural gas. In addition, H_2S is produced by bacterial breakdown of organic materials (e.g. compost) and human and animal wastes (e.g. sewage and slurry).

An odour management programme, good management practises, and control over individual procedures, ensures that odour is not a major issue on site. Previous assessments of the baseline air quality on site (Volume 3: Appendix 4) have not found any significant odour.

3.4.2.3 Sulphur Dioxide (SO_2)

Power stations are the principal source of sulphur dioxide (SO_2) emissions, emitting 56 per cent of the total in 2008 according to EPA figures. As a traffic-based pollutant, SO_2 is mainly emitted from vehicles running on diesel fuel, which will include most light goods vehicles (LGV's) and heavy goods vehicles (HGV'S). Reductions in SO_2 emissions of 76 per cent from 1990 to 2008 have made significant progress towards achieving the SO_2 National Emissions Ceiling target. Ireland's national emission ceiling for SO_2 under the NEC Directive is 42 kilotonnes (kt) to be achieved by 2010. This is equivalent to a 77 per cent reduction from the 1990 baseline level of 182.5 kt SO_2. In general Ireland is making good progress towards achieving the SO_2 emissions ceiling, with 98 per cent of the required reduction from 1990 levels having been achieved by 2008. This reflects significant switching from the use of oil and solid fuels to natural gas and reduced sulphur content in coal and oil. The target is expected to be achieved by this year.

The SO_2 levels predicted at the nearest receptors are below the limits for the protection of human health at the relevant 1 hour and 24 hour limits according to the Air Dispersion Model completed by RPS. A fully copy of this report is included in Volume 3: Appendix 3.1.3. According to this report, the maximum 1 hour average GLC is predicted to be 72.25μg/m^3 on top of a background of 6μg/m^3 leading to levels of approximately 21% of the limit for the protection of human health (125μ/m^3).

3.4.2.4 Nitrogen Oxides (NO_x)

The term oxide of nitrogen refers predominately to nitric oxide (NO) and nitrogen dioxide (NO_2). These Oxides are formed when nitrogen combines with oxygen at the high temperatures generated by fossil fuel combustion. Nitric oxide has no odour, or taste and is non-toxic. In the atmosphere it is rapidly oxidized to nitrogen dioxide by reaction with ozone. Nitrogen dioxide is a reddish-brown gas that has an irritating odour. It absorbs light and contributes to the yellow-brown haze sometimes seen hanging over cities. It is one of the main components of smog. Nitrogen oxides occur both naturally and from human activities. In nature, they are a result of bacterial processes, biological growth and decay, lighting, as well as forest and grassland fires. Traffic emissions are the principal source of anthropogenic nitrogen oxides and is responsible for approximately half the emissions in Europe ('Ireland's *Environment –A Millennium Report' EPA April 2000)*.

According to the Air Dispersion Model completed by RPS, the Nitrogen Oxides combustion emissions from the proposed developments are well within the limits as set out for human health. The highest annual average ground level concentration at the nearest receptor is 2.82μg/m^3 which, on top of a background level of 4μg/m^3, results in an overall impact of 6.82μg/m^3. This is approximately 17% of the annual limit for the protection of human health (40μg/m^3). The maximum impact is predicted to occur to the east of the facility, consistent with the south-westerly prevailing winds.

3.4.2.4 Volatile Organic Compounds (VOC's)

Volatile organic compounds (VOCs) are emitted as gases from the use of a wide array of products including paints, paint strippers, glues, adhesives and cleaning agents. Several constituents of gasoline are important VOCs, which are emitted by combustion and evaporation. VOCs also arise as a product of incomplete combustion of other fuels, especially solid fuels, and as such are significant emissions from residential fuel combustion. Individual VOCs may give rise to local air quality concerns but the principal environmental problem associated with VOC is their contribution to the formation of ground level ozone.

Ireland's national emission ceiling for VOC under the NEC Directive is 55 kilotonnes (kt), to be achieved by 2010. This represents a 32.9 percent reduction from the 1990 baseline level of 81.9 kt.

VOC's are released in vehicle exhaust gases either as unburned fuels or as combustion products and are also emitted by the evaporation of solvents and motor fuels. Certain VOC's are important because of the role they play in the photochemical formation of ozone in the atmosphere. The existing Waste Permit does not require specific monitoring for VOC's largely because there is not an emissions point on site. The levels present on site did not show any peak results and therefore further sampling was not required.

Table 10: Air Monitoring Results for OTCL 2013

Parameter	Up Wind	Down Wind	Facility offices
PM10	13.4 µg/m3	17.5 µg/m3	**53.7 µg/m3**
Aspergillus	0	0	**0**
Total Bacteria	255 CFU/m3	117 CFU/m3	**95.7 CFU/m3**
H2S	<0.0mg/m3	<0.0mg/m3	**<0.0mg/m3**
Mercaptans	5pp/m	5pp/m	**5pp/m**
Ammonia	22pp/m	22pp/m	**22pp/m**
Amines	<0.0mg/m3	<0.0mg/m3	**<0.0mg/m3**
Odour	No odour	No odour	**No significant odour (compost building)**

Table 11: Air Monitoring Results for OTCL 2012

Parameter	Up Wind	Down Wind	Facility offices
PM10	29 µg/m3	40 µg/m3	**36 µg/m3**
Aspergillus	None Detected	None Detected	**None Detected**
Total Bacteria	96 CFU/m3	176 CFU/m3	**344 CFU/m3**
H2S	<0.0mg/m3	<0.0mg/m3	**<0.0mg/m3**
Mercaptans	<0.5mg/m3	<0.5mg/m3	**<0.5mg/m3**
Ammonia	<0.25mg/m3	<0.25mg/m3	**<0.25mg/m3**
Amines	<0.01mg/m3	<0.01mg/m3	**<0.01mg/m3**
Odour	No odour	No odour	**No significant odour (compost building)**

Table 12: Air Monitoring Results for OTCL 2011

Parameter	Up Wind	Down Wind	Facility offices
PM10	41 µg/m3	33 µg/m3	**42 µg/m3**
Aspergillus	0	0	**0**
Total Bacteria	85 CFU/m^3	100 CFU/m^3	**135 CFU/m^3**
H2S	<0.2mg/m^3	<0.2mg/m^3	**<0.2mg/m^3**
Mercaptans	<0.5mg/m^3	<0.5mg/m^3	**<0.5mg/m^3**
Ammonia	<0.25mg/m^3	<0.25mg/m^3	**<0.25mg/m^3**
Amines	<0.01mg/m^3	<0.01mg/m^3	**<0.01mg/m^3**
Odour	No odour	No odour	**No significant odour (compost building)**

Table13: Air Monitoring Results for OTCL September 2010

Parameter	Up Wind	Down Wind	Facility offices
PM10	32 µg/m3	36 µg/m3	**39 µg/m3**
Aspergillus	0	0	**0**
Total Bacteria	20 CFU/m3	100 CFU/m3	**130 CFU/m3**
H2S	<0.2mg/m3	<0.2mg/m3	**<0.2mg/m3**
Mercaptans	<0.5mg/m3	<0.5mg/m3	**<0.5mg/m3**
Ammonia	<0.25mg/m3	<0.25mg/m3	**<0.25mg/m3**
Amines	<0.01mg/m3	<0.01mg/m3	**<0.01mg/m3**
Odour	No odour	No odour	**No significant odour (compost building)**

3.4.3 The Predicted Impacts

The possible predicted impacts on air quality from the proposed developments at the OTCL facility are odour, hydrogen sulphide, and dust.

3.4.4 Construction Phase

As most of the infrastructure for this development is currently in place and as the proposal is predominantly for an expansion of existing activities it is anticipated that there will be a minimal construction phase. This will be restricted to the construction of the Civic Amenity Site, installation of a new bio-filter at the rear of the skip shed and the addition of an airlock to the composting building.

During this stage of the proposal the main potential impact to air quality will result from the generation of dust during the construction phase and the movement of additional traffic for construction purposes. However the short-term construction period required (less than 3 months for all significant works) to construct the proposed development will minimise the potential to impact on air quality.

3.4.4.1 Generation of Dust

The impact of fugitive dust generated from the construction phase will to a certain extent depend on wind direction, wind speed and rainfall. A limited amount of topsoil will be dug up during construction due to the existing ground levels and most of this overburden will be reused on site. Any construction waste generated will be retained on site and processed during the operational phase of the development. Fugitive dust may arise from the movement of construction vehicles on the existing hard standing area. However the level of dust is likely to be of a relatively short duration with minimal impact on the receiving environment.

3.4.4.2 Traffic Pollutants

The movement of construction vehicles at the site during the construction phase of the development will generate exhaust fumes and subsequently to potential emissions of volatile organic compounds, nitrogen oxides, sulphur dioxide and $PM_{10.}$ While the levels of these pollutants will increase temporarily during the construction phase strict adherence to ‘good site/engineering practices’ such as switching all vehicles off when not in use will minimise the generation of any unnecessary air emissions. In any event it is considered that the level of contamination emitted will be minimal and of short duration. Given that facility is located immediately beside the N80 and that the increased activity will have a negligible impact on traffic it is also expected that there will not be any increased impact on traffic related pollutants.

3.4.5 Operational Phase

Once the proposed development is fully operational it is anticipated that it will result in a predicted 15 Heavy Goods Vehicular movements per day.

3.4.5.1 Dust & PM_{10}

Dust production during day to day operations can be a significant environmental issue at composting facilities. This dust originates from both direct emissions from the composting process if not controlled and moisture levels are allowed to drop. Dust can also be generated by loading and unloading of material unto vehicles, transfer of material between buildings and general site operations.

The results of ongoing monitoring at the facility show that the current band of environmental dust emissions based on previous dust monitoring reports over a period of 4 years during 2010-2013 range between 1.0 and 165 mg/m^2/day with an average of 123 mg/m^2/day recorded in 2013. Taking this worst case scenario dust over the area would equate to 44,775 mg/m^2 per annum.

The predicted environmental dust emissions for the proposed development using current best practice will see dust levels rise to approximately 294mg/m^2/day or 107,458 mg/m^2 per annum as an extreme worst case scenario based on the maximum results. This projection is based on the current dust deposition level for the operation being increased by an additional 140 % which again models the extreme worst case scenario. The dust is therefore predicted to be below the permitted levels of 350 mg/m^2/day even using extreme worst case models.

Experience of monitoring such facilities has shown that with well-managed dust control and suppression systems in place, dust levels will be consistently under the regulatory limit.

The proposed development will not involve any material washing or exposed grading processes. All future waste processing will take place indoors within enclosed buildings, therefore dust emissions from the facility are not expected to be a nuisance issue for the proposed development. All processes are being undertaken within a negative pressure environment and all exhausts are being filtered. The proposed truck in-take airlock will ensure that any fugitive dust emissions are contained.

When operational a potential source of dust is from vehicles accessing the proposed CA site. This will however be minimal due to the facility being paved with bitumen and concrete. The hardstand of the CA site will also be wetted down during dry weather conditions to prevent the generation of dust. The worst-case scenario would be an increase of 50% of the observed baseline dust depositions due to the associated increase in traffic volumes. At no location is the level of PM10 generated from the proposed operation expected to exceed 40 ug/m^3.

The main potential sources of dust emissions from the proposed facility are the raising of dust by vehicles entering and exiting the site.

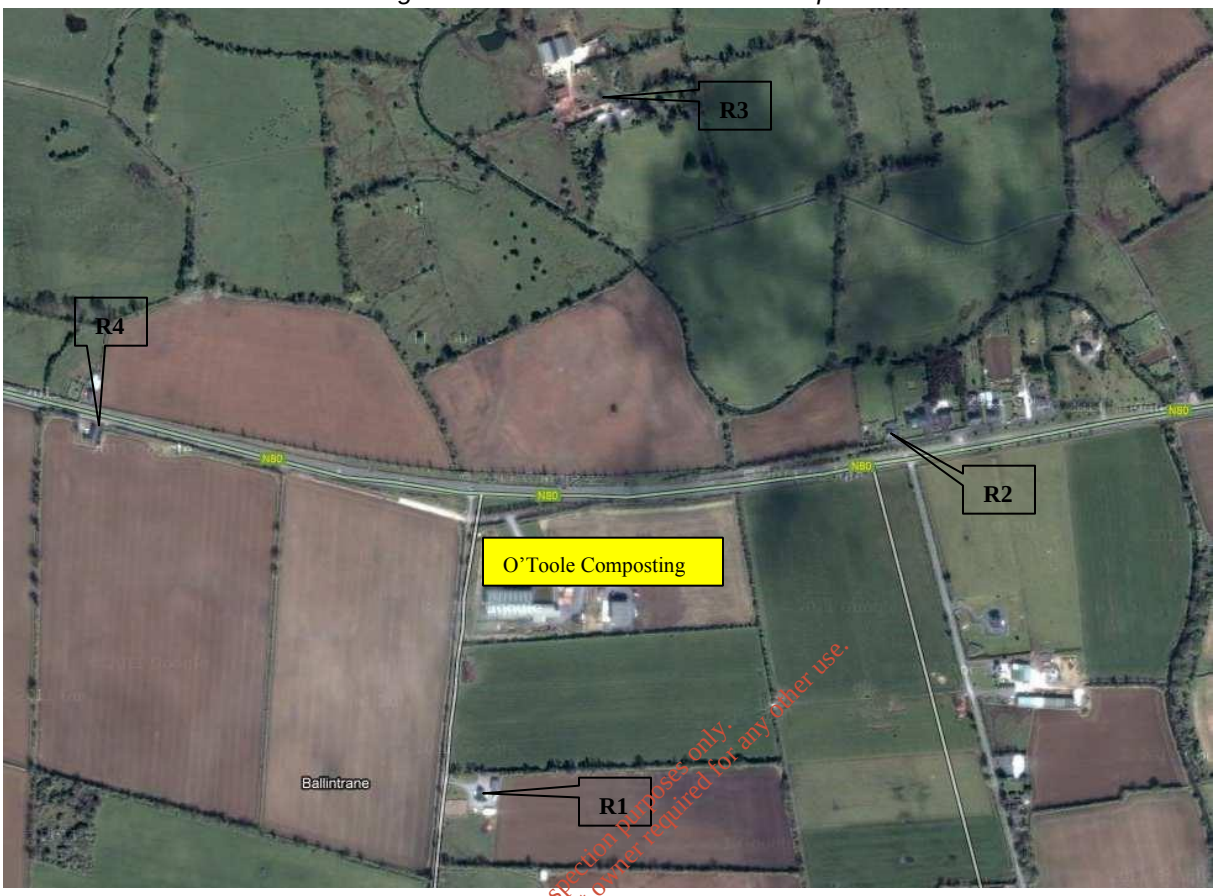
3.4.5.2 Odour and Hydrogen Sulphide

RPS was commissioned by O'Toole Composting Ltd to carry out an odour impact assessment and dispersion modelling assessment to simulate the emissions from the proposed developments at the facility. Please see Volume 3: Appendix 4 for a full copy of the report. The odour dispersion model was undertaken to assess the impact of odours from the existing Bio-filter at the composting unit and the proposed Bio-filter at the skip shed and to estimate the ground level odour concentrations at sensitive receptors in the vicinity of the facility (Table 14 below).

Table 14: Sensitive Receptors employed in the model

R1	Dwelling House to south of the site (Burrin Equestrian Supplies)
R2	Group of Dwelling Houses to the east of the site at Ballintrane Cross Roads on the N80
R3	Tinnaclash House to the north of the site
R4	Dwelling house to the west of the site on the N80

Figure 5: Locations of Sensitive Receptors



RPS followed the procedure presented in the EPA Guidance Note AG4 for "Air Dispersion Modelling for Industrial Installations" in this assessment. The model used for Air Dispersion Modelling was the US EPA approved AERMOD Prime model, which is the current regulatory model in the US and a recommended model under the EPA guidance. This model is a third generation model utilising advanced boundary-layer physics. AERMOD is run with a sequence of hourly meteorological conditions to predict concentrations at receptors for averaging times of one hour up to a year. The modelling procedure assed the impact of odours from the Bio-filters on the environment and at the nearest sensitive receptors. The modelling approach has allowed for the specification of emission guidelines for each phase of the development to minimise the potential for odour nuisance. The modelling exercise considers the planned phased development under two scenarios:

- Scenario 1: Upgrade of the existing bio-filter at the operational composting unit
- Scenario 2: Composting bio-filter and the addition of a new bio-filter at the skip shed

The modelling approach has allowed for the specification of emission guidelines for each phase of the development to minimise the potential for odour nuisance.

Given the nature if the sources on site the purpose of the modelling exercise was to establish the impacts of the following parameters:

- Odour emissions (OUE/m3) and Hydrogen Sulphide emissions from the bio-filters

As all sources are planned, a review of suitable emission concentrations has been carried out using standard BREF, BAT and TA Luft referencesto determine the emission rates for each source.

The EPA has prepared a BAT Guidance Note for the composting industry but this is still in development and has not been published. As a result, the parent BREF Note for the Waste Treatments Industries (2006, a review has commenced in 2013) has been employed as a reference for this assessment. Section 5.2 of this BREF Note outlines what is considered BAT for specific types of waste treatments, including biological treatments such as composting. The BAT levels of odour emissions to air from biological treatment of wastes following abatement, expressed as a range of acceptable values are; Limit for Treated Exhaust Gas- Odour (OuE/m3) <500 - 6,000. This BAT range will be used as the basis for determining suitable emission rates from the bio-filters on site. In terms of odour gases (hydrogen sulphide) there is no specified BAT limit presented in the BREF Guidance note.

The Technische Anleitung zur Reinhaltung der Luft, (TA-Luft Guidance) are German Government Guidelines for the control of air quality and are frequently used a reference in emissions assessment in Ireland. These Guidelines are also used as a reference for many EPA BAT Guidance Notes. The TA Luft Guidelines detail the technical measures expected to be applied in different sectors of industry including methods for assessment. Originally published in 1986, the 2002 revision has been referenced for this report. Paragraph 5.2.4 of TA Luft provides generic emission guidelines for Hydrogen Sulphide as a concentration limit of 3 mg/m3 and a mass emission limit of 0.015 kg/hr

RPS has followed the procedures presented in the EPA Guidance Note AG4 “Air Dispersion Modelling for Industrial Installations” in this assessment. There are no legislative limits relating to the impact of odour on residential or other receptors. Irish and UK guidance use a series of annoyance criteria for odours from various waste and industrial sources. In general, the higher the odour risk posed by a facility the more stringent the annoyance criteria (e.g. a landfill would have to comply with annoyance criteria of 1.5 OuE/m3, whereas a bakery would only have to comply with 6.0 OuE/m3 due to the less unpleasant nature of the odour).

Given the nature of the waste operations at the site, it is considered appropriate to place the site in the high risk category and the relevant criteria for this assessment is 1.5 OuE/m3 at the 98th percentile. These criteria are at the 98th percentile of the 1-hour average concentrations, which means they must be complied with 98% of the time. At this criteria the odours from the plant are not predicted to “give reasonable cause for annoyance” at the nearest sensitive receptors.

SCENARIO 1:

Scenario 1 consists of the upgrade of the existing bio-filter at the composting unit. The input parameters are presented below in Table 15. These emission values represent the operating scenario when only this emission source is operational. The odour emission factor employed in the model is based on the recommended BAT emission limit range. The H2S emission level is derived as the maximum concentration to allow for compliance with the relevant assessment criteria. The results of the model assessment are presented in Table 16 below for the discrete receptors.

Table 15: Input Emission Factors for Scenario 1

Parameter	Input
Source Type	Point
Dimensions (diameter)	1 m
Height	10 m
Temperature	25^0C (298K)
Volumetric Flow Rate	60,000 m^3/hr
Odour Emission Concentration	3,300Ou_E/m^3
H2S Emission Concentration	5.7 mg/m3

Table 16: Results of dispersion modelling for Scenario 1

Ref	Receptor	Receptor Type	Predicted Odour Concentration ($Ou_E/m^{3)}$ 98th Percentile of 1 – hour averages	Predicted H2S Concentration (µg/m3) 1-hour max	Predicted H2S Concentration (µg/m3) 24-hour max
R1	Dwelling house to south of site (Burrin Equestrian Supplies)	Residential	1.13	6.87	1.59
R2	Group of dwelling houses to east of site at Ballintrane Cross Roads on N80	Residential	1.44	3.45	1.40
R3	Tinnaclash House to the north of the site	Residential	0.42	2.70	0.72
R4	Dwelling house to the west of the site on the N80	Residential	0.54	2.90	0.97
Guideline Limits for 'High Risk Odour Operations:			**1.50**	7	150

The model predicts that the odour emissions from the bio-filter will be within the standard annoyance criteria for odour nuisance. In relation to Hydrogen sulphide the levels at the nearest sensitive receptor (R1) will remain below the WHO odour annoyance criteria. By default, at this emission level the concentrations at the sensitive receptors will be less than 1% of the WHO health protection limit.

SCENARIO 2:

Scenario 2 represents the Composting bio-filter in addition to the installation of a new Bio-filter at the Waste Transfer Shed. The input parameters for the bio-filters are presented below in Table 17. The emission factors employed in the model are based on the recommended BAT emission limit range for odour and hydrogen sulphide. The results of the model assessment are presented in Table 18 below for the sensitive receptors.

Table 17: Input Emission Factors for Scenario 2

Parameter	Composting Bio-filter	Skip shed bio-filter
Source Type	Point	Area
Dimensions (diameter)	1 m (diameter)	20.5 x 8.0 m
Height	10 m	3 m
Temperature	25^0C (298K)	25^0C (298K)
Volumetric Flow Rate	60,000 m^3/hr	10,000 m^3/hr
Odour Emission Concentration	3,300Ou_E/m^3	800 Ou_E/hr
H2S Emission Concentration	3 mg/m3 0	0.9 mg/m3

Table 18 Results of Dispersion for Scenario 2

Ref	Receptor	Receptor Type	Predicted Odour Concentration (Ou_E/m^3)98th Percentile of 1 – hour average	Predicted H2S Concentration (µg/m3) 1-hour max	Predicted H2S Concentration (µg/m3) 24-hour max
R1	Dwelling house to south of site (Burrin Equestrian Supplies)	Residential	1.21	4.65	0.84
R2	Group of dwelling houses to east of site at Ballintrane Cross Roads on N80	Residential	1.46	6.85	0.96
R3	Tinnaclash House to the north of the site	Residential	0.44	3.69	0.42
R4	Dwelling house to the west of the site on the N80	Residential	0.54	3.00	0.33
Limit for 'High Risk Odour Operations to prevent reasonable cause for annoyance			**1.50**	**7**	**150**

This model indicates that the predicted cumulative odour emissions from the combined Composting Bio-filter and Skip Shed Bio-filters will be within the standard annoyance criteria for odour nuisance. The emission value for the composting bio-filter is reduced to account for the additional contribution of the skip shed bio-filter. Odours are not predicted to 'give reasonable cause for annoyance at any property'.

In relation to H2S, at the BAT emission concentration of 3mg/m3 at the composting Bio-filter stack and an emission rate from the Skip Shed Bio-filter of 0.9mg/m3, the levels at the nearest sensitive receptor (R2) will remain below the WHO odour annoyance criteria and health protection limit. As with the odour levels, the H2S emission concentration for the composting Bio-filter stack has reduced from Scenario 1 to account for the additional emissions from the Skip Shed Bio-filter.

Table 19 below outlines the modelled emission rates of the two Bio-filters at the facility. Emission values are presented on a phased basis as modelled in this RPS report and emissions at these values will not give rise to odour nuisance in the vicinity of the development. These odour emission concentrations are based on the acceptable emission range outlined in the BREF Note for the Waste Treatment Industries. H_2S emission rates are based on TA Luft. The results indicate that at these levels the impact of all Bio-filters operating under the various phases will be within the acceptable criteria for odour nuisance and health impact.

Table 19: Modelled Odour Emission Values for the Bio-filters

Source	Parameter	Emission Value with only this unit operating	Emission Value with both units operating
Composting Unit Biofilter	Odour (Ou_E/m^3)	3,300	3,000
	Hydrogen Sulphide (mg/m^3)	5.7	3
Skip Shed Biofilter	Odour (Ou_E/m^3)	-	800
	Hydrogen Sulphide (mg/m^3)	-	0.90

In summary, the proposed operation of the O'Toole Composting facility at the emission levels prescribed above will not result in odour nuisance at the nearest sensitive receptors.

3.4.5.3 Bio-aerosols

Bio-aerosols are generated when organic matter including bacteria, fungi and yeasts become airborne. These particles have the potential to travel within the air and cause adverse human health effects to those exposed. One of the major constituents of bio-aerosols that is known to cause adverse health effects in humans is Aspergillus Fumigatus. The resultant disease from exposure to this fungus is Aspergillosis. This disease mainly affects individuals with immune deficiencies. The fungus rarely affects healthy individuals even if they are exposed to high concentrations. Aspergillus is a widespread fungus and there is no evidence to suggest that concentrations arising from even conventional outdoor windrows pose any threat to public health.

The proposed development will continue to operate to the same criteria that has resulted in no risk to human health from *Aspergillus Fumigatus.* The processing and movements of organic material will all take place indoors within the facility. The temperature of the composting process is and will be strictly controlled to ensure that the process temperature exceeds 60`C to minimise Aspergillus which grows at a temperature of between 20 and 50 degrees centigrade.

3.4.6 Mitigation Measures

OTCL Environmental is ensuring that all equipment installed currently and in the proposed facility is designed to the latest international best practice to minimise impact on air.

The composting process is designed to manage and minimise the impacts on air such as odour, dust and bio-aerosols. This is demonstrated by the ongoing monitoring results presented for these parameters. All waste processing activities will be in sealed buildings and this will mean that there will be no uncontrolled emissions to the atmosphere. All buildings both existing and the proposed extensions will be operated under negative air pressure and all air that is extracted from the buildings will pass through a bio-filter system, which will filter the air and reduce the emissions of odorous substances, dust and bio-aerosols to insignificant levels. As part of the subject proposal the current bio-filtration system will be upgraded to provide for increased extraction capacity.

The composting process, may, if not operating correctly, give rise to odour and dust emissions. The processes installed at the OTCL facility are in line with BAT technology and are carried out indoors under negative air. The process is constantly being monitored by site personnel and there is a 24 hour alarm system in the event of a system failure. This ensures that corrective action can be taken in the minimum amount of time.

3.5 TRAFFIC

3.5.1 Introduction

The objective of this report is to assess the impact the proposed development will have on the existing road network. This report will calculate the expected volume of traffic that will be generated by the proposed development and will assess the impact that this traffic will have on the operational capacity of the road network in the vicinity of the development.

3.5.1.1 Methodology

Traffic surveys were carried out at the OTCL facility along the N80 to determine the baseline flows. These flows were then adjusted to take account of yearly traffic growth to determine the background traffic for each year analysed.

Estimates for the amount of traffic that would be generated were calculated from the quantity of materials that the proposed additional building will be catering for. The generated traffic was then distributed onto the road network where it was combined with the background traffic and subsequently analysed using a relevant software program.

3.5.2 Existing Environment

3.5.2.1 Site Description

The facility is located in the townland of Ballintrane Co. Carlow just off the N80 Carlow to Wexford National Secondary Road. The subject site is approximately 9.5 kilometres north-east of Bagenalstown and approximately 7.5 kilometres south-west of Tullow. The surrounding area is mainly rural with agriculture the predominant activity. There are some industrial operations located along the N80 with the nearest one being Carlow Precast approximately 1.2 kilometres east of the OTCL Facility along this road. Access is via a minor local road 0.1 km from the N80 that runs along the western boundary. The facility is well served by the existing road network and is approximately 4 km from the M9 motorway. The general surfacing and structure of the adjoining road network is very good.

Sightlines at the junction of the N80 and the local access road are excellent with over 100 meters in either direction. Visibility at the facility entrance in both directions is also very good and the entrance is wide enough to accommodate HGV's entering and exiting the facility.

3.5.2.2 Existing Traffic Conditions

The facility currently incorporates a Composting Facility and Recycling Operation. Traffic is generated by these operations including journey to work trips for staff and servicing. Current staff levels on site amounts to 10 including office staff and general operatives.

The most recent traffic count was carried out at the facility entrance on Friday 6th January 2012 from 08.00hrs to 18.00hrs for the purposes of the following:

- To establish existing traffic flow on the N80 at the entrance to the OTCL facility
- To establish the existing traffic patterns at the facility entrance
- To determine a base line for the purpose of assessing the potential future impact of the proposed development.

There has been no change to operations at the subject facility since the traffic count in 2012 and as such this baseline data is still considered relevant. The details of these traffic counts are presented in Table 20 below and cover all movements as follows:

- Carlow to Wexford
- Wexford to Carlow
- Movements into OTCL facility
- Movements out of OTCL facility
- Local traffic movements

There is a weighbridge on site and all site traffic is recorded. This was used to cross check all HGV's entering and exiting the facility.

Table 20: Results of Traffic Count at O'Toole Composting Facility Entrance

Time	Carlow to Wexford	Wexford to Carlow	Into Facility	Exit Facility	Local Traffic
8-9	256 (26*)	306 (28*)	3	1	2
9-10	227 (20*)	258 (31*)	1	2	1
10-11	188 (38*)	267 (27*)	1	1	1
11-12	180 (32*)	269 (28*)	4	3	2
12-13	202 (26*)	216 (26*)	1	1	
13-14	236 (16*)	260 (26*)	3	1	1
14-15	242 (18*)	238 (18*)	4	2	
15-16	302 (20*)	252 (24*)	2	3	1
16-17	328 (30*)	252 (26*)	4	1	1
17-18	394 (22*)	268 (14*)		5	3

*** The figures in brackets reflect HGV units.**

The survey indicated that the annual average daily traffic (AADT) on the N80 on the west (Carlow) side of the facility is 4292 vehicles per day with a HGV content of 8.6% while the AADT on the east (Wexford) side of the facility is 4089 vehicles per day with a 9.7% HGV content. The short duration count was expanded in accordance with RT201 – Expansion Factors for Short Period Traffic Counts to yield these AADT's. The factor used was that for a 7 hour count from 9am to 1pm and from 2pm to 5pm and this gives a confidence level for the predicted AADT of 16%. It should be noted that from a traffic perspective the busiest hours are between 17.00 hours and 18.00 hours followed by 16.00 and 17.00 and 08.00 and 09.00.

The volume of traffic related to existing operations at the composting facility (traffic generated by existing facility) has been derived from data gathered for the operation of the site to date. All vehicles entering and exiting the site must pass over the Weighbridge and are duly recorded. Based on these figures the facility currently as an average of 46 Heavy Goods Vehicles (HGV's) delivering to the site per week which gives an average daily figure of less than 8 vehicles per day.

3.5.2.3 Description of Proposed Development

The O'Toole Composting Facility at Ballintrane has been in existence at this site since 2005 and the current proposal is to expand the operating capacity of the facility. The majority of the infrastructure required for this proposal is already in-situ with the exception of some site upgrades such as the installation of concrete hardstand and the two proposed bio filters, the only additional works will be the proposed Truck Intake Air Lock and the Bring Centre for Municipal Waste. The proposed increase in capacity at the composting plant and other additions to the facility will accommodate up to 60,000 tonnes of waste per annum. The material processed will comprise of 40,000 tonnes of biodegradable waste for composting whilst the remaining 20,000 tonnes will consist of household waste, mixed dry recyclables, commercial and industrial wastes for recycling and processing before being removed off-site for further recovery.

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A planning search was carried out in the area and no significant committed developments were identified in the surrounding area and as such any increase in traffic is expected to be accounted for in the growth factors that have been applied to the background traffic.

3.5.3 Potential Impacts

3.5.3.1 Traffic Generation

As referred to in section 3.5.1, an estimate for the amount of traffic that will be generated by the development has been calculated based on the additional quantity of material that will be delivered to site. See Table 21 below.

Table 21: Single Trip Traffic Generation per Annum (Entering)

Additional Materials (tonnes)	Average Delivery Load (tonnes)	Total Trips	Daily Trip Rate*
60,000	15	4000	13

** 52 weeks per year, 6 days per week assumed*

In addition to trips relating to the delivery of materials, it is also expected that a certain amount of trips will be generated by the need for additional staff as a result of the new facility. It is expected that 2 additional staff will be required and it is assumed that these staff will arrive in the AM peak and leave during the PM peak.

In addition to incoming traffic consideration must also be given to the traffic generated by material leaving the site. It should be noted that not all vehicles entering the facility with a load can then be 'back loaded' before exiting the site for various reasons such as transport logistics, type of vehicle etc. Based on current figures from the weighbridge it is estimated that approximately 50 % of incoming vehicles can be 'back loaded'. Therefore of the proposed 60,000 tonnes per annum entering the site, 30,000 tonnes can leave the site following processing by being 'back loaded'.

Furthermore of the proposed 40,000 tonnes per annum of biodegradable waste for composting, 20,000 tonnes will remain after a weight reduction of 50% as part of the drying processes involved in composting. This will result in 20,000 of compost and 20,000 tonnes of mixed waste (for recycling and disposal) leaving the site, 10,000 of which will have to leave in vehicles that arrived empty. Assuming that each load is despatched in HGV's with an average conservative capacity of 20 tonnes per load this equates to approximately 9.6 additional truck movements per week or 1.6 per day.

Table 22: Traffic Generation per Annum (Exiting)

Additional Materials (tonnes)	Average Load (tonnes)	Total Trips	Daily Trip Rate*
20,000 Compost	20	1000	+3
20,000 Mixed Waste	20	1000	+3
30,000 'Back-Loaded'	20	1500	-5
Additional Traffic Generated (Empty Arrivals)	**20**	**500**	**<2**

** 52 weeks per year, 6 days per week assumed*

The volume of traffic related to existing operations at the composting facility amounts to an average of 46 Heavy Goods Vehicles (HGV's) delivering to the site per week which gives an average daily figure of less than 8 vehicles per day. The traffic that is expected to be generated by the increased operations at the facility has been estimated assuming similar HGV loads for the increased volumes of materials that will be processed. In addition to traffic related to the delivery of materials to or from the composting facility, the facility also employs 10 full time staff. The proposed extension of the facility is expected to increase numbers to 12 full time staff in total which will result in an additional 2 vehicles per day. As can be seen in Table 23 below the proposed increase in operations at the subject site will result in a predicted additional 7 HGV's per day and two LGV's for staff.

Table 23: Total Traffic Generated per Annum

Additional Materials (tonnes)	Average Delivery Load (tonnes)	Average Total Trips per year	Daily Trip Rate*
Additional Traffic Generated	15	4000	13
Additional Traffic Generated (Empty Arrivals)	20	500	<2
Total Traffic Generated	**15/20**	**4500**	**15**

Finally O'Toole Composting Ltd. will continue to promote recycling in the local area by providing a Bring Centre for Municipal Waste on site. It is the intention of O'Toole Composting to incentivise recycling by distributing free compost to the Bring Centre users. It is hoped to attract an additional 10 users per day to the facility thus generating an additional 20 traffic movements per day of private cars or light commercial vehicles.

As outgoing traffic can be strictly controlled by the facility it is not anticipated that there will be a significant impact on peak hour traffic. To allow for worst case it is predicted that there will be no more than one load despatched from the facility at each of the peak times.

The estimates for the total number of additional vehicles that will be arriving and departing from the facility during the AM and PM peaks as a result of the increased activity are detailed in Table 24 below.

Table 23: Peak Hour Traffic Generation

Peak Hour Traffic Generation	Arrivals	Departures
AM Peak:		
HGV Traffic	2	2
Staff Traffic	2	0
Total	**4**	**2**
PM Peak:		
HGV Traffic	2	2
Staff Traffic	0	2
Total	**2**	**4**

3.5.3.2 Traffic Growth

Background traffic on the road network is expected to grow in future years and the proposed development is expected to operate for the foreseeable future. Analysis has been carried out on the expected year opening of 2014 and a design year of 2026. The background traffic growth factors used in the analysis in this report are those provided by the NRA (Published August 2003 for years 2002 – 2040).

The growth factors applied to the surveyed flows were the 'non-national primary roads factors' and are detailed in Table 25 below and are in the region of 2%.

Table 25: Traffic Growth Factors

Traffic Growth Factors	HGV	Cars & LGV
2010 – 2011	1.018	1.009
2010 – 2026	1.184	1.162

3.5.4 Construction Traffic

Because most of the required infrastructure is currently in place the construction phase necessary for the completion of this project will be minimal and of short duration. In any event the traffic during the construction phase will be considerably less than that occurring during the operational phase.

3.5.5 Other Considerations

3.5.5.1 Road Safety

Sight line requirements for entrances within an 80km/hr speed zone are 3m x 160m and this requirement will be satisfied at the existing entrance. Traffic flow within the site is managed by signage and road markings such that traffic flows clockwise around the main buildings. The speed limit within the boundaries of the site is 10km/hr and is clearly indicated with signage. This traffic management system is strictly enforced as a health and safety priority. The traffic management plan for the facility is attached in Appendix 3. This will be updated once the construction work for the proposed development is complete.

3.5.5.2 Parking

A total of 10 car parking spaces are provided within the site adjacent to the office building. This is considered sufficient to accommodate both the current staff levels and the additional staff required to operate the new facility.

3.5.5.3 Pedestrians

To accommodate staff travelling on foot within the development, it is recommended that safe walking routes are clearly marked on the roadway through the facility. There are however no footpaths along the access roads

3.5.5.4 Access for People with Disabilities

It is recommended that a disabled parking space be provided in accordance with the NDA's Build for Everyone' it is recommended that this parking space be located closest to the main buildings within the development.

3.5.6 Conclusions and Recommendations

The conclusions of this report are as follows:

- The development entrance will operate below capacity up to and including the design year
- The facility entrance has previously and will in the future have no impact from a traffic perspective and would not constitute a traffic hazard.

- The traffic generated by this development will constitute less than 1% of traffic on the N80, which is considered a negligible impact.

The recommendations of this report are as follows:

- Disabled parking space to be provided in accordance with NDA's 'Building for Everyone'.
- Advance Warning signs to be maintained advising motorists of HGV activity ahead
- Regular inspections of public road to be undertaken to check for any significant quantities of mud and sweeping of road if required
- Roads to be checked for any evidence of litter and 'litter picks' to be carried out if appropriate
- All vehicles entering and leaving the facility to be suitably covered
- Traffic to and from the site to be prohibited from parking on the public roadway at all times

3.6 NOISE

3.6.1 Introduction

An assessment of noise has been carried out with reference to ISO 1996 and EPA Noise Survey Guidelines and other relevant policy guidance. Noise issues relating to the operation of the proposed development have been considered to the nearest noise-sensitive properties surrounding the site.

The subject site is currently operating as a composting and waste recycling facility. The proposed development is essentially an extension of existing operations to allow for increased tonnage in both the compost facility and the recycling facility. There is also a proposal for the installation of anaerobic digestion. The noise assessment in this chapter assessed the noise impacts from this proposal and examines the cumulative impacts against the stated criteria.

An assessment has been made of the baseline situation by Axis Environmental Services in November 2013 and October 2012 and by Bluegreen Environmental Consulting in September 2011 (see Volume 3: Appendix 3.1.6 for a full copy of the reports). Noise monitoring is required on an annual basis as part of the current Waste Permit with the following levels specified:

- Daytime: 55dB LAeq 30 mins
- Night-time: 45dB LAeq 15mins

The following terminology is used in assessing noise:

LAeq: This is the 'equivalent continuous level' or the average sound level over a period of time. The formal definition is '*when a noise varies over time, the Leq is the equivalent continuous sound which would contain the same sound energy as the time varying sound'*

LA10: The LA10 value is that which is exceeded for 10 per cent of the time during a sampling period. This means that for ten per cent of the time, the noise level recorded at the LA10 value or higher. It is used to provide an indication of the amount of intermittent and impulsive noises recorded during a survey.

LA90: The LA90 value is that which is exceeded for 90 per cent of the time during a sampling period. This means that for ninety per cent of the time the noise level recorded was at the LA90 value or higher. It is used to provide an indication of the background noise level.

By analysing the relative spread between these three values, it is possible to examine the level and extent of intermittent and impulsive noise on the background levels.

Therefore the baseline assessment was carried out using the above parameters.

3.6.2 The Existing Environment

In 2013 and 2012 Axis Environmental Services used a Cirrus Optimus Green Sound Level Meter model CR:171B to monitor noise levels on site. The instrument was calibrated using a Cirrus Optimus Green Acoustic Calibrator CR:515. It was calibrated before the start of measurements to 94 dB and the calibration was verified at the end of both the day and night measurements.

In 2011 Bluegreen Environmental Consulting used a Bruel and Kjaer Sound Level Meter Type 2260 to monitor noise levels on site which was calibrated using a Bruel and Kjaer Calibrator 4231. It was calibrated before the start of measurements to 94dB and the calibration was also verified at the end of both the day and night measurements.

Schedule 2 4.1 of the Waste Facility Permit outlines the noise monitoring requirements for the existing facility. Monitoring must be carried out annually and at noise sensitive locations agreed in advance of monitoring with Carlow County Council. In 2013 three noise sensitive locations were chosen namely N3, N4 and N6 and a total of 6 measurements were undertaken. In 2012 and 2011, 6 locations were chosen and a total of 12 measurements were undertaken. The locations remain the same throughout the monitoring period 2011-2013 as described below in Table 24 and illustrated in the noise report included in Volume 3: Appendix 3.1.6.

The measurement readings from the Noise survey have been rounded to the nearest decibel. The results for each location are presented in the tables below (Tables 26; 27; 28; 29; 30, 31 & 32).

Table 26: Noise Monitoring Locations

Location	Description
N1A	External side of North Eastern site boundary
N2	External side of southern site boundary
N3	External boundary of residential property to south of site
N4	Residential property to east of site
N5	Residential property to east of site
N6	Residential property at Ballintrane Cross Roads

Table 27: Daytime Results October 2013

Location	Time and Date	Notes	Noise Levels bB(A)		
			LAeq	LA90	LA10
N3	24/10/2013 13:55	Primary source of noise here was farm machinery operating nearby	41	65	37
N4	24/10/2013 14:47	Continuous N80 Road Traffic noise	69	83	50
N6	24/10/2013 14:03	Traffic from local access road and birds chirping were main sources of noise	62	93	42

Table 28: Night-time Results September 2013

Location	Time and Date	Notes	Noise Levels bB(A)		
			LAeq	LA90	LA10
N3	13/11/2013 22:05	Low noise environment	52	63	45
N4	13/11/2013 22:05	N80 Road traffic noise dominant no audible noise from OTCL	59	85	44
N6	13/11/2013 22:51	Traffic from the N80 the most significant source of noise	55	76	43

Table 29: Daytime Results September 2012

Location	Time and Date	Notes	Noise Levels bB(A)		
			LAeq	LA90	LA10
N1A	03/10/2012 14:58	N80 Road Traffic noise dominant throughout	67	80	52
N2	03/10/2012 15:33	Fan noise and operational noise from inside sheds	53	81	49
N3	03/10/2012 15:47	Distance traffic noise. Passing vehicle approx distance 2 m	51	74	44
N4	03/10/2012 16:34	N80 Road Traffic noise dominant	68	80	53
N5	03/10/2012 06:25	Continuous traffic noise from N80	76	92	54
N6	03/10/2012 17:02	Traffic from local access road and birds chirping were main sources of noise	65	87	47

Table 30: Night-time Results October 2012

Location	Time and Date	Notes	Noise Levels bB(A)		
			LAeq	LA90	LA10
N1A	03/10/2012 20:29	Traffic from N80 the predominant noise source	57	85	39
N2	03/10/2012 19:55	Low noise environment. Extractor fans dominant.	43	52	41
N3	03/10/2012 20:09	Low noise environment. Vehicles using private cul de sac passing directly by the meter	46	76	36
N4	03/10/2012 20:56	N80 Road Traffic noise dominant.	62	84	40
N5	03/10/2012 21:00	N80 Road Traffic noise dominant dog barking beside meter	65	82	38
N6	03/10/2012 19:12	Traffic movements on local access road and N80	61	85	43

Table 31: Daytime Results September 2011

Location	Time and Date	Notes	Noise Levels bB(A)		
			LAeq	LA90	LA10
N1A	24/09/2011 12:21	N80 Road Traffic noise dominant throughout	57	45	65
N2	24/09/2011 12:56	Quiet environment. Continuous fan noise broadband in characteristic.	47	49	53
N3	24/09/2011 14:00	Distance traffic noise. Occasional passing vehicle.	50	41	56
N4	24/09/2011 13:28	N80 Road Traffic noise dominant. Trucks passing (>90dB recorded)	62	45	70
N5	24/09/2011 07:57	Almost continuous traffic noise. Passing conversation	60	37	68
N6	24/09/2011 07:20	Occasional passing vehicle. Distant traffic noise.	49	47	56

Table 32: Night-time Results September 2011

Location	Time and Date	Notes	Noise Levels bB(A)		
			LAeq	LA90	LA10
N1A	24/09/2011 06:00	Occasional traffic from N80	39	37	44
N2	24/09/2011 05:41	Low noise environment. Extractor fans dominant. Occasional rustle in trees	38	37	41
N3	24/09/2011 05:17	Low noise environment. Extractor fans dominant. Rustle in trees	38	35	40
N4	24/09/2011 06:23	N80 Road Traffic noise dominant.	51	37	57
N5	24/09/2011 06:57	N80 Road Traffic noise dominant. Passing trucks and tractors (>90 dB recorded)	60	37	68
N6	24/09/2011 06:40	Quiet overall. No site noise audible.	42	40	48

Due to the proximity of the O'Toole Composting facility to the N80 road, a national secondary road there was significant background interference from traffic movement throughout the surveys. As can be seen above this resulted in the daytime L_{Aeq} levels at all bar five of the noise sensitive locations exceeding broadband levels of 55dB, and also all bar five of the night-time L_{Aeq} levels. The main noise source at these locations is the continuous traffic along the N80. The guidance in relation to locations like this is to use LA90 to give a more representative outlook of noise emanating from the subject facility. When the interference from traffic was removed, all monitoring points were determined to be in compliance. The figures show that noise due to the normal facility operations of the subject development does not exceed the daytime or night-time permitted levels.

It was concluded that the noise contribution made by the OTCL operation does not exceed the permit emission limit values of 55dB daytime and 45dB night-time. There was no evidence of a tonal or impulsive component to the noise attributable to the plant operation.

The results indicate that the plant, machinery and operation practices within the facility do not significantly contribute to the local noise environment and or cause undue disturbance to nearby sensitive locations. The results also indicate that the plant is operating within its permitted noise limits.

3.6.3 The Predicted Impacts

The proposed development when fully operational, will involve an increase in vehicular traffic entering and exiting the site. The proposed Bring Centre will also result in a marginal increase in noise levels during operational hours when collection containers are filled and skips are emptied. However it is not expected that emission limit values will be breached. Any noise sensitive locations are well screened and it is proposed that the Bring Centre site will be located on the northern boundary closest to the N80 and away from any of the sensitive receptors. Monitoring will be ongoing and OTCL will continue to operate in compliance with any conditions on the new EPA License which will take account of the proposed new developments. Control measures will be implemented such as installing rubber baffles on collection containers to reduce noise and lining trucks with rubber mats to reduce noise when being emptied.

All waste processing procedures are enclosed with a negligible impact on the nearest noise sensitive locations. The composting process for example will use the same machinery and infrastructure to process 40,000 tonnes per annum as it uses currently.. The waste transfer facility will also use the same infrastructure and machinery to transfer additional tonnage as it uses currently.

As the additional traffic associated with the increased activity level on site is predicted to be less than 1% of that using the N80 and as traffic noise is the main contributor to the noise levels in the immediate vicinity of the site and at nearby sensitive receptors, it is predicted that the increase in traffic associated with this project will have little or no overall impact on the local noise environment.

3.6.4 Mitigation Measures

The following points are recommended with a view to reducing overall noise impacts on the noise sensitive locations:

- The internal pavement of the facility should be improved to reduce vehicular noise, especially banging from empty trucks;
- Screening bunds close to the residences art the noise sensitive location should be maintained and the planting programme continued to further reduce potential noise impact;
- Periodic noise monitoring at the noise sensitive locations should be introduced to ensure that all national guidelines in relation to noise ELV's are being complied with; and
- A review of reversing sirens should take place with a view to examining their possible replacement with white sound technology.

3.7 FLORA & FAUNA

3.7.1 Introduction

This section assesses the potential impacts the proposal to increase the volume of material accepted for composting and recycling at O'Toole Composting Ltd. Ballintrane, Fenagh, Co. Carlow. The assessment is in accordance with the EPA Guidelines on the Information to be contained in Environmental Impact Statements (2002).

Any habitats present are described in their current status and their conservation value assessed. Consideration has been given to the vegetation and floral surveys that were undertaken as part of the original EIS for the facility to establish if any sensitive or protected species were present prior to the operation of a waste management facility on the site.

In compiling this chapter, due regard was given to relevant legislation pertaining to flora and fauna assessment. These included;

- Wildlife Act 1976.
- EC Council Directive on the Conservation of wild birds (Birds Directive, 1979).
- European Communities (Conservation of Wild Birds) Regulations, 1985-1999).
- EC Council Directive on the Conservation of Natural Habitats of Wild Fauna and Flora (Habitats Directive, 1992).
- European Communities (Natural Habitats) Regulations, 1997.
- Wildlife (Amendment) Act, 2000.
- Any relevant protection orders.

3.7.2 The Existing Environment

The subject site is located along the N80 immediately surrounded by agricultural land with some isolated rural dwellings. There are some large industrial installations within 1 or 2 kilometres of the facility. There is an existing Waste Management and Recycling Facility on site to which the current proposal relates. This OTCL facility has been in operation on this site since 2005. Subsequent to this the site and much of the surrounding landscape was used for agricultural purposes.

The site covers an area of approximately 13 acres, with the terrain for most part being flat with earth mounding along the south west and part of the north east boundary. The site is mostly covered with concrete or hard standing. There is a grassed area surrounding the staff car park at the office block which also has some mature trees dispersed throughout. The site is accessed from the N80.

The soil beneath the site is disturbed and consists of light brown, glacial till with limestone boulders. The bedrock geology is identified as Calp Limestones of Lower Carboniferous period.

Surface water run-off from the site drains to the on-site surface water drainage network that discharges into the Burren River. The Burren River is a tributary of the River Barrow.

Existing Flora on site is limited due to the extent of the existing hardstanding area. However within the small areas of managed grassland there are several dominant grass species. These include cocksfoot (Dactylis glomerata), red fescue (Festuca rubra) and meadow grass (Poa spp.). Broadleaf herb species present include buttercup (Ranunculus repens), dandelion (Taraxacum spp), daisy (Belis perennis), silverweed (Potentilla anserina) and red clover (Trifolium pratense,).

The surrounding area land use is exclusively agricultural with all of the fields immediately adjacent to the facility under cultivation. The flora (other than crops) is restricted to the ditches and banks that occur around each field. These hedges have be planted with or colonised by hawthorn, Crataegus monogyna, Blackthorn Prunus spinosa, Bramble Rubus fruticosus, Grey willow, Salix cinerea, and some gorse Ulex europaeus.

There is also a well-developed 'hedge flora' in the narrow strips between the hedges and the cultivation with the following species:

Table 33: Hedge Flora Identified

Species Identified	
Foxglove	Digitalis purpurea
Bush vetch	Vicia sepium
Germander speedwell	Veronica chamaedrys
Barren strawberry	Potentilla sterilis
Common violet	Viola riviana
Ribwort plantain	Plantago lanceolata
Primrose	Primula vulgaris

Due to the developed nature of the site there is a paucity of species. Fauna present on the site is limited for the most part to bird species using the hedgerows adjacent to the site for shelter or winter roosts. These species include all those listed in Table 34 below.

Table 34: Fauna Identified

Species Identified	
Pheasant	Phasianus colchicus
Sparrowhawk	Accipter nisus
Woodpigeon	Columba palumbus
Skylark	Alauda arvensis
Swallow (summer only)	Hirundo rustica
Meadow Pipit	Anthus pratensis
Pied Wagtail	Motacilla alba
Wren	Troglodites troglodytes

Dunnock	Prunella modularis
Robin	Erithacus rebecula
Blackbird	Turdus merula
Fieldfare (winter only)	Turdus pilaris
Song Thrush	Turdus philomelus
Redwing (winter only)	Turdus iliacus
Mistle Thrush	Turdus viscivorus
Willow Warbler (summer only)	Phylloscopus trochilus
Goldcrest	Regulus regulus
Coal Tit	Parus ater
Blue Tit	Parus caeruleus
Great Tit	Parus major
Magpie	Pica pica
Jackdaw	Corvus monedula
Rook	Corvus frugilegus
Hooded Crow	Corvus corone
Starling	Sturnus vulgaris
House Sparrow	Passer domesticus
Chaffinch	Fringilla coelebs
Greenfinch	Carduelis chloris
Goldfinch	Carduelis carduelis
Linnet	Carduelis cannabina
Bullfinch	Pyrrhula pyrrhula
Reed Bunting	Emberiza schoeniclus

None of the bird species recorded at or near the facility are on the red list or amber list of protected species. The operations of the facility are carried out indoors and as such do not attract scavenging birds such as Black headed Gulls (Larus ridibundus) or Herring Gulls Larus argenteus which can be attracted to poorly run facilities.

Mammals: The only mammals seen close to the site were Rabbit (Oryctolagus cuniculus) and a Red Fox was sighted in nearby fields on 6/1/2012.

3.7.2.1 Designations In The Vicinity

There are no designated NHA's, SAC's or SPA's in the vicinity of the subject site. However there are three Special Areas of Conservation (SAC's) in County Carlow. These sites are as follows;

- Slaney River Valley (SAC 000781)
- Blackstairs Mountains (SAC 000770)
- River Barrow and River Nore (SAC 002162)

There is no impact or potential for impact from the OTCL operation on the first two of these SAC's. The River Burren is a tributary of the River Barrow system. However as addressed in the section on water the existing operations on site have no direct impact on this SAC as there are no emissions to groundwater, all surface water emissions are strictly controlled and monitored and all wastes and consumables on site are stored in bunded areas and any process waste is tinkered off site directly to the county Council's Waste Water Treatment Plant. In fact from the EPA monitoring it has been shown that the water quality downstream from the O'Toole facility is better than that upstream.

3.7.3 The Predicted Impacts

This survey found that there were no sensitive or protected species of flora or fauna on site. The main habitat occurring on the site prior to the OTCL facility was managed farmland. Since then the site has been developed so that much of the once managed farmland has been replaced with hardstanding. In addition there are no significant additional groundworks proposed as part of the application therefore it is considered that there will be no resulting impacts to flora and fauna.

A screening for Appropriate Assessment was carried out by Ash Ecology in August 2013 and is included in Volume 3: Section 7 of this EIS. It concluded the following:

'*Overall, it can be concluded from the screening assessment completed above, that the proposed development will not result in likely significant direct or indirect impacts, either alone or in combination, on the structure, function and conservation objectives for the River Barrow and River Nore SAC or any other Natura 2000 site'*.

3.7.4 Mitigation Measures

There will be no emissions to groundwater from the proposed development therefore there is no potential to impact on the existing SAC's. The flora and fauna present are limited as the majority of the area is covered with concrete and there is no conservation value for the site. Monitoring of the surface water adjacent to the site will be ongoing as part of the licence conditions and it is not expected that there will be any discharges that are different to existing. Consequently there are no planned mitigation measures.

3.8 SOIL & GEOLOGY

3.8.1 Introduction

This section of the EIS examines the type of soils and geology underlying the site. A desk top study was carried out using information obtained from Geological Survey of Ireland (GSI) reports and comprehensive interactive mapping services.

There were no intrusive ground investigations such as boreholes, trial pits or auguring, undertaken as part of this study as the proposed development is an expansion of current operations at the site.

3.8.2 The Existing Environment

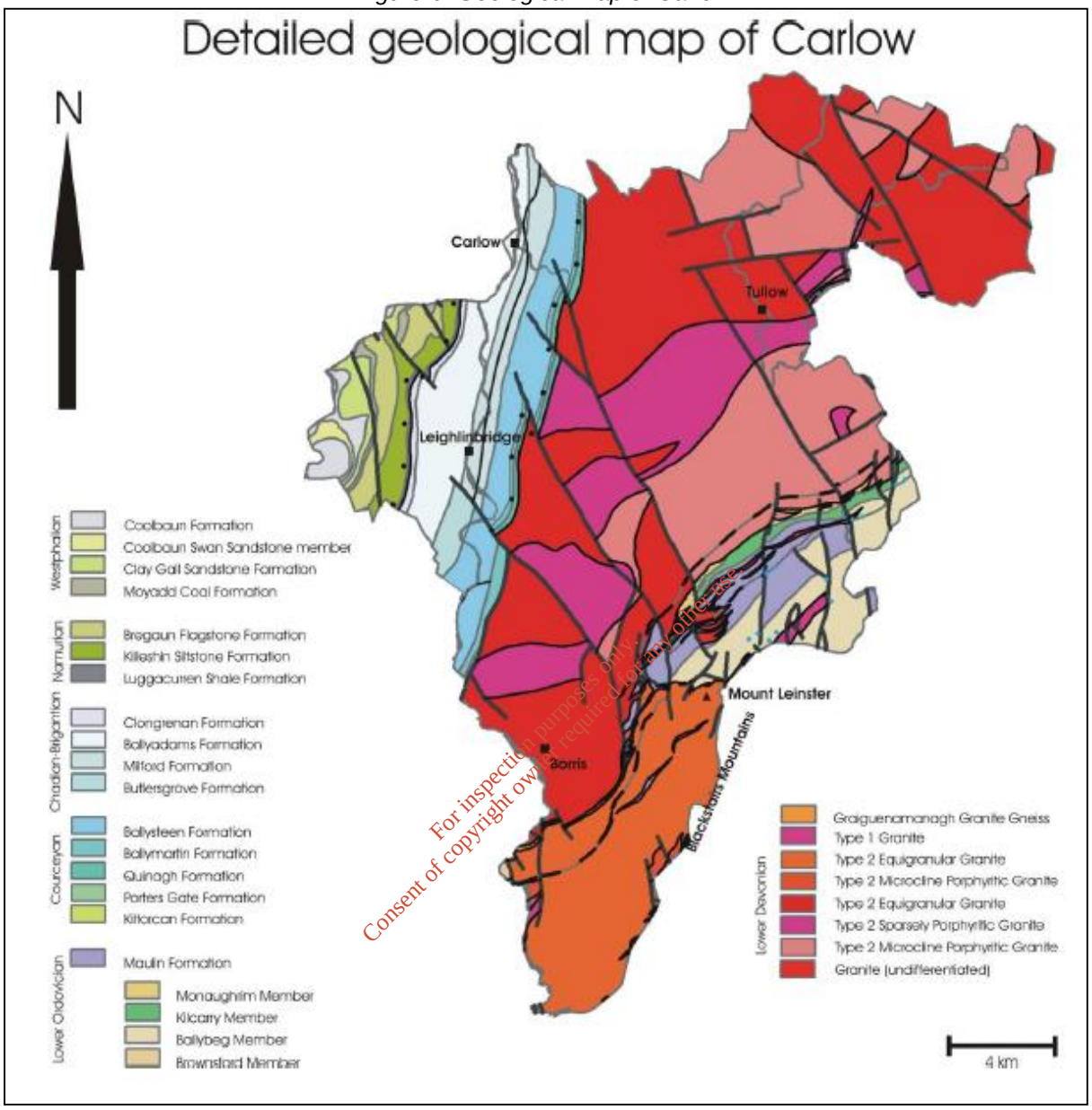
Carlow County is underlain by a bedrock sequence that dates from the Palaeozoic Era, and is Ordovician to Upper Carboniferous in age. The county's macro-topography is influenced by the dominant bedrock lithologies and structures. Predominantly, the county is underlain by granite which covers almost two thirds of the county as can be seen in Figure 23 below. Limestone, shales, slates and sandstone are the other predominant rock types cropping out elsewhere in the county. Overall, the bedrock surface is exposed rarely in the County, with outcrop and subcrop estimated at covering about 15% of the land surface.

The Blackstairs Granite and the Tullow Granite, both exposed in Carlow form part of the Leinster Granite. Extending from the Carlow-Wexford area northeast to Dublin Bay, the Leinster Granite is the largest body of granite in Ireland and Britain. It was intruded into the Lower Palaeozoic rocks towards the end of the Caledonian Orogeny, during early Devonian times (around 400 million years ago). The intrusion of the granite cooked and metamorphosed the surrounding country rock as it was emplaced, altering the mudstones of the Maulin Formation to micaceous phyllites and schists adjacent to the granite.

The oldest rocks are exposed in the easternmost portion of the County, around Clonegall, Kildavin and as far southwest as Slievebawn and were deposited during the Ordovician period (495-440 MY ago). These Ordovician rocks have generally been metamorphosed or partly metamorphosed by the later intrusion of the Leinster granites, and are schists, slates, siltstones and sandstones.

The site of the proposed development is located to the north west of the county, off the N80 main Carlow Wexford road, approximately 6km southeast of Carlow town. Published geological information of the site area identifies the bedrock as Caledonian Granite as identified in Figure 6. This formation is Silurian to Devonian in age.

Figure 6: Geological Map of Carlow



The site itself is set in a rural area where the surrounding lands are predominantly agricultural. O'Toole Composting facility has been operational since 2004. Prior to this the site was a Greenfield site used as agricultural land for grazing. Currently, the site is partially paved with concrete hardstand with green areas along the boundaries and to the east of the site. During initial construction stage of the facility in 2004 and 2005 the upper soil horizons beneath the site were altered.

The site and its immediate surrounds have historically been used for agricultural grazing. Due to the nature and extent of local agricultural activities it is not expected that there is potential for previous contamination of the subsurface.

3.8.3 The Predicted Impacts

There are no geological features of significance either at or beneath the site, therefore the proposed development will have little or no impact on local geology. Taking into account that the ground works associated with this development are limited, a negligible impact is expected. The construction of the anaerobic digester is the only proposed groundwork, subject to planning permission being granted at a future date. There will be no direct discharges to the subsoil as part of the proposal and subsequently there will be no impacts to the underlying subsurface. There will be no extraction or removal off-site of sub-soils.

The potential interaction with groundwater is low due to the low porosity of granite. The site is underlain with a poor aquifer (refer to Section 3.2.2.6), therefore the potential for contaminants leaching to groundwater is low.

3.8.4 Mitigation Measures

Raw materials, intermediates and products used on site comprise of fuel (diesel, hydraulic oil, engine oil, Ad-Blue, coolants, water, detergent, disinfectants and lubricants for the vehicles and plant. A list of all chemicals and substances used on-site is maintained at the facility along with the applicable materials safety data sheets (MSDSs). Copies of the MSDSs for the principal fuels used on-site are included as part of this attachment. If new chemicals are ordered, an MSDS is requested with the first delivery of the product.

All plant associated liquids are stored in bunded areas. Bulk fuel storage at the site is located within tanks on-site, which are complete with integrity certificates.
All waste water runoff from the composting process is diverted to underground leachate sumps which store the waste water until it is reused in the composting process. There is no discharge from this sump. Any excess wastewater from the process is tankered offsite to a waste water treatment facility. The facility is underlain with granite bedrock which acts as a poor aquifer, further reducing the potential of penetration of discharges to groundwater sources.

3.9 CULTURAL HERITAGE

3.9.1 The Existing Environment

This chapter of the EIS assesses the impact of the proposed development on the archaeological and architectural heritage of the subject site and surrounding area and investigates the cultural heritage and historical background of the application site and contiguous area.

An assessment of any known or potential cultural heritage resources within the area was carried out consisting of a collation of existing written and cartographic information in order to identify the likely significance and sensitivity of any known or potential heritage, archaeological and cultural resources that may have been or may be impacted by the existing composting facility and the proposed works.

The following documents were reviewed as part of the desktop study;

- Record of Protected Structures in the Carlow County Development Plan 2009-2015
- Record of Monuments and Places and the sites and monuments record archive (SMR)
- The Heritage Council: www.heritagecouncil.ie
- National Monuments Service: www.archaeology.ie
- Available cartographic resources & aerial photographs including the Ordnance Survey First Edition six-inch map (c.1840), the Ordnance Survey twenty-five inch map (and aerial views: http:// www.osi.ie
- Local history and archaeological journals
- Database of Irish Excavation Reports www.excavations.ie

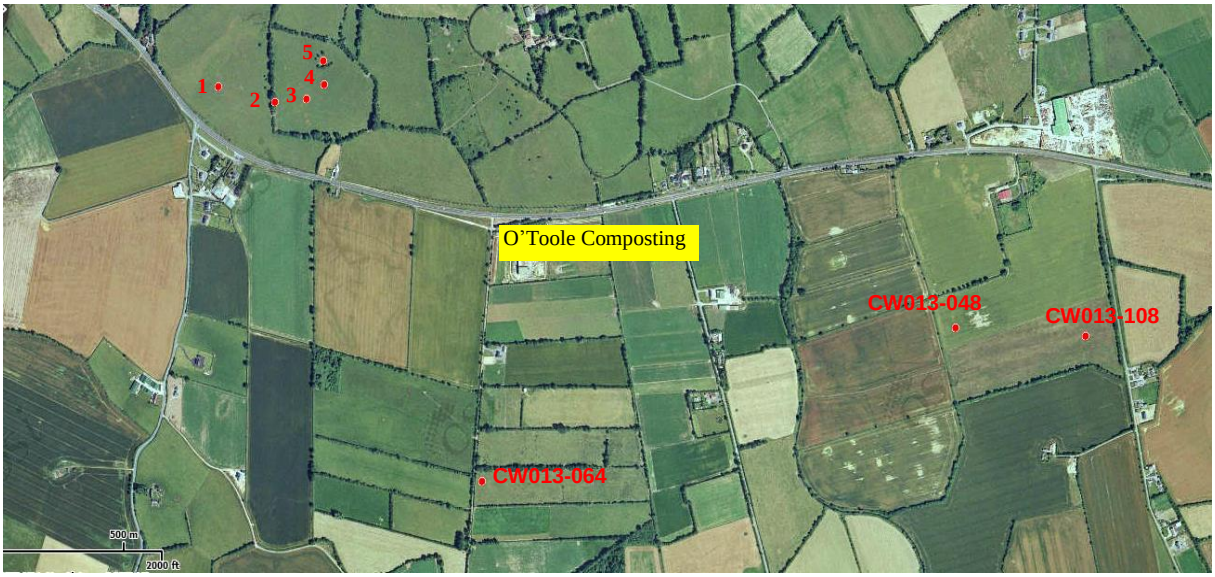
3.9.1.1 Archaeology

There are no recorded archaeological findings for the proposed development site. Furthermore previous groundwork's on site have not resulted in any findings of an archaeological nature.

The closest recorded archaeological site is CW013-064 (please see the map below) which is classified as a Fulacht fia and described by the Archaeological Survey of Ireland as 'Shown on 1908 OS 6-inch map as circular raised area (max diam c. 45m). No visible surface traces. Appears to have been on slight natural shelf in otherwise low lying area'

This is located approximately 0.5km to the south of the subject site in the townland of Ballintrane. (Grid Reference 278861; 166936). See the map below

Figure 7: Map of Monuments and Places within 2km of the Subject Site



Other archaeological sites recorded by the Archaeological Survey of Ireland for the townland of Ballintrane within 2 kilometres of the site are:

CW013-042: (1 above) Bullaun Stone (Grid Reference 278110 167950) Described as 'In exposed granite bedrock. Conical in section (diam 0.3m, D 0.2m) Filled with water and stones.

CW013-043: (5 above) Ringfort – rath (Grid Reference 278408 168017) Described as 'On a slight rise in low lying area. Regular circular platform (diam 44m, H 0.6m) with very low narrow bank, possibly modern, on periphery (inside H 0.2m). Traces of fosse visible from NW-N-NNE. No visible surface traces of entrance. Second enclosure (CW13-044) immediately S of ringfort.

CW013-044: (4 above) Enclosure (Grid Reference 278411 167955) Described as Approximately circular (diam c.45m) area, defined by and separated from ringfort (CW013-043) to N by depressed crescentic area. Uneven interior. Rises to highest point S of centre.

CW013-048: Enclosure: (Grid Reference 280143 167371) aerial photograph shows irregular, oval area defined by cropmarks of fosse with internal bank (est max. diam. c. 110m). In low-lying area.

CW013-083: (3 above) Fulacht fia (Grid Reference 278360 167920) Described as Small mound (diam 10m H c 0.3m) in low lying area of dried out stream courses. Dark gravelly soil exposed by sheep. Second site (CW0130084) c80m to W.

CW013-084: (2 above) Fulacht fia (Grid Reference 278270 167910) Described as Low circular mound (diam 9m: H 0.3m) Probing indicated stones. On very slight W facing slope, slightly above dried out stream course. Second site c 80m to E (CW013-083)

CW013-108: Enclosure in the townland of Kilknock. Descriibed as being seen in aerial photographs. (Grid Reference 280 579 167309)

There are also two ‘castles listed as CW013-045 and CW013-046 and are described as ‘not precisely located’.

3.9.1.2 History

There are no known traditions associated with the site or its immediate environs.

3.9.1.3 Architecture

The buildings on site have no architectural merit and there are no protected structures within the vicinity of the site.

3.9.2 Predicted Impacts

3.9.2.1 Archaeology

There are no additional groundwork’s proposed as part of the subject development, notwithstanding this, there are also no known sites of archaeological interest located in the environs of the site. Therefore there will be no impact to archaeology in the area. It should also be noted that none of the archaeological sites identified above can be seen from anywhere within the development site and as such the proposed will not result in any negative visual impact to these archaeological features.

3.9.2.2 History

It is envisaged that the proposed development will not impact on features or events of historical interest.

3.9.2.3 Architecture

There are no structures of architectural interest located within the boundaries of the subject site or indeed within the defined study area. Consequently as there are no sites identified there will not be any negative impact resulting from the proposed works.

3.10 MATERIAL ASSETS

3.10.1 The Existing Environment

The location of the proposed development is considered to be suitable for the following reasons:

- The processing facility does not require any major modifications to the existing electricity supplies, water or telecommunications in the area.
- The proposed development will reduce the need to transport larger volumes greater distances for treatment and disposal. Currently there is no other facility in County Carlow that can accept commercial waste.
- The site is located along a major road way and there are few dwellings as near neighbours.
- The development will not cause a decrease in adjoining property values given that there is an already established waste transfer facility on the site and also immediately adjacent to the site.

3.10.2 Potential Impacts

The facility site and immediate surroundings are not designated as a Natural Heritage Area or a proposed candidate Special area of Conservation, nor is it designated under any of the other nature conservation or landscape designations currently in place in Ireland.

Property values are expected to be unaffected by the proposed development. This has been an industrial area since the early 2000's and this facility has been in operation since 2005. Therefore the proposed development is unlikely to have any negative impact on property values in the locality. The extra traffic movements may cause very slight disruption to road users but this is expected to be minimal. The beneficial impacts that will result from the proposed development include the additional employment created by the proposal and the provision of the Bring Centre which will serve the local community.

3.10.3 Proposed Mitigation Measures

The main potential impact on material assets on the area relate to an overall reduction in the residential quality as a result of environmental nuisances (odour, litter, vermin, birds, noise, insects and pests, and dust). As the facility is situated in an industrial area with the nearest dwelling located some 170m from the site, it is not anticipated that there will be any impact on material assets.

The OTCL facility will be operated to the Best Available Techniques (BAT) as per EPA recommendations and under conditions of the EPA Waste Licence. Environmental control measures are constantly being reviewed and updated to ensure that the facility operates at the very highest environmental level. It is anticipated that when the facility is fully operational to

capacity the company will ensure that the Environmental Management System for the facility meets the requirements of the ISO 14001:2004 Standard.

3.11 INTERACTION OF THE FOREGOING

3.11.1 Introduction

All environmental factors are inter-related to some extent. As defined in the Environmental Protection Agency 'Guidelines on the information to be contained in Environmental Impact Statements' accumulative effect is defined as 'the addition of many small impacts to create one larger, more significant impact'. A synergistic impact occurs where 'the resultant impact is of greater significance than the sum of its constituents'.

The significant impacts of the proposed operations and the measures proposed to mitigate these impacts have been detailed in this report. However in any development with the potential for environmental impact, there is also the potential for interaction/inter-relationships between the impacts of the different environmental aspects. The result may either exacerbate the magnitude of the impact or may in fact ameliorate it.

3.11.2 Potential Impacts

There is potential for the interaction between the impacts of the proposed development within and adjacent to the proposed development. Atmospheric and noise emissions from the facilities have the potential to impact on human beings in the vicinity of the site. Impacts from dust and odour have the most significant on the proposed facility.

3.11.2.1 Human Beings/Fauna

Waste facilities have the potential to attract unwanted fauna such as rats, flies and birds (particularly gulls and crows). These species can impact on humans from both a health and nuisance point of view. Mitigation measures to protect against these potential impacts are proposed in this EIS to include environmental nuisance control, humans, fauna, after which effects on the local community are expected to be insignificant.

3.11.2.2 Human Beings/Hydrology

Contamination of groundwater beneath the site could impact on water quality. Mitigation measures to improve these potential impacts are proposed in the chapters dealing with Soils and Geology and Hydrogeology and Hydrology.

3.11.2.3 Human Beings/Air

Dust emissions, noise emissions and odour from the facility have the potential to impact on human beings in the vicinity of the site. Impacts from dust, odours are addressed in the chapter dealing with Air Quality, whereas noise impacts on humans addressed in the section on noise. Mitigation measures are proposed for each potential impact and the likely significant effects on the population are expected to be minor.

3.11.2.4 Water/Flora and Fauna

Contamination of surface water has the potential to impact on the water quality of streams and rivers. This impact has the potential to affect the aquatic life of these water courses. Mitigation measures are detailed in the relevant chapters.

3.11.2.5 Water/Soil

Soil beneath the site can act as a pathway for contaminants reaching both the groundwater and surface water. Mitigation measures and monitoring controls are detailed in the relevant chapters.

While there is potential for the impacts to interact/inter-relate and result in a cumulative impact, it is deemed unlikely that any of these cumulative impacts will result in significant environmental degradation.

3.11.3 Proposed Mitigation Measures

The facility will be operated to the Best Available Techniques (BAT) as per EPA recommendations and under conditions of the Waste Licence. All information is available to interested parties and a complaints register is maintained. The EPA carry out regular environmental audits, which demonstrate how the facility is performing. These measures result in interaction in all environmental criteria.

Compliance monitoring is carried out as per regulatory conditions and is reported on as part of the Annual Environmental Report. These reports are available to interested parties and will allay public concerns as to the operation of the site and will result in a positive interaction with respect to human beings.