

8. Air, Climate and Noise

Byrne Environmental Consulting Ltd. was commissioned to prepare an Air Quality, Climate and Noise Impact Assessment on behalf of Mr. Binman Ltd. for the proposed increase in capacity at their existing Waste Transfer Station and Recycling Centre (EPA Waste Licence No. W0061-02) at Luddenmore, Grange, Kilmallock, Co. Limerick from up to 105,000 tonnes per annum to a proposed 200,000 tonnes per annum.

This Impact Assessment identifies and presents the potential air quality, climatic and noise impacts associated with the proposed development, and presents the proposed mitigation measures that shall be implemented at the development site to ensure that all site activities are controlled and managed according to Industry Best Practices to minimise the impact on the local receiving environment.

This Impact Assessment has been prepared with reference to the EPA 2003 Publication '*Best Available Technique Guidance Note – Waste Sector (Transfer)*'.

8.1 Air in the Existing Environment

This assessment includes a review of the programme of continuous monthly dust deposition monitoring which is currently conducted at three site boundary locations, and routine environmental noise monitoring that is conducted in the vicinity of the four closest Noise Sensitive Receptors to the Mr. Binman Ltd. site.

Secondly, a comprehensive review of National Air Quality data has also been assessed to further evaluate the existing ambient air quality in the vicinity of the existing site.

8.1.1 Existing Air Quality

The existing ambient air quality in the vicinity of the subject site at Luddenmore is expected to be typical of a rural environment. There are no major population or industrial centres in the vicinity of the site. The site is in a predominantly rural agricultural area comprising of livestock farming and tillage farming. Additional industrial activities within one kilometre of the site include an active quarry.

There are a number of one off houses located along the local road network in the general area in which the subject site is located.

The most significant other local sources of emissions to atmosphere in the vicinity of the subject site are as follows:

As discussed above there are potentially a number of local sources of air emissions, which may currently influence the air quality in the vicinity of the site. In addition, the emissions from agricultural activities will include methane from ruminants as well as wind blown dust generated by working agricultural fields and a local quarry site. Many of the substances released from these developments, namely methane, carbon dioxide and dust from crops, however are not potential releases from the proposed development, so the proposal will have no significant impact on the atmospheric budget of these substances in the area and therefore they will not be discussed in substantial detail in this report.

Substances which are expected to be present in emissions released from the subject site are sulphur dioxide and nitrogen oxides which will originate from both fossil fuel combustion sources and dust which will originate from the waste handling and processing operations. These substances are also expected to be present in emissions released from some of the other local sources including agricultural sources, domestic sources and from local road traffic movements.

A description of existing levels of these substances in ambient air is required to allow completion of the evaluation of all potential air quality impacts associated with the proposed capacity increase at the subject site. Other potential pollutants will also be discussed in brief but it is the potential pollutants from the proposed development that will be discussed in greatest detail.

The principal air pollutant that is generated by site activities is dust which may be entrained by the wind to extend beyond the subject sites boundaries. Specifically, in relation to the cumulative impact of dust emissions from all sources, the VDI (Verein Deutsche Ingenieure: German Society Engineers) dust deposition method employed at the site to assess the baseline air quality in the vicinity of the subject site measures dust from all local sources and as such it is not specific to monitoring dust from only the subject application site but from all local dust sources that contribute to the ambient air quality in the vicinity of the site boundaries.

8.1.2 Existing Air Quality Assessment

In order to further assess the existing ambient air quality in the vicinity of the subject site it is necessary to review available air quality monitoring data from published sources such as the most recent EPA annual report entitled 'Air Quality in Ireland 2007'. This EPA report provides detailed air quality monitoring data collected from a number of monitoring locations throughout Ireland. There is no long term data available specifically for the subject site however, relevant data for rural areas (Specified as Zone D by EPA) is described as being representative of that which would be expected for subject areas.

It is noted that the EPA does not monitor dust deposition data as part of their annual air quality surveys, however, there is site specific dust deposition monitoring data available for the purposes of this assessment.

Air quality data is compared against National Air Quality standards as detailed in Table 8.1.

8.1.2.1 Nitrogen Oxides

Data for rural areas is limited but the available data suggests that the annual mean concentrations of NO_x in rural areas is 6 to 10 µg/m³ with NO₂ accounting for c. 5 to 8 µg/m³. The Preliminary Assessment under Directive 1996/62/EC projects a maximum annual mean background concentration of NO₂ of <20 µg/m³ for rural areas. The recorded value at the Kilkitt monitoring station in 2007 was 3 µg/m³ which may be considered as indicative of the subject site.

The World Health Organisation (WHO: Air Quality Guidelines for Europe, 2000) suggest that ambient NO₂ levels in rural areas are generally in the range <1 µg/m³ to 9 µg/m³ NO₂. Data from the UK Monitoring Network for Rural Areas was also reviewed for the purpose of the assessment.

Given the absence of any significant industrial developments or concentrations of residential housing developments in the vicinity of the application site, it is reasonable to predict that ambient concentrations of nitrogen dioxide would be well within the expected range for an unpolluted rural environment.

Table 8.1 Assessment criteria for air quality impact assessment

Parameter & Standard	Averaging period	Concentration ($\mu\text{g}/\text{m}^3$)	Basis of application of the limit value
Particulate Matter (PM₁₀)			PROTECTION OF HUMAN HEALTH
Irish AQS SI No. 271 [1] Council Directive 1999/30/EC [2]	Annual - Stage 1	40	Annual mean (Calendar Year) Annual mean (Calendar Year) Not to be exceeded more than 35 times in a calendar year (i.e. 90.4%ile) Not to be exceeded more than 7 times in a calendar year (i.e. 98.1%ile)
	- Stage 2 24-hour -Stage 1	20 50	
	Stage 2	50	
NO₂			PROTECTION OF HUMAN HEALTH
WHO Guideline [3]	1-hour	200	Maximum of one-hour means Annual mean
	Annual	40 - 50	
Irish AQS SI No. 271 [1] Council Directive 1999/30/EC	1-hour	200	Not to be exceeded more than 18 times in a calendar year (i.e. 99.8%ile) Annual mean
	Calendar year	40	
Irish AQS SI No. 271 [1] Council Directive 1999/30/EC	Annual mean	30	PROTECTION OF VEGETATION Calendar Year
SO₂			PROTECTION OF HUMAN HEALTH
WHO Guideline	Annual	50	Annual mean Maximum 1hour mean
	1-hour	350	
Irish AQS SI No. 271 [1] Council Directive 1999/30/EC	1-hour	350	Not to be exceeded more than 24 times in a calendar year (i.e. 99.7%ile) Not to be exceeded more than 3 times in a calendar year (i.e. 99.2%ile) Annual mean
	24-hour	125	
	Calendar year	20	
Council Directive 1999/30/EC	Annual	20	PROTECTION OF ECOSYSTEMS Calendar Year
	6-month	20	1 st October to 31 st March

NOTES

- [1] Irish Air Quality Standard Regulations, SI No. 271 of 2002
 [2] Stage 1 - to be attained by January 2005; Stage 2 - to be attained by January 2010. There are various dates from 2001 to 2010 specified in the Directive for attainment of air quality standards
 [3] Guidelines for Air Quality, WHO, Geneva, 2000

8.1.2.2 Sulphur Dioxide

Annual mean concentrations of sulphur dioxide in 'rural' areas are expected to be in the range 3 - 6 $\mu\text{g}/\text{m}^3$ and 25 - 100 $\mu\text{g}/\text{m}^3$ in 'urban' locations (World Health Organisation: *Guidelines for Air Quality, May 2000*.) The overall air quality in the subject area is expected to be characteristic of other similar rural locations, with low levels of air contaminants. Given the absence of any significant industrial developments or concentrations of residential housing developments in the vicinity of the application site, it is reasonable to predict that ambient concentrations of sulphur dioxide would be well within the expected range for an unpolluted rural environment.

The recorded value at the Kilkitt, Co. Monaghan rural monitoring station in 2007 was 2 $\mu\text{g}/\text{m}^3$ which may be considered as indicative of the subject site.

The Air Quality Framework Directive (1996/62/EC) on ambient air quality assessment and management lists sulphur dioxide, nitrogen oxides (NO_x), particulate matter and lead as the priority pollutants to be covered by the initial phases of the management approach. Under the terms of the Directive, Member States are required to divide their territories into zones for the assessment and management of air quality. The Environmental Protection Agency has published in 2001 a "Preliminary Assessment Under Article 5 of Council Directive 1996/62/EC" to meet the requirements of the Directive. The report presents the results of the assessment of air quality throughout the country and defines zones and associated assessment requirements for Ireland.

8.1.2.3 Carbon Monoxide

The Air Quality Standards Regulations 2002 specify a limit value of 10 mg/m³ for carbon monoxide (CO), which is applied to the maximum daily eight-hour mean concentration. The standard, taken from Daughter Directive 2000/69/EC, comes into force in 2005. It is the first standard to be adopted for CO in Ireland and is used as the reference for CO assessment here.

CO monitoring is very limited in Ireland and the available data relates mainly to urban locations with high levels of transport related CO emissions. Data on CO levels for 2007, for Zone D areas are presented from Ferbane, Co. Offaly with the annual mean concentration for 2006 being 0.2 mg/m³ (expressed as the annual mean of 8-hour running means) indicating that CO levels are well below the limit of 10 mg/m³, therefore it is reasonable to conclude that ambient levels of CO at the application site will be even lower given its rural type location.

8.1.2.4 Particulate Matter PM₁₀

PM₁₀ is particulate matter less than 10 µm aerodynamic diameter (or, more strictly, particles which pass through a size selective inlet with a 50% efficiency cut-off at 10 µm aerodynamic diameter). Airborne particles originate from a wide variety of sources. Significant natural sources of PM₁₀ particles include re-suspension of soil material in rural areas, sea spray and reactions between natural gaseous emissions. Particles are classified into two categories. They may be primary – they are emitted directly from primary sources such as industrial sources, power stations, cement factories combustion process and motor vehicles; or they may be formed from secondary sources – particles formed within the atmosphere from condensation of vapours, or as a result of chemical reaction processes.

PM₁₀ monitoring in Ireland is limited to continuous monitoring stations operated by the local Authorities and EPA, mainly in urban areas. The most recent PM₁₀ measurements made are reported in the Environmental Protection Agency's *Air Quality in Ireland Report 2007*. The recorded annual mean value at the Kilkitt monitoring station in 2007 was 10 µg/m³ which may be considered as indicative of the subject site.

Council Directive 1999/30/EC and as transposed into Irish Law (June 2002) as Statutory Instrument S.I No. 271 specifies a limit value of 50 µg/m³ for the 24-hour average concentration of PM₁₀, not to be exceeded more than 35 times in a calendar year (90.4 percentile).

8.1.2.5 Dust Deposition

Dust levels in rural atmospheres can be influenced by local activities such as land cultivation and vehicle movements on unsealed access-ways. There are no national or European Union air quality standards with which these levels of dust deposition can be compared. However, a figure of 350 mg/m²-day (as measured using Bergerhoff type dust deposit gauges as per *German Standard Method for determination of dust deposition rate, VDI 2129*.) is commonly applied to ensure that no nuisance effects will result from specified waste management activities.

Dust Deposition Rate is normally measured by gravimetrically determining the mass of particulates and dust deposited over a specified surface area over a period of one month (30 days +/- 2 days). The results are expressed as dust deposition rate in mass per unit area per day (mg/m²-day).

For the purposes of assessing the potential for unacceptable soiling of property arising from dust emissions, a figure of 350 mg/m²-day (as measured using Bergerhoff type dust deposit gauges as per German Standard Method for determination of dust deposition rate, *VDI 2119*) is recommended.

The *VDI 2119* standard specifies that the dust deposition measurement period should be of one month duration 30+/- 2 days. This guideline limit value of 350 mg/m²-day is obtained from the commonly applied *German TA Luft Air Quality Standard* emission limit value, which was established to protect against damage or impairments to property or amenities and it, is to this standard that the results of this survey have been assessed.

The existing and proposed dust deposition monitoring locations are presented in Figure 8.1. The site-specific monthly dust deposition measurement results for the period between August 2007 and July 2008 are presented in Table 8.2.

Figure 8.1 Existing and proposed dust deposition monitoring locations

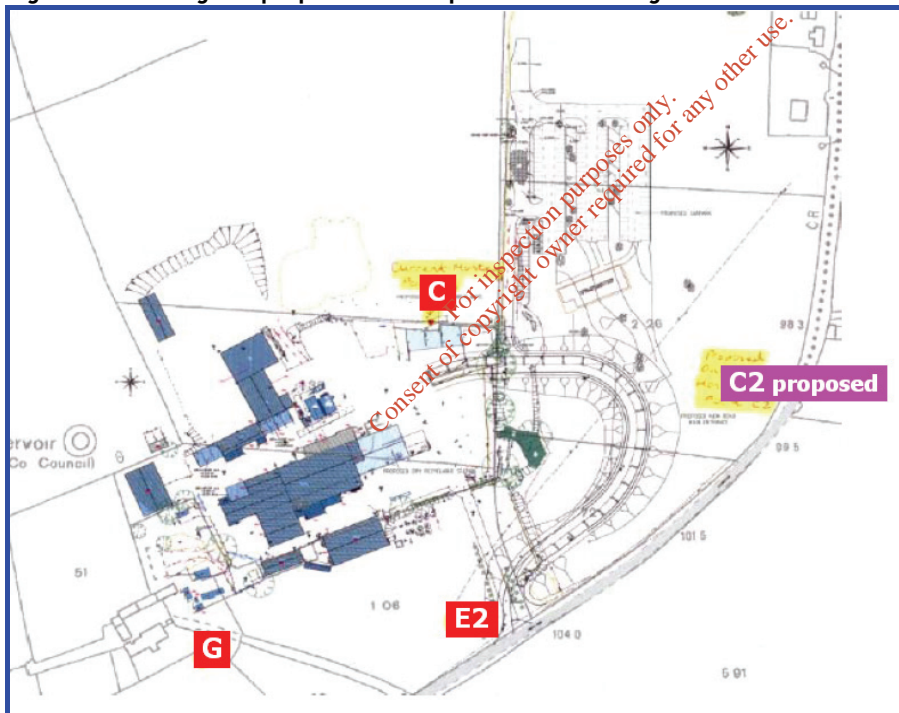


Table 8.2 Dust Deposition Monitoring Results Aug 07 – July 08

Reference	Aug 07	Sept 07	Oct 07	Nov 07	Dec 07	Jan 08	Feb 08	Marc h 08	April 08	May 08	June 08	July 08
C	978	606	1540	2229	1821	272	1651	889	1281	1369	462	892
E2	2612	327	269	143	417	143	184	203	250	367	60	286
G	401	166	66	139	180	171	74	222	62	118	64	402

Table 8.3 Dust Deposition Monitoring Locations

Reference	Description
C	Northern Site Boundary
E2	Southern Site Boundary
G	Southwestern Site Boundary
C2 Proposed	Eastern Site Boundary

The range of measured dust deposition values from onsite and off-site sources show reasonable compliance with the specified 350 mg/m²/day limit value as recommended by the EPA for Waste Transfer Facilities.

Based on the results presented above for the specific monitoring intervals, it can be concluded that existing air quality with respect to dust deposition at the subject site may be classified as being good at locations E2 and G, however additional dust mitigation measures are required at location C on the Northern site boundary. The measures required to minimise dust emissions are detailed in Section 8.5 of this report.

8.1.2.6 Ambient Air Quality Overview

Air quality standards and guidelines are available from a number of sources. The guidelines and standards referenced in this report include those from the European Union, Ireland and WHO. Air quality standards are developed at different levels for different purposes. European legislation on air quality has been framed in terms of two categories, limit values and guide values. Limit values are concentrations that cannot be exceeded and are based on WHO guidelines for the protection of human health. Guide values are set as a long-term precautionary measure for the protection of human health and the environment. The existing ambient air quality meets the requirements of all relevant legislation. The only significant parameters from the facility that may currently contribute to air quality in the area are nitrogen oxides (NO_x), sulphur dioxide (SO₂), and particulate matter and given the non-industrial nature of the facility, together with the relatively coarse particle size which are less likely to become entrained in wind blow, this ensures that site operations have no adverse or unacceptable impact on local ambient air quality. These factors will also ensure that the proposal to increase the through-put of the waste transfer station and recycling centre will have no adverse or unacceptable impact on local ambient air quality.

8.2 Noise in the Existing Environment

This section of the report presents a description of the existing ambient noise levels at the closest Noise sensitive Receptors in the vicinity of the Mr. Binman Ltd. site at Luddenmore, Co. Limerick. It is significant to note that to date, there have been no reported noise nuisance complaints from any of the closest noise sensitive receptors in the vicinity of the site.

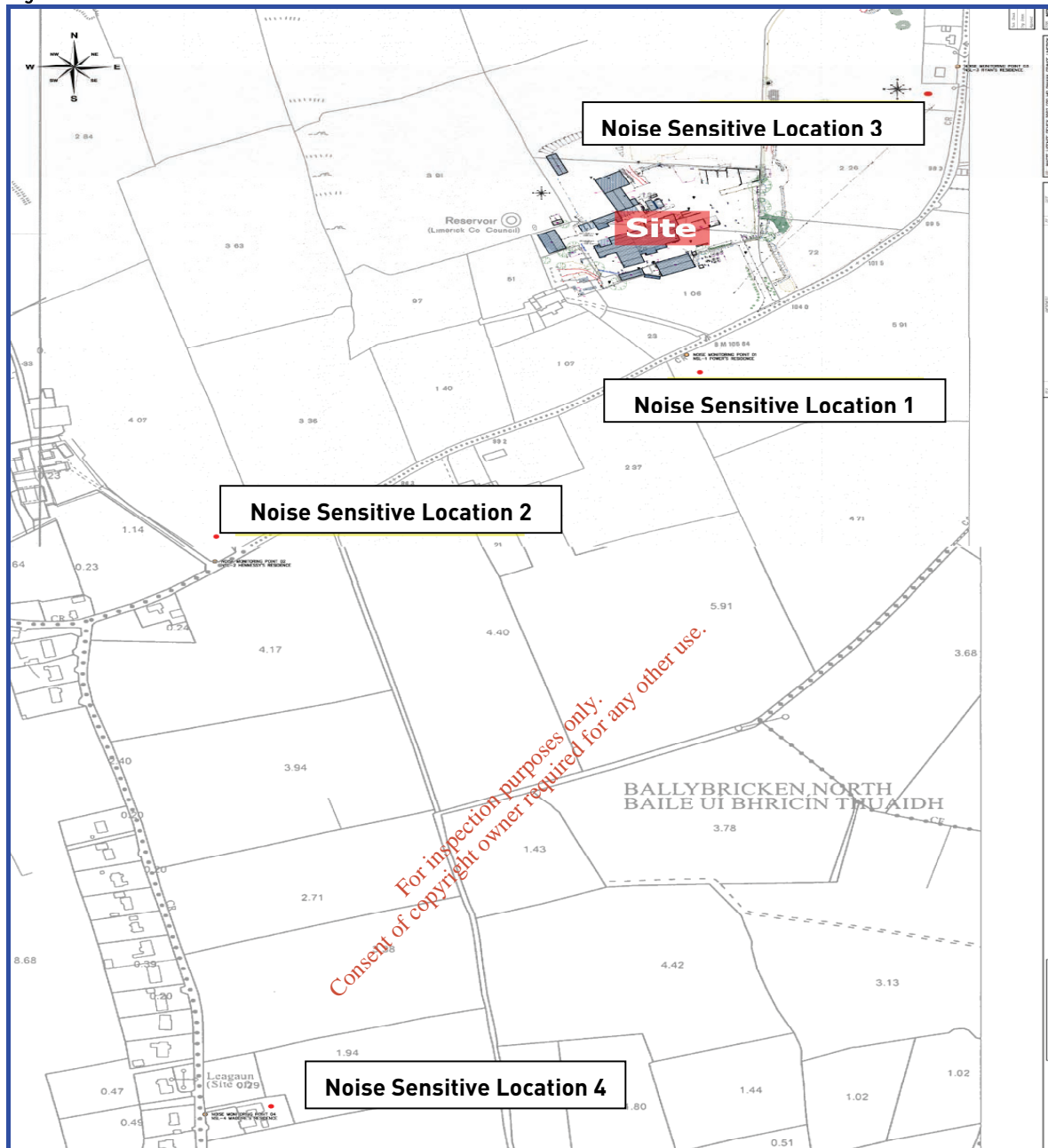
8.2.1 Noise Sensitive Receptors

There are a number of private residences located in close proximity to the subject site that have been identified as Noise Sensitive Receptors (NSR's). It is noted that a programme of twice yearly environmental noise monitoring is conducted at four of these NSRs, the results of which are presented in Section 8.2.2. A description of the NSR's is presented in Figure 8.2.

8.2.2 Existing Noise Levels

Environmental noise surveys are conducted on a biannual basis at the Mr. Binman Ltd. site and the results of monitoring conducted between September 2005 and June 2008 are summarised in Table 8.4.

Figure 8.2 Location of NSRs



Information on identified noise sources during each measurement interval are summarised as follows:

NSL-1 Site activities including plant operating and facility related vehicles are noted to be either barely audible or faintly audible. Dominant noise is passing non-site related road traffic.

NSL-2 Site activities including plant operating and facility related vehicles are noted to be either faintly audible or clearly audible. Dominant noise is passing non-site related road traffic.

NSL-3 Site activities including plant operating and facility related vehicles are noted to be faintly audible. Dominant noise is passing non-site related road traffic.

NSL-4 Site activities including plant operating and facility related vehicles are noted to be either inaudible or faintly audible. Dominant noise is passing non-site related road traffic.

Table 8.4 Environmental Noise Monitoring Results Sept 05 – June 08

Reference	Sept 05	June 06	Nov 06	June 07	Nov 07	June 08
	L _{Aeq} , 30min (L _{A90} , 30min)	L _{Aeq} , 30min (L _{A90} , 30min)	L _{Aeq} , 30min (L _{A90} , 30min)	L _{Aeq} , 30min (L _{A90} , 30min)	L _{Aeq} , 30min (L _{A90} , 30min)	L _{Aeq} , 30min (L _{A90} , 30min)
NSL 1						
6 - 7am	-	-	-	-	-	54 (41)
7 - 8am	48 (38)	68 (43)	59 (41)	65 (42)	63 (42)	63 (49)
After 8am	49 (35)	65 (48)	53 (38)	67 (44)	59 (47)	67 (46)
NSL 2						
6 - 7am	-	-	-	-	-	70 (39)
7 - 8am	67 (45)	64 (44)	62 (40)	66 (42)	66(43)	67 (42)
After 8am	64 (43)	65 (44)	66 (45)	67 (41)	65 (47)	61 (42)
NSL 3						
6 - 7am	-	-	-	-	-	59 (39)
7 - 8am	66 (37)	55 (36)	57 (38)	51 (37)	49 (39)	53 (43)
After 8am	64 (40)	52 (38)	59 (40)	52 (43)	53 (40)	58 (44)
NSL 4						
6 - 7am	-	-	-	-	-	62 (38)
7 - 8am	59 (38)	47 (41)	48 (38)	59 (37)	52 (54)	63 (46)
After 8am	60 (36)	60 (43)	62 (43)	59 (38)	50 (41)	64 (43)

Note All values in dB(A)

Note Values in parenthesis are recorded L_{A90} values

The noise climates in the vicinity of the closest Noise Sensitive Receptors to the subject site are characterised as being influenced by passing road traffic noise arising from both subject site related traffic and non-site related traffic as evidenced in the Traffic Impact Assessment contained within the EIS.

From the noise surveys conducted to date at the closest Noise Sensitive Receptors it is apparent that the operation of the subject site does not generate unacceptable noise levels at these locations.

The recorded L_{Aeq} values describe the existing noise levels at each receptor arising from all sources including site activities and local passing non-site related traffic. In order to demonstrate the actual impact that the existing facility alone has without the influence of other non-site related noise sources, it is prudent to discuss the noise impact of the subject site with respect to the recorded L_{A90} values which are representative of the background noise level at each receptor.

The L_{A90} values presented above in Table 8.4 clearly demonstrate that the noise climates at each receptor are not dominated or adversely impacted by any continuous or dominant noise source and it is concluded that the existing noise levels at each receptor are typical of the expected noise levels associated with a rural environment.

These conclusions further demonstrate that the existing Mr. Binman site does not have an adverse impact on the local receiving noise environment.

8.2.3 Vibration

The nature of the Mr. Binman Ltd. development does not cause observable ground borne vibrations and this will continue to be the case for the proposal to increase capacity at the subject facility. Vibrational impacts are therefore not required to be addressed as part of this impact assessment study.

8.3 Climate and Weather in the Existing Environment

8.3.1 Description of Existing Climate

Climate can refer to both the long-term weather (macro-climate) patterns in an area and also to the more localised atmospheric conditions, referred to as the microclimate. Climate has implications for many aspects of the environment from soils to biodiversity and landuse practices. This section deals with the existing climate in the area and how the proposed development may impact on the microclimate.

The closest synoptic meteorological station to the subject site at Luddenmore is at Shannon Airport which is located approximately 25 kilometres northwest of the site and as such, long-term measurements of wind speed/direction and air temperature for this location are representative of prevailing conditions experienced at the subject site. The most recent (2007) meteorological data sets for Shannon Airport were obtained from Met Eireann for the purposes of this assessment study.

Table 8.5 Meteorological Data for Shannon

Shannon Airport					
Year	Month	Rainfall (mm)	Max. Temperature (Degrees Celsius)	Min. Temperature (Degrees Celsius)	Mean Temperature (Degrees Celsius)
2007	1	93.5	10.0	4.5	7.3
2007	2	65.2	9.8	3.0	6.4
2007	3	63	11.3	3.7	7.5
2007	4	11.2	16.5	6.7	11.6
2007	5	66.3	15.5	7.9	11.9
2007	6	103.6	18.9	11.4	15.1
2007	7	97	18.4	11.9	15.1
2007	8	100.6	18.7	12.0	15.4
2007	9	51.6	17.8	9.9	13.8
2007	10	44.3	16.0	9.3	12.7
2007	11	52.0	12.3	6.7	9.5
2007	12	166.3	10.5	5.2	7.9
		Mean = 76mm			

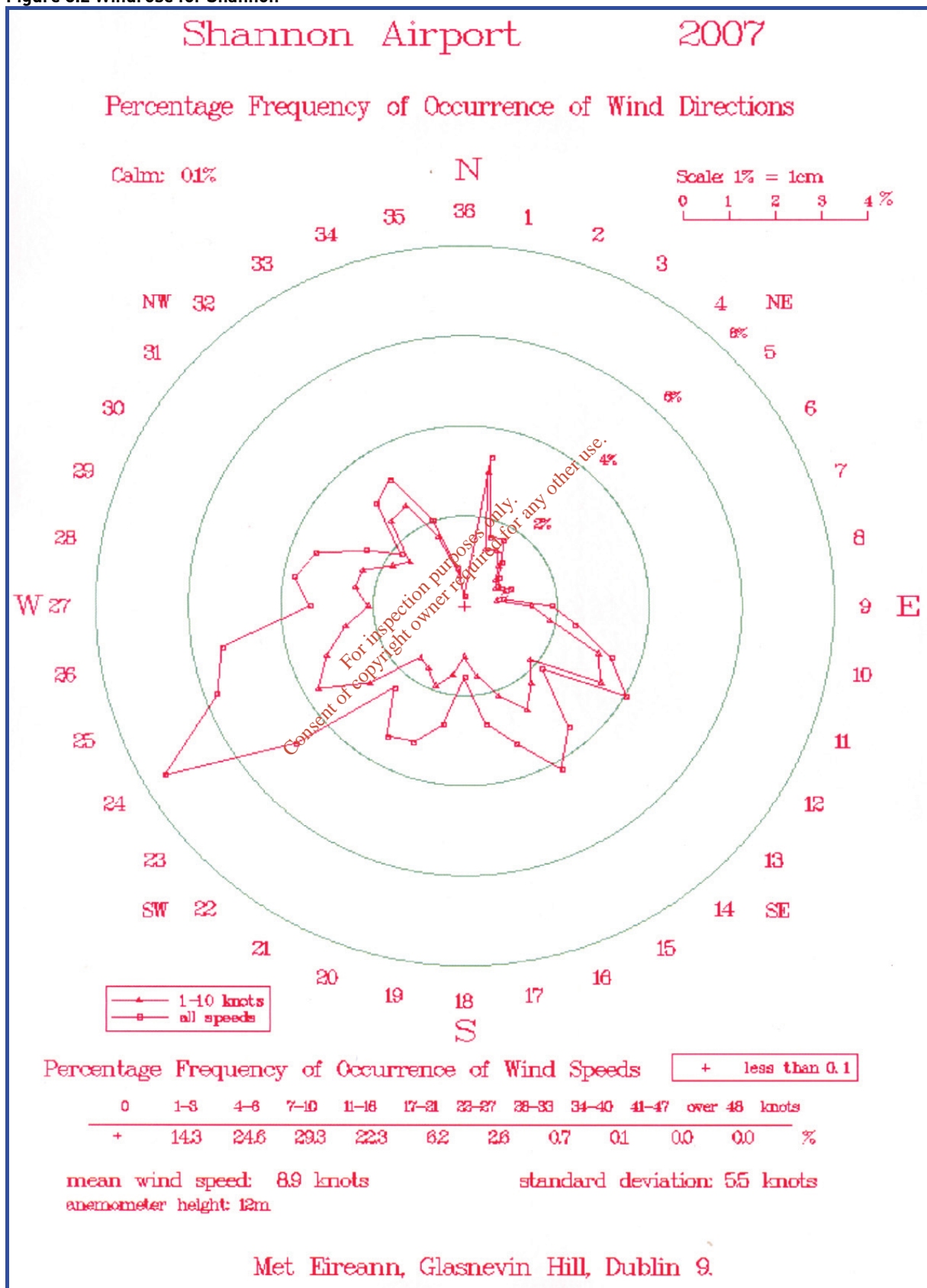
Data supplied by Met Eireann

8.3.1.1 Wind

The windfield characteristics of the area are important climatological elements in examining the potential for the generation of fugitive dust emissions from the site. Fugitive dust emissions from a surface occur if the winds are sufficiently strong and turbulent and the surface is dry and loose, together causing re-suspension of particulate matter from the ground. A wind speed at ground level in excess of about 5 metres per second is considered to be the threshold above which re-suspension of fine sized material from an exposed surface may occur. The mean annual wind speed in the Shannon area is approximately 4.6 metres per second. The surface needs to have a relatively low moisture content for this type of dust emission to take place and any wetting either by rainfall or sprayers, will greatly reduce the potential of fugitive dust emissions. Mitigation measures such as the use of sprinklers will ensure that re-suspension of dust will not be a major impact.

The windrose for Shannon as presented below in Figure 8.2 indicates that the prevailing wind direction, in the Shannon area, is from the Southwest and blows Northeast across the proposed development.

Figure 8.2 Windrose for Shannon



8.3.1.2 Rainfall

Precipitation data from the Shannon meteorological station for the period 2007 indicates a mean annual total of about 915 mm. This is within the expected range for most of the western half of the Ireland, which has between 750 mm and 1000 mm of rainfall in the year.

8.3.1.3 Temperature

The annual mean temperature at Shannon (2007) is 11°C with a mean maximum of 19°C and a mean minimum of 3°C. Given the relative close proximity of this meteorological station to the proposed development, similar conditions would be observed.

8.4 Likely and Significant Impacts and Mitigation Measures

The proposed development will involve the storage, transfer, sorting, baling and recycling of waste products, within yard and building areas of the existing site at Luddenmore.

The potential impacts to air quality as a result of the increased capacity of the existing development are addressed in terms of scheduled emissions (i.e. stacks & vents) and traffic impacts.

8.4.1 Impacts on Air Quality

Regarding current operations at the subject site, the activities include import by heavy goods vehicle (HGV), transfer, sorting, baling recycling and export of processed wastes off site via HGV. As a result, there are no major scheduled emissions (i.e. through stacks, vents, etc.) planned for the development and site activities will continue not to cause any deterioration in local air quality.

The Mr. Binman Ltd. waste transfer station and recycling centre currently operates with significant control techniques and mitigation measures in place to ensure that all site activities have no adverse impact on local ambient air quality. The existing mitigation measures in operation at the facility include the following:

- Weekly collection of municipal waste ensures waste is “fresh” and has not putrefied. Mr. Binman Ltd. is the only operator in the region that offers a weekly collection system.
- The recycling system separates biodegradable waste and removes this fraction from the site on a daily basis thereby minimising the potential for odour on site.
- There is no long-term storage of waste at the site, which prevents generate fugitive dust or odorous emissions.
- Processing and storage of waste is conducted in enclosed areas. The timber bay is the only outstanding area remaining to be covered and this will be enclosed as part of an agreed Environmental Management Programme with the EPA.
- A regular ground cleaning programme is in place at the site which includes a road sweeping truck dedicated to cleaning the site and local roads as required. The road sweeper is fitted with high pressure water jets and a high powered vacuum to minimise dust emissions when cleaning ground surfaces.
- There is an end-of-day clean up at the site to ensure that all sources of dust and litter are removed and to ensure that there is no off-site nuisance outside of normal operating hours.

- Odour and dust abatement units are strategically located inside the relevant processing areas.
- Daily environmental checks, including odour and litter, are conducted on site and around the perimeter of the site.
- Dust deposition monitoring is conducted at site boundary locations as required by the facility's EPA Waste Licence.

There are potential impacts from unscheduled emissions of dust from HGV movements on the site surfaces. This impact is directly related to the working practices on the site. A robust dust control and minimisation plan (i.e. truck washes, road sweepers, etc), will reduce the potential impacts of fugitive dust.

As there is no waste deposited on the site, there is no potential for the build up of methane and landfill gas.

Odours are a potential nuisance from any facility that involves waste storage or transfer. Fugitive odours (i.e. not through stacks or vents) from landfills, waste transfer stations, baling stations, etc. arise mainly from the uncontrolled anaerobic biodegradation of waste to produce unstable intermediates. Odours are generated by a number of different components, the most significant being the sulphur containing compounds (thiols, mercaptans, hydrogen sulphide), volatile fatty acids (butyric acid, Valeric acid), amines (methamine, Dimethylamine), phenols (4-methylphenol), chlorinated hydrocarbons (tichlorethylene, tetrachloride). Most of these compounds have been in very low concentrations. Different concentrations and mixtures of these compounds can intensify or reduce odour threshold concentration, determined as synergism and antagonism respectively.

A series of design features, work practices and mitigation measures for the reduction of fugitive odour emissions are specified below:

- The EPA will continue to require a level of operation that will not impinge on the surrounding environment and decide on the extent and nature of any environmental monitoring (e.g. dust or odours) to be carried out. Any complaints arising during the operation of the facility regarding an environmental nuisance will be logged by the EPA who will require corrective action to remove the source of that nuisance.

Positive impacts associated with the proposed increase in capacity at the site include the diversion of a viable volume of separated biodegradable waste from landfill to a biogas/composting facility currently being developed by Greenport Environmental Ltd. Here, the biogas (e.g. methane) generated from the biodegradable waste shall be used to generate approximately 1 MW of electricity.

8.4.1.1 Road Traffic

Emissions of pollutants from road traffic can be minimised by either controlling the number of road users or by controlling the flow of traffic. For the majority of vehicle-generated pollutants, emissions rise as speed drops, although the opposite is true for oxides of nitrogen. Emissions are also higher under stop-start conditions when compared with steady speed driving. The free flow of the traffic as a result of the scheme is desirable in order to minimise the generation of traffic-generated pollutants.

A Traffic Impact Assessment of the proposal has been carried out, and the results included in Section 11 of this EIS. Detailed traffic flow information has been used to assess whether any significant impact on sensitive receptors may occur. This examined daily traffic counts for the

traffic in the area of the proposed development. The percentage HGVs in the traffic volumes for each road is detailed as this has a direct bearing on emissions. Traffic flow predictions have been presented under two scenarios:

The proposed increase in capacity at the subject facility from up to 105,000 tonnes per annum to 200,000 tonnes per annum will result in an estimated 575 daily HGV trips associated with the site. This equates to an average of 48 HGV movements per hour during a typical day.

With respect to the relatively low volumes of traffic movements on the local road network it is predicted that the proposed increase in HGV movements will not have an adverse impact on local ambient air quality. Continued developments in fuel technologies will further offer to minimise emissions of combustion gases and particulate matter from HGV diesel engines.

In summary, concentrations of combustion gas and particulate emissions from HGV diesel engines in the immediate vicinity of the site will not be adversely affected by the increase in capacity at the facility. In terms of both long-term pollution and regional pollution, the potential impact to air quality as a result of the proposed development is not considered significant. In addition, the subsequent impacts to climate as a result of the development are considered minimal.

8.4.2 Air Quality Mitigation Measures

The measures presented in this section of the EIS shall be implemented at the facility to ensure that the impact of all site activities are controlled and that the potential impact on local air quality is minimised. Routine daily visual inspections by the site management will be conducted and recorded to assess the effectiveness of existing mitigation measures and to record the occurrence of visual dust emissions beyond site boundaries.

8.4.2.1 Traffic Movements

Emissions of pollutants from road traffic can be controlled by either controlling the number of road users or by controlling the flow of traffic. For the majority of vehicle-generated pollutants, emissions rise as speed drops, although the opposite is true for oxides of nitrogen. Emissions are also higher under stop-start conditions when compared with steady speed driving. The free flow of the traffic as a result of the scheme is essential in order to minimise the generation of traffic related pollutants.

- The practice of leaving vehicle engines idling unnecessarily or for prolonged periods is discouraged and appropriate signage shall be clearly posted at the facility.
- Local roads shall be swept and cleaned as necessary if it is observed that roads are being soiled by vehicles entering or exiting the site.

8.4.2.2 Dust Control

Comprehensive dust control measures are currently in place at the Mr. Binman Ltd. waste transfer station and recycling centre, and will continue to be so with the proposed increase in tonnages accepted at the facility. The existing dust control measures include:

- The carrying out of a comprehensive dust-monitoring programme, in line with the requirements of the facility's existing EPA Waste Licence. Dust deposit gauges are installed at the locations shown on Figure 8.1 in order to continuously monitor dust deposition levels.

- Continued maintenance of a complaint log by site management to ensure that all complaints made by members of the public are recorded and investigated. No complaints have been received by Mr. Binman Ltd. to date regarding dust emissions from the facility.
- At the request of the EPA and to ensure compliance with licence conditions, Mr. Binman Ltd. continues to cover all waste storage and processing areas, on a phased basis. The programme for completion of these projects was submitted to the EPA as part of the Annual Environmental Report (AER) in March 2008. All waste handling activities, with the exception of timber processing, are conducted within enclosed areas, which serves to contain dusts generated by material handling and processing. Planning permission has been granted by Limerick County Council to Mr. Binman Ltd. for the covering of the timber storage and processing area this area (Planning Reference No. 08/245).
- External doors of all waste buildings are kept closed as far as is practically possible.
- Regular cleaning and maintenance of site roads and yard areas is carried out. A road sweeping truck is used to clean the site and local roads as required. The road sweeper is fitted with high-pressure water jets and a high-powered vacuum to minimise dust emissions when cleaning ground surfaces. Public roads outside the site are regularly inspected for cleanliness, and cleaned as necessary.
- The regular watering of any road that has the potential to give rise to fugitive dust during dry and/or windy conditions is carried out.
- A speed restriction of 15 kilometres per hour is applied to site roads.
- All vehicles exiting the site use a wash facility where necessary to ensure mud and other wastes are not tracked onto public roads.
- Material handling systems and site stockpiling of materials is designed and laid out to minimise exposure to wind.
- There is an end-of-day clean up at the site to ensure that all sources of dust and litter are removed and to ensure that there is no off-site nuisance outside of normal operating hours.

The following additional mitigation measures will further ensure that no nuisance is posed to the local environment by dust emissions from the Mr. Binman Ltd. facility:

- As part of the EPA Licence Review, Mr. Binman Ltd. proposes to relocate dust emission monitoring station C to an appropriate location at the site boundary to ensure there is no impact offsite. This new monitoring location will be referred to as station C2.
- Planning permission was granted to Mr. Binman Ltd. by Limerick County Council in 2007 for the construction of a new entrance roadway, and car park with spaces for 166 cars and two buses (Planning Reference Nos. 05/3128 and 07/2466). Once constructed, the new entrance roadway and hard-standing car park will reduce dust emissions created by the existing gravel park during dry weather conditions.

8.4.2.3 Odour Control

The potential for odour emissions from the facility is currently minimised by a series of design features and work practices. These measures will continue to be implemented at the site, and include:

- All waste handling operations are conducted in enclosed areas. Planning permission has been granted for the covering of the timber storage and processing area.
- Roller shutter doors are used where necessary to minimise exposure to outside environment.
- All work surfaces and floors are cleaned regularly.
- The residence time for waste, including non-odorous waste, is kept to a minimum before transfer. There is no long-term storage of waste at the site, which prevents fugitive dust or odorous emissions.
- A suitable masking agent/deodorant system is employed at the site.
- The weekly collection of municipal waste ensures waste is “fresh” and has not putrefied. Mr. Binman is the only operator in the region that offers a weekly collection system.
- The recycling system separates biodegradable waste from the incoming waste stream and removes this fraction from the site on a daily basis thereby minimising the potential for odour on site.
- Odour and dust abatement units are located strategically inside or relevant processing areas.

8.4.3 Impacts on Noise Levels

Once operational, the main sources of noise impact associated with the development will be additional vehicles on the existing road system, vehicle movements within the site and noise from the operation if the site.

8.4.3.1 Road Traffic

Increased traffic, particularly from heavy goods vehicles (HGV) during the operational phase of the proposed development, has the potential to increase noise levels at noise sensitive locations along the routes surrounding the site.

A traffic assessment has been conducted of current and predicated flows at the Mr. Binman Ltd. Luddenmore site assuming a worse case scenario of the site operating at full capacity. In general the number of HGV's on surrounding routes is predicated to increase should the facility operate to the proposed increase in capacity to 200,000 tonnes per year.

An assessment of the predicated noise impact of traffic generated from the proposed development has been carried out with reference to the UK's Department of Transport (Welsh Office) document entitled “Calculation of Road Traffic Noise” using the predicated traffic flow information supplied of AM and PM peak hour flows. The results of this assessment are included in Tables 8.6 and 8.7. The significance of change in noise levels is summarised in Table 8.8.

Table 8.6 Predicted traffic noise values for AM peak hour flows along surrounding routes

AM peak hour flow	2025 without development ('Do Nothing') (dB LA10 1hour)	2025 with development (dB LA10 1hour) ('Do Something') Difference in dB	Difference in dB
Facility access Road	70	73	+3

Table 8.7 Predicted traffic noise values for PM peak hour flows along surrounding routes

AM peak hour flow	2025 without development ('Do Nothing') (dB LA10 1hour)	2025 with development (dB LA10 1hour) ('Do Something') Difference in dB	Difference in dB
Facility Access Road	70	73	+3

Table 8.8 Classification of predicted noise impacts (EPA 7 DMRB)

Change in sound level	Subjective reaction	Impact
<3	Imperceptible	Not significant/Imperceptible
3-5	Perceptible	Minor/Slight
6-10	Up to a doubling of loudness	Moderate/Significant (Minor)
11-15	Over a doubling of loudness	Major/Significant (Major)
>15	-	Severe/Profound

With reference to Tables 8.6 and 8.7 above, traffic noise levels on surrounding routes between the 'do something scenario' (i.e. the proposed development proceeds) and the 'do nothing scenario' (i.e. the proposed development does not proceed) during the year 2025 are predicted to increase by a maximum of 3 dB during AM and PM peak hour flows along the site access road. This road is a county road with a number of residential properties set back from the roadside. The increase in predicted HGVs will result in changes in existing noise levels by a maximum of 3 dB in both the do nothing and do something scenarios. In subjective terms, this increase is considered to be minor / slight.

8.4.3.2 Waste Transfer Facility

The future operation of the waste recycling and transfer facility will continue to involve the delivery, sorting, bailing and storing of waste materials prior to export off site. Each on site process has the potential for noise generation. The combined noise level from all sources operating within the facility has been assessed assuming all machinery is operating simultaneously for 100% of the time.

As site activities associated with additional waste volumes passing through the site will not alter as part of this proposal there will be no additional noise generated by the facility as all existing plant and machinery shall be utilised, however, a series of additional noise minimisation techniques have been specified in Section 8.4.4 to ensure that noise control at source is implemented at the site for all activities.

8.4.4 Noise Mitigation Measures

During the operational phase of the development, the total noise from all internal operations shall be designed to not adversely affect the existing ambient noise over both day and night time periods. The equivalent continuous sound level (L_{Aeq}) of the plant noise at the nearest noise sensitive premises shall be limited to 55 dB(A) during the daytime period (08:00 to 22:00 hours) and 45 dB(A) during the night time period (22:00 to 08:00 hours) which will ensure that the impact of noise from the Mr. Binman Ltd facility will be not significant. It is considered that the use of the L_{A90} index would also be an appropriate noise indicator to assess the actual noise impact the facility has on the receiving environment. With attenuation provided by the building construction and distance attenuation between the site boundary and the nearest residential properties, these guidance levels will be achieved.

With respect to all mechanical plant utilised at the facility, the following noise mitigation measures are currently implemented at the site, and will continue to be so:

- Main buildings are designed so that main processing areas face inward and away from the site boundary, with site buildings providing noise attenuation.
- All main processing areas/storage areas, with the exception of the timber storage area are enclosed. Planning permission has been granted by Limerick County Council to Mr. Binman Ltd. for the covering of the timber storage and processing area this area (Planning Reference No. 08/245).
- All permanent equipment is located indoors/within enclosures.
- Anti-vibration mounts have been fitted to plant and machinery where appropriate.
- Items of plant are turned off when not in use.
- The use of vehicular horns is discouraged unless necessary for safety purposes.
- A speed restriction of 15 kilometres per hour is applied to site roads.
- The on-site diesel generator unit is completely enclosed within a concrete room with a sealed steel door, which ensures that its operation is inaudible beyond site boundaries.
- Low noise level reverse warning alarms consistent with site safety requirements are utilised.

With respect to further minimising the noise impact from the site, the following proposed additional noise mitigation measures shall be implemented:

- The existing routine noise-monitoring programme will continue to be carried out at noise sensitive locations.
- Any noise complaint will be thoroughly investigated and corrected measures put in place to prevent reoccurrence. It is significant to note that to date, no noise nuisance complaints have been received at the facility from members of the public.
- The timber processing area shall be enclosed.
- The dry recyclables enclosure shall be completed.

8.4.5 Impacts on Climate

Greenhouse gases occur naturally in the atmosphere (e.g. carbon dioxide, water vapour, methane, nitrous oxide and ozone) and in the correct balance, are responsible for keeping the lower part of the atmosphere warmer than it would otherwise be. These gases permit incoming solar radiation to pass through the Earth's atmosphere, but prevent most of the outgoing infrared radiation from escaping from the surface and lower atmosphere into the upper levels. However, human activities are now contributing to an upward trend in the levels of these gases, along with other pollutants with the net result of an increase in temperature near the surface.

Motor vehicles are a major source of atmospheric emissions thought to contribute to climate change. There would be the additional emissions generated from vehicles that will be associated with the proposed development and the potential for increases in air pollutants, which may

contribute to climate change. Smooth inflow and outflow of traffic incorporated into the site design and future improvements to existing road will result in free flowing traffic which will reduce the impact arising from vehicle emissions, compared to the emission pattern associated with congested driving conditions.

8.4.5.1 Impact on Micro Climate

The physical structures of the site buildings will produce slight changes in shelter, microclimate: the spatial distribution of temperature, light, shade and rainwater runoff. There are no buildings on the site of the proposed development that will be affected by this slight change in the microclimate. There are also no particularly sensitive life forms that will suffer. The proposed development will continue not to have an adverse impact on shading or temperature profiles at the nearest residential properties.

8.4.6 Climatic Mitigation Measures

The proposed increase in capacity at the Mr. Binman Ltd. Luddenmore facility will have no impact on the climate or microclimate at the site and therefore no mitigation measures are proposed.

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9. Landscape

This section of the Environmental Impact Statement addresses the landscape and visual impacts of the proposed development. It includes a description of Limerick County Council landscape policy, with specific reference to the area within which the proposed development site is located. Landscape values and sensitivity are also examined. The landscape of the area is described in terms of its character, which includes a description of the physical, visual and image units.

The only available, quasi-official document providing guidance on landscape at a national level is 'Outstanding Landscapes', published by An Foras Forbartha in 1976. The then Department of the Environment and Local Government built on this document in 2000 by producing 'Landscape and Landscape Assessment – Consultation Draft of Guidelines for Planning Authorities', which recommended all local authorities adopt a standardised approach to landscape assessment for incorporation into Development Plans and consideration as part of the planning process. This section of the EIS has been broadly based on these guidelines. The 'Guidelines for Landscape and Visual Impact Assessment' published by The Landscape Institute as part of the Institute of Environmental Management & Assessment (Britain) in 2003 were also an important source of information.

9.1 Landscape Policy

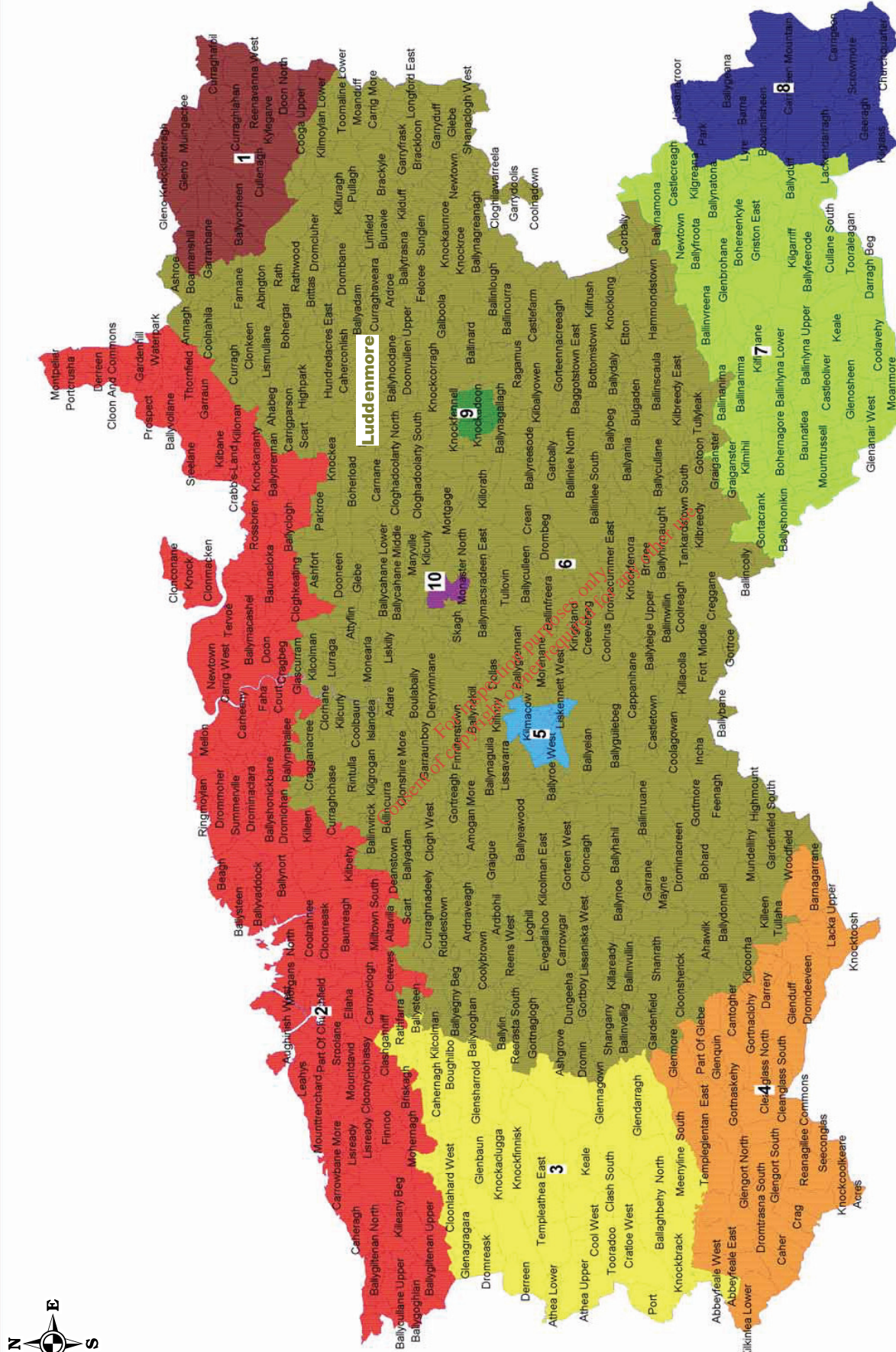
9.1.1 Limerick County Council Landscape Character Assessment

The importance of landscape and visual amenity in relation to planning is described in the Planning and Development Act 2000, which requires that County Development Plans include objectives for the preservation of landscape views and prospects. Section 7.2 of the Limerick County Council Development Plan 2005 – 2011 presents the Planning Authority's policies and objectives regarding Landscape and Visual Amenity within the county:

- *"Policy ENV 5 - Enhancing Tree Cover: It is the policy of the Council to preserve and enhance the general level of tree cover within the county, both in the countryside at large and also in the county's towns. The Council strongly encourages the establishment of native species, in particular broadleaf species.*
- *Policy ENV 6 - Landscaping and Development: It is the policy of the Council to ensure the adequate integration of development into the landscape by retention of trees and landscape features and/or encouraging suitable planting.*
- *Policy ENV 7 - Landscape Character Areas: It is the policy of the Council to promote the distinctiveness and where necessary the sensitivity of Limerick's landscape types, through the landscape characterisation process and also, where possible, to develop means to successfully and sustainably integrate differing kinds of development within them."*

The Planning and Development Act 2000 also requires the assessment of landscape character, a process in which Limerick County Council has been proactive. The results of the assessment are set out in the Limerick County Council Development Plan 2005 – 2011. The landscape character assessment was carried out according to the Department of the Environment 2000 Guidelines and stresses the distinctiveness of differing kinds of landscape and how different types of development can best be integrated within them.

The Landscape Character Assessment for County Limerick divides the county into ten distinct Landscape Character Areas (LCAs), as illustrated in Figure 9.1. The townland of Luddenmore, in which the proposed development site is located, lies within LCA 6, the Agricultural Lowlands. This



- 1. Slieve Felim
- 2. Shannon ICZM
- 3. Western Uplands
- 4. Southern Uplands
- 5. Knockferna
- 6. Agricultural Lowlands
- 7. Ballyhaura / Slieve Reagh
- 8. Galtee Uplands
- 9. Lough Gur
- 10. Tory Hill

MAP TITLE: Landscape Character Map of Co. Limerick	MAP NO.: Figure 9.1
PROJECT TITLE: 081005 - Mr Binman EPA Licence EIS	ISSUE NO.: 080610-2008.11.24-F1
MAP REQUESTED BY: Lorraine Meehan	CHECKED BY: Brian Keville
McCarthy Keville O'Sullivan	DATE: 24-11-2008

LCA comprises the majority of central County Limerick and is described in the County Development Plan as follows:

“This is the largest of the Landscape Character Areas in the county and comprises almost the entire central plain. This landscape is a farming landscape and is defined by a series of regular field boundaries, often allowed to grow to maturity. This well developed hedgerow system is one of its main characteristics. In terms of topography the landscape is generally rather flat with some locally prominent hills and ridges. The pastoral nature of the landscape is reinforced by the presence of farmyards.”

The landscape setting of the Mr. Binman Ltd. waste transfer station is consistent with that described in the County Development Plan. Agriculture is the primary land-use within the surrounding rural landscape. The site lies approximately three kilometres southeast of the village of Ballyneety and is accessed via the local road through Luddenmore, which adjoins the R512 Regional Road. The R512 travels in a north-south direction to the west of the site, linking Limerick City with Killmallock and Fermoy.

9.1.2 Scenic Views and Prospects

The Landscape Character Areas described in the Limerick County Development Plan 2005 – 2011 incorporate the designated scenic views and prospects of earlier County Development Plans in order to ensure continuity between and further development of landscape policies for the county. The policy of Limerick County Council in relation to scenic views and prospects is:




“Policy ENV 8 - Scenic Views and Prospects. It is the policy of the Council to safeguard the scenic views and prospects by integrating them into Landscape Character Areas, which will ensure a more balanced approach towards landscape issues within the county. In areas where views and prospects are listed in Map 7.6 of the Plan, there will be a presumption against development except that which is required in relation to farming and appropriate tourism and related activities, or a dwelling required by a long term land owner or his/her family that can be appropriately designed so that it can be integrated into the landscape. The Planning Authority will exercise a high level of control (layout design, siting, materials used, landscaping) on developments in these areas. In such areas, site-specific designs are required. It should be noted that in area outside these delineated areas, high standards will also be required.”

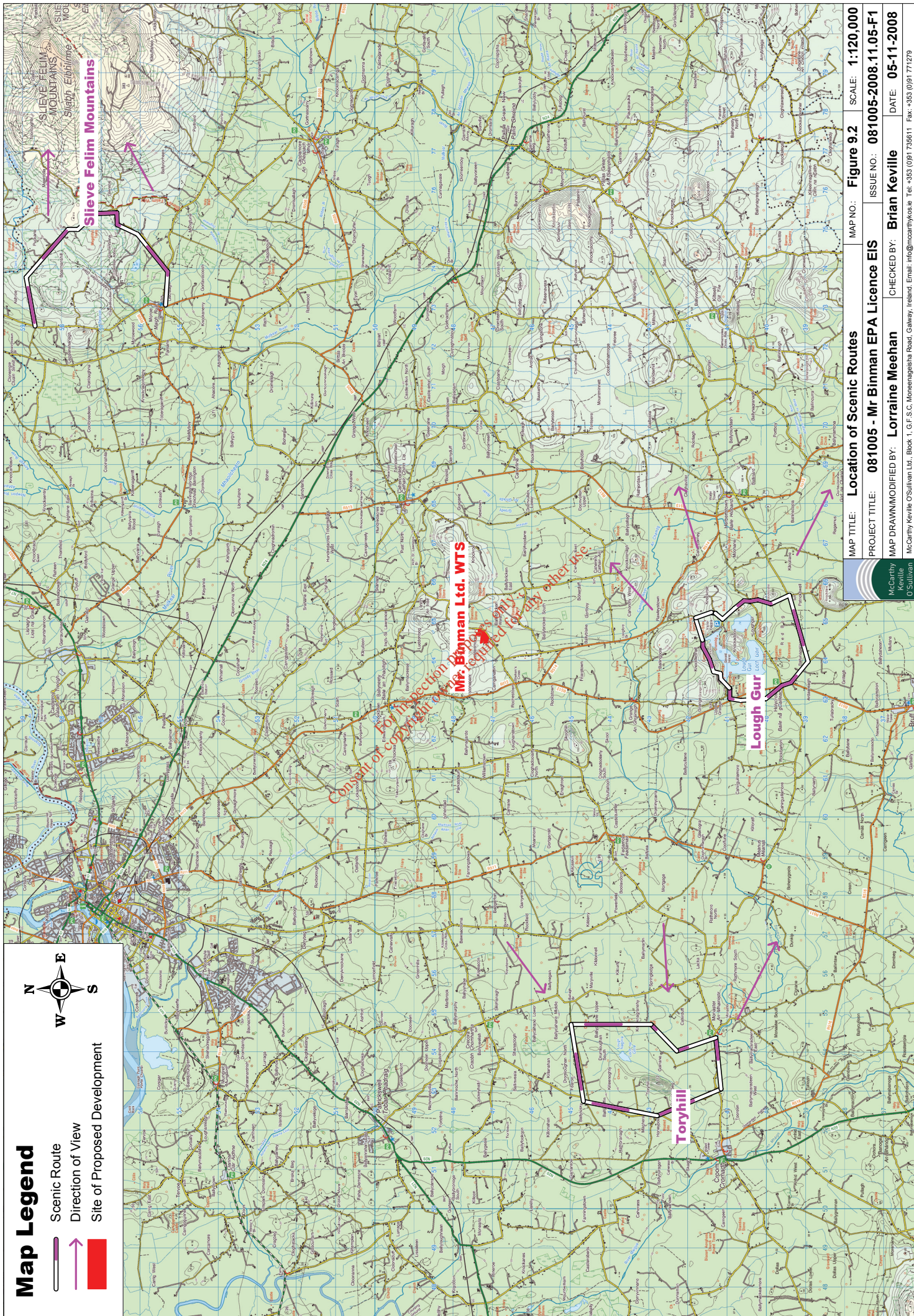
There are no designated scenic views or prospects within a five-kilometre radius of the proposed development site. The nearest protected views are those found in the Lough Gur area, approximately 5.5 kilometres south of the waste transfer station, as shown in Figure 9.2. Lough Gur is included as an individual Landscape Character Area (LCA 9) in the County Development Plan, in which it is described as follows:

“Lough Gur is perhaps the most significant archaeological site in the county. Topographically it is made of series of rolling hills surrounding the lake, which is the centre point of the area. The lake itself is enclosed on the southeast, east and northeastern sides by large hills. The landscape is a farmed landscape with a long history of human habitation. The presence of a wide variety of archaeological remnants is one of the characteristic features of the area.”

It is the policy of Limerick County Council to safeguard the visual amenity of the area and to have regard to the views and prospects in and out of Lough Gur (Policy ENV 14).

Map Legend

-  Scenic Route
-  Direction of View
-  Site of Proposed Development



MAP TITLE: Location of Scenic Routes	MAP NO.: Figure 9.2	SCALE: 1:120,000
PROJECT TITLE: 081005 - Mr Binman EPA Licence EIS	ISSUE NO.: 081005-2008.11.05-F1	
MAP DRAWN/MODIFIED BY: Lorraine Meehan	CHECKED BY: Brian Keville	DATE: 05-11-2008

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Views towards Toryhill, which lies approximately ten kilometres southwest of the proposed development site, are also designated for protection by the Limerick County Development Plan 2005 – 2011. Toryhill is included as an individual Landscape Character Area (LCA 10) and is described in the Plan as follows:

“Tory Hill is an isolated locally prominent hill which is within two kilometres of the town of Croom and is visible from the Cork/Limerick road. It is an important feature in the surrounding countryside, and is of geologic importance as it is a limestone hill with deposits of gravel, which have been left since the last Ice Age. The hill supports areas of scrub and woodland as well as limestone grassland.”

The County Development Plan states the presumption of the Planning Authority against development in this location.

Scenic views of the Slieve Felim Mountains from the road around the townland of Cappercullen are also designated for protection by the Limerick County Development Plan 2005 – 2011. This route lies approximately 12 kilometres northeast of the proposed development site. The Slieve Felim Uplands Landscape Character Area (LCA1) is described in the County Development Plan as follows:

“The Slieve Felim Hills located in the northeast of the county are the most dominant feature in this part of the county. Though not particularly high (average height of the most important peak is 395 metres), it is because of the low-lying surrounding landscape that they appear such a dominant feature. The hills themselves are rounded in shape lacking the starkness that some of the Galtee range to the south possess, and are generally pastoral in character in that almost all the hills show evidence of enclosure for agricultural purposes, with a well developed field boundary system in place.”

The Mr. Binman Ltd. waste transfer station is located too far from each of the designated views or routes described above to be visible from them. Activities at the site have no impact on these scenic views or areas of high visual amenity.

9.2 Landscape Character

Landscape character refers to the distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, and how people perceive this. It reflects particular combinations of geology, landform, soils, vegetation, land use and human settlement, and creates the particular sense of place found in different areas. The identification of landscape character comprises the identification of the physical, visual and image units.

9.2.1 Physical Unit

The topography, vegetation and anthropological features on the land surface in an area combine to set limits on the amount of the landscape that can be seen in any part of the area at any one time. These physical restrictions form individual areas or units, known as physical landscape units, whose character can be defined by aspect, slope, scale and size. A physical unit is delineated by topographical boundaries and is defined by landform and land-cover. The physical landscape unit in which the proposed development site is located is shown on Figure 9.3. This area occupies approximately 750 square kilometres in eastern Co. Limerick, most of which belongs to the Agricultural Lowlands Landscape Character Area (LCA). The physical unit also encompasses the two smallest LCAs of Lough Gur and Toryhill. The boundaries of this unit are marked by hilly or mountainous topography to the northeast, south and southwest. Limerick City marks the boundary