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ENVIRONMENTAL IMPACT STATEMENT

MATERIALS RECOVERY AND TRANSFER FACILITY

AT

SARSFIELDCOURT INDUSTRIAL ESTATE,

GLANMIRE

COUNTY CORK

Prepared For: -

Greenstar Recycling (Munster) Ltd.,
Sarsfieldcourt Industrial Estate,
Glanmire,
Co. Cork.

Prepared By: -

O' Callaghan Moran & Associates,
Granary House,
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Cork.

June 2010

Project	Environmental Impact Statement 2010
Client	Greenstar Recycling (Munster) Ltd. W0136-02

Report No	Date	Status	Prepared By	Reviewed By
0480201	06/04/2010	Draft	Michael Watson MA	.Jim O'Callaghan MSc
	18/06/2010	Rev A	Michael Watson MA	.Jim O'Callaghan MSc
	24/06/2010	Rev B	Michael Watson MA	.Jim O'Callaghan MSc

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NON-TECHNICAL SUMMARY

Introduction

Greenstar Recycling (Munster) Ltd. (Greenstar) is Corks leading waste management company and has been operating its waste Materials Recovery and Transfer Facility (MRTF) at Sarsfieldcourt Industrial Estate in Glanmire since 2003.

Based on a review of market conditions in the Cork Region, Greenstar has identified an opportunity to expand recycling/recovery capacity from 95,000 tonnes allowed by the existing planning permission to 200,000 tonnes, and also to provide a Civic Amenity Area (Bring Bank) where members of the public can drop off household wastes.

The current planning permission allows Greenstar to accept 95,000 tonnes of waste annually and operate for 12 hour days from Monday to Friday and 6 hours on Saturdays. The facility does not open on Sundays or Public Holidays. The existing equipment has the capacity to process 200,000 tonnes annually, but cannot do so due to the limits on the times the facility can operate.

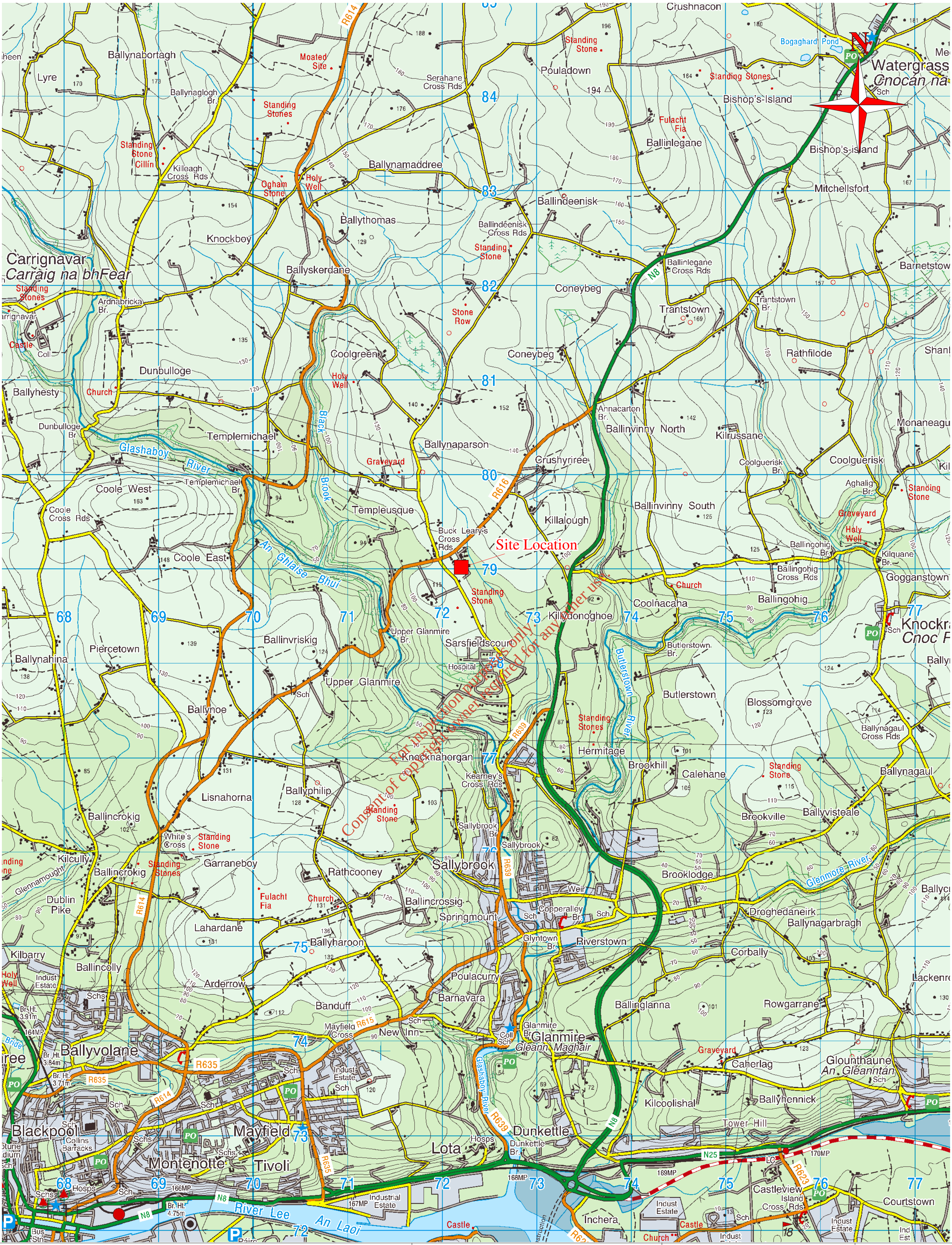
Public Consultation

Greenstar placed a notice of its intention in the Evening Echo and invited written comments from the general public. No submissions were received.

Description of the Proposed Development

Existing Site

The site occupies 1.56 hectares, almost 4 acres, and is located in the Sarsfieldcourt Industrial Estate, approximately 5 miles north of Glanmire Village (Figure 1). The Industrial Estate is entered off the R616, which connects with the N8 and the M8 motorway, approximately 2km north east of the site. There is one main processing building, offices, two weighbridges, a vehicle wash, paved open yards and parking areas (Figure 2).



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environmental management for business

CLIENT

Greenstar Recycling (Munster) Ltd.

TITLE

Site Location Map

DETAILS

O.S. Licence Agreement Number AR 0038709

Ordnance Survey Ireland. Government of Ireland

Sheet No. 80

FIGURE No.

1

SCALE

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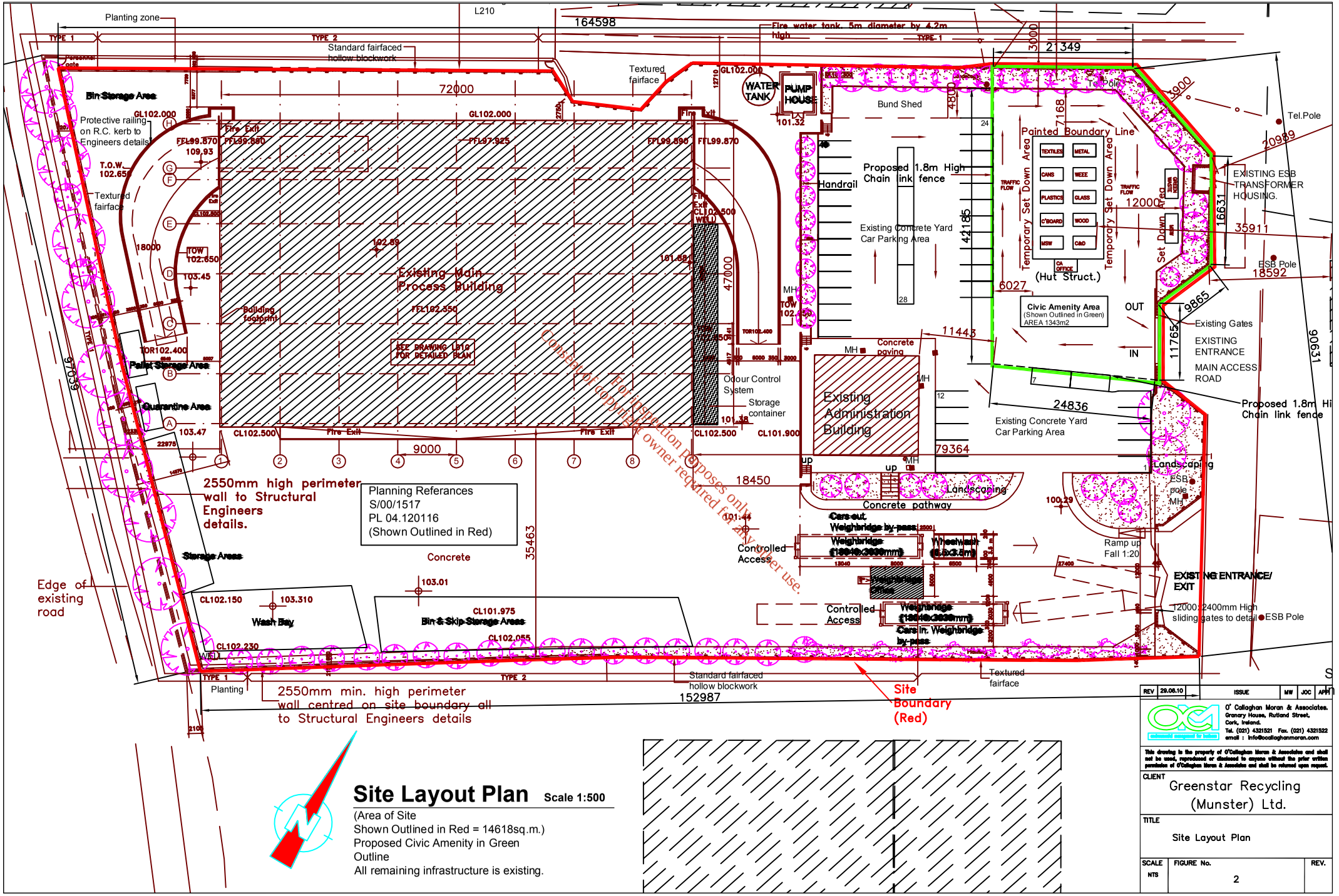

Site Layout Plan Scale 1:500

(Area of Site
Shown Outlined in Red = 14618sq.m.)
Proposed Civic Amenity in Green
Outline
All remaining infrastructure is existing.

REV	29.06.10	ISSUE	MW	JOC	APP

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Greenstar Recycling (Munster) Ltd.

TITLE
Site Layout Plan

SCALE	FIGURE No.	REV.
NTS	2	

Site Development

The only change to the existing site layout involves the provision of a Civic Amenity Area in the north east of the site, in an area currently used for skip storage and car parking. It is proposed to extend the current waste acceptance and operating hours and to increase the overall amount of wastes accepted annually. It is not proposed to construct any new permanent buildings, significantly change the existing site layout, infrastructure or drainage arrangements.

The Civic Amenity Area will have its own entrance, which is already in place and will consist of skips, bins and bottle banks for people to place mainly segregated wastes. The waste will include a small amount (less than 10 tonnes per annum) of household hazardous waste, for example, bleach and household cleaning agent bottles.

Opening Hours

Condition 7 of the current planning permission states '*The facility shall not be open to receive waste outside the hours of 0800 hours to 1800 hours Monday to Friday and 0800 hours to 1400 hours Saturday'*. These hours severely restrict the service Greenstar can provide to its business customers, particularly those in the city and large towns, who require early morning or late evening collections to minimise disruption to their customers.

The proposal to change the waste acceptance hours to 24 hours, 7 days a week is to accommodate only some of Greenstar's commercial customers and it is expected that the majority of the wastes will be accepted from 7am to 7pm Monday to Saturday. It is not expected that wastes will be delivered throughout the entire night time. The Civic Amenity Area will be open from 7am to 7pm Monday to Saturday and from 9am to 5pm on Sundays.

Waste Volumes

Condition 1 of the current planning permission restricts the quantity of wastes to 95,000 tonnes annually. It is proposed to increase this to 200,000 tonnes per annum. It is not proposed to change the types of waste, with the exception of a small amount (10 tonnes) of household hazardous waste. The existing building and equipment have the capacity to process the additional wastes.

Existing Environment, Potential Environmental Effects and Mitigation Measures

Climate

The climate in the area is mild and wet, with the prevailing wind from the south west. The proposed changes will not have any impact on the local climate.

Geology / Hydrogeology

Groundwater monitoring at the site has shown that the existing operations have not affected the ground or groundwater. It is not proposed to carry out any construction works or disturb any ground. The proposed change to the working hours and increase to the amounts of waste taken in will not give rise to any new emissions to the ground or groundwater and therefore there will be no impacts on soil and groundwater.

Surface Water

Rainwater from the roofs and paved areas is collected and piped to the storm sewer serving the Industrial Estate, which is connected to a stream about 100m to the east of the facility. Surface water quality monitoring has found the quality of the run-off from the site is good and is not impacting on the stream. The proposed changes will not affect the existing surface water drainage system, or the volume and quality of the run-off.

Ecology

The site is either paved or covered by buildings. It is not proposed to disturb any ground and the proposed operational change will have no impact on the local ecology.

Air Quality

Dust monitoring has shown that the facility is not a significant source of dust. The proposed changes will mean an increase in traffic to and from the facility, which is a possible source of dust. Dropping off construction waste from small household renovation jobs at the Civic Amenity Area may also be a minor source of dust. However, the current dust control measures, which include damping down paved areas in dry weather, have proven to be effective and will continue to be used.

Odours

Odours are controlled by an advanced odour control system, installed in 2006, which collects air from the part of the building where wastes containing foodstuffs are handled and treats this air in a filter. The control system has proven to be effective. The proposed changes will not result in any changes to the area where this waste type is handled and the control system has the capacity to manage the increases in waste amounts.

Noise

Noise surveys carried out to assess the noise impacts, have established that the proposed changes will not cause noise impacts at the nearest residences to the site, which are located approximately 170m away. All waste processing is carried out in doors and this will continue. The Civic Amenity Area will not be a significant source of noise.

Landscape

It is not proposed to alter the buildings or disturb any ground and so there will be no impact on the landscape.

Traffic

There will be increased traffic associated with the proposal to increase the amount of waste taken in. An assessment of the existing traffic and future traffic on the local roads shows that the overall increase in traffic will be small. Large vehicles will be diverted from the road between Buck Leary's Cross Road and Glanmire Village and instead will use the Dublin – Cork. Road. The assessment also looked at the potential traffic impacts associated with the proposed Civic Amenity Area and found these to be negligible.

Cultural Heritage

There are no known significant archaeological, heritage or socio-cultural features either on the site, or the adjoining lands.

Human Beings

Land use in the surrounding area is a mix of industrial, commercial, residential and agricultural. The nearest house is 170 m to the north-west of the site boundary. There are no hospitals, hotels or holiday accommodation within 1 km of the site. St Stephens's hospital is approximately 1.2km to the south of the facility. The facility is designed and managed in a way to prevent any impacts on human beings in the locality. The proposal to operate a Civic Amenity Area is a positive impact, as it will provide an outlet for householder that do not have a waste collection service or who need to dispose of bulky items, for example mattresses.

Material Assets

The site is in an area zoned for industrial and related development, and it does not have a significant leisure or amenity value. The potential for damage to amenities and leisure land use arising from the proposed changes are very low.

Interaction of the Foregoing

The proposed changes have the potential to impact on human beings arising from noise, dust, vehicle exhaust emissions, odour and traffic. The location, design and proposed method of operation have taken these potential impacts into account. Proven effective control measures are used to ensure that the facility has and will have a minimum environmental impact.

PREAMBLE

This Environmental Impact Statement (EIS) examines the potential impacts and significant effects on the environment of the proposal by Greenstar Recycling (Munster) Ltd. (Greenstar) to increase the volume of waste accepted; increase the waste acceptance and operational hours, and operate a Civic Amenity Area at its existing waste Materials Recovery and Transfer Facility at Sarsfieldcourt Industrial Estate, Glanmire, County Cork.

The information contained in the EIS complies with Paragraph 2 of the Second Schedule of the European Communities Environmental Impact Assessment Regulations 1989, as amended by the European Communities (Environmental Impact Assessment) (Amendment) Regulations 2001.

The EIS follows the grouped format structure recommended in the Guidelines on the Information to be Contained in Environmental Impact Statements (March 2002), published by the Environmental Protection Agency (Agency), and the Agency's Advice Notes to these Guidelines. This structure assesses each relevant topic in a separate section, which describes the existing environment, the impacts associated with the proposed development and where considered necessary, the proposed mitigation measures.

Public Consultation

Greenstar held pre-application discussions with Cork County Council in February and June 2010 and also informed the Agency of the proposed changes and that it would be applying for a revised Waste Licence to authorise these changes.

Greenstar published a notice of its intention to extend the operational hours, increase the waste volumes and operate the Civic Amenity Area in the Evening Echo and invited written submissions, which would be taken into consideration during the preparation of the EIS. A copy of the newspaper advertisement is included in Appendix 1. No submissions were received.

Difficulties in Compiling the Required Information

OCM did not encounter any particular difficulties in compiling the information that formed the basis of the EIS. Given the nature of the proposed changes to facility operations, which do not involve ground disturbance or the construction of any new buildings, specialist archaeological, and landscape assessments were not required. A biological assessment of the surface water stream, which receives run-off from the site, was completed at the request of the Planning Authority.

Project Team

O' Callaghan Moran & Associates (OCM) were the prime consultants, and were assisted by a number of specialist service providers. Unless otherwise referenced, OCM were responsible for completing the baseline surveys and assessment of impacts.

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1. INTRODUCTION

Greenstar Recycling (Munster) Ltd (Greenstar) is part of Ireland's leading integrated waste management company, Greenstar Holdings Limited, which operates waste recovery, recycling and disposal facilities in counties Cork, Dublin, Galway, Kildare, Kilkenny, Limerick, Meath, Sligo, Waterford, Wexford and Wicklow.

Greenstar opened its Materials Recovery and Transfer Facility (MRTF) at Sarsfieldcourt Industrial Estate, Glanmire in 2003 and has operated the facility in accordance with the planning permission (S/00/1517 & PL.04.120116) granted by the planning authority, Cork County Council, and Waste Licence(s) (W0136-02) issued by the Environmental Protection Agency (Agency).

This Environmental Impact Statement (EIS) was prepared in support of an application by Greenstar to the planning authority for planning permission to increase the quantity of wastes that can be accepted at the facility, change the waste acceptance hours and to operate a Civic Amenity Area.

The EIS examines the potential impacts and significant effects on the environment associated with the proposed changes. Where the potential for a significant impact is identified, measures to either prevent, or mitigate that impact are presented. The EIS will also accompany an application to review the current Waste Licence.

1.1 Waste Activities

The facility currently accepts and processes source separated and mixed non-hazardous solid wastes. The waste types include Household, Commercial & Industrial (C&I) and Construction & Demolition (C&D). Day to day operations involve on-site mechanical and manual sorting, compacting, baling and transfer off-site to recycling/treatment and disposal (residual landfill) facilities. The facility is authorised to compost biodegradable wastes, but the compost plant has not yet been built, however this may be constructed at some point in the future.

The current planning permission allows for the acceptance of 95,000 tonnes of waste per annum between the hours of 08:00-18:00 Monday to Friday and 08:00 – 14:00 on Saturdays. There is no restriction on the operational hours. The Waste Licence allows the acceptance of 99,017 tonnes annually between the hours of 08:00-18:00 Monday to Friday and 08:00 – 14:00 on Saturdays and sets operational hours from 07:00 – 20:00 Monday to Friday and 07:00 – 15:00 on Saturdays.

1.2 Proposed Changes

Greenstar proposes to

> Extend the waste acceptance and operational hours from the current 12-13 hours daily to 24 hours, seven days per week;
>
> Operate a Civic Amenity Area where members of the public can drop off waste that may include small quantities of hazardous household wastes, and
>
> Increase the waste acceptance limit to 200,000 tonnes per annum.

It is not proposed to disturb the ground, construct any new permanent buildings, alter the drainage system or install any new types of plant or equipment. The only new structure will be a small portakbin type office at the Civic Amenity Area.

It is not intended to accept waste continually over 24 hours seven days a week and the majority of waste will continue to be accepted during normal business hours from Monday to Saturday. However, due to the nature of the waste recycling business, it is on occasion necessary to accept waste outside the normal hours, for example to meet customer demands in relation to the collection of wastes in urban areas.

The primary purpose of the facility is to maximise the recovery of recyclable materials from the incoming waste streams and to minimise the amount of waste disposed to landfill and, as such, it is an integral part of Greenstar's planned Mechanical Biological Treatment (MBT) capacity. Greenstar has invested heavily in the processing plant and equipment deployed at the facility, but this is currently underused due to the restriction of the operational hours and amount of waste that can be accepted.

Future growth in the volumes of materials recovered/recycled depends on achieving the maximum efficiency from the existing processing capacity and increasing recycling options for the general public, such as the proposed Civic Amenity Area.

2. PLANNING POLICY AND CONTEXT

2.1 Introduction

This Section describes the planning history and main planning policy statements that affect the facility, and describes how it is consistent with European Union (EU), national and regional waste management policy objectives.

2.2 Planning History

Three planning permissions have been granted for the site: -

1. Planning Reference No. S/3460/90. Planning permission for a warehouse issued to United Transport Ltd on the eastern lot. This was not developed.

2. Planning Reference No. S/95/1339. Planning permission for the construction of warehouse, offices and toilets for the manufacture and storage of corrugated cardboard products issued to Pakform Ltd on the western lot. This was not developed.

3. Planning Reference No. S/1517/00. Erection of a recycling and waste transfer station, including a main process building, a weighbridge office, weighbridge platforms and associates external works including truck and bin parking areas" issued to Ahern Industrial Services Ltd. (Ahern) for the entire site on the 1st June 2000. The Decision was appealed to An Bord Pleanála, which confirmed the grant of permission on the 29th January 2001 (PL 04.120116).

Greenstar acquired Ahern in 2002 and started construction works. The facility opened in 2003.

2.3 National Waste Management Policy

Waste Management Policy

National waste management policy is grounded on the Department of the Environment and Local Government's policy statement of September 1998, "*Changing Our Ways*". This statement firmly bases national policy on the EU Waste Management Hierarchy. In descending order of preference this is: -

Prevention;
Minimisation;
Reuse;
Recycling;
Energy Recovery;
Disposal.

The policy statement was based on, and supported by, EU legislation that requires the reduction in the volume of biodegradable waste disposed to landfill. EU Landfill Directive 99/31/EC sets out the following reduction targets, which are based on 1995 figures:-

Minimum 25% reduction by 2010 (includes 4 year derogation);

Minimum 50% reduction by 2013 (includes 4 year derogation)

Minimum 65% reduction by 2016 (derogation available but not taken).

"Changing our Ways" recognised that the achievement of these targets requires the development of alternative waste recovery facilities and significant expansion of the existing recycling infrastructure. It emphasised the utilisation of the potential of the private sector to deliver services.

The 2002 government policy statement *'Preventing and Recycling Waste - Delivering Change'* identified initiatives to achieve progress at the top of the Waste Hierarchy in terms of preventing waste arising and increasing recycling rates.

In further policy documentation 'Waste *Management – Taking Stock and Moving Forward' 2004*, the significant improvement in recycling rates achieved since 1998 were recognised, but the need for further expansion is emphasised. The statement confirms that Ireland's national policy approach remains *'grounded in the concept of integrated waste management, based on the internationally recognised waste hierarchy, designed to achieve, by 2013, the ambitious targets set out in Changing Our Ways'*.

The European Union (EU) has adopted a framework (Waste Framework Directive 2008/98/EC) for coordinating waste management in the Member States in order to limit the generation of waste and to optimise the organisation of waste treatment and disposal. The Directive also introduces the first EU wide recycling targets. By 2020, Member States must reuse or recycle 50% of certain categories of household waste and reuse, recycle or recover 70% of non-hazardous construction and demolition waste.

The Department of the Environment, Heritage and Local Government (Department) initiated a review of waste policy in 2008, with the objective of determining Irish waste management policy, including the role of local authorities and the private waste management industry. The scope of the review was to identify possible changes to policy at national level that would assist Ireland to move towards a sustainable resource and waste policy, including minimising the creation of waste and self-sufficiency in the reuse and recycling of materials.

The review also sought to address how better to implement waste prevention and minimisation in the context of the emergence of new technologies for waste management, particularly those for the MBT.

The proposed changes to the facility operation is consistent with national waste policy objectives, as it will enhance the opportunities to recover/recycle wastes and reduce the volume of waste going to residual landfill through the use of MBT.

2.4 Cork Waste Management Policy

Section 1 of the Cork County Waste Management Plan states that the Plan reflects government policy in waste planning, particularly in terms of reducing reliance on landfill in favour of an integrated waste management approach and increasing participation by the private sector in the provision of services.

The Waste Management Strategy for the Cork Region on which the Plan is based, which spans the 25 years to 2020, commits the Cork local authorities to:

> Act to conserve and protect the environment and natural resources of the region.
>
> Provide a framework to address the region's growing problem of waste management in accordance with best prevailing norms, financial capacity and best environmental practice.
>
> Provide solutions for three main issues:
>
> - Expansion of recycling facilities.
> - Reduction of the volumes disposed in landfill through pre-treatment options.
> - Proper disposal to landfill of residues in accordance with EU and EPA requirements.

The proposed changes to the facility operations are consistent with regional waste policy objectives, as they will increase volume of materials recovered/recycled at the facility.

2.4.1 Cork County Development Plan 2009

It is a policy objective (Policy Inf. 6-1) to: -

> Implement and support the provisions of the County Council's approved Waste Management Plan and in particular, to promote the development of facilities for the prevention, minimisation, re-use / re-cycling or disposal with energy recovery of waste material.

2.5 Need for the Development

The primary function of the facility is materials recovery. The incoming wastes are processed to separate out the different recyclable materials, which include, paper, cardboard, plastics, metals and organic content.

Arising from a change in emphasis away from landfill and towards MBT, which is driven by national policy, Greenstar has identified an opportunity to significantly increase recycling/recovery rates in the Cork region and is aiming to double the rate over the next two to three years. To achieve this, there is a need to expand both the facility's processing capacity and the recycling options open to the members of the public, both of which are objectives of the planning application.

3. ALTERNATIVES

3.1 Alternatives Examined

3.1.1 Alternative Locations

The facility is specifically designed for its current use and has the capacity to process the increased waste volumes. It is located in an Industrial Estate, where other occupants operate outside normal business hours. It is not economically viable to develop a new facility at an alternative location.

3.1.2 Alternative Site Layout & Processes

Waste processing and storage, with the exception of the Civic Amenity Area, will be carried out inside the existing facility buildings and the proposed changes do not require the construction of new buildings. The existing processing plant and equipment have the capacity to handle the increased waste inputs and does not require any upgrade or alteration.

The Civic Amenity Area is positioned in the north eastern part of the site, which is serviced by a separate entrance from that used by the bulk waste transport vehicles. This is the only part of the site that is suitable for the proposed use.

4. FACILITY DESCRIPTION

4.1 Introduction

This Section presents an overview of the facility and the surrounding area. More details on various aspects of the facility and operations are presented in the following Sections.

4.2 Location

The site, which encompasses 1.56 hectares (ha), is located in the Sarsfieldcourt Industrial Estate, approximately 5 miles north of Glanmire Village (Figure 4.1). The Industrial Estate is accessed off the R616, which connects with the N8 and the M8 approximately 2km north east of the site.

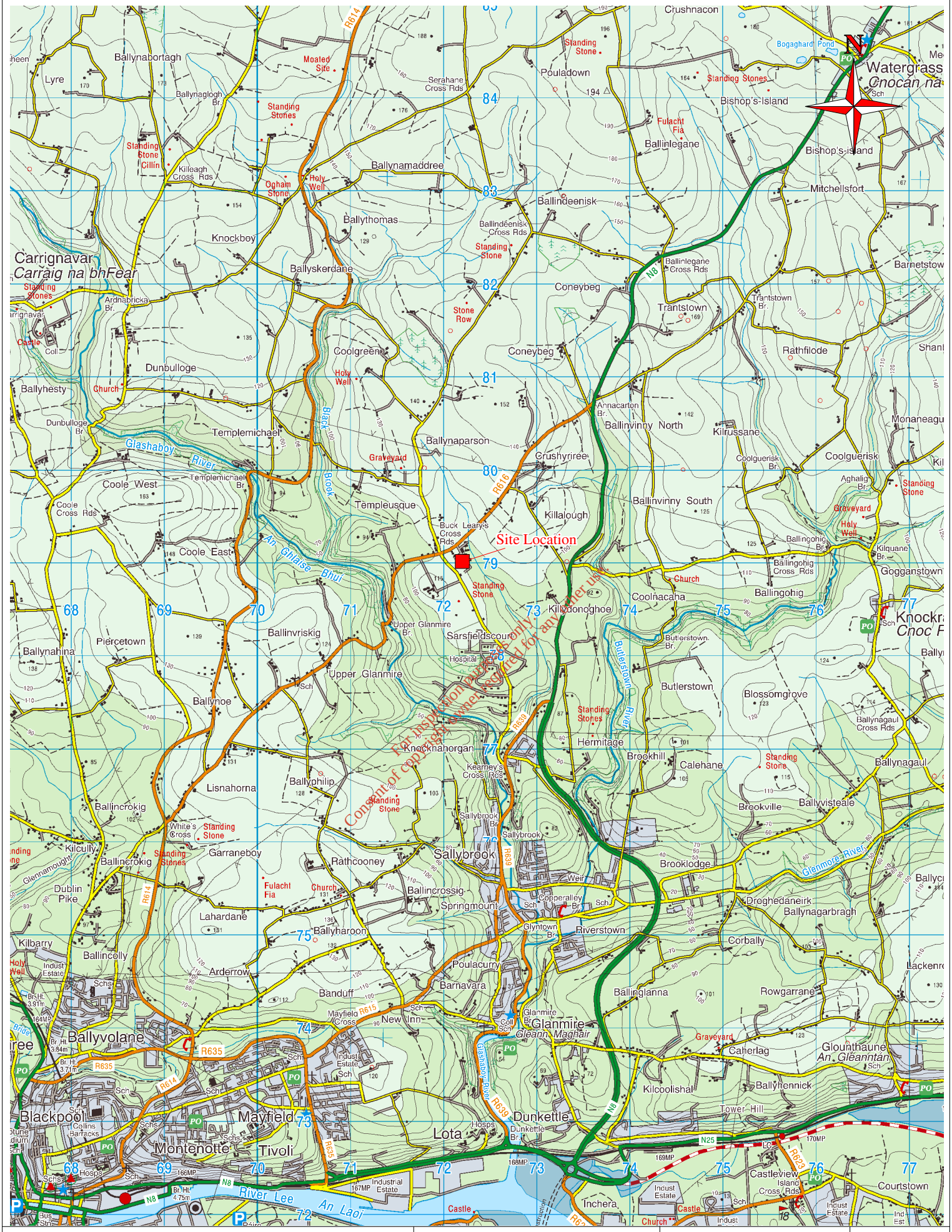
4.3 Layout

The facility comprises one MRF building and ancillary infrastructure, including administration offices, two weighbridges, a vehicle wash, paved open yards and parking areas (Figure 4.2). The proposed Civic Amenity Area will be in an area which is currently used for parking and the storage of empty skips and bins. It will be fenced off from the remainder of the site and will include a portakabin type office and a range of different waste receptacles.

4.4 Site History

Construction of the Sarsfieldcourt Industrial Estate began in the late 1980's and it is understood that prior to this the lands were in agricultural use. The first planning permission granted for the application site was in 1991 for a transport depot warehouse, but this was not constructed.

Ahern Industrial Services Ltd. (Ahern) acquired the site in 1998, and in 2000 obtained planning permission for change of use to a Waste Transfer Station. The Agency granted Waste Licence W0136-01 to Ahern in July 2001. Greenstar acquired Ahern in 2002 and constructed the existing facility, which began operations in 2003. In 2004, the Agency issued a revised Licence (W0136-02) that authorised changes in operations.



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CLIENT
Greenstar Recycling (Munster) Ltd.

TITLE
Site Location Map

DETAILS
O.S. Licence Agreement Number AR 0038709

Ordnance Survey Ireland. Government of Ireland

Sheet No. 80

FIGURE No.
4.1

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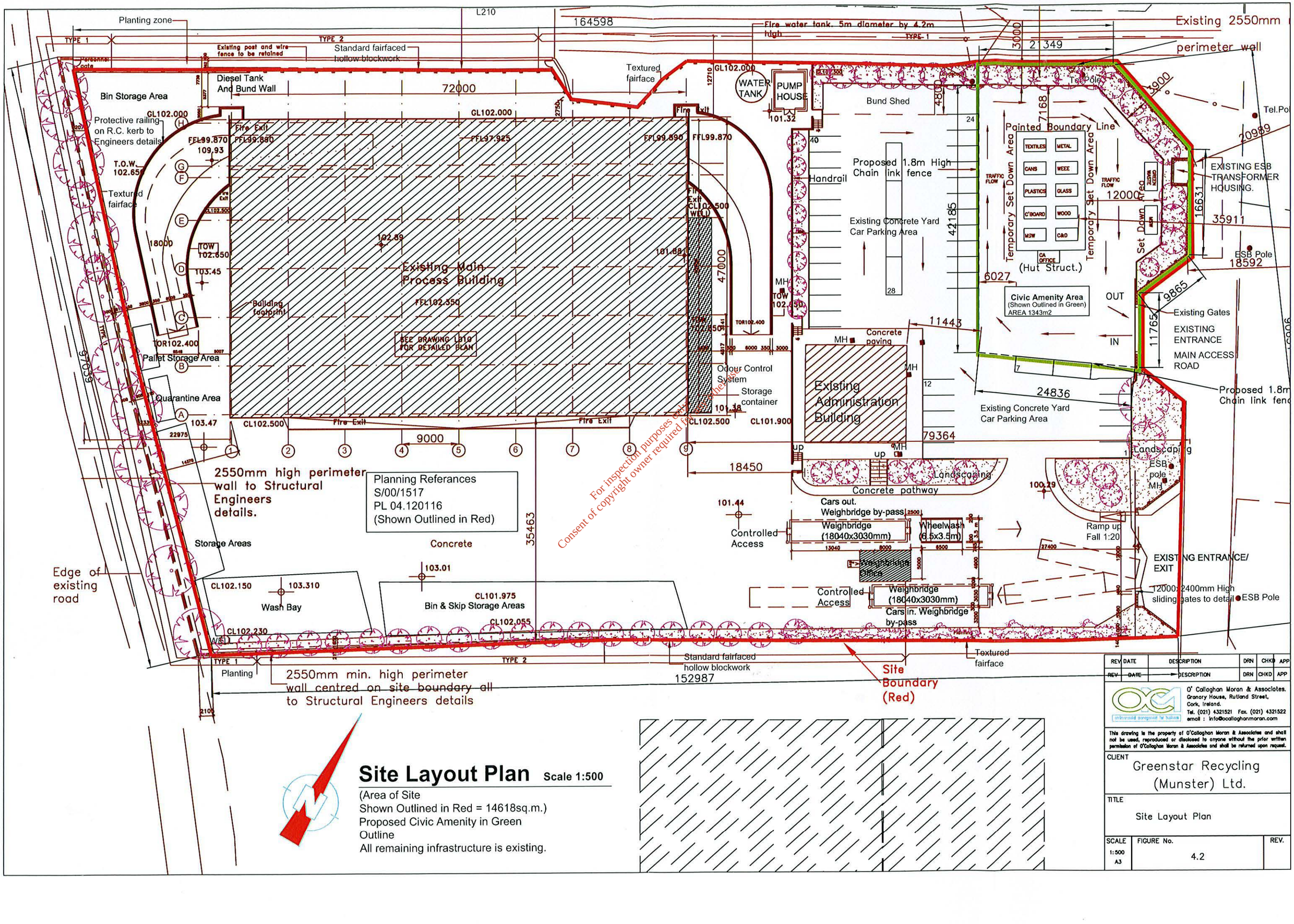
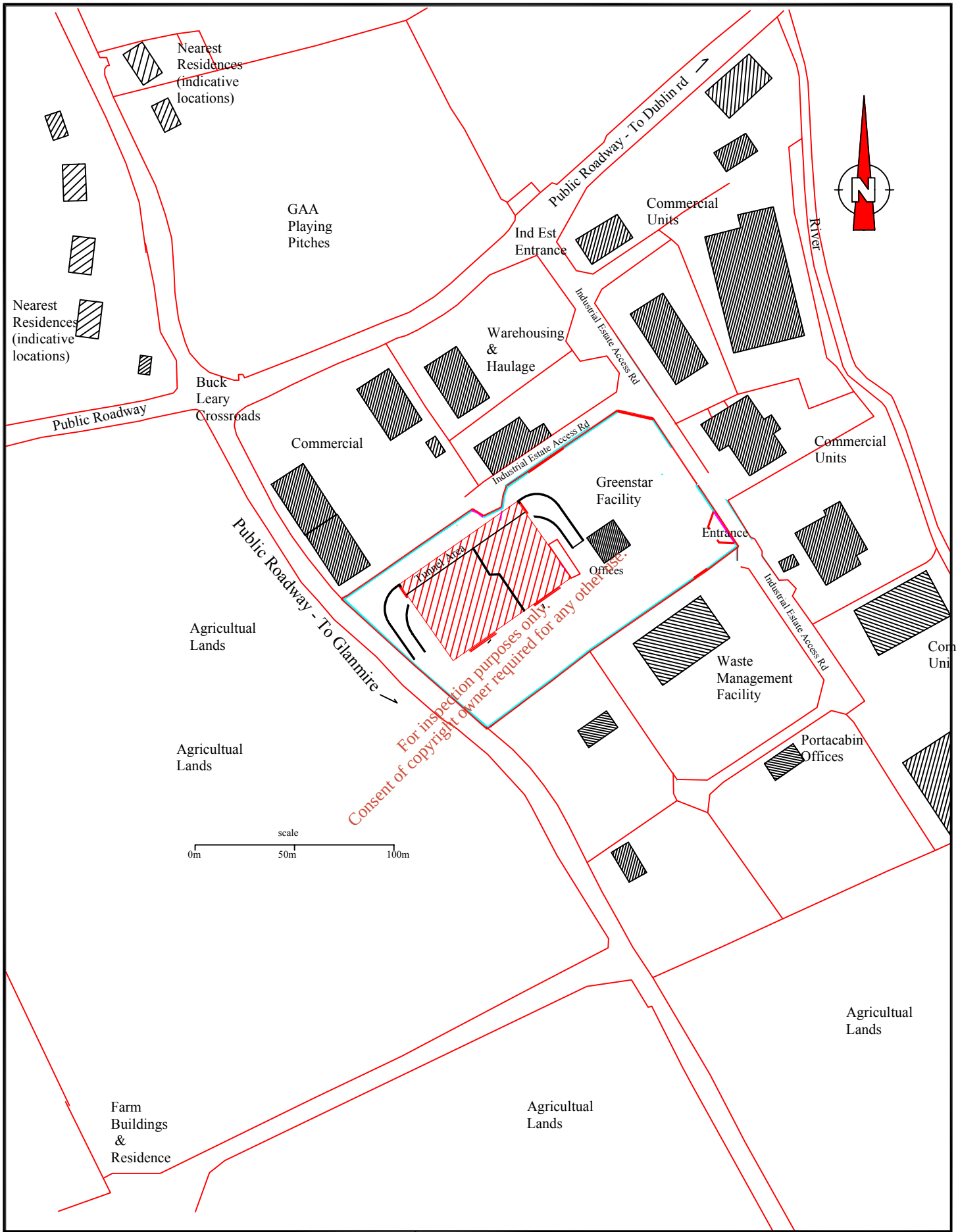


4.5 Surrounding Land Use

There are approximately sixteen other lots of varying sizes in the Industrial Estate. The facility is bounded to the north by haulage contractor's yards and associated warehouses, with a truck crash repair operation and farm supplies store further north; to the east by the Estate access road, with storage warehousing and manufacturing businesses further east; to the west by a local road, on the far side of which is agricultural lands (pasture) and to the south by a dry recyclables recovery facility. Other occupants of the Estate include a portakabin distribution centre; a scaffolding distribution centre and a fitted kitchen warehouse and store.

The Estate is in a rural area where the surrounding land use is primarily agricultural, with some low density residences (Ref Figure 4.3). The nearest sensitive location (private residence) is a house at Buck Leary's Cross Roads, approximately 170m to the north-west of the facility boundary. This is the first of a row of eight detached residences that extends northwards on both sides of the public road. The last residence is approximately 300m from the facility boundary. There are two residences approximately 350m south of the facility boundary and St. Stephen's Hospital is approximately1 km to the south. The closest residences to the north are 300m from the facility, along the R616 towards the N8/M8



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CLIENT
GREENSTAR

TITLE
SURROUNDING LANDUSE

DETAILS

OS Licence No. AR 0038709 Ordnance Survey Ireland

Figure No. 4.3

SCALE 1:2500

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5. PROJECT DESCRIPTION

5.1 Introduction

This Section describes the proposed changes to the facility operations. It provide details of the waste handling, treatment and support activities and also outlines the control measures incorporated into the facility design and operation to eliminate and/or mitigate environmental impacts. More information on the control measures are provided in other Sections of this document.

5.2 Site Development

It is not proposed to alter the existing site infrastructure or drainage arrangements. The Civic Amenity Area will comprise a range of open and closed receptacles for the acceptance of different household waste types and a portakabin-type office, but will not require the provision of any permanent structures.

5.3 Current & Proposed Hours of Operation

Condition 7 of the current planning permission stipulates '*The facility shall not be open to receive waste outside the hours of 0800 hours to 1800 hours Monday to Friday and 0800 hours to 1400 hours Saturday*'. These hours severely restrict the service that Greenstar can provide its commercial customers, particularly those located in urban areas who require either early morning, or late evening collection to minimise disruption to their business.

The proposal to change the waste acceptance hours to 24 hours 7 days a week is to facilitate some of Greenstar's commercial customers and it is expected that the majority of the wastes will be accepted from 07:00 – 19:00 Monday to Saturday. The Civic Amenity Area will be open to the general public from 0700 to 1900 Monday to Saturday and from 0900 to 1700 Sunday.

5.4 Current & Proposed Waste Volumes

Condition 1 of the planning permission restricts the quantity of wastes that can be accepted to 95,000 tonnes per annum. It is proposed to increase this to 200,000 tonnes per annum.

Table 5.1 shows the types and expected quantities of wastes that will be accepted. The quantities of the individual waste types may be greater than shown in the Table, but the total of 200,000 tonnes will not be exceeded.

Table 5.1 Total Expected Annual Waste Inputs

Waste Type	Maximum Capacity*
Commercial & Industrial	100,000
Household**	90,000
Construction & Demolition	10,000
Total	**200,000**

*Subject to Market Conditions
**Includes household waste accepted at the civic amenity area.

The vast majority of the waste comprises on-hazardous household, Construction and Industrial (C & I) and construction and demolition (C & D) waste. It is proposed to accept a small amount (10 tonnes per annum) of hazardous household wastes at the Civic Amenity Area.

5.5 Waste Acceptance Procedures

5.5.1 MRTF

Greenstar as developed documented waste acceptance procedures based on the conditions in the Waste Licence. All of the wastes delivered by waste collectors arrive in enclosed rear end loaders, curtain sided trailers and covered open top trailers and skips. All these vehicles are weighed on the weighbridge, any accompanying documentation checked and the contents of the vehicle inspected by Greenstar personnel to confirm its suitability. The vehicles then drive to a designated area inside the MRTF Building, where the waste is off-loaded.

Any waste load which is deemed to be unsuitable upon inspection at the weighbridge is not accepted. In such instances the name of the delivery contractor, the driver, the vehicle registration number and the nature and origin of the waste are recorded. The vehicle driver is then instructed to return the waste to the producer.

Materials identified as being unsuitable following off loading are, where practical, loaded back onto the delivery vehicle for immediate removal off-site. If this is not possible, the material is placed in designated quarantine area close to the western boundary of the site, where it is stored in a covered and bunded container pending its collection by either the waste producer or the waste contractor. Should the producer and/or contractor refuse to remove the waste, Greenstar ensures that it is removed off-site and disposed of at an appropriate facility as soon as is practicable. Greenstar maintains records of the waste type, quantity, and ultimate disposal/treatment facility.

5.5.2 Civic Amenity Area

The Civic Amenity Area will be supervised on a full time basis when open to ensure that unsuitable materials are not delivered. Appropriate signs will be erected that clearly identify what can be placed in each receptacle. Members of the public will be required to initially call to the office to inform the facility staff of the type of waste they have brought and pay the appropriate fee.

5.6 Waste Handling

All waste processing is and will continue to be carried out inside the MRTF building, When the individual receptacles in the Civic Amenity Area are full they will be brought into the MRTF Building and off-loaded for processing. The majority of the receptacles will be emptied at least once a day. In the case of mixed household waste containing putrescible materials, the receptacle will be emptied more frequently throughout the day, depending on quantities received to ensure that no odours are generated.

5.6.1 Household Waste

Household waste comprises source separated dry recyclables and mixed residual wastes. It is off- loaded in two discrete areas inside the MRTF Building. The Building is divided into Dry Waste and Mixed Waste processing areas by an internal steel stud partition wall. This facilitates the operation of an effective odour control system in the Mixed Waste area. More detail on the control system is presented in Section 11.

The source separated dry recyclables and similar materials are off-loaded in the Dry Waste area and then moved to the baling units or loading bays where, depending on its nature, it is baled, or compacted before being stored pending removal to off site recycling facilities. Dry recyclables collected in the Civic Amenity Area will be handled in a similar manner.

Residual mixed waste containing putrescibles is off-loaded in the Mixed Waste area where it is mechanically treated to remove potential recyclable materials including metals, paper, plastic and organic materials suitable for biological treatment. The recovered metals, paper and plastic are stored on-site pending removal to off-site recovery/recycling facilities. The organics are stored pending consignment to off-site approved biological treatment plants. The mixed household waste dropped off in the Civic Amenity Area will be handled in a similar fashion.

5.6.2 C & I Waste

The C & I wastes comprise source separated and mixed residual waste. Greenstar provides a source segregation service for customers that generate large quantities of this waste. Trained Greenstar staff sort and segregate waste at the customers premises, which means that source

separate separated materials generally contain a larger fraction of recyclable materials, such as cardboard, plastic and aluminium cans, than the household dry recyclables.

These materials are off-loaded in the Dry Waste area and processed in the same way as the household wastes. The mixed residual waste is off-loaded in the Mixed Waste area of the MRF building where it is processed in the same way as the household mixed waste

5.6.3 C & D Waste

C & D Waste is off-loaded in a designated part of the Mixed Waste area of the MRF building. Large items of wood, metal or plastic are removed using a mechanical grab or trommel and moved to a designated storage area. The remaining material is mechanically screened. The oversize and undersize are stored on-site pending removal for further processing or use in off-site recovery operations. The C&D waste dropped off in the Civic Amenity Area will be handled in a similar fashion.

5.7 Staffing Levels

The facility is staffed by trained personnel. There are currently 40 full time staff, including a Facility Manager, Site Foreman, Weighbridge Clerk, and machine operators. In addition, up to 60 drivers are based at the site. Additional staff (approximately 10% increase) will be employed at maximum capacity.

The Facility Manager, who has the appropriate training and experience as required under the Waste Licence, is responsible for day-to-day facility operations. Appropriately trained and experienced staff are present all times when the facility is open to supervise waste acceptance, processing and transfer.

5.8 Facility Equipment

The type and numbers of fixed and mobile plant and vehicles used is shown in Table 5.2. The existing equipment has the capacity to process the increased waste quantities and no additional items are required.

All key plant items have 100% duty and 50% standby capacity to handle 200,000 tonnes per annum. Additional supporting plant items may be hired in for use for short periods, if required to ensure continued site operations. Critical spares are maintained on-site and a preventative maintenance programme is implemented and records of thiskept by the Facility Manager.

Table 5.2 Plant and Equipment

No.	*Plant*	Model	Operational Capacity	Standby Capacity
2	Conveyor lines	Generic	25t/hr	25t/hr
1	Picking Line	7-bay sorting line	Not in Use	N/A
1	Baler	Bollegraff	20t/hr	0
21	Trucks	Curtain Sider * 1	66 hr/wk	-
		Roll on Roll Off Vehicles * 1	66 hr/wk	-
		Skip Trucks * 5	66 hr/wk	-
		Refuse Trucks * 8	66 hr/wk	-
		Crusher * 3	66 hr/wk	-
		Glass * 2	66 hr/wk	-
		Transit Tipper*1	66hr/wk	-
1	Trommel	Turmec	25t/hr	0
1	Loading Shovel	Liebherr L544	70t/hr	0
2	Fork Lift	2 Jungheinrich 2.5tonnes	60 hr/wk	60hr/wk
2	Grab	Liebherr 904	25t/hr	25t/hr
1	Weighbridge – 2 scales	-	56hr wk	56 hours
1	Wheel Wash	Generic	56hrs/wk	0

5.9 Safety and Hazard Control

All facility personnel and visitors entering the MRTF, including waste contractors, are obliged to comply with Greenstar's safety guidelines. These regulate access to and from the facility and on-site traffic movement. All site personnel are provided with, and obliged to wear, the appropriate personal protective equipment (PPE). PPE includes facemasks, gloves, safety glasses, steel-toed footwear, overalls, reflective jackets and helmets.

To avoid the potential for accidents between the bulk waste transport vehicles and members of the public using the Civic Amenity Area, the Area will be accessed using the northern site entrance, while all heavy goods vehicles will continue to use the southern entrance. The Area will be surrounded by a chain link fence to prevent public access to the rest of the facility.

5.10 Oil / Chemical Storage

Operations involve the storage and handling of fuel for the site plant and collection vehicles, engine hydraulic and lubricating oils, anti-freeze, detergents and disinfectants. A dedicated, bunded oil storage area is provided at the northern site boundary, as shown on Figure 4.2. The bund, which has a capacity of 32,000 litres (l) and contains a 19,000 l vehicle refuelling diesel tank, a 2,300 l waste oil tank, a 2,500 l plant refuelling diesel tank and a 1,000 l detergent (Adblu) Intermediate Bulk Container (IBC).

The waste quarantine area is located at the western site boundary. This consists of a specially designed bunded container, which is used to store miscellaneous small items removed from the incoming wastes and small drums of oils.

The retaining capacity of both the oil storage and waste quarantine areas is >110% of the largest storage tank/container in the bunds and are completely covered to prevent the accumulation of rainfall. Both bunds were inspected and tested and passed fit for purpose in July 2009. The results of the bund tests are included in Appendix 2.

5.11 Water Supply

The facility obtains its water supply from an on-site well. There is a 300 cubic meter (m^3) water tank and associated pump house on the northern boundary. This tank is topped up from the well as required.

5.12 Surface Water Management

The surface water drainage system is shown on Drawing No. IE539. Run-off from the paved yards and building roofs is collected and discharged to the drainage system serving the Industrial Estate. Silt traps and two oil interceptors are provided at the locations shown on Drawing No. IE539. More details on the surface water drainage are presented in Section 9.

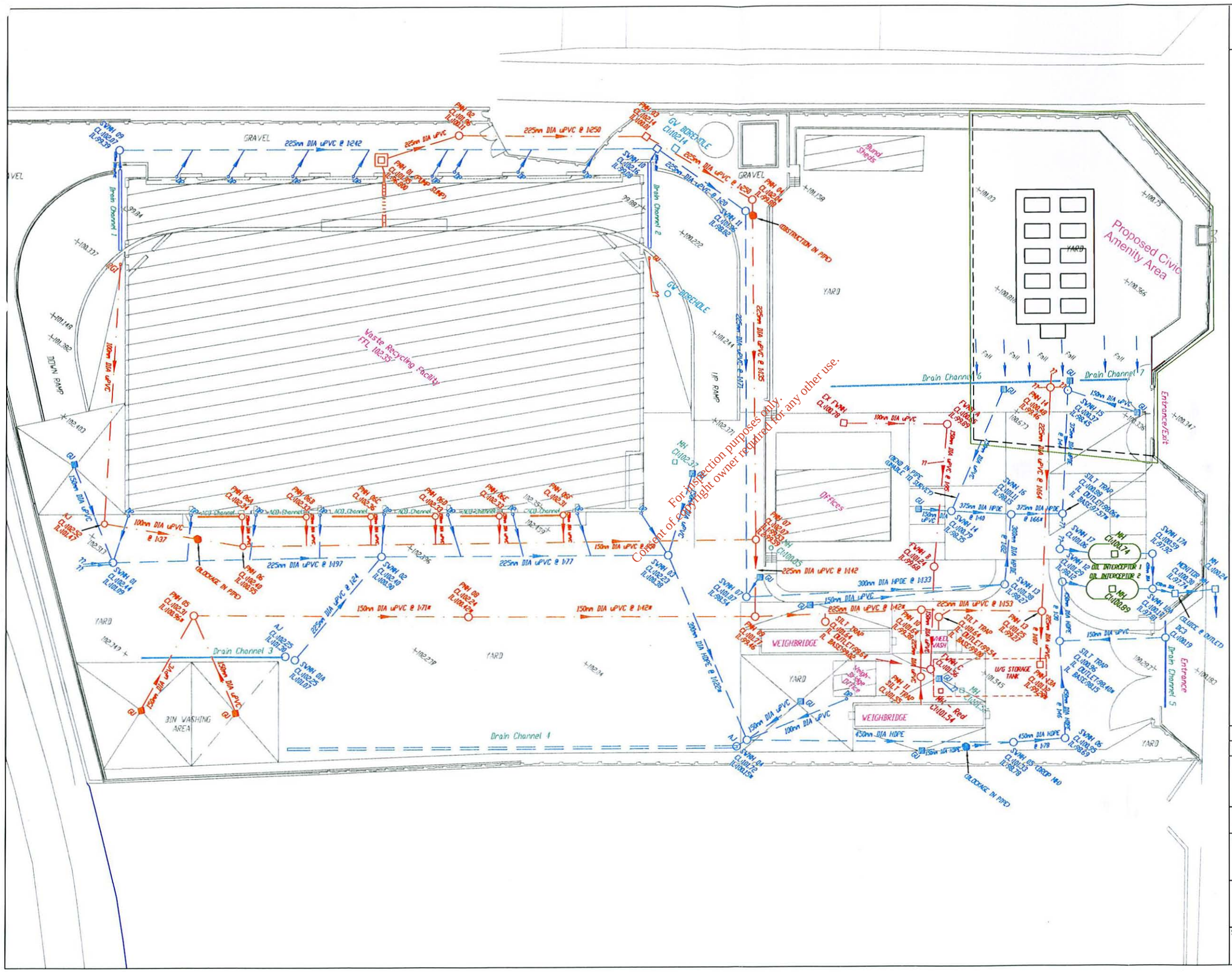
5.13 Wastewater

The sanitary and wastewater drainage system discharges to a holding tank located to the east of the site security hut, as shown on Drawing No IE539. The tank is emptied as required and the contents sent to a wastewater treatment plant in Leixlip, County Kildare. In 2009, 548.88m^3 of wastewater was consigned from the facility. Wastewater monitoring is undertaken biannually as required by the Waste Licence and the 2009 and Q1 2010 results are shown in Table 5.3.

Table 5.3 Wastewater Monitoring Results 2009 and Q1 2010

Parameter	Units	March '09	August '09	March 2010
Temperature	°C	9.5	18.5	15.5
pH	pH units	7.98	7.83	7.59
Conductivity	mS/cm	0.484	0.481	0.375
BOD	mg/l	13	6	28
COD	mg/l	91	163	74
Ammoniacal Nitrogen	mg/l	1.11	1.05	0.82
Total Suspended Solids	mg/l	276	53	14
Mineral Oils	mg/l	72	<0.01	0.213

NOTES



REV	DATE	DESCRIPTION	DRN	CHKD	APP
A	15/06/2010	PRELIMINARY ISSUE	MW	SM	**

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CLIENT

GREENSTAR

TITLE

DRAINAGE
LAYOUT
SARSFIELDCOURT

SCALE	DRAWING No.	REV.
1:500 A3	IE539	A

5.14 Waste Generation

The facility generates small volumes of office type wastes. Greenstar operates a source segregation policy to maximise the recovery of potential recyclable materials from these waste streams. All recovered materials are transferred off-site to recovery/recycling facilities. The mobile plant is subject to on-site maintenance by a contractor. The waste oils and batteries are removed off-site for disposal/recovery at licensed treatment/recovery facilities.

Unsuitable materials, e.g. batteries, gas cylinders etc. removed from the wastes delivered to the site and which cannot be removed by the delivery vehicle, are stored on-site in a bunded container pending removal off-site for disposal at appropriately licensed facilities. The oil interceptors and silt trap on the surface water and waste water drainage system are routinely cleaned and emptied, and the contents sent off-site for disposal/treatment at appropriately licensed facilities

5.15 Nuisance Control

The mixed Household and C&I waste contains foodstuffs and other putrescible materials, have the potential to give rise to nuisance.

5.15.1 Litter

Site activities are not a significant source of litter. All waste road transport vehicles are either fully enclosed or covered. All bulk waste handling operations, including waste off-loading and processing, is carried out inside the MRTF Building. CCTV cameras are provided at the facility entrance to deter fly-tipping. Enclosed bins will be provided in the civic amenity area for wastes that have the potential to generate litter. Daily litter patrols are carried out both on and offsite to ensure litter in the vicinity of the facility is removed.

5.15.2 Birds

Birds can be attracted to waste management facilities where there is available foodstuff. The mixed household and C & I waste include some foodstuffs. However, such waste is delivered in fully enclosed vehicles and, with the exception of the Civic Amenity Area, all these waste types are handled internally and all wastes are removed from the facility in fully enclosed vehicles. These practices are proven to eliminate bird attraction and birds are not a significant issue at the facility.

An enclosed bin will be provided in the Civic Amenity Area for mixed household waste. This bin will be emptied as necessary throughout the working day and brought into the MRTF Building for processing.

5.15.3 Vermin/Pests

Vermin and insects are a potential problem at facilities where waste containing foodstuff and other putrescibles is not handled properly. However, this usually arises where waste is either being disposed of (landfilled) or stored for long periods of time. At the facility, waste containing foodstuffs and putrescible matter are generally processed and the organic components transported off-site the same day. Where mixed waste containing putrescible matter has to be retained on-site overnight, it is stored inside the MRTF Building.

The facility is inspected daily for the presence of insects or vermin and deinfestation measures are implemented as necessary. Greenstar, as a preventative measure, has engaged a pest control contractor to implement vermin control measures on a routine basis.

5.15.4 Odours

The facility accepts wastes that have the potential to be a source of odours e.g. food stuffs and other putrescibles in the mixed household and C&I. Such wastes are generally processed and the organic components transported off-site the same day. The mixed waste bin provided at the Civic Amenity Area will be regularly emptied throughout the working day. Where mixed waste containing putrescible matter has to be retained on-site overnight, it is stored inside the MRTF Building.

The Mixed Waste area is maintained under negative air pressure provided by an air extraction system connected to an odour abatement system before discharge to atmosphere. Further details of the odour management system, including its capacity to handle the increased waste inputsare presented in Section 12.

5.15.5 Dust

Dust is not a significant issue at the facility. Apart from the Civic Amenity Area, there is no open storage of waste and all waste processing is carried out inside the MRTF Building. The facility access roads, vehicle manoeuvring and parking areas are all paved.

5.15.6 Noise

Noise is generated by the waste processing plant and vehicle movements. An assessment of baseline noise levels in the vicinity of the site, the predicted noise impacts and mitigation measures is presented in Section 13.

5.16 Site Security

There is a 2.5 m high perimeter blockwork wall surrounding the site. The entrance gates are locked when the facility is closed. In addition, CCTV cameras are strategically located throughout the site to deter unauthorised entry or fly-tipping.

5.17 Landscape Measures

The proposed changes to facility operation will not have any impact on existing landscaping measures.

5.18 Natural Resource Consumption

Facility operations involve the consumption of water, oil, detergents, carbon in the odour abatement system and electricity. The quantities consumed in 2009 are given in Table 5.4. The proposal to increase the volumes of waste processed will result in an increase in resource consumption.

Table 5.4 Resource Consumption 2009

Resources	Quantities
Road Diesel	5,685,446 litres
Ad Blue	2,000 litres
Hydraulic, Transmission, Engine Oil	3,000 litres
Electricity	247,800 units
Carbon	44,000 kg

5.19 Environmental Monitoring Programme

An environmental monitoring programme is implemented at the facility in accordance with conditions and schedules of Waste Licence W0136-02. The programme includes monitoring of surface water, waste water, groundwater, noise, dust and odour emissions.

5.20 Contingency Arrangements

Greenstar has prepared an Emergency Response Plan designed to ensure a rapid response to any incident by trained staff and minimise the impact on the environment of any associated emissions.

5.21 Changes to the Project

The facility has the capacity to process a maximum of 200,000 tonnes per annum. It is not envisaged that there will be any subsequent significant changes to the facility operations over its lifetime. In the unlikely event that the facility closes down, the closure will be managed in accordance with the conditions set in the Waste Licence.

5.22 Associated Developments

The facility is designed to meet national and regional waste management policy objectives on waste recovery. The processed materials will be transferred off-site to existing and new recycling/recovery operations. While Greenstar will, depending on market conditions, avail of existing waste recovery/recycling facilities in the region, it is not envisaged that the proposed changes to operations will be directly or indirectly responsible for any associated developments.

6. CLIMATE

6.1 Introduction

This Section describes the climate at the facility and is based on meteorological data obtained from the Cork Airport Meteorological Station.

6.2 Meteorological Data

The climate in the area can be described as mild and wet, with the prevailing wind direction from the south west. Average rainfall, temperature, humidity and wind speed and direction for the Meteorological Station at Cork Airport is presented in Table 6.1 and more detailed information is contained in Appendix 3.

Table 6.1 Meteorological Data: Cork

Rainfall	
Annual average	1207 mm
Average maximum month (Jan)	148.3 mm
Average minimum month (July)	65.4 mm
Temperature	
Mean Daily	9.4 C
Mean Daily Maximum (July)	18.5 C
Mean Daily Minimum (Feb)	2.5 C
Relative Humidity	
Mean at 0900UTC	87%
Mean at 1500UTC	77%
Wind (Knots)	
Frequency of calms	0.6%
Prevailing direction	South West
Prevailing sector	South West

The average annual rainfall at the site is 1207 mm. The winds are predominantly from a south west direction.

6.3 Impact Assessment

The proposed changes to operations will not result in any impacts on the climate or microclimate at the site. By diverting biodegradable material from landfill the facility assisting the reduction of greenhouse gases (carbon dioxide, methane) generated at such sites.

7. TRAFFIC

7.1 Introduction

This Section describes the existing traffic conditions and is derived from a Traffic Impact Assessment (TIA), carried out by Trafficwise Ltd. A copy of the Trafficwise report, which describes the methodologies applied and the full appraisal analyses, is included in Appendix 4 and the findings are summarised herein.

7.2 Existing Conditions

Traffic classified turning count surveys were conducted at the site access and the nearby Buck Leary's Crossroads using video surveillance technology on Tuesday 23rd February 2010 (Appendix A of the Trafficwise Ltd Report). The surveys recorded traffic flows on the R616 and Buck Leary's Crossroads together with all vehicles arriving at and departing from the Sarsfieldcourt Industrial Estate. Greenstar vehicles were separately classified at both survey locations.

7.2.1 R616 Traffic Flows

Over the course of the traffic count, the R616 carried a total two-way traffic flow of 2,620 No. vehicles, of which some 243 No. (9%) were heavy goods vehicles (HGV). The R616 experienced two peak hour periods at 08:00hrs to 09:00hrs in the morning and 17:00hrs to 18:00hrs in the evening, which are typical commuter peak hours.

During the morning peak hour, a total two-way traffic flow of 347 No. (4% HGV) vehicle movements were recorded, whilst during the evening peak hour a total two-way traffic flow of 333 No. (4% HGV) vehicle movements were recorded. The number of HGV on the R616 during both peak hours is significantly less than that recorded in other periods throughout the day.

Over the course of the 12 hour survey the R616 had an average hourly two-way traffic flow of 220 No. vehicle movements, with an average of 20 No. HGV per hour. Based on the National Roads Authority (NRA) document RT201, the R616 has an indicative AADT1 in the range of 3,200 to 4,800.

7.2.2 Glanmire Road Traffic Flows

The Glanmire Road (between Buck Leary's crossroads and Glanmire Village) carried a total two-way traffic flow of 1,687 No. vehicles of these a total of 135 No. (8%) were HGV. The peak hours were identical to that recorded on the R616, 08:00hrs to 09:00hrs in the morning and 17:00hrs to 18:00hrs in the evening.

During the morning peak hour a total two-way traffic flow of 173No.(4% HGV) vehicle movements was recorded, whilst during the evening peak hour a total two-way traffic flow of 183 No.(3% HGV) vehicle movements was recorded. Over the course of the surveys, the Glanmire Road showed an average hourly two-way traffic flow of 140 No. vehicle movements, with an average of 11 No and is estimated to have an indicative AADT in the range of 2,000 to 3,100.

7.2.4 Traffic Generated by Industrial Estate

The Industrial Estate generated a total of 900 No. traffic movements (446 No. in and 454 No. out) during the 12-hour survey. This traffic was made up of 231 No. HGV movements and 669 No. Car/Van movements. The peak hour of Industrial Estate generated traffic was recorded from 16:00hrs to 17:00hrs. During this hour, the Industrial Estate generated a total of 112 No. traffic movements (46 No. in and 66 No. out). In comparison an average two-way traffic flow of 75 No. movements per hour was recorded across the survey.

In terms of traffic distribution, 74% of all traffic arrived at/departed the Industrial Estate to/from the west (Buck Leary's Crossroads); with 26% arriving at/departing to/from the east (R639).

7.3 Traffic Generation at Existing Facility

7.3.1 Traffic Survey Analysis

A combined total two-way traffic flow of 282 No. movements (125 No. in and 157 No. out) were recorded at the two existing site entrances. On the day of the survey, there was an average two-way traffic flow of 24 No. movements every hour. Over the course of the 12 hour survey, the facility generated a total of 58 No. cars/LGV in and a total of 86 No. cars/LGV out, indicating that staff arrive at the facility prior to 07:00hrs.

The facility generated a total of 138No. HGV movements (67 No. in and 71 No. out) during the survey. On average an hourly two-way flow of 12No. HGV movements (6 No. in and 6 No. out) was recorded. The peak hour for HGV traffic generation was from 12:00hrs to 13:00hrs when there was a total of 22 No. HGV movements (9 No. in and 13 No. out).

7.3.2 Weighbridge Data Analysis

Weighbridge records were analysed with the objective of validating the findings of the traffic count survey for waste related traffic movements and establishing daily traffic trends. The weighbridge data includes parameters such as: time and date of entry/exit, type of load, payload (tonnes), vehicle type, customer details etc. The records reviewed for the purposes of the TIA span a three month period from December 2009 to February 2010.

The facility generated an average of 59 No. waste related trips per day (118 No. movements). The data shows the 85th percentile upper value was 75 No. waste related trips per day (150 No. movements). The traffic count survey of Tuesday 23 February 2010 recorded a total of 138 No. waste related movements. The level of waste traffic recorded during the traffic count survey correlates with the weighbridge data.

Over the weighbridge assessment period, the facility generated an average of 59 No. waste related trips per day (118 No. movements). The weighbridge data shows that on Saturdays the traffic volume is one third of the average weekday (Mon to Fri) traffic generation.

The weighbridge data was used to calculate the current 85th percentile traffic generation. The Institution of Highways & Transportation (IHT) recommends using 85th percentile traffic generation values in traffic assessments in order to ensure a robust analysis which reflects 'busier than normal' times. This ensures existing and proposed road infrastructure can accommodate future traffic levels over and above what is expected at proposed developments. It also provides the Local Authority with better certainty in determining traffic impacts.

The weighbridge data shows the 85th percentile upper value was 75 No. waste related trips per day (150 No. movements). The traffic count survey of Tuesday 23 February 2010 recorded a total of 138 No. waste related movements. The level of waste traffic recorded during the traffic count survey was considered to represent a busier than normal day.

Following on from the above existing traffic generation is summarised in Table 7.1.

Table 7.1 – Existing Traffic Generation (Trips per Day)

	MRF		
Traffic Generation	HGV	Cars/Vans	Total
Average	59	72	**131**
85th Percentile	75	72	**147**

7.4 Proposed Development Traffic Generation

In forecasting future traffic generation of the proposed development the following assumptions were made:

90% of all MRF deliveries are likely to occur between 07:00hrs and 19:00hrs, Monday to Friday i.e. 90% of 200,000 tonnes (180,000 tonnes);
Traffic generation was assessed for weekdays and Saturdays, since the facility is expected to generate more traffic on weekdays, but the Civic Amenity Area is expected to generate more traffic on Saturdays;
On Saturdays the MRF will continue to generate approximately one third of the weekday waste traffic generation;
Existing loading characteristics of waste deliveries and collections will not change.
The facility will accept 200,000 tonnes of material in the Opening Year;
Staffing levels will not significantly increase (>10%);
The Civic Amenity Area will be open to members of the public from 07:00hrs to 19:00hrs Monday to Saturday and 09:00hrs to 17:00hrs on Sundays.

Table 7.2 includes forecast traffic generation at the MRF at full capacity and when the Civic Amenity Area is operational during the weekday assessment period of 07:00hrs to 19:00hrs.

Table 7.2 – Forecast Weekday Traffic Generation (Trips per Day)

	MRF		Civic Amenity	
Traffic Generation	HGV	Cars/Vans	Cars/Vans	Total
Average	124	72	30	**226**
85th Percentile	157	72	40	269

Table 7.3 includes forecasts traffic generation at the MRF at full capacity and when the Civic Amenity Area is operational during the Saturday assessment period of 07:00hrs to 19:00hrs.

Table 7.3 – Forecast Saturday Traffic Generation (Trips per Day)

	MRF		Civic Amenity	
Traffic Generation	HGV	Cars/Vans	Cars/Vans	Total
Average	42	24	90	**156**
85th Percentile	53	24	120	197

As previously stated, the 85th percentile traffic generation values are used for assessment purposes and reflect busier than normal times. The actual day to day impact of the proposed development is better quantified by the average traffic generation values.

7.5 Impact Assessment

In line with the NRA: Traffic and Transport Assessment Guidelines, the Industrial Estate Access and Buck Leary's Cross Roads were modelled in Year I (2011); Year 1r +5yrs (2016); and Year 1 +15yrs (2026).

The computer modelling program PICADY (Priority Intersection CApacity and DelaY) was used to prepare a comparative assessment of existing and future performance of the local road network. PICADY provides information regarding capacity, queuing and delay. Generally a reserve capacity of less than 0.750 is accepted at junctions in rural areas.

A series of future traffic flow scenarios were assessed both with and without the proposed changes to the facility in place. These are referred to as the 'do nothing' and 'do something' scenarios and are described in detail in the Trafficwise Report. These scenarios were developed so that the incremental impact of development traffic could be evaluated against the baseline where the facility would continue to operate at existing processing levels. The results show that the Buck Leary's Cross Roads should operate well within capacity for the assessment peak hour periods in Year 1, Year 1 +5yrs and Year 1 +15yrs scenarios.

The R616 in the vicinity of the site carried a total of 2,620 No. two-way vehicle movements during the 12-hour traffic count survey. These figures include the current traffic generated by the facility which amounts to 282 No. vehicles during the 12-hour survey. Given that the majority of this traffic i.e. 75% or 212 No. vehicles, accesses the site to/from the west, this is the section of the R616 upon which the facility has the greatest impact, contributing approximately 8.0% of the overall traffic volumes on the R616 during the assessment period of 07:00hrs to 19:00hrs.

Based on 85th percentile forecasts over a 12-hour period, on weekdays the proposed changes will generate approximately 269 No. vehicle trips per day (538 No. vehicle movements). Taking into account distribution patterns, i.e. 75% of traffic to/from the west, the proposed changes could result in a total of 202 No. vehicle trips per day (404 No. vehicle movements) on the section of the R616 between Buck Leary's Cross Roads and the Industrial Estate access. The net increase in development traffic at this section of the road is estimated to be 96 No. vehicle trips or 192 No. vehicle movements.

Following the proposed development R616, traffic volumes over 12-hours at this section of the road are expected to increase to 2,800 No. vehicle movements. It follows that, based on 85th percentile forecasts, the proposed changes could result in the MRF contributing approximately 14.4% of all R616 traffic between Buck Leary's Cross Roads and the Industrial Estate access during the assessment period of 07:00hrs to 19:00hrs. It also follows that the proposed development could increase facility traffic contribution from 8.0 to 14.4% of overall R616 traffic volumes. The traffic impact upon the road network on Saturdays and Sundays will be less than outlined above. The forecast traffic increases will not impact adversely upon the safety and capacity of the local road network.

7.6 Mitigation Measures

HGVs and car/vans generated by the existing MRF are adequately accommodated by the local road network including the R616 and Glanmire Road and all of their respective major and minor junctions. There are currently no restrictions with regard to accessing the site.

Notwithstanding this, Greenstar proposes to adopt a new routing regime, to encourage drivers of large articulated vehicles to avoid using the Glanmire Road (running between Buck Leary's Cross Roads and Glanmire) in the interests of traffic safety and minimising potential traffic hazards. As an alternative, these vehicles will turn right towards the M8 when leaving the Industrial Estate.

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8. GEOLOGY & HYDROGEOLOGY

8.1 Introduction

This Section describes the soils and bedrock conditions and the groundwater regime beneath the application site. It is based on a desk study of available information on the local geological and hydrogeological conditions and the results of the groundwater monitoring programme specified in the Waste Licence.

8.2 Geology

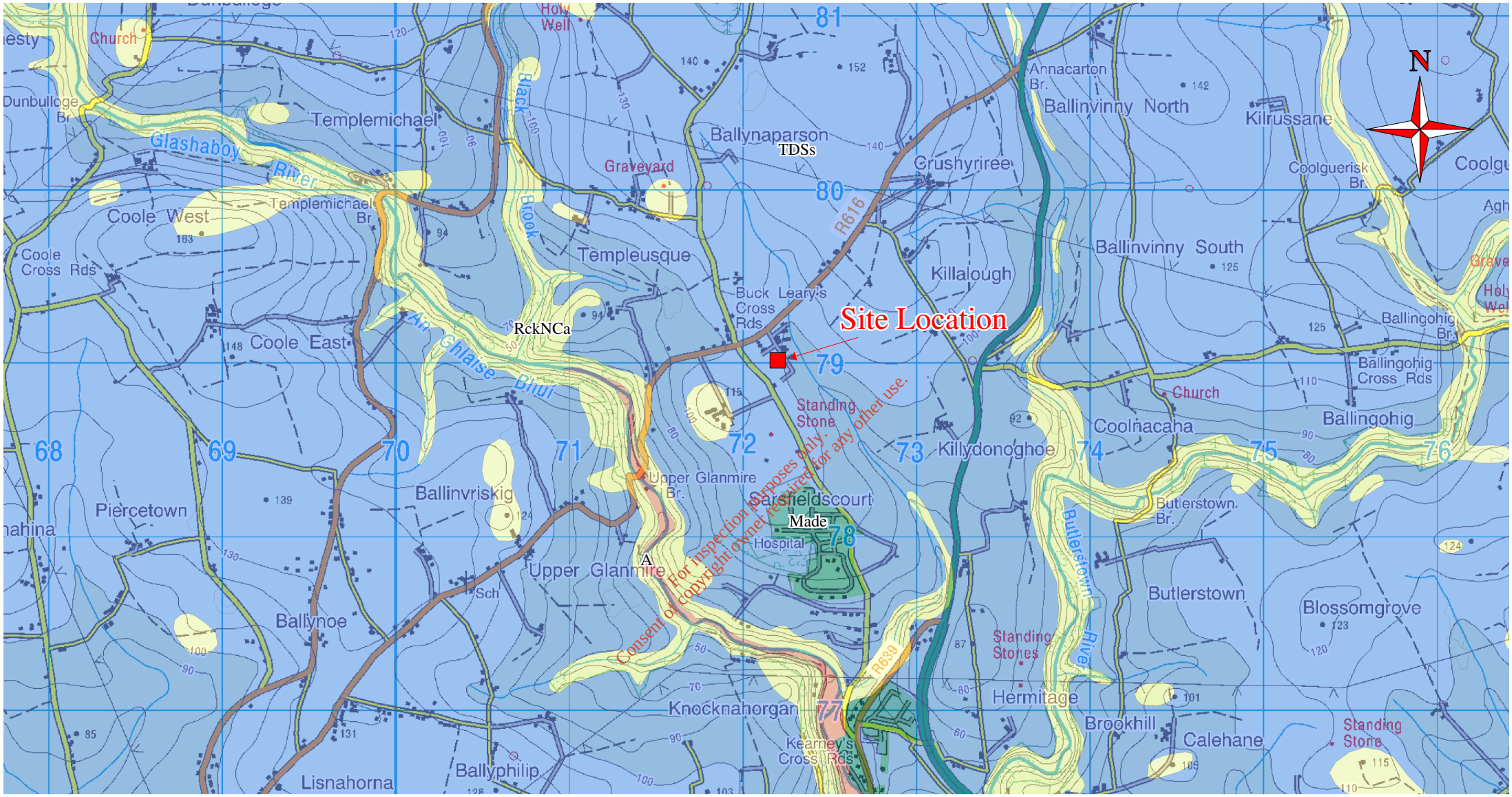
Information on the geology and hydrogeology was derived from a review of information maintained by the Geological Survey of Ireland (GSI) and from an EIS prepared for the site by K.T. Cullen & Co in 2000. The latter included information derived from a limited site investigation.

8.2.1 Subsoils

The GSI subsoil map indicates that the area beneath the site consists of Devonian sandstone till, as illustrated on Figure 8.1. The site investigation data confirms the GSI mapping and indicates that the subsoils comprises approximately 0.3m of reddish brown gravelly silty clay which was placed or regraded at the site. This overlies an undisturbed layer approximately 0.7m of gravelly silty clay.

8.2.2 Bedrock

Information on the bedrock geology was obtained from the GSI Bedrock Map Sheet 25 (Figure 8.2). The bedrock comprises Devonian mudstone and siltstone from the Ballytrasna Formation. The site is located on the southern limb of an east to west striking anticline with carboniferous limestone and a thick sequence of sands and gravels occupying the syncline to the south along the coast from Glanmire to Carrigtwohill.



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CLIENT

Greenstar Recycling (Munster) Limited

TITLE

Subsoil Map

LEGEND

- A - Alluvium
- GDSs -Sandstone sands & gravels
- Made - Made Ground
- TDSs - Sandstone Till
- RckNCa - Rock near Surface

FIGURE No.

8.1

SCALE

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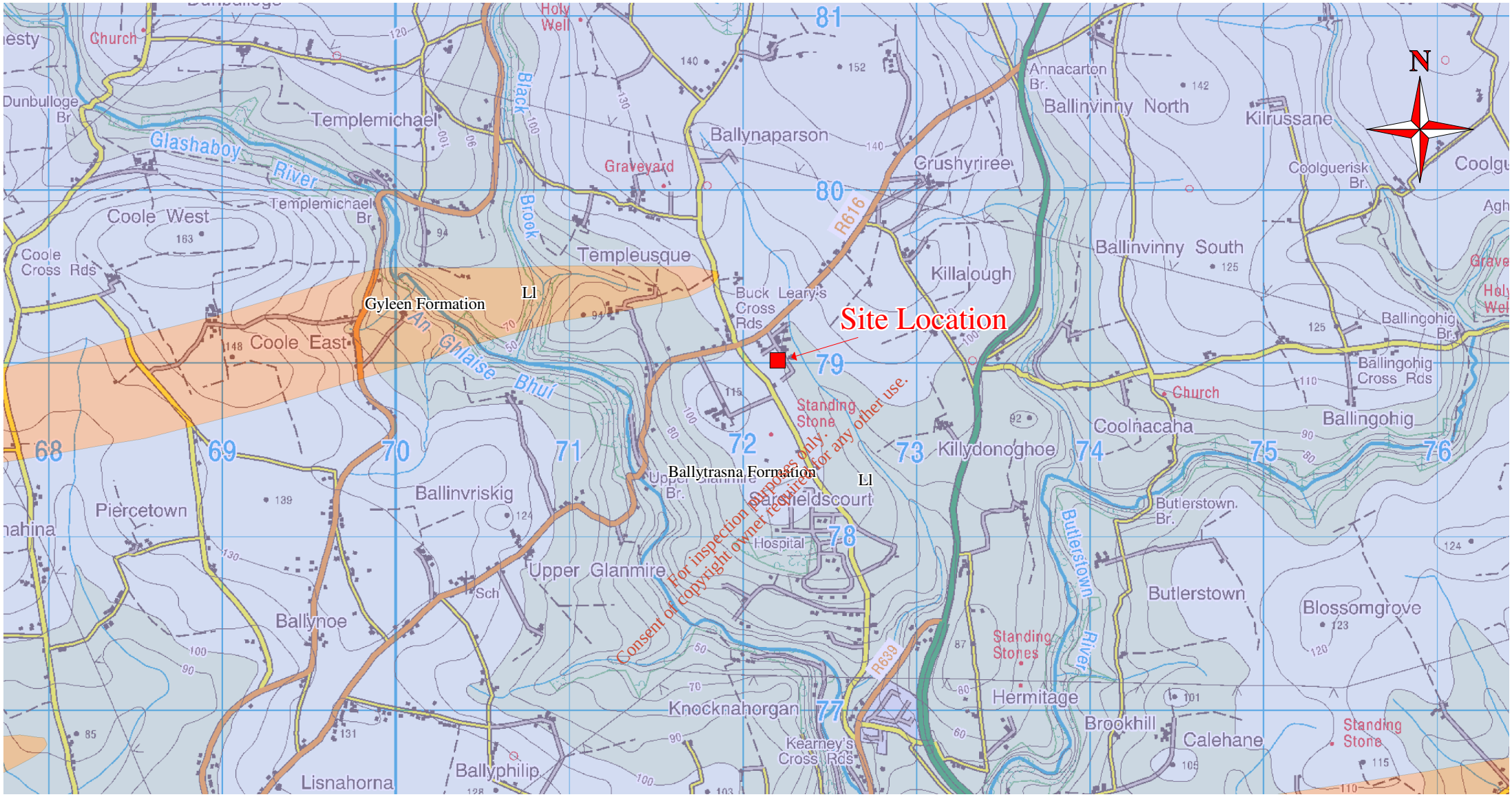

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environmental management for business

CLIENT

Greenstar Recycling (Munster) Limited

TITLE

Bedrock Aquifer Map

LEGEND

- Ballytrasna Formation
- Gyleen Formation

Ll - Locally Important Aquifer which is Moderately Productive only in Local Zones

FIGURE No.

8.2

SCALE

1:30,000

8.3 Hydrogeology

The bedrock aquifer is classified by the GSI as a Locally Important aquifer which is moderately productive only in local zones (**Ll**) (Figure 8.2). The aquifer vulnerability according to the GSI is considered to be high **(H)** (Figure 8.3). However, the site investigation data indicates the aquifer vulnerability is extreme (H). However, as the entire site is either paved or occupied by buildings, which prevents infiltration to the soils, the actual risk is low.

Groundwater level at the site is measured as part of the routine monitoring programme and is about 1.5m below ground level at the western boundary and 3.5m at the eastern boundary. The direction of groundwater flow is to the east and possibly southeast.

8.4 Groundwater Monitoring

Groundwater monitoring is carried out bi-annually at two on-site wells (W-1 and W-2) located at the facility. The direction of groundwater flow is most likely from west to east towards the stream, which flows along the eastern side of the Industrial Estate. W-2 is at the upgradient and W-1 is at the downgradient side of the site.

The range of analysis includes TOC, pH, electrical conductivity, ammoniacal nitrogen, nitrate, nitrite, total suspended solids and mineral oils. The monitoring results for 2009 are included on Table 8.1 and Table 8.2 below. These are consistent with the results of monitoring carried out since 2003. The quality of the groundwater is good and there is no evidence of any impact associated with facility operations.

Table 8.1 – Groundwater Monitoring Results 2009 & 2010 – W-1

Parameter	Units	May '09	Dec '09	May '10	IGV
Ph	pH units	7.83	7.87	7.76	6.5-9.5
Conductivity	mS/cm	0.219	0.261	0.229	1.000
TOC	mg/l	6	<2	<2	NAC
Ammoniacal Nitrogen	mg/l	<0.01	0.03	0.04	0.12
Total Suspended Solids	mg/l	660	31	257	N/A
Nitrate as NO_3	mg/l	20.2	22.1	14.2	25
Nitrite as NO_2	mg/l	<0.02	<0.02	0.02	0.1
Mineral Oils	mg/l	<0.010	<0.01	<0.01	0.01

Table 8.2 – Groundwater Monitoring Results 2009 & 2010 – W-2

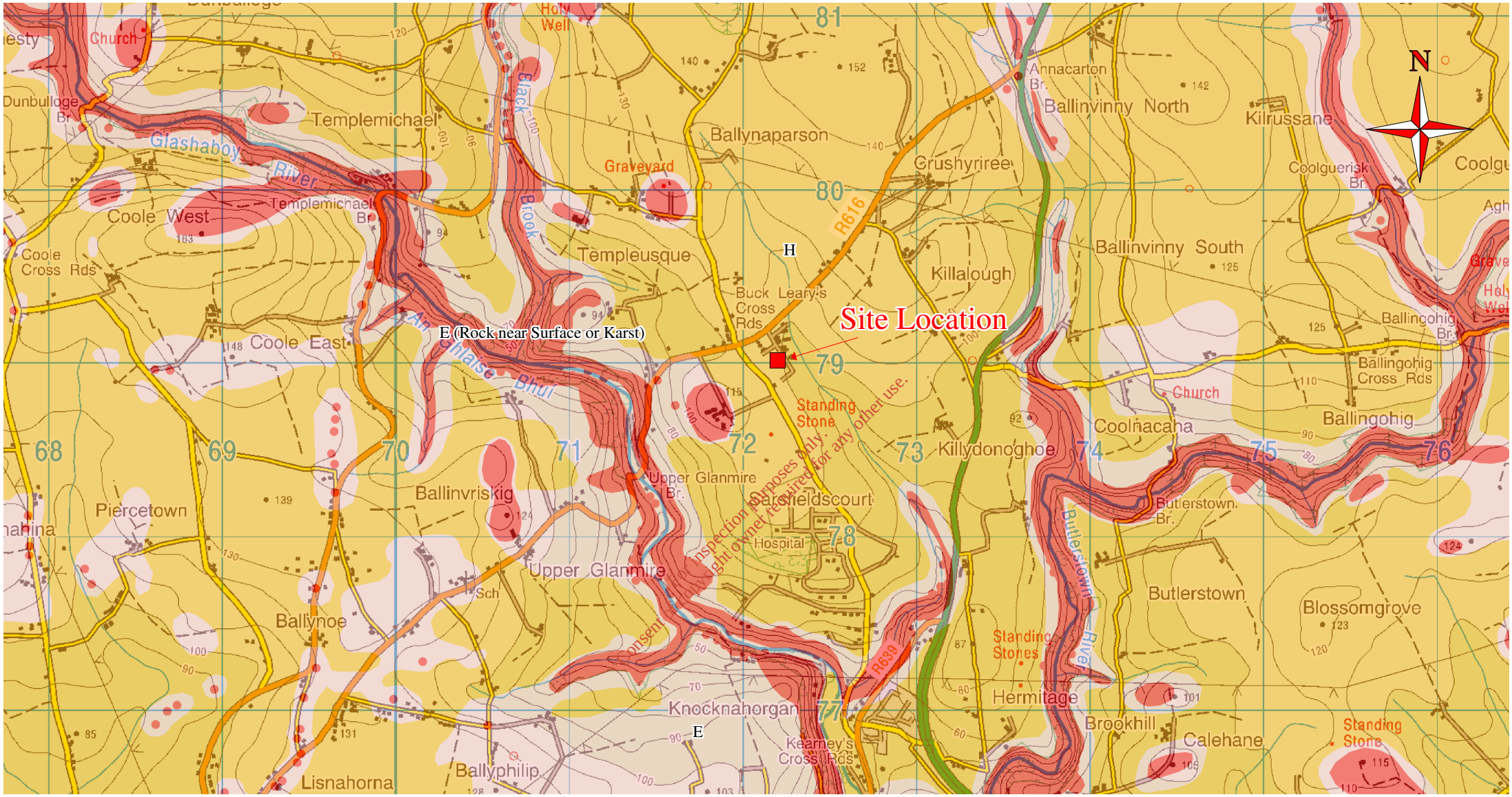
Parameter	Units	May '09	Dec '09	May' 10	IGV
pH	pH units	7.81	7.26	7.14	6.5-9.5
Conductivity	mS/cm	0.198	0.178	0.201	1.000
TOC	mg/l	7	5	13	NAC
Ammoniacal Nitrogen	mg/l	0.03	0.03	0.04	0.12
Total Suspended Solids	mg/l	1,943	616	8819	N/A
Nitrate as NO_3	mg/l	14.8	11.7	3.7	25
Nitrite as NO_2	mg/l	<0.02	<0.02	0.02	0.1
Mineral Oils	mg/l	<0.010	<0.01	<0.01	0.01

8.5 Impact Assessment

There are no direct or indirect discharges to ground at the facility. The facility is paved or covered with buildings and runoff is directed either to the wastewater or surface water drainage systems. All waste processing occurs internally in the MRTF building which is in the western area of the site.

Wastewater from the floor of the MRTF, the bin washing area, the wheel wash and the weighbridge area is directed to the waste water drainage system, which discharges to a holding tank located to the east of the site security hut. The liquid is removed as required and sent to an off-site wastewater treatment. Surface water runoff from the roof and paved areas is directed via silt traps and oil interceptors to the stream approximately 100m to the east of the facility.

The proposed operations changes will not result in any new direct or indirect emissions from the facility to the ground or groundwater and therefore there will therefore be no impacts on soil and groundwater.



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CLIENT

Greenstar Recycling (Munster) Limited

TITLE

Vulnerability Map

LEGEND

- E - Extreme
- E (Rock near Surface or Karst)
- H - High

FIGURE No.

8.3

SCALE

1:30,000

9. SURFACE WATER

This Section describes the surface water regime at the facility and includes an assessment of the significance of the impacts from the facility operations. The assessment is based on surface water monitoring carried out in compliance with the Waste Licence and a biological assessment of the stream to which run-off from both the facility and other lots within the Industrial Estate discharges. The report on the latter, which was requested by the Planning Authority and completed by Ecofact Ltd, is included in Appendix 5

9.1 Catchment Area

The facility is in the catchment of the Glashaboy River, which is approximately 2 km to the south west of the site boundary. An unnamed tributary of the Glashaboy River is approximately 100 m to the east of the site boundary and receives run-off from the facility and other occupants of the Industrial Estate.

9.2 Surface Water Monitoring

The facility's surface water drainage system takes run off from the roof areas, yard areas, car-park and hard standing areas. The quality of discharges from the site and the receiving waters are tested quarterly at three monitoring locations (SW-1, SW-2 and SW-3). SW-3 is located on the storm sewer upstream of the connection to the sewer serving the Industrial Estate**.** SW-2 is to the north and upstream of the discharge point(s) from the Industrial Estate drainage system and SW-1 is south and downstream of the discharge points. The monitoring results for 2009 and Q1 2010 are shown on Tables 9.1 to 9.3.

Emission Limit Value (ELV) and Trigger Levels are set in Waste Licence, but only apply to the discharge (SW-3). The ELV and Trigger Levels were not exceeded in 2009 and 2010 and the quality of the water in the stream is generally good. There is no evidence that the discharge from the facility is impacting on the water quality in the stream.

Table 9.1 – Surface Water Monitoring Results 2009/2010 SW-1

Parameter	Units	Q1	Q2	Q3	Q4	Q1 2010
pH	pH units	7.28	8.3	8.18	7.74	7.91
Conductivity	mS/cm	0.305	0.39	0.355	0.247	0.253
Temperature	°C	9.9	10.9	15.8	10.1	13
BOD	mg/l	<1	<1	<1	<4	<1
COD	mg/l	<7	<7	10	15	<7
Ammoniacal Nitrogen	mg/l	0.06	1.03	0.04	0.08	0.50
Dissolved Oxygen	mg/l	9	9	9	9	10
TOC	mg/l	3	7	<2	8	2
Total Suspended Solids	mg/l	<10	<10	<10	<10	<10
Oils, Fats & Greases	mg/l	<0.010	<0.010	<0.01	0.443	<0.010
Nitrate as NO_3	mg/l	31.5	25.1	21.7	19.2	24.4
Nitrite as NO_2	mg/l	0.05	0.04	0.09	<0.02	0.06
Mineral Oils	mg/l	<0.01	<0.01	<0.01	0.288	<0.010
Total Coliforms	cfu/100 ml	-	-	14010	13700	1,300
Faecal Coliforms	cfu/100 ml	-	-	1553	1640	921

Table 9.2 – Surface Water Monitoring Results 2009/2010 SW-2

Parameter	Units	Q1	Q2	Q3	Q4	Q1 2010
pH	pH units	7.9	8.38	8.15	7.97	8.13
Conductivity	mS/cm	0.308	0.296	0.341	0.224	0.243
Temperature	°C	10.3	11.3	16.7	9.9	13
BOD	mg/l	<1	<1	<1	<4	<1
COD	mg/l	<7	<7	14	<15	<7
Ammoniacal Nitrogen	mg/l	0.06	0.04	0.05	0.09	0.04
Dissolved Oxygen	mg/l	9	10	9	10	11
TOC	mg/l	<3	7	<2	9	<2
Total Suspended Solids	mg/l	<10	<10	<10	<10	<10
Oils, Fats & Greases	mg/l	<0.010	<0.010	<0.01	<0.01	<0.010
Nitrate as NO_3	mg/l	32.1	25.5	26.6	19	29.2
Nitrite as NO_2	mg/l	0.05	0.03	0.08	<0.02	0.07
Mineral Oils	mg/l	<0.01	<0.01	<0.01	<0.01	<0.010
Total Coliforms	cfu/100 ml	-	-	13540	10910	770
Faecal Coliforms	cfu/100 ml	-	-	1300	1370	46

Table 9.3 – Surface Water Monitoring Results 2009/2010 SW-3

Parameter	Units	Q1	Q2	Q3	Q4	Q1 2010	Trigger & ELVs
pH	pH units	8.28	8.28	8.22	7.8	7.89	NA
Conductivity	mS/cm	0.551	0.479	0.378	0.425	0.435	NA
Temperature	°C	9.9	12.5	16.1	10	13	NA
BOD	mg/l	<1	<1	<1	10	7	25
COD	mg/l	<7	<7	13	34	23	NA
Ammoniacal Nitrogen	mg/l	0.3	0.34	1.25	0.28	0.05	NA
Dissolved Oxygen	mg/l	9	10	2	5	7	NA
TOC	mg/l	<3	7	<2	8	3	NA
Total Suspended Solids	mg/l	33	<10	<10	23	<10	35
Oils, Fats & Greases	mg/l	<0.010	<0.010	<0.01	<0.01	<0.010	NA
Nitrate as NO_3	mg/l	22.1	15.8	6.1	10.3	4.1	NA
Nitrite as NO_2	mg/l	0.25	0.15	1.22	0.1	7.92	NA
Mineral Oils	mg/l	<0.010	<0.010	<0.01	<0.01	<0.010	5
Total Coliforms	cfu/100 ml	-	-	1732900	782000	173,290	NA
Faecal Coliforms	cfu/100 ml	-	-	81640	109100	16,790	NA

NA – Not Applicable

9.3 Biological Assessment

A biological assessment of the stream was carried out by Ecofact Ltd in March 2010. A copy of the report is included in Appendix 5 and summarised here.

9.3.1 Study Limitations

Surface water runoff from the facility discharges to the surface water drainage system serving the Industrial Estate (17 Units). There are two outfalls from the Estate drainage system to the stream. The first is a pipe at the south-eastern corner of the Industrial Estate (Discharge Point 1). The second, known as Discharge Point 2, is approximately 170m downstream of the R616. The discharges from both points contains run-off from a number of different occupants in the Estate therefore it is not possible to conclude on the impact of the Greenstar facility on the quality of the receiving stream.

9.3.2 Methods

A detailed description of the methods used is described in the assessment report in Appendix 5. As the stream is not ideally suited to the Agency's Q-rating system due to its small size, the Small Stream Risk Score (SSRS) was also used. This system was devised by the Agency as a biological monitoring tool for first and second order streams as part of the Water Framework Directive Monitoring Programme.

9.3.3 Site Locations

Three locations on the stream were assessed, as shown on Table 9.4. One was a receptor site down stream of the Industrial Estate and two were adjacent to the Industrial Estate.

Table 9.4 – Monitoring Locations

	Receptor Site	SW1	SW2
Location	Approximately 50m downstream of the south-eastern corner of Sarsfieldcourt industrial estate	Approximately 200m downstream of the R616	Approximately 15 m downstream of the R616
NOS Grid Reference	W72449 78869	W72350 79018	W72265 79284

9.3.4 Results

The results are shown on Table 9.5. There are two discharge points from the Sarsfieldcourt Industrial Estate to the stream and there is a decline in water quality downstream of both discharge points. However, the worst location (receptor site) is only considered slightly polluted.

Table 9.5 - Water quality ratings of the three sites investigated during the March 2010 biological assessment of the Sarsfieldcourt Stream.

	Receptor	SW1	SW2
Diversity (no. of families)	7	11	16
Q-value	3-4	4-5	4-5
Q-status	Slightly polluted	Unpolluted	Unpolluted
Quality Class	B	A	A
WFD status	Moderate	Good	Good
SSR Score	5.6	8	8
SSRS Assessment	'at risk'	'probably at risk'	'probably at risk'
WFD Status	Moderate	High	High

The routine surface water monitoring conducted quarterly at a point where the run-off leaves the facility and joins the Industrial Estate storm sewer indicates that the water quality is good. There is no evidence that the run-off from the Greenstar site contributes to the deterioration in quality downstream of the Estate discharge points.

9.4 Hydraulic Loading Impacts and Mitigation

The drainage system operates satisfactorily and there have never been any flooding problems either within, or outside the site boundary. The only discharge to the stormwater sewer is rainfall. As it is not proposed to increase the paved areas or construct new buildings, there will be no increase in the hydraulic loading on the storm sewer.

9.5 Surface Water Quality Impacts and Mitigation

Site activities with the potential to impact on surface water quality if uncontrolled, include: -

Run-off from open yard areas,

Spills and leaks.

Run-off from the yards areas could potentially contain silt and small amounts of oils from minor leaks from road vehicles and the mobile plant. Run-off from the open yards, including the area where the Civic Amenity Area will be located, is collected and directed to on-site silt traps and oil interceptors.

The volume of oils, anti-freeze, detergents and disinfectants stored at the facility are kept to the minimum required for continued operation. These materials are stored in a designated bunded area at the western site boundary. Spill containment kits are provided and maintained on-site and facility personnel are trained in the proper use of the kits to contain and clean up any major spills that occur.

9.6 Firewater Retention

Firewater generated within the site will be contained inside the MRF Building and the open paved areas. A shut off-valve is provided on the surface water sewer upstream of the silt trap and interceptors. In the event of a fire, the valve can be shut to contain run off inside the site.

An Emergency Response Procedure is in place to ensure correct actions are carried out in the event of a fire, minimising environmental damage and subsequently reporting to the applicable authorities.

10. ECOLOGY

10.1 Introduction

This Section describes the ecological status of the facility and the impacts of the proposed changes to ecological status of the facility. As it is not proposed to redevelop any part of the site or construct new buildings and there will be no new emission points or changes to the emissions, it was not necessary to carry out a terrestrial ecological survey. A biological assessment of the stream that receives surface water run-off from the facility was completed and is described in Section 9.

10.2 Existing Environment

The Industrial Estate was developed in the late 1980's and early 1990's, and prior to this the land was used for agricultural purposes. The facility is either completely paved or covered with buildings and there are no significant landscaped areas, wetlands or ponds within the facility boundary.

10.3 Evaluation of the Ecological Importance of the Site

The evaluation was based on a desk study of what of databases maintained by the National Parks and Wildlife Service. The facility is not within any proposed Natural Heritage Area (pNHA) nor is it Special Area of Conservation (SAC) designated in accordance with Council Directive 92/43/EEC and adopted in Ireland under S.I. No. 94 of 1997 as amended in 1998 and 2005.

The nearest sites of ecological importance are Great Island Channel (pNHA, SAC), Cork Harbour (SAC), Glanmire Wood & Dunkettle Shore (pNHA), which are approximately 6 km to the south of the facility.

10.4 Impact Assessment

The proposed changes to the site operations will have will have no impact on the ecology in the vicinity the facility.

11. AIR

11.1 Introduction

This Section describes the ambient air quality based on monitoring carried out in 2009 compliance with the Waste Licence, assesses impacts and discusses mitigation measures. Odours and Noise, which are other potential forms of air pollution, are dealt with separately in Sections 12 and 13.

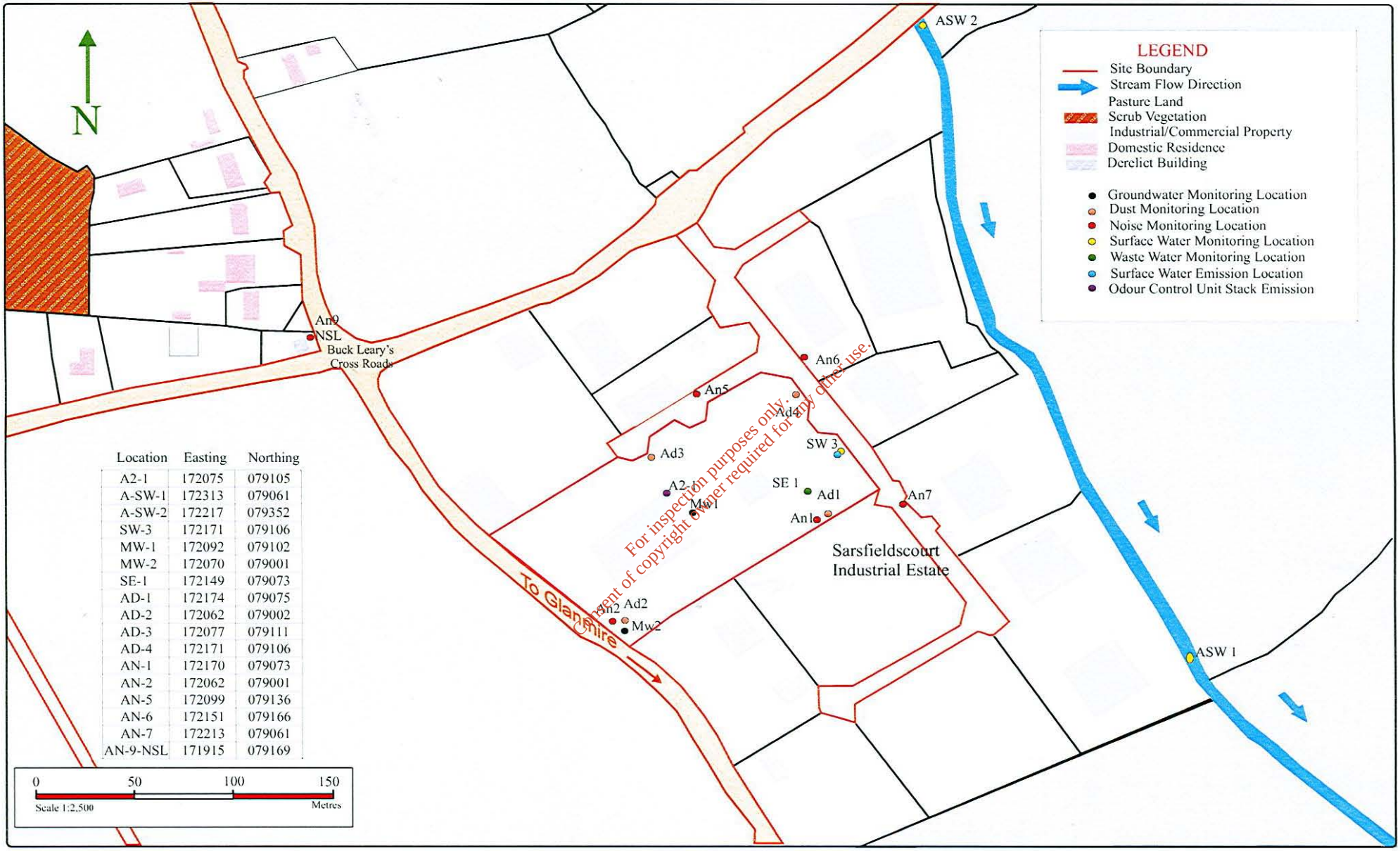
11.2 Existing Conditions

11.2.1 Dust

All waste handling, processing, loading/unloading and storage are, with the exception of the proposed Civic Amenity Area, carried out inside the MRF building. The waste types accepted at the Civic Amenity Area, with the exception of C&D wastes, will not be a source of dust generation. The Civic Amenity Area will be supervised on a full time basis and if dust from the C&D storage skip is identified as a potential problem, the wastes in the skip will be dampened down. Vehicle movements on paved areas in dry weather are the only potential other source of dust emissions from facility activities.

Dust deposition levels are monitored at four locations (D-1, D-2, D-3 and D-4) (Figure 11.1 Monitoring Locations) three times annually, two of which are between May and September. D-1 is on the southern boundary to the south of the weighbridge and main entrance, approximately 20m from the main access road of the Industrial Estate. D-2 is on the western boundary of the, D-3 is on the northern boundary and D-4 is on the eastern boundary.

The monitoring results indicate that the facility is not a significant source dust emissions. In June 2009 and July 2009 the deposition limit set in the Waste Licence (350 $mg/m^2/day$) was exceeded at D-1 (554 $mg/m^2/day$ and 351 $mg/m^2/day$ respectively). All the other levels recorded were below the deposition limit. D1 is close to the access road serving the Estate and it is considered that vehicle movements within the Estate, where many of the lots are not paved, and on the main access road way contributed to the dust levels recorded at this monitoring location.



Location	Easting	Northing
A2-1	172075	079105
A-SW-1	172313	079061
A-SW-2	172217	079352
SW-3	172171	079106
MW-1	172092	079102
MW-2	172070	079001
SE-1	172149	079073
AD-1	172174	079075
AD-2	172062	079002
AD-3	172077	079111
AD-4	172171	079106
AN-1	172170	079073
AN-2	172062	079001
AN-5	172099	079136
AN-6	172151	079166
AN-7	172213	079061
AN-9-NSL	171915	079169

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CLIENT
Greenstar Recycling (Munster) Ltd

TITLE
Sarsfieldscourt
Monitoring & Emission Locations

Details

FIGURE NUMBER
11.1

Scale
Not To Scale

Revision
A

11.2.2 Traffic Emissions

The volume of traffic accessing the facility is similar to other units of the Industrial Estate and is not considered to have a significant impact on ambient air quality. The traffic impact assessment (Section 7), showed that in February 2010 the facility generated an average of 131 No vehicle related trips per day while the Industrial Estate in total generated an average of 900 No. trips per day.

11.3 Impact Assessment

Potential air quality impacts associated with the increased operation of the facility include traffic emissions and dust.

11.3.1 Dust

The acceptance of C&D wastes at the Civic Amentiy Area is a potential source of dust. The increase in processing capacity will also increase traffic movements, which are the main potential source of dust generation at the facility. Dust monitoing has however shown that dust is not a significant issue at the facility. The residual impact of dust emissions is considered to be imperceptable.

11.3.2 Traffic Emissions

There will be an increase in the volume of traffic using the facility as described in Section 7. The forecast traffic generation is expected to have the potential to generate an average of 269 No. vehicle trips per week day when operating at maximum capacity (200,000 tonnes per annum). Potential increased emissions of pollutants from road traffic are not considered to be significant in the context of the existing traffic volumes using the Industrial Estate (900 No. trips per day).

11.4 Mitigation Measures

11.4.1 Dust

Dust is not a significant issue at the facility. The potential for dust emssions is linked to the cleanliness of the paved areas and the weather conditions. The existing mitigation measures (damping down the paved areas in dry weather, use of a roadsweeper and the use of a wheel wash) have proven to be successfull and will continue to be employed. Additional damping measures will be used at the C&D storage bin in the Civic Amenity Area if necessary. The potential impact is therefore considered imperceptible.

11.4.2 Traffic Emissions

The proposal to increase the waste volumes will result in an increase in traffic movements and the associated vehicle emissions. Greenstar puts an additive into the diesel for all its heavy goods vehicles which reduces nitrous oxide emissions (Ad blue). Greenstar has a policy that vehicle engines are not allowed to 'idle' when on-site and also applies internal speed restrictions.

In the longer term, emissions will generally decrease due to legislation driven improvements in engine technology and fuel content. It is considered that the impacts due to increased traffic will be imperceptible.

12. ODOURS

12.1 Introduction

This Section discusses the potential impacts of odours associated with the proposed changes. The assessment is based on an assessment, including air dispersion modelling, carried out by Odour Monitoring Ireland Ltd (OMI), whose full report is included in Appendix 6.

12.2 Existing Odour Control System Performance

Greenstar installed and commissioned an air emission abatement system in the MRTF building in 2006, which was designed to control dust and odour emissions from the Mixed Waste handling area. The system provides negative ventilation to the main building handling the putrescible waste (i.e. where odours are generated). In 2007, the original two deep bed carbon filters were removed and replaced with two 45,000 m^3/hr annular vessels. This eliminated the possibility of carbon shifting and bed fluidisation. The building is fitted with interlocked rapid roller doors providing efficient containment of odours within the building.

The abatement system is audited quarterly by OMI to ensure that it is working correctly. The audits have confirmed that the system is operating satisfactorily and the report on the most recent audit event in March 2010 is included in Appendix 1 of the OMI report.

The audit included air dispersion modelling to assess the impacts of the emissions. The modelling was based on an odour threshold level of ≤1.5 Odour Units ($OU_E\ m^{-3}$) and took into consideration building downwash effects. The audit confirmed that the odour control system is performing adequately, with all ground level odour concentrations lower than 1.5 $OU_E\ m^{-3}$.

12.3 Odour Management Plan

Greenstar has adopted an Odour Management Plan (OMP) for waste handling operations and this was updated in June 2010 and a copy is included in Appendix 6. The OMP is a core document detailing operational and control measures applied to effectively manage and control odours. It provides sufficient detail to allow facility and maintenance staff to clearly understand the odour management operational procedures for both normal and abnormal conditions.

The OMP includes data to enable site management and the Agency to audit site operations on odour management, which include:

A summary of the site odour sources and the location of receptors,
Details of site management responsibilities and procedures for reporting faults, identifying maintenance needs, replenishing consumables and complaints procedure,
Odour management equipment operation procedures (e.g. correct use of equipment; checks on equipment performance; maintenance, including carbon filter replacement, and inspection,
Operative training,
Housekeeping,
Maintenance and inspection of plant (both routine and emergency response),
Spillage/contaminated surface management procedures,
Record keeping – format, responsibility for completion and location ,
Emergency breakdown and incident response planning including responsibilities and mechanisms for liaison with the local authority.

The OMP is regularly updated to take account of operational changes.

12.4 Impact Assessment

It is proposed to accept 200,000 tonnes of waste per annum at maximum capacity. There will be no change to the Mixed Waste area, which is currently served by the air abatement system. This means that there will be no change to the volume of air requiring treatment or the emission velocity. OMI concludes that the existing system has the capacity to effectively treat the air in Mixed Waste area and the proposed extension of the operational hours and increases in waste volumes will not result in any increase in odour impact.

12.5 Mitigation Measures

Although the existing system is proven effective and has the capacity to treat any odours generated at maximum capacity, Greenstar will, based on the precautionary principle, carry out the following actions recommended by OMI.

A smoke integrity test to assess the containment efficiency of the building fabric and identify any leakage points, for example eves, apex, corners, rising concrete walls, dividing walls and around access doors and windows located within the facility building. If such points are identified they will be sealed to enhance the existing negative pressure application.

Update the OMP before increasing tonnage throughput to the facility.

13. NOISE

13.1 Introduction

This Section discusses the impacts of noise associated with the proposed extension of operational hours. The assessment included two noise surveys completed by Dixon Brosnan Ltd, whose full reports are included in Appendix 7.

13.2 Survey Details and Results

The environmental noise surveys were conducted in accordance with ISO 1996: 1982: Acoustics – Description and measurement of environmental noise. Full details of the methodologies applied are presented in the Dixon Brosnan Ltd reports and are summarised below.

The first survey was conducted on June 2009 during day time hours when the facility was fully operational. This provides a worst case scenario for noise impacts at the nearest Noise Sensitive Location (NSL) at Buck Leary's Cross Roads. The second survey was carried out in September 2009, during the period 1840-2000 hours. The aim of this survey was to replicate the more likely noise impacts during night time operations.

It is not expected that the facility will continually accept waste 24 hours per day seven days per week. The majority of wastes accepted will be during normal business hours, most likely 07:00-19:00 Monday to Saturday. After 19:00 each day the doors on the MRTF building will be closed, as waste will not generally be accepted after this time. During the second survey, the activities carried out were the same as the proposed night time operations.

13.2.1 Measurement Locations

The measurement locations included five onsite stations (N1, N2, N5, N6 and N7) and one off-site noise sensitive location (N9), which is specified in the Waste Licence. N1 is on the southern boundary, N2 is on the western boundary, N5 is on an access road to the north of the facility and N6 and N7 are on the access road to the east of the facility. N9 is located at Buck Leary's Cross Roads, adjacent to the nearest occupied private dwellings to the facility.

13.2.2 Operations – 1st Survey – June 2009

Noise emissions arose from several sources during the survey;

Truck movements through entrance and weighbridge.

Truck and plant movements around yard areas.

Air handling system operating continuously.

Compressor operating almost continuously at rear of materials recovery building.

Generator operating continuously at western site boundary.

Normal waste processing within the facility building

13.2.3 Operations – 2nd Survey – September 2009

During this survey there were a number of discrete noise sources:

Odour Abatement System operating continuously at eastern façade of MRF building.

Reverse pressure jets (RPJ) arising regularly at Odour Abatement System.

Compressor operating continuously at western façade of MRF building.

Generator set operating continuously at western façade of MRF building.

Shredder, trommel, baler and conveyors operating continuously within MRF building.

Grab, front end loader and forklift truck operating almost continuously within MRF building.

13.2.4 Instrumentation and Procedure

The Dixon Brosnan Ltd. report details the methodology applied, the personnel who completed the survey and the instrument calibration procedures.

13.2.5 Measurement Parameters

The measurement parameters applied were: -

1) L_{aeq} is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period;

2) L_{amax} is the instantaneous maximum sound level measured during the sample period;

3) L_{Amin} is the instantaneous minimum sound level measured during the sample period;

4) L_{A10} is the sound level that is exceeded for 10% of the sample period. It is typically used as a descriptor for traffic noise;

5) L_{A90} is the sound level that is exceeded for 90% of the sample period. It is typically used as a descriptor for background noise.

The "A" suffix denotes the fact that the sound levels have been "A-weighted" in order to account for the non-linear nature of human hearing. All sound levels are expressed in terms of decibels (dB) relative to 2x10-5 Pa.

13.2.6 1st Survey Findings

The results of the noise survey are presented in Table 13.1. The dominant source of noise at N9 was road traffic.

Table 13.1 Noise Survey Results June 2009

Station	Time	$L_{Aeq\ 30\ min}$ dB	$L_{A10\ 30\ min}$ dB	$L_{A90\ 30\ min}$ dB	Noise audible
N1	1016-1046	67	72	52	Intermittent truck movements through entrance dominant when present, particularly trucks idling close to SLM while queuing for weighbridge. Between movements, air handling system and generator/compressor audible continuously at low level. Offsite, emissions from frequent vehicle movements through surrounding industrial estate, most of which not associated with facility. General commercial/industrial noise also arising across estate.
N2	1050-1120	66	67	64	Generator set and compressor audible continuously and dominant. Latter audibly tonal. No other noise audible.
N5	1214-1244	53	55	49	Emissions from Greenstar air handling system audible at low level. Truck movements through site also audible. Offsite, compressor at nearby premises audible continuously and dominant. Regular power washing nearby also dominant. Vehicle movements through surrounding industrial estate audible.
N6	1409-1439	62	63	50	No emissions audible from site apart from bottle tipping event x1. Frequent vehicle movements in industrial estate roadway dominant, some of which Greenstar. Power tools at nearby premises regularly audible.
N7	1444-1514	65	65	53	No emissions audible from facility apart from intermittent truck movements through entrance. Noise from surrounding premises continuously clearly audible. Vehicle movements on industrial estate roadway dominant when present.
N9 (NSL)	1520-1550	66	69	48	Road traffic through adjacent junction (Buck Leary's Cross Road) dominant, and on approaches. No emissions audible from industrial estate apart from AHU closest premises (not Greenstar) and truck movements near entrance. No Greenstar emissions audible.

SLM: Sound level meter, AHU: Air handling unit

13.2.7 2nd Survey Findings

The results of the noise survey are presented in Table 13.1. The dominant source of noise at N9 was road traffic.

Table 13.2 Noise Survey Results September 2009

Station	Time	$L_{Aeq\ 10\ min}$ dB	$L_{AF10\ 10\ min}$ dB	$L_{AF90\ 10\ min}$ dB	Noise audible
N1	1923-1933	54	54	51	Odour abatement emissions clearly audible continuously. RPJ pulses also audible. Paused for passing truck onsite at 19:25. Sporadic vehicle movements on access road audible. Emissions from adjacent waste management premises also audible sporadically.
N2	1936-1946	60	61	59	Genset and compressor on rear facade continuously dominant. RPJ pulses slightly audible. Road traffic outside wall faintly audible.
N5	1846-1856	50	52	47	Continuous emissions audible at low level from odour abatement system, compressor and genset. Sporadic vehicle movements on industrial estate access road. Traffic audible on public roads. Birdsong. RPJ pulses audible.
N6	1858-1908	63	58	44	Odour abatement system continuously audible at low level. RPJ also audible. Sporadic vehicle movements on industrial estate access road. Traffic noise to N audible. Birdsong.
N7	1910-1920	57	56	47	Greenstar odour abatement system slightly audible, screened by wall. Operations at adjacent waste management premises continuously audible and dominant. Traffic on road to N audible. Sporadic vehicle movements on access road.
N9 (NSL)	1951-2000	67	68	38	Road traffic almost continuously audible through junction and on approaches. During lulls, compressor and genset noise at Greenstar faintly audible. RPJ faintly audible with difficulty.

RPJ: Reverse pressure jet

13.3 Predicted Impact of the Proposed Development

The June 2009 survey showed that when the facility was fully operational it did not greater than 39 dB at the nearest NSL. This is significantly lower that the 45dB limit set in the Waste Licence for night time operation emissions. The $L_{AF90\ 30\ min}$ level recorded at the NSL was 48 dB. As Greenstar emissions did not contribute to this level, noise levels attributable to the Greenstar facility were most likely more than 9 dB lower at N9, i.e. less than 39 dB

During the September 2009 survey, the LAeq 10 min level measured at station N9, which is the noise sensitive location identified in the Waste Licence, was 67 dB, arising entirely from road traffic noise. The time history profile (Appendix 7 of the Dixon Brosnan Report) shows the dominance of road traffic. Between traffic movements, the LAF level decreased towards 40 dB. Later in the interval, as traffic volume decreased following the ending of a football match at nearby playing fields, LAF levels decreased below 40 dB.

The overall LAF90 10 min level measured was 38 dB. This level is considered partly representative of the continuous emissions from the Greenstar facility i.e. these emissions are likely to have been less than 38 dB. It follows that noise levels at N9 attributable to Greenstar operations were less than both the 55 dB daytime limit, which will apply until 2200 hours, and less than the 45 dB limit which will apply thereafter.

There were no tonal components in the emissions from the Greenstar facility recorded at N9. One third octave band frequency analysis did not detect tones at any of the stations, other than two onsite locations. While RPJ emissions associated with the Odour Abatement System were impulsive when recorded onsite, they were only faintly audible with difficulty at N9.

13.4 Impact and Mitigation Measures

The noise survey established that noise emissions associated with the proposed extension of operational and waste acceptance hours will not result in an exceedance of either the current 55 dB daytime limit or the 45 dB night time limit set in the Waste Licence at the nearest noise sensitive location. The proposed extension of the operational and acceptance hours will have an imperceptible impact at the nearest noise sensitive locations.

The proposed Civic Amenity will not be a source of noise with the potential to impact on the nearest noise sensitive locations. The only noise will be from vehicles (cars mainly) accessing the north eastern yard and the movement of waste receptacles into and out of the MRTF building. The proposed location is currently used for empty skip and vehicle storage and so there will be no new significant noise source. This part of the site is bounded to the north and east by a 2.5m blockwork wall, which will mitigate noise emissions from the use of the Civic Amenity Area.

The mitigation measures, which have been proven to be effective, are the internal processing of waste in the MRTF building and keeping building doors closed after 19:00 each day. The facility is also surrounded by 2.5m high blockwork walls which act as further mitigation.

14. LANDSCAPE

14.1 Introduction

This Section describes the landscape at and in the vicinity of the facility. It is not proposed to construct new or alter existing buildings.

14.2 Methodology

The assessment of the landscape was based on guidelines in the document 'Landscape and Landscape Assessment, Consultation Draft of Guidelines for Planning Authorities' published by the Department of the Environment and Local Government (June 2002). It is based on site inspections carried out in February 2010 and a review of Ordnance Survey maps.

The study area was defined based on the visibility of the facility and the analysis of public viewpoints. The choice of viewpoints was influenced by the identification of private residences, key vantage points and the visibility of the existing buildings in the Industrial Estate.

14.3 Site Context

The site, which encompasses an area of c. 1.56 ha, is located in the Sarsfieldcourt Industrial Estate approximately 5 miles north of Glanmire Village (Figure 4.1).

14.4 Landscape Character

14.4.1 Landscape Value

The site is not in an area designated as of scenic or of special amenity importance.

14.5 Landscape Sensitivity

The sensitivity of the landscape is low and the facility does not significantly interfere with the existing landscape character or eliminate a landscape value.

14.6 Impact Assessment

The only change to the appearance of the facility will be the provision of a Civic Amenity Area, which will comprise a range of different skips and bins and a small portakabin type office. The Civic Amenity Area will be in an area currently used for car parking and the storage of empty skips and bins, which is similar in character to the proposed use. This part of the site is not visible from the Industrial Estate access road, as it is screened behind a large block-work wall which defines the sites boundary.

14.7 Mitigation Measures

The building and site layout have been designed to blend into the existing industrial environment and no further mitigation measures are considered necessary.

15. HUMAN BEINGS

15.1 Introduction

This Section assesses the impacts of the facility on the local population. It describes the economic activity, social consideration, land uses, health and safety and significance of impact.

15.2 Existing Environment

Land use in the surrounding area varies between industrial, commercial, residential and agricultural uses. Figure No. 4.2 shows all dwellings within 300 m of the site boundary, with the nearest dwelling approximately 170 m to the north west of the site boundary. There are no hospitals, hotels or holiday accommodation within 1 km of the site. St. Stephen's hospital is approximately 1.2km to the south of the facility.

15.3 Human Health

The overwhelming majority of the wastes accepted at facility will comprise non-hazardous Household, C & I and C & D waste. A small amount (10 tonnes/year) of hazardous household waste will be accepted at the Civic Amenity Area. With the exception of the Civic Amenity area all wastes will be stored inside the MRTF building.

All wastes will be processed indoors thereby mitigating against any potential health impacts on occupants of the units in the adjoining Industrial Estate and the nearest residences. All potentially odorous waste is processed in a designated area of the building that is provided with an appropriate odour abatement system.

The processing of all wastes internally and the provision of appropriate control measures ensures that the facility does not attract vermin or birds. There are no routine emissions to ground or groundwater, which minimises the risk to groundwater.

Facility personnel are provided with appropriate personal protective equipment to minimise the risk of health impacts.

15.4 Socio-Economic Activity

The proposed changes will not adversely influence the existing economic activities in the surrounding area, nor will it reduce the potential for the expansion of economic activities in the area. The facility is in keeping with national and local waste management policy objectives and existing and proposed land use patterns, and will not result in the loss of amenities or rights of way. The proposal is potentially beneficial in that additional employment is expected to be provided should the facility develop as proposed and the Civic Amenity area will provide an additional amenity in the local community.

15.5 Environmental Nuisance

The facility was designed and is and is operated in a manner that either eliminates, or minimises to the greatest practical extent the risk of environmental nuisance, (noise, litter, vermin and odours). The relevant mitigation measures have been described in detail in Sections 5, 11, 12 and 13 of the EIS.

15.6 Impact Assessment

It is considered that the proposed changes will have a neutral impact with imperceptible consequences for Human Beings in terms of their interaction with the environment. The provision of the Civic Amenity Area is considered a positive development for people living in the local area who will now have use of the facility.

16. ARCHAEOLOGY

16.1 Introduction

This Section describes the archaeological significance of the site and assesses the impacts of the development. Given the size of the site and the available information on site history, the archaeological assessment was confined to a desk study.

16.2 Study Methodology

The desk study included a review the Record of Monuments and Places (RMP) of the Heritage Service of the Department of Environment Heritage & Local Government a review of Ordnance Survey maps for the area.

16.3 Archaeological and Historical Background

There is no record of any archaeological feature on the site. The immediate vicinity of the Industrial Estate is not particularly rich in archaeological features. The nearest archaeological sites according to the national monuments and places record are a Ringfort/Rath located approximately 100 m to the north of the facility and a Ringfort/Rath and Standing Stone located approximately 300 m to the south of the facility.

16.4 Impact Assessment

There is no record of any archaeological feature on or adjacent to the site. The proposal to increase the waste volumes and amend the waste acceptance and operational hours do not require any ground disturbance or construction works and therefore will not impact on any unknown archaeological features.

16.5 Mitigation Measures

No mitigation measures are required.

17. MATERIAL ASSETS

17.1 Introduction

This Section describes the material assets on and in the environs of the site assesses the associated impacts and presents mitigation measures.

17.2 Amenities

The facility is in an area zoned for industrial and related development. Neither the facility nor its immediate environs have a significant leisure or amenity potential. It is considered, based on the existing land use and the nature of the proposed changes that the potential for diminution of amenities and leisure land use is negligible.

17.3 Infrastructure

The only impact on infrastructure associated with the proposed operational changes is on the local and regional road network and this is described in Section 7.

17.4 Agriculture

The proposed changes will not have any impact on agricultural land use in the area.

17.5 Natural Resource Consumption

Facility operations involve the consumption of water, oil and electricity. The main energy sources are electricity and diesel. Diesel is used to fuel the mobile plant and waste vehicles. Table 17.1 shows the expected annual non-renewable resource consumption.

Table 17.1 Expected Annual Non-Renewable Resource Consumption

Resources	Quantities
Road Diesel	5,685,446 litres
Ad Blue	2,000 litres
Hydraulic, Transmission, Engine Oil	3,000 litres
Electricity	247,800 units
Carbon	44,000 kg

*Subject to variation depending on the processing plant layout

18. INTERACTION OF THE FOREGOING

18.1 Introduction

Earlier Sections describe the impacts associated with the proposed operational changes and the mitigation measures. This Section discusses the significance of the actual and potential direct, indirect and cumulative effects of the changes due to interaction between relevant receptors. Only those receptors between which there is an identifiable actual or potential relationship are addressed.

18.2 Human Beings / Air

Waste activities have the potential to impact on human beings arising from noise, dust, vehicle exhaust emissions and odour. The location, design and method of operation have taken account of these emissions and effective mitigation measures have been implemented. These measures comply with the requirements of the Waste Licence.

18.3 Human Beings / Material Assets / Traffic

The proposed changes will result in an increase in traffic on the local road network, however this has the capacity to accommodate the increase with no adverse effects.

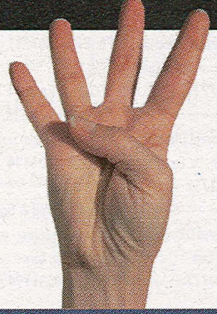
APPENDIX 1

Public Consultation

Greenstar Recycling (Munster) Limited (Greenstar), Sarsfieldcourt Industrial Estate, Glanmire, Co Cork is applying to Cork County Council for Planning Permission and to the Environmental Protection Agency for a review of their Waste Licence Reg. No. W0136-02. The facility is a non hazardous waste Materials Recovery Facility. It is proposed to extend the hours of waste acceptance and operation to 24 hour, seven days per week and to increase the volume of wastes accepted from 95,000 to 200,000 tonnes per annum. It is not proposed to construct any new buildings or accept any new types of waste. Cork County Council has requested that an Environmental Impact Statement (EIS) be prepared. Greenstar invites comments for consideration in the preparation of the EIS. Written submissions only should be sent to O'Callaghan Moran & Associates, Granary House, Rutland Street, Cork to be received by the 02/04/2010.

Evening Echo Classifieds

Cork 021-4274455
email ads@eecho.ie



Legal Section

Planning Notices

Cork County Council: We, Philip and Patricia Stokes, seek permission to retain access route to southern lands, rock armouring and concrete hardstanding at Ballywilliam, Kinsale. The Planning application may be inspected or purchased, at a fee not exceeding the reasonable cost of making a copy, at the offices of the Planning Authority during its public opening hours and a submission or observation in relation to the application may be made in writing to the Planning Authority on payment of the prescribed fee within the period of 5 weeks beginning on the date of receipt by the Authority of the application.

Cork City Council: Permission is sought for a loft extension to a two storey semi-detached dwelling at Glena, 7 Ardfoyle Avenue, Ballintemple, Cork by Elizabeth Dollard. The planning application may be inspected or purchased at the offices of the Planning Authority, City Hall, Cork during its public opening hours – 9.30am – 4.30pm, Monday to Friday, excluding Public Holidays. A submission / observation in relation to the application may be made to the authority in writing on payment of a fee of €20 within the period of 5 weeks beginning on the date of receipt by the authority of the application.

Cork City Council: Permission is sought for alterations to existing dwelling house and associated site works at 10 Bishopstown Avenue, Bishopstown, Cork by Maeve Conrick and Frank Martin. The planning application may be inspected or purchased at the offices of the Planning Authority, City Hall, Cork during its public opening hours – 9.30am - 4.30pm, Monday to Friday, excluding Public Holidays.
A submission / observation in relation to the application may be made to the authority in writing on payment of a fee of €20 within the period of 5 weeks beginning on the date of receipt by the authority of the application

Planning Notices

Cork City Council: Planning permission is sought by Absolute Entertainment Ltd. for proposed extension at second floor level to existing licensed premises to include bar facilities, seating, external smoking area, fire escapes, associated internal changes and all associated site development works and services at 21 Tuckey St. Cork. The Planning Application may be inspected or purchased, at a fee not exceeding the reasonable cost of making a copy, at the offices of the Planning Authority during its public opening hours and a submission or observation in relation to the application may be made to the Authority in writing on payment of the prescribed fee within the period of 5 weeks beginning on the date of receipt by the Authority of the application.

Cork City Council: We, Firestone Developments Ltd., intend to apply for permission for alterations to the existing approved scheme (T.P. 09/33720) as follows: modifications to the external landscaping layout comprising extension of site boundary to the north & south and provision of fence & hedge to the southern boundary, at the lands known as the Ursuline Convent, Blackrock, Cork, of which Convent and Chapel are Protected Structures. The site is bounded by an open field adjoining Blackrock Road to the north; a convent with burial ground to the east and the Eden development site to the east, south and west. The planning application may be inspected or purchased at the offices of the Planning Authority, City Hall, Cork during its public opening hours - 9.30a.m. - 4.30p.m., Monday to Friday, excluding Public Holidays. A submission / observation in relation to the application may be made to the authority in writing on payment of a fee of €20 within the period of 5 weeks beginning on the date of receipt by the authority of the application.

Cork County Council: Marian Rea & Derek Daly is applying for planning permission to construct a storey and a half dwelling house, garage and other ancillary site works at Courtstown, Little Island, Co.Cork. The Planning Application may be inspected or purchased at a fee not exceeding the reasonable cost of making a copy at the offices of the Planning Authority during its public opening hours and a submission or observation in relation to the application may be made to the Authority in writing on payment of the prescribed fee within the period of 5 weeks beginning on the date of receipt by the Authority of the application.

Planning Notices

Cork County Council: We, Nick & Rose Horgan, intend to apply for Permission for modifications to existing dwelling to include raising the roof and conversion of the attic space to living accommodation with 3 dormer windows to the front elevation and 6 rooflights to the rear and retention of existing garage for use as domestic storage and playroom only and ancillary site works at Knocknasuff, Blarney, Co. Cork. The planning application may be inspected or purchased at a fee not exceeding the reasonable cost of making a copy, at the offices of the Planning Authority during its public opening hours. A submission or observation in relation to the application may be made to the Authority in writing on payment of the prescribed fee within the period of 5 weeks beginning on the date of receipt by the Authority of the application.

Midleton Town Council - Further Information and Revised Plans, Drawings & Particulars. Planning Application by John Hurley for development at Park Street, Midleton, Co. Cork. (Planning Register Reference No. 10/56004). Significant further information and revised plans, in relation to the application, have been furnished to the planning authority and are available for inspection or purchase, for a fee not exceeding the reasonable cost of making a copy, at the offices of the authority during office hours. A submission or observation in relation to the further information or revised plans may be made in writing to the Planning Authority within the period of two weeks beginning on the date of publication of this notice and payment of the prescribed fee as may be appropriate.

Cork City Council: I Helen Field intend to apply for permission for development at this site: 3 Beechmount Place, Wellington Road, Cork. (A protected structure).
The development will consist of widening the car entrance by 381mm, so that the entrance will be 2768mm. The lintel will be maintained as recommended by the conservation Officer.
The Planning application may be inspected or purchased at the offices of the Planning Authority at City Hall, Monday - Friday 9.30am - 4.30pm. A submission or observation in relation to the application may be made in writing to the planning authority on payment of the prescribed fee, within the period of 5 weeks, beginning on the date of receipt by the Authority of the Application.

Tenders

ANGEL GUARDIAN COMMUNITY PRESCHOOL
ASHMOUNT, SILVER SPRINGS, CORK

FIT OUT PROJECT

Applications are invited from competent building/fit out contractors who wish to tender for the above project.

Tender documents are available from:

JACK B. CAHILL & CO., Consulting Engineers
28 South Mall, Cork
Tel. 021-4270959 e-mail: engineers@jbcahill.com

Completed tenders must be returned by June 16, 2010 at 12 noon

Public Notices

APPLICATION TO CORK COUNTY COUNCIL FOR A WASTE FACILITY PERMIT

Notice is hereby given, in accordance with Articles 7 and 8 of the Waste Management (Facility Permit and Registration) Regulations 2007, that Cuthbert Environmental, on behalf of Pat Kelleher Rubber Ltd., of Roovesmore, Coachford, Co. Cork, intends to apply for a Waste Facility Permit at Roovesmore, Coachford, Co. Cork, to manage a tyre recovery facility.

The application for a Waste Facility Permit will be made to Cork County Council within 10 working days of the date of this notice.

The Class of Activity at the site, as specified in the Third Schedule of the Waste Management Act, 1996-2008, is as follows: Class 13.

The Classes of Activity at the site, as specified in the Fourth Schedule of the Waste Management Act, 1996-2008, are as follows: Class 4 (Principal) and 13.

The Classes of Activity at the site, as specified in Part I of the Third Schedule of the Waste Management (Facility Permit and Registration) Regulations 2007, are as follows:
Class 10 (Principal) and 12.

It is an offence for any person, other than the applicant, his/her agent, Cork County Council or the Environmental Protection Agency, to remove this site notice.

A copy of the application for the Waste Facility Permit will be available for inspection or purchase, as soon as is practicable after receipt by the Cork County Council, at the principal offices of the Environment Dept., Cork County Council, Inniscarra, Co. Cork.

Greenstar Recycling (Munster) Limited (Greenstar), Sarsfieldcourt Industrial Estate, Glanmire, Co Cork, is applying to Cork County Council for Planning Permission and to the Environmental Protection Agency for a review of their Waste Licence Reg. No. W0136-02.

The facility is a non-hazardous Waste Materials Recovery Facility. It is proposed to extend the hours of waste acceptance and operation to 24 hour, seven days per week, to increase the volume of wastes accepted from 95,000 to 200,000 tonnes per annum and to open a civic amenity centre for members of the public.

Cork County Council has requested that an Environmental Impact Statement (EIS) be prepared.

Greenstar invites comments for consideration in the preparation of the EIS. Written submissions only should be sent to O'Callaghan Moran & Associates, Granary House, Rutland Street, Cork, to be received by the 18/06/2010.

APPENDIX 2

Bund Test Report

CATHAL LEHANE BE Dip Prjt MIEI
Consulting Civil & Environmental Engineer

Springville, Ovens, Co. Cork.
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Report on Inspection and Integrity Testing of Bunded Tanks

For

Greenstar

At Sarsfield Court
Glanmire
Co. Cork

CATHAL LEHANE BE Dip Prjt MIEI

Consulting Civil & Environmental Engineer

Springville, Ovens, Co. Cork.

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Introduction

Cathal Lehane, Consulting Civil & Environmental Engineer was commissioned by Countywide Drain Services on behalf of Greenstar to conduct a series of inspections and integrity testing of bunded areas at Sarsfield Court, Glanmire, Co. Cork. There were 2 no. Bunds to be certified.

Bund No. 1 is a covered Diesel Oil Bund with a capacity of 32,000 litres. It contains 4 no. oil tanks. Bund No. 2 is an enclosed tray bund at bottom of sealed container which holds various containers on a temporary basis. Items such as old batteries, empty gas cylinders and new oil drums are temporarily stored.

A preliminary site visit took place on Tuesday 7th July 2009. This preliminary site inspection was used to perform an initial visual inspection of the bunds

On Thursday 9th July 2009 bunds were cleaned of any debris and surfaces cleaned. . Effective capacities of bunds were calculated at this stage. A visual inspection of bunds was completed.

On Friday 10th July 2009 clean water was imported to site and bunds filled to appropriate level. Integrity testing of tanks was carried out.

Inspection & Integrity Procedure

Following cleaning of bunds dimensions were recorded and bunds checked for any defects. When all preparations had been carried out the integrity/water tightness test was then performed according to the procedure defined in the Environmental Agency (England & Wales) R&D Technical Report P16. Initial water levels were taken and these were continuously monitored during the test. Any drop in water level would indicate bund failure. Although the test is described as a six hour test, if failure was noticed at an earlier stage then the test would be stopped immediately.

CATHAL LEHANE BE Dip Prjt MIEI
Consulting Civil & Environmental Engineer

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Email: info@cathallehane.ie
Web: www.cathallehane.ie

Results & Compliance

Tank	Length (m)	Width (m)	Depth (m)	Bund Effective Capacity (litres)	Max Volume Stored (litres)	Test Fill Height (m)	Comment
1	16.12	4.18	0.475	32,006	24,801	0.275	Tested & Passed
2	5.6	1.4	0.110	862	255	0.108	Tested & Passed

Bund 1 – Diesel Oil Bund

Following visual inspection of bund no cracks or defects were visible. Construction is relatively new mass concrete construction. Bund is covered so there is no issue with rainwater.

The bund contained 4 no tanks.

Diesel Tank 1 volume	1,000 L
Diesel Tank 2 volume	2,500 L
Diesel Tank 3 volume	2,301 L
Diesel Tank 4 volume	19,000 L
Total	24,801 L

Bund was filled to level of bottom of lowest tank (to ensure floatation of tank did not take place). Capacity of bund is in excess of 125% the total volume of 4 no. individual tanks. No drop in water level was recorded during this monitoring period (6 hours) and so the bund has passed the integrity test and in compliance with licence requirements.

CATHAL LEHANE BE Dip Prjt MIEI

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Tank 2

Following visual inspection of bund no rusting, cracks or defects were visible. Construction is relatively new metal tray in sealed container.

This bund/container is for temporary storage of vessels which contain liquids/gasses that pose a safety/pollution risk. On the day of test the following vessels were in bunded area.

6 no batteries	15 L
12 no 20 L machine oil drums	240 L
Empty Gas Containers	------
Total	255 L

Bund was filled to underside of grill. Capacity of bund in container is in excess of 125% the total volume of individual vessels. No drop in water level was recorded during this monitoring period (6 hours) and so the tank has passed the integrity test and in compliance with licence requirements.

Conclusion

Both bunds tested during this visit were found to be without defects and their integrity confirmed from these tests. Capacity of both bunds exceeded 125% of volume of total of individual vessels contained in bunded areas.

Signed: Cathal Lehane
Cathal Lehane

Dated: 11th July 2009
11th July 2009

PROFESSIONAL INDEMNITY INSURANCE POLICY SCHEDULE

POLICY NUMBER:	GEI/COM/01406911		
THE INSURED:	Cathal Lehane t/a Southwestern Architectural & Engineering		
BUSINESS ADDRESS:	Springville Ovens Co Cork		
BUSINESS DESCRIPTION:	Consulting Engineer		
INCEPTION DATE:	09 May 2009	TIME:	00:01 hours
EXPIRY DATE:	08 May 2010	TIME:	23.59 hours
PERIOD OF INSURANCE:	09 May 2009 to 08 May 2010		
RENEWAL DATE:	09 May 2010		
ANNUAL (MINIMUM AND DEPOSIT PREMIUM):	€ 1,923.00		Inclusive of 2% Government levy
FIRST (MINIMUM AND DEPOSIT PREMIUM):	€ 1,923.00		Inclusive of 2% Government levy
TERRITORIAL LIMITS:	Worldwide excluding USA/Canada		
JURISDICTION:	Worldwide excluding USA/Canada		
RETROACTIVE DATE:	09 May 2005		
PROPOSAL FORM DATED:	16 March 2009		
LIMIT OF INDEMNITY:	€ 500,000 For any one event		
EACH & EVERY OCCURRENCE EXCESS:	€ 1,000		

APPENDIX 3

Climatic Information

CORK AIRPORT

monthly and annual mean and extreme values 1962-1991

	jan	*feb*	*mar*	*apr*	*may*	*jun*	*jul*	*aug*	*sep*	*oct*	*nov*	*dec*	
TEMPERATURE *(degrees Celsius)*													
mean daily max.	7.6	7.5	9.3	11.3	13.8	16.6	18.5	18.2	16	13.1	9.9	8.5	**12.5**
mean daily min.	2.6	2.5	3.1	4.2	6.5	9.2	11.1	10.9	9.4	7.5	4.5	3.7	**6.3**
mean	5.1	5	6.2	7.7	10.2	12.9	14.8	14.5	12.7	10.3	7.2	6.1	**9.4**
absolute max.	12.6	13.5	15.5	20.5	23.6	25.7	28.7	27.5	24.7	19	15.9	13.6	**28.7**
absolute min.	-8.5	-8.6	-6.1	-2.4	-0.9	2.4	4.8	4.9	2.3	-0.4	-3.3	-5.9	**-8.6**
mean no. of days with air frost	6.7	5.6	3.4	1.8	0.1	0	0	0	0	0	2.4	3.9	**24**
mean no. of days with ground frost	15	12.7	12	9.4	2.9	0.2	0	0	0.4	2.6	9.5	12.2	**76.8**
RELATIVE HUMIDITY *(%)*													
mean at 0900UTC	90	90	88	83	81	81	83	86	88	91	90	90	**87**
mean at 1500UTC	84	80	75	71	71	72	72	73	76	82	83	86	**77**
SUNSHINE *(hours)*													
mean daily duration	1.7	2.28	3.51	5.21	6.02	5.53	5.4	5.14	4.13	2.8	2.16	1.56	**3.8**
greatest daily duration	7.3	9.3	11.8	13.8	15.4	15.9	15.4	14.2	12.8	9.9	8.5	6.7	**15.9**
mean no. of days with no sun	11	9	6	4	2	3	2	2	4	7	9	12	**69**
RAINFALL *(mm)*													
mean monthly total	148.3	115.9	97.1	70.2	84.1	67.7	65.4	89.9	97.4	125.8	108.7	136.5	**1207**
greatest daily total	55.1	48.2	39.3	44.9	49.3	43.3	83.8	64.8	51.8	86.7	69.9	52.2	**86.7**
mean no. of days with >= 0.2mm	20	17	18	14	16	15	14	16	16	19	19	20	**204**
mean no. of days with >= 1.0mm	16	13	13	10	12	10	9	11	12	15	14	16	**151**
mean no. of days with >= 5.0mm	9	8	6	4	6	5	4	5	6	8	7	8	**75**
WIND *(knots)*													
mean monthly speed	12.9	12.6	12.3	11	10.6	9.5	9.1	9.2	10.3	11.2	11.6	12.4	**11.1**
max. gust	94	83	70	63	60	51	57	54	64	75	66	68	**94**
max. mean 10-minute speed	58	54	44	41	41	36	40	38	45	48	46	46	**58**
mean no. of days with gales	3.2	2.2	1.7	0.7	0.4	0.1	0.1	0.2	0.7	1.2	1.8	2.5	**15**
WEATHER *(mean no. of days with...)*													
snow or sleet	4.5	4.7	3	1.1	0.2	0	0	0	0	0	0.6	2.3	**16.4**
snow lying at 0900UTC	2.7	1.8	0.4	0	0	0	0	0	0	0	0	0.6	**5.6**
hail	1	1.1	1.9	1.9	1.1	0.3	0.1	0.1	0.1	0.4	0.3	0.6	**8.8**
thunder	0.4	0.1	0.1	0.2	0.4	0.5	0.8	0.5	0.2	0.4	0.1	0.1	**3.7**
fog	7.4	7.3	7.9	5.9	7.7	8.6	8.5	9.8	10.7	10.4	7.3	8	**99.5**

APPENDIX 4

Traffic Impact Assessment

PROPOSED INTENSIFICATION OF WASTE ACCEPTANCE AT AN EXISTING MATERIALS RECOVERY FACILITY, GLANMIRE, CO. CORK

TRAFFIC IMPACT ASSESSMENT

JUNE 2010

02908/20100624/FR01/BMjk

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1 NON TECHNICAL SUMMARY

1.1 This report addresses existing and potential future traffic conditions on the local road network in the vicinity of a Materials Recovery Facility (MRF), located in the established Sarsfield Court Industrial Estate on the outskirts of Glanmire.

1.2 The proposed development is to increase the level of waste accepted at the existing MRF from 97,000 to 200,000 tonnes per annum; it is also proposed to provide a new civic amenity area which will be open to members of the public.

1.3 The MRF generated a total of 142No. vehicle trips during the 12hr traffic count survey between 07:00hrs to 19:00hrs. This traffic stream is made up of 69No. HGV trips and 72No. LGV trips. Under the óworst caseô traffic generation scenario it is estimated that the proposed development, when operating at itsô ultimate capacity and with the civic amenity area in place, has the potential to generate a total of:

- up to 269No. vehicle trips on weekdays (175No. HGV trips and 112No. LGV trips);
- up to 196No. vehicle trips on Saturdays (52No. HGV trips and 144No. LGV trips).

1.4 The peak hour for traffic entering and leaving the existing Sarsfield Court Industrial Estate will remain as 16:00hrs to 17:00hrs with the proposed development. On weekdays during this peak period the MRF is forecast to generate a two-way traffic flow of 76No. vehicle movements; as opposed to the existing flow of 41No. vehicle movements. The level of traffic manifest at the Sarsfield Court Industrial Estate access in the same peak period is expected to increase from 112No. traffic movements to 147No. traffic movements.

1.5 The performance of the R616, with the proposed development in place, has been assessed for the Sarsfield Court Industrial Estate weekday peak hour of 16:00hrs to 17:00hrs and the expected Saturday peak hour of 12:00hrs to 13:00hrs. This assessment period has been selected since the level of traffic generated at the industrial estate access to the R616 during the network peak hours is not significant.

1.6 The existing traffic generation of the MRF accounts for approximately 8.0% of R616 traffic flows to the west of the Sarsfield Court Industrial Estate access. The proposed development (operating at ultimate capacity) is estimated to increase this percentage 14.4% over the 12-hour assessment period. Clearly, if development traffic were permitted to distribute over a 24-hour period, such impact will be lower.

1.7 In terms of development impact upon the carrying capacity of the local roads network the results of the analysis show that traffic arising from the current proposal is not likely to have an adverse impact upon the capacity and operation of the receiving roads environment.

1.8 It is recommended that a new routing regime is adopted by the Applicant. The new regime will encourage drivers of large articulated vehicles to avoid using the Glanmire Road (running between Buck Learyôs Cross Roads and Glanmire) and is proposed in the interests of increasing traffic safety and reducing insofar as practicable potential to create traffic hazard.

2 INTRODUCTION

2.1 General Overview

2.1.1 **Traffic***wise* Ltd. has been retained by Greenstar Holdings Ltd. to carry out a Traffic Impact Assessment for a development comprising the proposed intensification of waste acceptance and a new civic amenity centre at an existing Materials Recovery Facility (MRF) at Sarsfield Court Industrial Estate, County Cork.

2.1.2 Under waste license W0136-02 the existing MRF is licensed to process 97,000 tonnes of material per annum over a 12-hour working day. The proposed development objective is to increase the annual tonnage to 200,000 tonnes per annum and to extend the hours of operation to 24 hours per day.

2.1.3 This report identifies existing traffic conditions and provides an assessment of the incremental or relative level of traffic impact arising on the receiving local road network as a direct result of the proposed intensification of activities at the development.

2.1.4 This report is structured in accordance with the Institution of Highways & Transportation (IHT) document ôGuidelines for Traffic Impact Assessmentô (Sept 1994) and reference is also made to the National Roads Authority (NRA): Traffic and Transport Assessment Guidelines (Sept 2007).

3 EXISTING CONDITIONS

3.1 Location of Site

3.1.1 The application site is located in Sarsfield Court Industrial Estate approximately 6km north of Glanmire in the administrative region of Cork County Council. Sarsfield Court Industrial Estate currently serves several industrial and warehousing units together with an assortment of materials recovery and recycling facilities, including the application site operated by Greenstar Ltd.

3.1.2 Sarsfield Court Industrial Estate is located to the east of Buck Learyôs Crossroads. The northern boundary of the estate fronts onto the R616 Regional Road to which direct vehicular access is provided. The western boundary fronts onto the local road which runs from Glanmire north to Buck Learyôs Crossroads, hereafter referred to as Glanmire Road for the purposes of this report. The eastern and southern boundaries are characterised by agricultural lands.

3.1.3 The existing Greenstar Materials Recovery Facility (MRF) is provided with two access points located approximately half way along, and on the western side of the internal spine road serving the Sarsfield Court Industrial Estate. In general the more northerly access is used predominantly by cars and light goods vehicles. The southern access leads to the weighbridge and is the access used for HGV (deliveries/collections). The existing facility is privately operated and there is no public amenity facility at the site.

3.1.4 The existing MRF site is bounded by warehouses to the north and Glyntown Enterprises Ltd. to the south. The neighbouring Glyntown Enterprises Ltd. site operates under permission granted in April 2007 under Planning File Reference 06/9718. The western boundary of the MRF is formed by the industrial estate spine road whilst the eastern boundary is formed by Glanmire Road which runs south from Buck Learyôs Crossroads.

3.2 The Local Road Network

3.2.1 Sarsfield Court Industrial Estate enjoys direct vehicular access to the Regional Road Network and is served by a singular simple priority T-junction on the R616.

3.2.2 Visibility to the left for drivers departing the existing industrial estate is in the order of 185m extending to the minor road centreline of Buck Learyôs Crossroads. Drivers exiting the industrial estate can see approximately 40m beyond the crossroads. Visibility sightlines to the east of the access are somewhat restricted for exiting drivers due to the existing northern boundary fence of the industrial estate. The application site is located well within Sarsfield Court Industrial Estate and the application lands do not include any part of the northern boundary to the site accordingly there is no potential for the applicant to propose improvement to sightlines to the east of the existing industrial estate access under the current application. Forward visibility for drivers approaching the site access along the R616 is satisfactory from both directions.

3.2.3 The R616 Regional Road follows a north-easterly route from Whites Cross through Buck Learyôs Crossroads and on to Ballinvinny North where it intersects with the R639 at Annacarton Bridge. The R639, which is believed to be the old Dublin Road leads north to Watergrasshill where it connects with the new M8 Motorway at a grade separated interchange. Travelling south from Annacarton Bridge leads to a grade separated interchange on the M8. Further south of the interchange the R639 leads to Glanmire Village.

3.2.4 In the context of the current application the R616 is considered to consist of two sections. The first section spans 5km between Whites Cross and Buck Learyôs Crossroads. This section of road is particularly torturous and narrow in parts. On the westbound approach to Buck Learyôs Crossroads the R616 is provided with information signs indicating that the road ahead is unsuitable for HGV. The second part of the R616 runs between Buck Learyôs Crossroads and the R639. The section of the road is characterised by lesser gradients and less torturous bends. The R616 over this more northerly section was measured to have an average width of 6.0m. This section of the R616 currently accommodates HGV servicing various enterprises located thereupon.

3.2.5 The Glanmire Road runs from Buck Learyôs Crossroads south to the R639 at Kearneyôs Crossroads. Glanmire Road has an average width of 6.0m. The road is characterised by narrow verges and there are isolated sections where trees canopies overhang the edge of road thus reducing the effective available road width for high-sided vehicles. Tree canopies can accordingly compromise the opposed passage of high-sided vehicles. St. Stephenôs Psychiatric Hospital is located on the western side of Glanmire Road approximately 1.2km to the south of the Buck Learyôs Crossroads. The carriageway is generally in good condition and carries moderate levels of HGV arising predominantly from Sarsfield Court Industrial Estate. Public Bus Service Route No. 215 (Glanmire to Watergrasshill) was also observed to use Glanmire Road. The local road is considered suitable for routing of average and smaller sized HGV; but not particularly suitable for larger high-sided articulated HGV due to the intermittent occurrence of low overhanging canopy of trees adjacent to the carriageway.

3.3 Current Local Authority Policy and Roads Objectives

3.3.1 We have reviewed the Cork County Development Plan 2009 for future road objectives and there is no evidence of specific objectives in the plan for road improvements in the general vicinity of the site, the R616 or the local road herein called Glanmire Road.

4 EXISTING TRAFFIC FLOWS ON THE LOCAL ROAD NETWORK

4.1 Independent Traffic Surveys

4.1.1 Abacus Transportation Surveys Ltd. carried out traffic classified turning count surveys at the site access and the nearby Buck Learyôs Crossroads using video surveillance technology on Tuesday 23 February 2010. A DVD copy of the CCTV footage can be made available upon request. The original survey data and location mapping is provided in Appendix A.

4.1.2 The surveys recorded traffic flows on the R616 and Buck Learyôs Crossroads together with all vehicles arriving at and departing from the existing Sarsfield Court Industrial Estate. Greenstar vehicles have been classified separately at both the industrial estate access and Buck Learyôs Crossroads. The existing surveyed traffic volumes on the public roads are presented in this section of the report. Traffic generated by the existing MRF site is detailed in Section 5.

4.2 Traffic Flows on R616 Regional Road (Between Ind. Est. and Crossroads)

4.2.1 The daily traffic flow profile of the R616 is shown in Figure 1 of Appendix B which provides both tabular and graphical representation of the volumes of traffic manifest on the R616 Regional Road over the course of the 12 hour traffic surveys.

4.2.2 Over the course of the traffic count survey the R616 carried a total two-way traffic flow of 2,620No. Vehicles, of which some 243No. (9%) were HGV.

4.2.3 Figure 1 of Appendix B shows that the greater proportion of traffic travelled westbound in the morning peak hour, with the converse manifest in the evening peak. Outside these peak times the R616 carried relatively equal traffic volumes in both directions.

4.2.4 The R616 experienced two peak hour periods identified from the surveys as 08:00hrs to 09:00hrs in the morning and 17:00hrs to 18:00hrs in the evening. These periods typically represent the commuter peak hours.

4.2.5 During the morning peak hour period a total two-way traffic flow of 347No. (4% HGV) vehicle movements were recorded, whilst during the evening peak hour a total two-way traffic flow of 333No. (4% HGV) vehicle movements were recorded. The quantum of HGV on the R616 during both peak hours is significantly less than that recorded for other periods throughout the day, suggesting that logistics managers program HGV deliveries/collections to occur outside the network peak hours; this is not unusual.

4.2.6 Over the course of the 12 hour traffic surveys the R616 manifest an average hourly two-way traffic flow of 220No. vehicle movements, with an average of 20No. HGV per hour. Using NRA document RT201, the R616 has an indicative AADT[1] in the range of 3,200 to 4,800.

4.3 Traffic Flows on the Local Road (Glanmire Road)

4.3.1 The daily two-way traffic flow profile of the local road is shown in Figure 2 of Appendix B which shows both the quantum of traffic and a graphical representation of same on the local road south of the Buck Learyâs Crossroads.

4.3.2 Over the course of the 12 hour traffic count survey the Glanmire Road carried a total two-way traffic flow of 1,687No. vehicles of these a total of 135No. (8%) were HGV.

4.3.3 Figure 2 of Appendix B shows that the Glanmire Road carried relatively equal traffic volumes in both directions over the course of the survey period. The survey peak hours were identified from the surveys to be identical to that recorded on the R616, those being 08:00hrs to 09:00hrs in the morning and 17:00hrs to 18:00hrs in the evening.

4.3.4 During the morning peak hour a total two-way traffic flow of 173No.(4% HGV) vehicle movements was recorded, whilst during the evening peak hour a total two-way traffic flow of 183No.(3% HGV) vehicle movements was recorded. Over the course of the surveys the Glanmire Road showed an average hourly two-way traffic flow of 140No. vehicle movements, with an average of 11No. HGV. Using NRA document RT201, the Glanmire Road is estimated to have an indicative AADT in the range of 2,000 to 3,100.

[1] Annual Average Daily Traffic Flow (24hours)

5 TRAFFIC GENERATED AT EXISTING MRF SITE

5.1 Traffic Survey Data

5.1.1 MRF Total Traffic Generation

5.1.1.1 Figure 3 of Appendix B shows a graphical and quantative representation of the total two-way traffic flow over the course of the 12 hour survey period. Figure 3 includes all vehicle movements i.e. HGV and cars/vans etc.

5.1.1.2 A combined total two-way traffic flow of 282No. movements (125No. in and 157No. out) were recorded at the two existing MRF accesses. The existing site was shown to generate an average two-way traffic flow of 24No. movements every hour during the survey. Over the entire survey the site generated a total of 58No. cars/LGV in and a total of 86No. cars/LGV out. This discrepancy in arrival/departure patterns indicates that staff members arrive on site prior to 07:00hrs.

5.1.1.3 Figure 3 of Appendix B shows the MRF peak hour for traffic generation occurred from 16:00hrs to 17:00hrs. During this ódevelopmentô peak hour the site generated a total two-way traffic flow of 41No. traffic movements. The 41No. movements were made up of 13No. inbound movements (3No. cars/LGV and 10No. HGV) and 28No. outbound movements (24No. cars/LGV and 4No. HGV).

5.1.2 MRF HGV Traffic Generation

5.1.2.1 The daily two-way profile of HGV traffic entering/exiting the existing MRF site is shown in Figure 4 of Appendix B.

5.1.2.2 The MRF generated a total of 138No. HGV movements (67No. in and 71No. out) during the survey. An average hourly two-way flow of 12No. HGV movements (6No. in and 6No. out) was recorded.

5.1.2.3 Figure 4 of Appendix B shows the peak hour for HGV traffic generation at the existing MRF was from 12:00hrs to 13:00hrs. During this hour the site generated a total of 22No. HGV movements (9No. in and 13No. out).

5.1.3 MRF LGV Traffic Generation

5.1.3.1 In terms of cars/vans the site generated a total of 58No. LGV in and a total of 86No. LGV out during the survey. This indicates that staff members tend to arrive at the facility before 07:00hrs in the morning. Over the survey period (07:00hrs to 19:00hrs) the facility generated a total of 144No. LGV movements or 72No. LGV trips.

5.1.4 Sarsfield Court Industrial Estate Total Traffic Generation

5.1.4.1 The daily profile of traffic entering/exiting the Sarsfield Court Industrial Estate as recorded in the traffic surveys is shown in Figure 5 of Appendix B. This includes all vehicle types.

5.1.4.2 Over the course of the 12 hour traffic survey the industrial estate generated a total of 900No. traffic movements (446No. in and 454No. out). An average two-way traffic flow of 75No. movements were generated every hour. In terms of cars/LGV the site generated a total of 669 No. movements (320 in and 349No. out) during the survey.

5.1.4.3 Figure 5 of Appendix B shows the peak hour of industrial estate generated traffic is 16:00hrs to 17:00hrs. This is the same peak hour manifest at the MRF. During this hour Sarsfield Court Industrial Estate generated a total of 112No. traffic movements (46No. in and 66No. out).

5.1.4.4 In terms of traffic distribution, 74% of all traffic arrived at/departed Sarsfield Court Industrial Estate to/from the west (Buck Learyôs Crossroads); with 26% arriving at/departing to/from the east (R639).

5.1.4.5 The Sarsfield Court Industrial Estate generated a total of 231No. HGV movements (126No. in and 105No. out) during the 12 hour survey period. An average of 20No. HGV movements were generated every hour. The peak hour of industrial estate HGV generated traffic was from 10:00hrs to 11:00hrs, during which a total of 35No. HGV movements were recorded.

5.2 Weighbridge Data

5.2.1 Overview of Weighbridge Data

5.2.1.1 Weighbridge records have been analysed with the objective of validating the findings of the traffic count survey for waste related traffic movements and establishing daily traffic trends. The weighbridge system records all HGV movements arising from the import and export of waste at the site. The records are used herein to establish the level of MRF traffic generation on the day of the survey and to assess same against typical 'average' and 'upper value' daily traffic flows.

5.2.1.2 The weighbridge data includes parameters such as: time and date of entry/exit, type of load, payload (tonnes), vehicle type, customer details etc. The records reviewed for the purposes of this assessment span a three month period from December 2009 to February 2010.

5.2.2 General Results of Weighbridge Data Analysis

5.2.2.1 A plot of daily HGV trips at the existing facility over the three month period of assessment is shown in Figure 6 of Appendix B.

5.2.2.2 A more detailed plot of daily HGV trips including a breakdown of the total number of deliveries (imports) and collections (exports) for each month included in the data is shown in Figures 7, 8 and 9 of Appendix B; for December 2009, January 2010 and February 2010 respectively.

5.2.2.3 Over the three month assessment period a total of approximately 16,500 tonnes of unsorted waste material was accepted at the MRF. This generated a total of 3,546No. waste deliveries (imports) to the site. The average load per delivery was calculated from the weighbridge data as 4.7 tonnes.

5.2.2.4 Over the assessment period a total of approximately 17,000 tonnes of sorted waste material was collected from the MRF and brought to offsite facilities for further processing and/or disposal. The export of materials generated a total of 796No. HGV. The average load exported was calculated from the weighbridge data to be 21.4 tonnes.

5.2.2.5 The weighbridge data shows that on Saturdays the MRF typically generates one third of the average weekday (Mon to Fri) traffic generation.

5.2.3 Traffic Generation Results of Weighbridge Data Analysis

5.2.3.1 The weighbridge data has been used to calculate the average traffic generation and 85th percentile traffic generation of the existing facility. The Institution of Highways & Transportation (IHT) recommends using 85th percentile traffic generation values in traffic assessments in order to ensure a robust analysis which reflects busier than normal times. Such robust analysis is typical and is done in the interest of not undersizing infrastructure which is often the result when only average traffic flows are investigated.

5.2.3.2 Table 5.1 provides a summary of the average and 85th percentile HGV traffic generation recorded over the three month weighbridge period investigated.

Traffic Generation	Deliveries (Trips)	Collections (Trips)	Total (Trips)
Average	48	11	59
85th Percentile	62	13	75

Table 5.1 Daily HGV Traffic Generation of MRF (Dec09-Feb 10)

5.2.3.3 From Table 5.1 above, the existing MRF generated an average of 59No. HGV trips per day (118No. HGV movements). The 85th percentile or upper assessment value was 75No. HGV trips per day (150No. HGV movements).

5.2.3.4 The traffic count survey of Tuesday 23 February 2010 recorded a total of 138No. HGV movements at the MRF. It follows that the level of waste traffic manifest during the traffic count survey correlates with the weighbridge data traffic generation analyses as presented in Table 5.1. In fact on the day of the traffic count survey traffic activity at the site was busier than average. Accordingly the survey data is considered representative.

5.3 Summary of Existing Traffic Generation

5.3.1 The weighbridge data quantifies existing average and 85th percentile HGV traffic generation values at the MRF i.e. an average value of 59No. HGV trips and an 85th percentile value of HGV 75No. trips.

5.3.2 Regarding other vehicles generated by the MRF the traffic count survey recorded a total of 72No. LGV trips. This value is likely to remain static regardless of the volume of HGV generated on any given day and is considered to apply to both average and 85th percentile assessment values.

5.3.3 Existing traffic generation values are summarised in Table 5.2 below.

Traffic Generation	MRF (Trips per Day)		
	HGV	LGV	Total
Average	59	72	131
85th Percentile	75	72	147

Table 5.2 Existing Daily Traffic Generation of MRF (Trips per Day)

6 TRAFFIC GENERATION OF PROPOSED DEVELOPMENT

6.1 General Overview of Proposed Development

6.1.1 The proposed development aims to increase the annual tonnage accepted at the existing MRF from 97,000 tonnes per annum to 200,000 tonnes per annum. It is further proposed to increase the timeframe over which waste can be accepted on site from 12-hours per day to a 24-hour period, Monday to Friday. It is envisaged that due to supplier and customer constraints waste will continue to be accepted for a half day on Saturdays.

6.1.2 The proposed increase in capacity is designed to allow for the progressive intensification of recycling activities thus facilitating Greenstar Ltd. in tendering for contracts in relation to the collection and recycling of materials.

6.1.3 The proposed development includes a new civic amenity area in the existing staff car park adjacent to the main MRF building. The centre will be open to members of the public from 07:00hrs to 19:00hrs Monday to Saturday and 09:00hrs to 17:00hrs on Sundays. Waste accepted will include plastics, cardboard, metal, glass, wood, cans, textiles, WEEE, MSW and C&D.

6.1.4 In the following sections traffic generation of the proposed development has been assessed for weekdays and Saturdays since the MRF is expected to generate more traffic on weekdays, whilst the proposed civic amenity area is likely to generate more traffic on Saturdays.

6.2 Assumptions adopted in Forecasting Traffic Generation

6.2.1 Notwithstanding the proposal to extend the hours of operation at the MRF to 24 hours per day it is assumed for the purposes of assessment that the majority of all waste deliveries and collections will occur between the hours of 07:00hrs and 19:00hrs. The impact of development traffic will be specifically quantified during this timeframe. This will result in a higher concentration of traffic accessing the facility between the hours of 07:00hrs and 19:00hrs, as opposed to being evenly spread out across a 24-hour timeframe; clearly this compounds the robustness of the traffic analysis.

6.2.2 It is conservatively assumed that 200,000 tonnes of waste could be accepted at the MRF immediately following a grant of permission in the development opening year, which is assumed to be 2011. In reality this is considered unlikely and intensification is expected to grow on a phased basis from the date of the permission.

6.2.3 The weighbridge data showed that on Saturdays the MRF currently generates approximately 33% of the average weekday (Monday to Friday) HGV traffic generation. It is assumed that this pattern will continue following the proposed development.

6.2.4 Existing loading characteristics of waste deliveries and collections will not change i.e. future waste deliveries will be an average of 4.7 tonnes per load and future waste collections will be 21.4 tonnes per load.

6.2.5 Staffing levels at the existing MRF will not increase i.e. the existing LGV traffic generation value of 72No. LGV trips per day will remain.

6.2.6 The civic amenity area will be open to all members of the public from 07:00hrs to 19:00hrs.

6.3 Forecast Traffic Generation of Proposed Development (Weekdays)

6.3.1 Forecast Traffic arising from Increase in Waste Acceptance

6.3.1.1 Given the proposed increase in tonnage accepted at the MRF from 95,000 tonnes per annum to 200,000 tonnes per annum, it is likely that the proposed development would result in a ódoublingô of existing levels of MRF generated HGV traffic. The forecast traffic generation values of the proposed development are therefore estimated by applying a pro-rata increase of 2.1 times existing traffic generation values, as shown in Table 6.1 below.

Traffic Generation	MRF (Trips per Day)		
	Deliveries	Collections	Total
Average	101	23	124
85th Percentile	130	27	157

Table 6.1 Forecast HGV Traffic Generation of MRF on Weekdays (Trips/Day)

6.3.1.2 Table 6.1 shows that the proposed development has the potential to generate an average of 124No. HGV trips and an 85th percentile assessment value of 150No. HGV trips at the site when it is operating at maximum capacity and accepting the proposed 200,000 tonnes of material per annum.

6.3.2 Forecast Traffic arising from Civic Amenity Area

6.3.3 Traffic generation of the proposed civic amenity area is based on data available at a similar Greenstar civic amenity area in Carriganard, Butlerstown County Waterford.

6.3.4 This existing facility accepts a similar waste stream to that of the proposed development and is open to members of the public over a similar timeframe.

6.3.5 From discussions with the operator of the civic amenity area in Waterford, it is our understanding that the civic amenity area generates no more than 30No. LGV per day for most weekdays. At weekends the civic amenity area typically generates no more than 90No. LGV per day.

6.3.6 Following on from this it is assumed through the Institution of Highways and Transportation recommended comparison method that the proposed civic amenity area could generate a similar volume of traffic in terms of average traffic generation. In forecasting 85th percentile traffic generation it is assumed that these values could be approximately 33% above the average values.

6.3.7 Forecast Total Daily Traffic Generation of Proposed Development

6.3.8 Table 6.2 summarises the weekday daily traffic generation likely to arise from the proposed development.

Traffic Generation	MRF		Civic Amenity Area	Total
	HGV	LGV	LGV	
Average	124	72	30	226
85th Percentile	157	72	40	269

Table 6.2 Forecast Total Traffic Generation on Weekdays (Trips/Day)

6.3.9 Forecast Peak Hour Traffic Generation at Proposed Development

6.3.10 In forecasting the impact of the MRF in the recorded peak hour of 16:00-17:00hrs the forecast 85th percentile HGV traffic generation (157No. HGV trips per day, equivalent to 157No. HGV arrivals and 157No. HGV departures) has been split into the hourly proportions of HGV arrivals and departures as recorded by the traffic count survey. The traffic count survey was previously shown to correlate reasonably well with the 85th percentile traffic generation identified from the weighbridge data, as such the factored up values are likely to be representative of 85th percentile traffic generation of the proposed development. The forecast daily spread of HGV arriving at and departing from the MRF is shown in Figure 10 of Appendix B.

6.3.11 The number of LGV arrivals and departures arising from the proposed intensification of waste acceptance is not expected to change. Average traffic generation values are estimated to be 20% lower than the 85th percentile values. The resulting forecast peak hour traffic generation following implementation of the proposed development is shown in Table 6.3 below.

Traffic Generation	HGV		LGV		Total	
	Arr	Dep	Arr	Dep	Arr	Dep
Average	19	7	3	24	22	31
85th Percentile	24	9	3	24	27	33

Table 6.3 Forecast Development Peak Hour (16:00-17:00hrs) Traffic Generation of MRF on Weekdays (No. of Vehicles/Hour)

6.3.12 For the civic amenity site it is estimated that up to 20% of the daily traffic generation (shown in Table 6.2 above) could occur during the identified peak hour of 16:00-17:00hrs. For average traffic generation this could result in the generation of 6No. arrivals and departures in the peak hour (20% of 30No. trips). For 85th percentile traffic generation a total of 8No. arrivals and departures are forecast (20% of 40No. trips). The forecast daily profile of LGV arriving at and departing the proposed civic amenity area is shown in Figure 11 of Appendix B.

6.3.13 Following on from this the total traffic generation of the proposed development during the peak hour of 16:00-17:00hrs is summarised in table 6.4 below.

Traffic Generation	HGV		LGV		Total	
	Arr	Dep	Arr	Dep	Arr	Dep
Average	19	7	9	30	28	37
85th Percentile	24	9	11	32	35	41

Table 6.4 Forecast Development Peak Hour (16-17:00hrs) Traffic Generation of Proposed Development on Weekdays (No. of Vehicles/Hour)

6.3.13.1 Table 6.4 shows that the proposed development, when operating at full capacity and when the civic amenity area is open, has potential to generate an average of 28No. vehicle arrivals and 37No. departures. The 85th percentile assessment value is 35No. vehicle arrivals and 41No. vehicle departures.

6.3.13.2 The forecast daily spread of HGV and LGV arriving at and departing the proposed development (as a result of the proposed increase in waste acceptance + civic amenity area) is shown in Figure 12 of Appendix B. Figure 12 clearly shows that the peak hour of the proposed development is likely to remain as 16-17:00hrs.

6.4 Forecast Traffic Generation of Proposed Development (Saturdays)

6.4.1 Forecast Traffic arising from Increase in Waste Acceptance

6.4.1.1 Based upon the weighbridge data which shows the existing MRF to generate a traffic flow which is equivalent to 33% of the average weekday HGV traffic flow on Saturdays and assuming that this pattern is likely to continue following the proposed development, Table 6.5 below shows estimates of traffic generation at the MRF on Saturdays after implementation of the proposed development.

Traffic Generation	MRF (Trips per Day)		
	Deliveries	Collections	Total
Average	34	8	42
85th Percentile	43	9	52

Table 6.5 Forecast HGV Traffic Generation of MRF on Saturdays (Trips/Day)

6.4.1.2 Table 6.5 shows that the proposed development has the potential to generate an average of 42No. HGV trips and an 85th percentile assessment value of 52No. HGV trips at the site on Saturdays when it is operating at maximum capacity and accepting the proposed 200,000 tonnes of material per annum.

6.4.1.3 With regard to LGV traffic generation on Saturdays it is estimated that 33% of the weekday LGV traffic generation will arise following the proposed development i.e. 33% of 72No. LGV weekday trips.

6.4.2 Forecast Traffic arising from the Civic Amenity Area

6.4.3 From discussions with the operator of the civic amenity area in Waterford, it is our understanding that the civic amenity area generates no more than 90No. LGV per day on Saturdays.

6.4.4 Following on from this it is assumed that the proposed civic amenity area at Sarsfield Court Industrial Estate could generate a similar volume of traffic in terms of average traffic generation. In forecasting 85th percentile traffic generation it is assumed that these values could be up to 33% above the average values.

6.4.5 Forecast Total Saturday Traffic Generation of Proposed Development

6.4.6 Table 6.6 summarises the average and upper value traffic generation rates forecast for Saturdays following the implementation of the proposed development (intensification of waste acceptance and civic amenity area).

Traffic Generation	MRF		Civic Amenity	Total
	HGV	LGV	LGV	
Average	42	24	90	156
85th Percentile	52	24	120	196

Table 6.6 Forecast Total Traffic Generation on Saturdays (Trips/Day)

6.4.7 Forecast Peak Hour Traffic Generation of Proposed Development

6.4.8 In assessing the potential impact of the MRF in the Saturday peak hour (12:00hrs to 13:00hrs), in the interest of a robust assessment it is assumed that up to 20% of the total daily traffic could be manifest during this period. The resulting MRF peak hour traffic generation at the proposed development is summaries in Table 6.7 below.

Traffic Generation	HGV		LGV		Total	
	Arr	Dep	Arr	Dep	Arr	Dep
Average	8	8	5	5	13	13
85th Percentile	10	10	5	5	15	15

Table 6.7 Forecast Peak Hour Traffic Generation of MRF on Saturdays

6.4.9 For the civic amenity site it is similarly estimated that up to 20% of the daily traffic generation could be manifest during the peak hour. Average traffic generation is estimated to be 18No. arrivals and departures in the peak hour (20% of 90No. trips). The 85th percentile traffic generation equates to 24No. arrivals and departures (20% of 120No. trips).

6.4.10 The total traffic generation of the proposed development during the Saturday peak hour of 12:00-13:00hrs is summarised in Table 6.8 below.

Traffic Generation	HGV		LGV		Total	
	Arr	Dep	Arr	Dep	Arr	Dep
Average	8	8	23	23	31	31
85th Percentile	10	10	29	29	39	39

Table 6.8 Forecast Development Peak Hour (12-13:00hrs) Traffic Generation on Saturdays

6.5 Assessment of Incremental Increase in MRF Generated Traffic

6.5.1 In the following, the potential increase in traffic generation is quantified for weekdays, since forecast traffic generation of the proposed development is expected to be less at weekends (refer to Tables 6.2 and 6.6).

6.5.2 The traffic count survey (Tuesday 23 February 2010) recorded the following levels of traffic generated by the existing MRF:

Daily: 141No. vehicle trips (69No. HGV; 72No. LGV);

Peak Hour: 41No. vehicle movements (14No. HGV; 27No. LGV).

6.5.3 Based upon a review of weighbridge data, the volume of traffic recorded during the survey correlated well with 85th percentile traffic generation derived from the weighbridge data and is considered to reflect busier than normal times.

6.5.4 Based upon the existing data sources (surveys and weighbridge data) the 85th percentile weekday assessment traffic generation of the proposed development has been estimated as follows:

Daily: 269No. vehicle trips (157No. HGV; 112No. LGV);

Peak Hour: 76No. vehicle movements (33No. HGV; 43No. LGV)

6.5.5 Based upon the forgoing, it follows that the increase in 85th percentile traffic generation rates from the existing scenario to the proposed are as shown hereunder:

Daily: +128No. vehicle trips (+88No. HGV; +40No. LGV)

Peak Hour: +35No. vehicle movements (+19No. HGV; +16No. LGV)

6.5.6 The forecast total daily profile of all vehicular traffic arriving at and departing the Industrial Estate is shown in Figure 13 of Appendix B.

6.6 Distribution of Development Generated Traffic

6.6.1 It is assumed that development generated traffic will be split into the proportions identified by the traffic count survey i.e. 75% of traffic arrives from/departs the Industrial Estate to/from the west; with 25% coming from/going to the east.

6.7 **Assessment of Uplift in Network Traffic Flows** (Weekday Traffic Flows)

6.7.1 Uplift Based Upon 12-hour Traffic Count Period (07:00-19:00hrs)

6.7.1.1 The R616 carried a total of 2,620No. two-way vehicle movements during the 12-hour traffic count survey (based upon busiest section between Sarsfield Court Industrial Estate and Buck Learyôs Crossroad).

6.7.1.2 The above figure includes traffic generated by the existing MRF, which accounts for a total of 282No. vehicle movements during the survey. Given that 75% of existing MRF traffic (212No. vehicle movements) accesses the site to/from the west, this is the section of the R616 upon which the MRF has the greatest impact. Based upon the surveyed traffic flows the existing MRF currently accounts for approximately 8.0% of R616 traffic in the vicinity of the site over the working day (07:00hrs to 19:00hrs).

6.7.1.3 The proposed development is forecast to generate approximately 128No. additional vehicle trips (256No. vehicle movements) during the assessment period of 07:00hrs to 19:00hrs. This is an upper value assessment figure and is representative of an 85th percentile assessment.

6.7.1.4 Based on the distribution of development traffic at the Industrial Estate Access, a total of 404No. vehicle movements (75% of 538No.) are expected to travel to/from the west; with a total of 134No. vehicle movements (25% of 538No.) to/from the east.

6.7.1.5 Based upon the upper value assessment generation figures the proposed development is estimated to increase traffic flows on the R616 to the west of the industrial estate access by 192No. vehicle movements (404No.-212No.).

6.7.1.6 Under the 85th percentile scenario, the total two-way 12-hour traffic flow on the R616 is estimated to increase to approximately 2,800No. vehicles per day on the section between Buck Learyôs Cross Roads and the Industrial Estate. The proposed development (MRF intensification + civic amenity area) is therefore expected to make up in the region of 14.4% (404/2,800) of all traffic on the R616 within the period of 07:00hrs to 19:00hrs (up from 8.0%).

6.7.2 Uplift Based Upon 24-hour Time Period

6.7.2.1 It is currently proposed to increase the timeframe over which waste can be accepted on site from 12-hours per day to 24-hours, Monday to Friday. In the preceding assessment calculation all development generated traffic has been assumed to use the road network between 07:00-19:00hrs. Were development traffic spread over a 24-hour period clearly this would dilute potential impact upon the local roads network.

6.7.2.2 Over a 24-hour period the R616 is estimated to have an existing AADT in the range of 3,200 to 4,800No. vehicles per day.

6.7.2.3 Traffic from the existing MRF accounts for approximately 4.4% to 6.6% of the 24-hour traffic flows recorded on the R616 between Buck Learys Cross Roads and Sarsfield Court Industrial Estate. Following the proposed development, traffic volumes along this section of the R616 are expected to increase by 192No. vehicle movements. At this stage the proposed development will potentially account for 8.1% to 11.9% of daily traffic flows on the R616 (based upon upper value or 85th percentile figures).

6.8 Assessment of Uplift in Network Traffic Flows (Saturday Traffic Flows)

6.8.1 Uplift Based Upon 12-hour Traffic Count Period (07:00-19:00hrs)

6.8.1.1 The traffic data collection process did not include for a traffic count on a Saturday. It is conservatively assumed nonetheless that the R616 could carry a similar volume of traffic on Saturdays as recorded during the traffic count survey, which was undertaken on a Tuesday.

6.8.1.2 The existing MRF is estimated to generate approximately 100No. vehicle movements on Saturdays. 75% of these traffic movements are likely to access the site to/from the west. Existing MRF traffic generation on Saturdays therefore contributes approximately 2.8% (75/2,620) of all traffic on the R616 to the west of the Industrial Estate Access.

6.8.1.3 Following the proposed development, it is estimated that a total of 196No. vehicle trips (392No. vehicle movements) could be generated by the MRF and civic amenity area. Approximately 75% of these traffic movements (294No.) are likely to access the site to/from the west .The proposed development is therefore likely to increase traffic flows on the R616 to the west of the industrial estate access by up to 219No. vehicle movements. Based upon these upper value or 85th percentile figures the proposed development is estimated to contribute to some 10.3% of R616 traffic volumes on Saturdays.

6.8.2 Uplift Based Upon 24-hour Time Period

6.8.2.1 The existing AADT of the R616 is 3,200 to 4,800No. vehicles per day. The existing MRF is therefore estimated to constitute some 1.5-2.3% (75 / 3,200 to 75 / 4,800) of daily traffic volumes on Saturdays.

6.8.2.2 Based upon a forecast AADT on the R616 in the region of 3,400 to 5,000No. vehicles per day, and 85th percentile traffic generation rates, the proposed development has the potential to make up approximately 5.9-8.6% of R616 traffic flows on a Saturday.

7 CAPACITY OF LOCAL ROAD NETWORK

7.1 Assumptions Adopted in Traffic Modelling Analysis

7.1.1 Overview

7.1.1.1 The capacity of any road network is dictated by the operation of the links and junctions within that network. Key links and junctions in the vicinity of the site will be modelled in the following section to evaluate the performance of the road network.

7.1.2 Assessment Scope

7.1.2.1 The performance of the Sarsfield Court Industrial Estate Access and adjacent Buck Learyôs Cross roads have been analysed under various assessment traffic flow scenarios. These junctions have been modelled for the existing Sarsfield Court Industrial Estate peak hour of 16:00hrs to 17:00hrs on weekdays and the future expected Sarsfield Court Industrial Estate peak hour of 12:00hrs to 13:00hrs on Saturdays.

7.1.2.2 The existing network peak hours of 08:00hrs to 09:00hrs and 17:00hrs to 18:00hrs were not analysed since traffic generation arising from both the proposed development and the Sarsfield Court Industrial Estate in general are not significant.

7.1.2.3 In line with the advice provided in the NRA: Traffic and Transport Assessment Guidelines, the Industrial Estate Access and Cross roads have been modelled in the opening year (2011); opening year +5yrs (2016); and opening year +15yrs (2026).

7.1.3 Modelling Program

7.1.3.1 The computer modelling program PICADY (Priority Intersection CApacity and DelaY) has been used to prepare a comparative assessment of existing and future performance of the local road network. PICADY provides information with regards to capacity, queuing and delay. Generally an RFC of less than 0.750 is accepted at junctions in rural areas.

7.1.3.2 The PICADY output results have been summarised in the tables provided in Appendix C. The summary tables shows the movement numbers as recorded in the traffic counts, forecast traffic flows and RFC values associated with each turning manoeuvre. Queuing and delay information has been omitted from the tables in Appendix C since the levels forecast were not significant.

7.1.4 Traffic Growth

7.1.4.1 Background traffic on the R616 and Glanmire Road has been assumed in the modelling exercise to increase by 3% per annum into the foreseeable future. Under this growth scenario background traffic estimates are derived for the theoretical opening year of 2011, opening year +5yrs (2016) and opening year +15yrs (2026).

7.1.4.2 In the context of the current economic and foreseeable climate a growth rate of 3% is considered suitably robust and in line with the worst case or upper value growth rate which might be expected to occur on National Primary Roads.

7.1.5 Saturday Traffic Flows

7.1.5.1 There is no traffic count data available on the R616 or the industrial estate access for Saturdays. For the purposes of assessment it is conservatively assumed that the R616 carries a similar volume of traffic on Saturdays as during the traffic count survey, which was a Tuesday.

7.1.5.2 The weighbridge data showed that the existing MRF generated 33% of the weekday traffic generation and such reduction is expected to apply across all existing premises in the Industrial Estate. The level of traffic generated by the Sarsfield Court Industrial Estate on Saturdays is therefore assumed to be 33% of the weekday traffic generation value.

7.1.5.3 During the existing Sarsfield Court Industrial Estate peak hour of 12:00-13:00hrs on Saturdays, the existing MRF is considered likely to generate 50% of overall industrial estate traffic.

7.1.6 Scenarios Analysed

7.1.6.1 A series of future traffic flow scenarios have been assessed both with and without the proposed development in place. These are referred to as the ódo nothingôand ódo somethingôscenarios. These scenarios have been provided so that the incremental impact of development traffic can be evaluated against the baseline whereby the existing MRF would continue to operate at existing processing levels without the proposed civic amenity developed.

7.2 Weekday Assessment Peak Hour (16:00 to 17:00hrs)

7.2.1 Sarsfield Court Industrial Estate Access

7.2.1.1 RFC values provide a measure of junction performance. RFC output values for the industrial estate access during the existing, do nothing and do something scenarios are shown in Tables C1 to C10 of Appendix C.

7.2.1.2 Tables C1 to C10 of Appendix C show that the Industrial Estate Access is forecast to operate satisfactorily for the future design years. Furthermore the incremental increase in RFC values between the ódo nothingôand ódo-somethingô scenarios is not significant i.e. in the 2026 Opening Year +15 assessment scenarios the difference between ódo nothingô (0.125) and ódo-somethingô (0.196) is 0.071.

7.2.1.3 Given that an RFC of 0.750 or less indicates that rural junctions will operate satisfactorily, it is reasonably concluded that the industrial estate access will function well within capacity over the design life of the scheme.

7.2.2 Buck Learyôs Cross Roads

7.2.2.1 RFC values for Buck Learyôs Cross roads for all assessment scenarios are shown in Tables C11 to C20 of Appendix C.

7.2.2.2 The cross roads is currently operating with an RFC value of 0.202. Following realisation of the proposed development this is expected to increase to 0.250 in the opening year (2011). The incremental impact of the proposed development is estimated to increase the RFC value at the cross roads from 0.315 in the ódo nothingôopening year +15 scenario to 0.356 in the ódo somethingôopening year +15 scenario. Such an increase is marginal and unlikely to result in congestion or queuing.

7.3 Saturday Assessment Peak Hour (12:00 to 13:00hrs)

7.3.1 Sarsfield Court Industrial Estate Access

7.3.1.1 The performance of the industrial estate access during the assessment peak hour on Saturday is shown in Tables C21 to C30 of Appendix C.

7.3.1.2 The MRF is estimated to generate slightly more traffic during the Saturday assessment peak hour (78No. vehicle movements) when compared with the weekday assessment peak hour (76No. vehicle movements). The overall impact upon the industrial estate access is nonetheless expected to be lower since the industrial estate as a whole generates less traffic on Saturdays than on weekdays.

7.3.1.3 Tables C21 to C30 of Appendix C show that in the 2026 Opening Year +15 assessment scenarios the RFC difference between ódo nothingô(0.029) and ódo-somethingô(0.086) is marginal.

7.3.1.4 Given that an RFC of 0.750 or less indicates that rural junctions will operate in a satisfactory manner, it is reasonably concluded that the industrial estate access will function well within capacity over the design life of the scheme.

7.3.2 Buck Learyôs Cross Roads

7.3.2.1 Traffic impact arising from the existing, do nothing and do something scenarios, during the Saturday assessment peak hour has been assessed and the results are shown in Tables C31 to C40 of Appendix C.

7.3.2.2 The results in Tables C31 to C40 of Appendix C show that the Cross Roads should operate well within capacity for the assessment peak hour periods in the opening year, opening year +5yrs and opening year +15yrs scenarios.

7.4 Conclusion

7.4.1 The results of the capacity analysis indicate that the road network has sufficient capacity to accommodate the forecast additional traffic arising from the proposed development.

7.4.2 The analysis is considered highly robust and conservative on account of the base assumptions. For example all development generated traffic is assumed to be concentrated upon the road network between the period of 07:00-19:00hrs. In reality the current applications seeks an extended timeframe for waste acceptance on site to a 24-hours per day. It is clear that some waste traffic is therefore likely to arrive at or depart the site outside the assessment timeframe.

7.4.3 The 85th percentile traffic generation values presented in the report have been provided for assessment purposes only. On a day to day basis the average traffic generation figures, also presented in the report, would be more representative of the expected traffic generation likely to arise from the proposed development. This further reinforces the robustness of the modelling analysis.

8 RECOMMENDED MITIGATIOM MEASURES

8.1 HGV Traffic Management

8.1.1 HGV generated by the existing MRF are adequately accommodated by the local road network including the R616 and Glanmire Road and all of their respective major and minor junctions. There are currently no restrictions with regard to HGV accessing the site apart from the section of the R616 to the west of Buck Learyôs Cross Roads.

8.1.2 Notwithstanding this and based on our site visit findings, under the current application it is recommended that a new routing regime is adopted by the Applicant. The new regime will encourage drivers of large articulated vehicles to avoid using the Glanmire Road (running between Buck Learyôs Cross Roads and Glanmire) in the interests of traffic safety and minimising potential traffic hazards.

8.1.3 The current volume of large articulated vehicles generated by the existing MRF, as recorded in the traffic count survey numbers 31No. HGV movements. These articulated vehicles represent some 11% of overall MRF generated traffic (31 / 282), as such the suggested routing regime is considered feasible and reasonable.

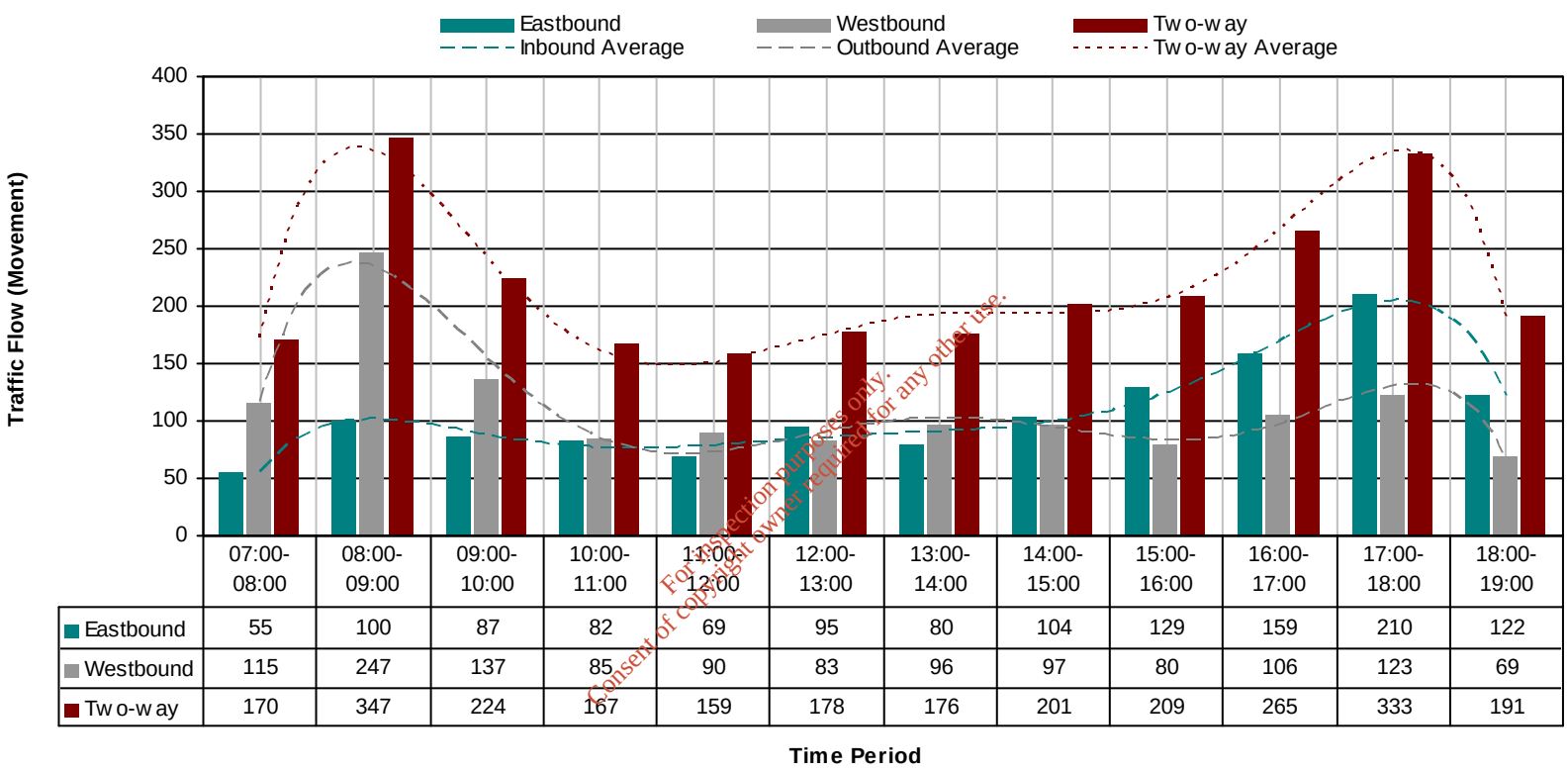
Appendix A

Traffic Count Data

Appendix B

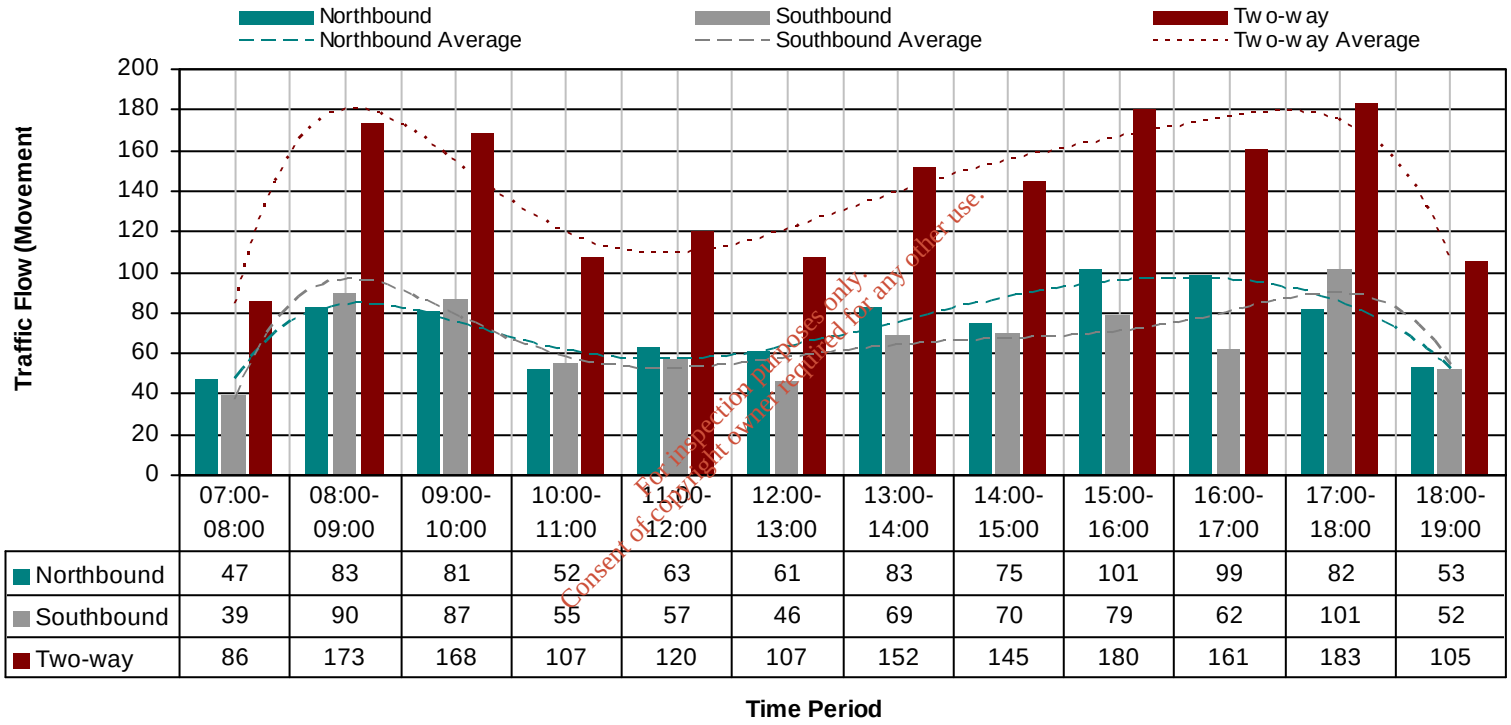
Existing & Future Traffic Flow Graphical Analyses

R616 Traffic Flows (23rd Feb 2010)



	07:00-08:00	08:00-09:00	09:00-10:00	10:00-11:00	11:00-12:00	12:00-13:00	13:00-14:00	14:00-15:00	15:00-16:00	16:00-17:00	17:00-18:00	18:00-19:00
Eastbound	55	100	87	82	69	95	80	104	129	159	210	122
Westbound	115	247	137	85	90	83	96	97	80	106	123	69
Two-way	170	347	224	167	159	178	176	201	209	265	333	191

Glanmire Road Traffic Flows (23rd Feb 2010)



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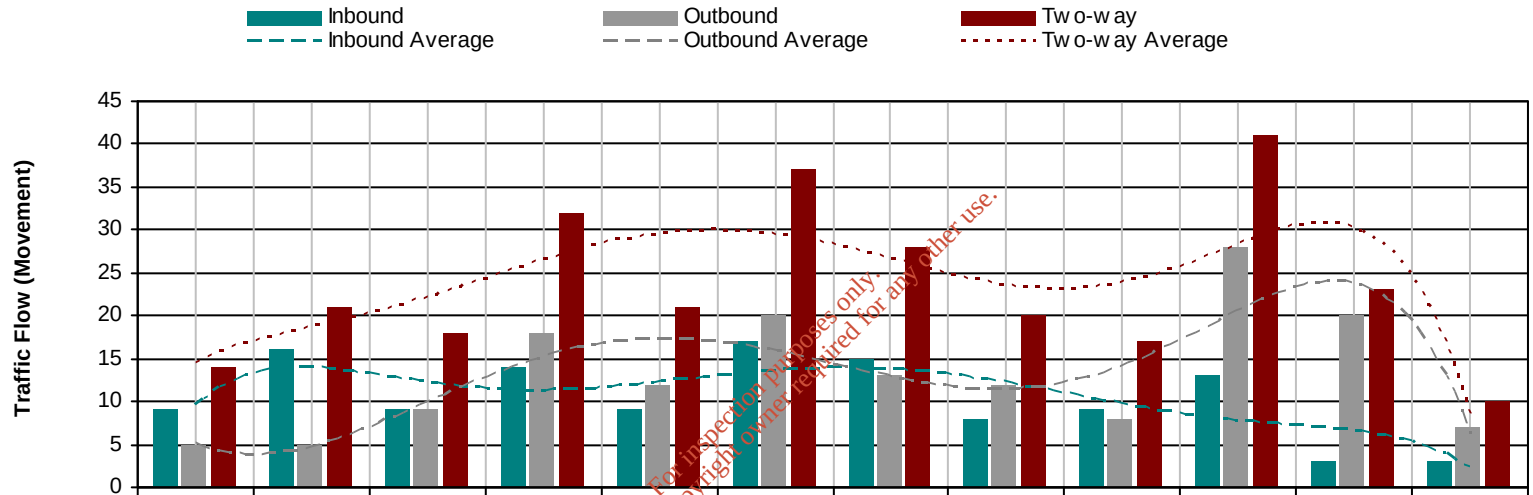
Northbound	47	83	81	52	63	61	83	75	101	99	82	53
Southbound	39	90	87	55	57	46	69	70	79	62	101	52
Two-way	86	173	168	107	120	107	152	145	180	161	183	105

Existing MRF TOTAL Traffic Generation (23rd Feb 2010)



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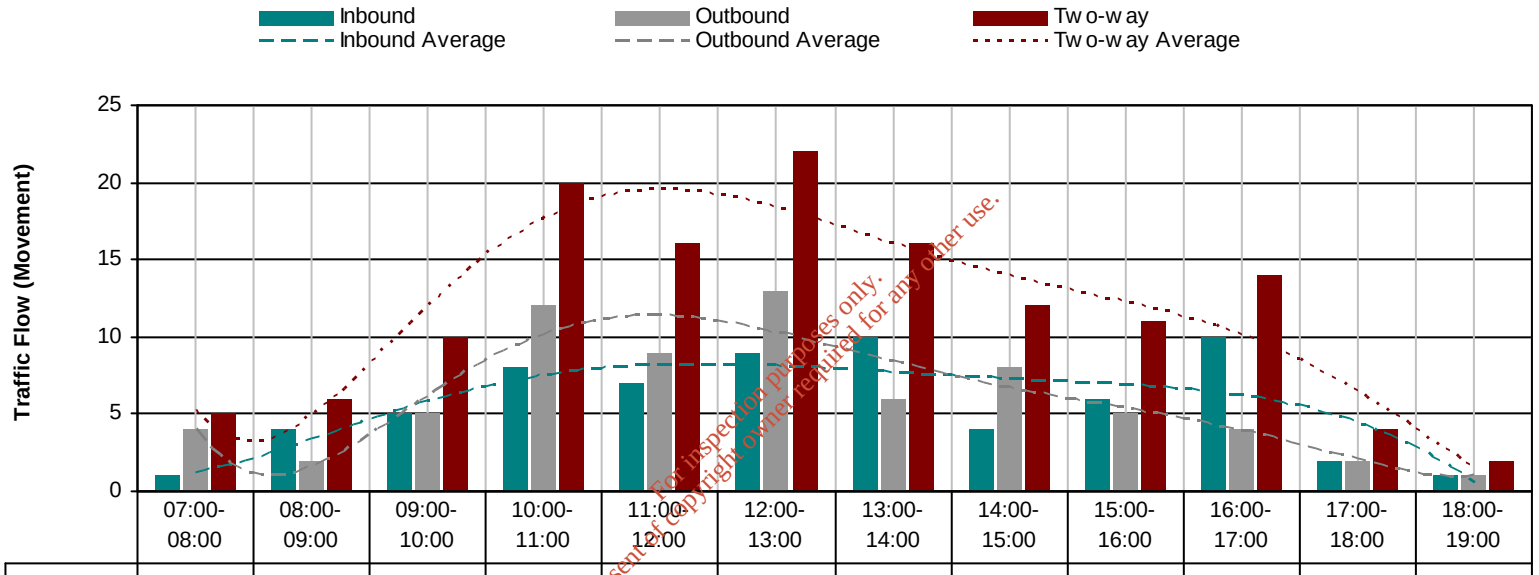
Inbound	9	16	9	14	9	17	15	8	9	13	3	3
Outbound	5	5	9	18	12	20	13	12	8	28	20	7
Two-way	14	21	18	32	21	37	28	20	17	41	23	10

Time Period

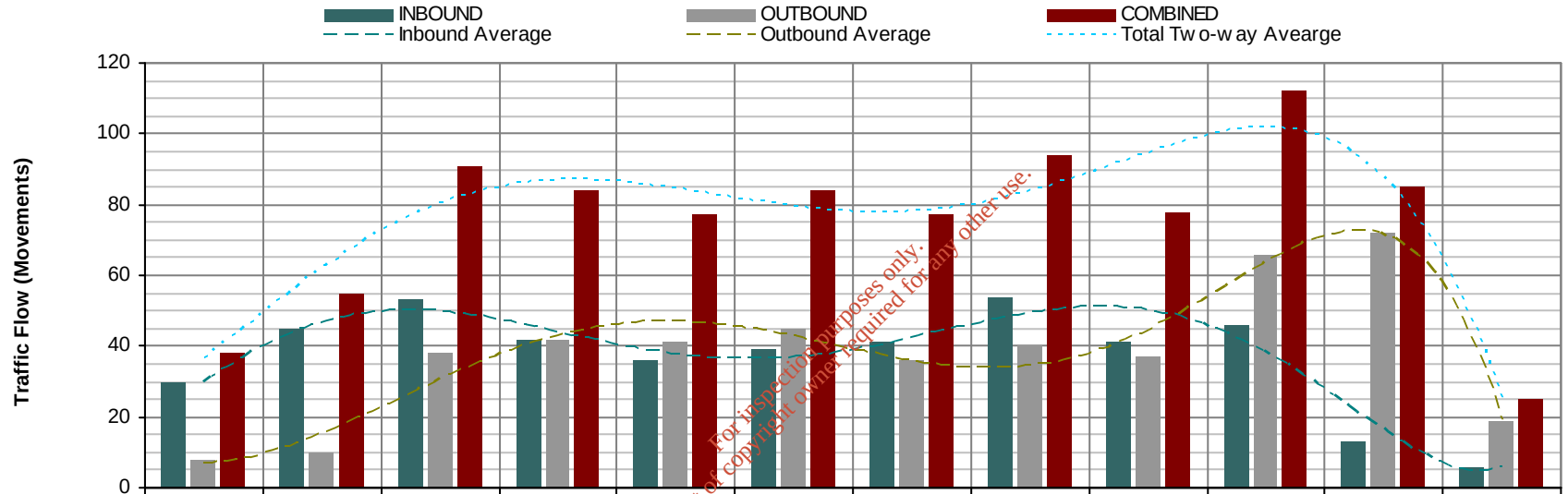
Existing MRF HGV Traffic Generation (23rd Feb 2010)



	07:00-08:00	08:00-09:00	09:00-10:00	10:00-11:00	11:00-12:00	12:00-13:00	13:00-14:00	14:00-15:00	15:00-16:00	16:00-17:00	17:00-18:00	18:00-19:00
Inbound	1	4	5	8	7	9	10	4	6	10	2	1
Outbound	4	2	5	12	9	13	6	8	5	4	2	1
Two-way	5	6	10	20	16	22	16	12	11	14	4	2

Time Period

Existing Traffic at Sarsfield Court Industrial Estate Access (ALL VEHS)



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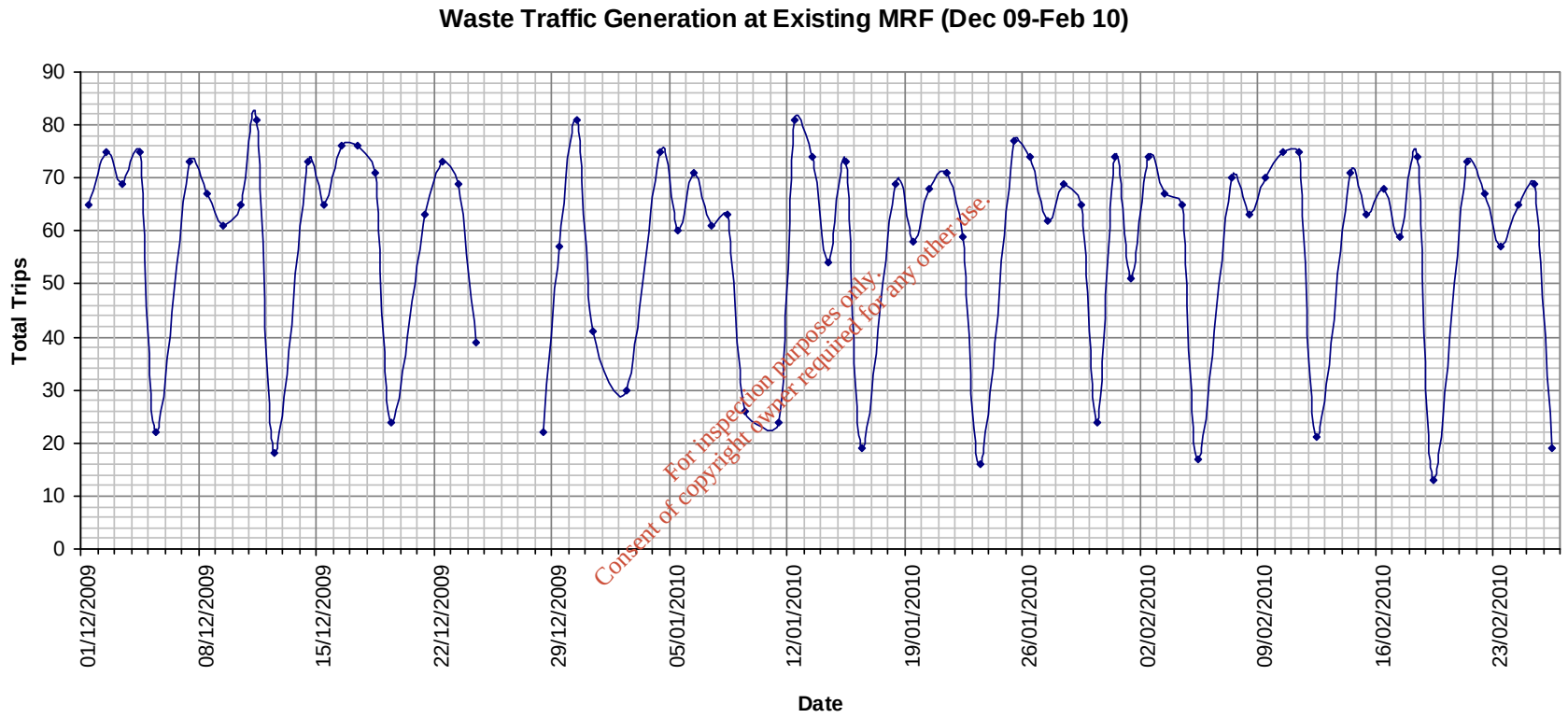
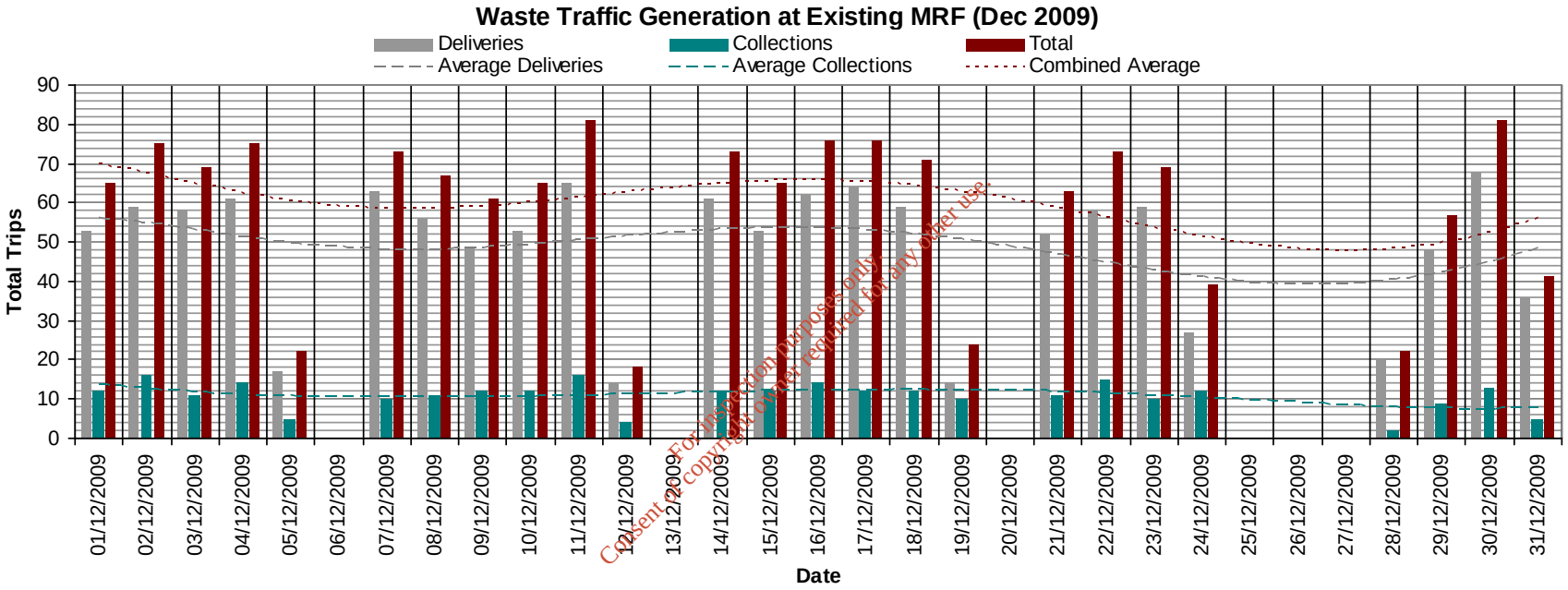
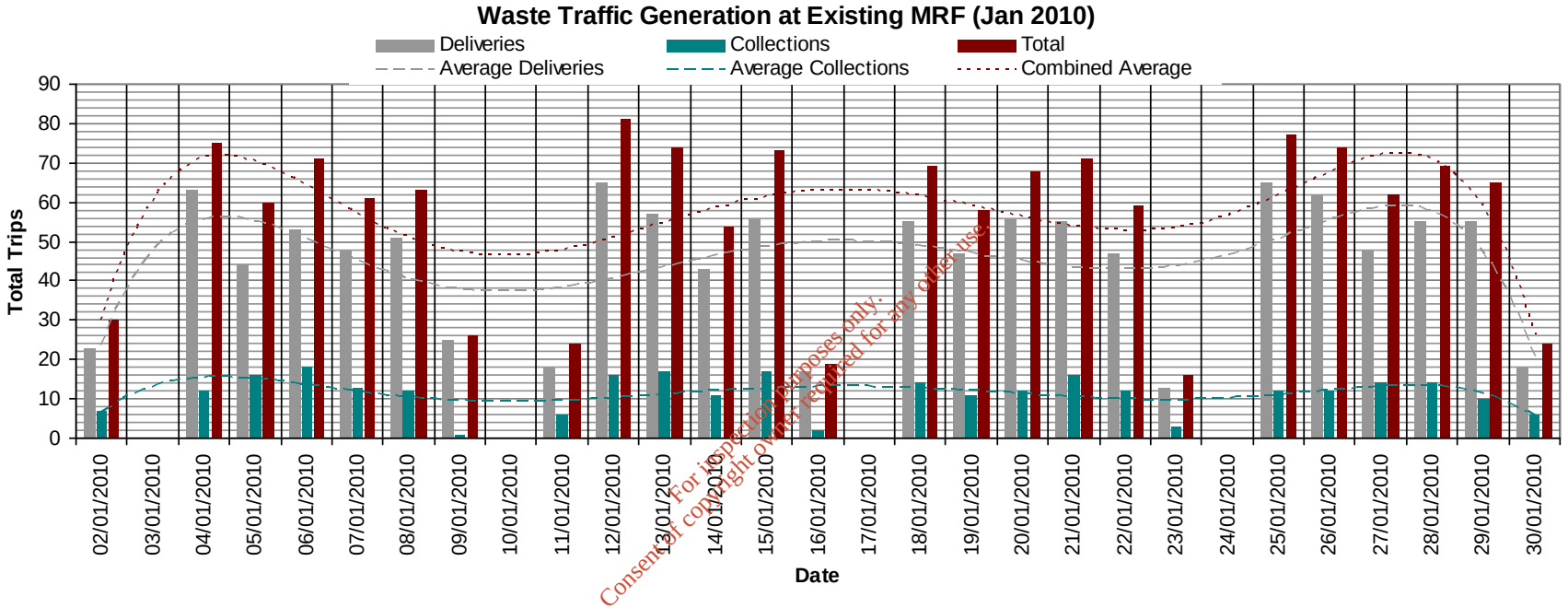
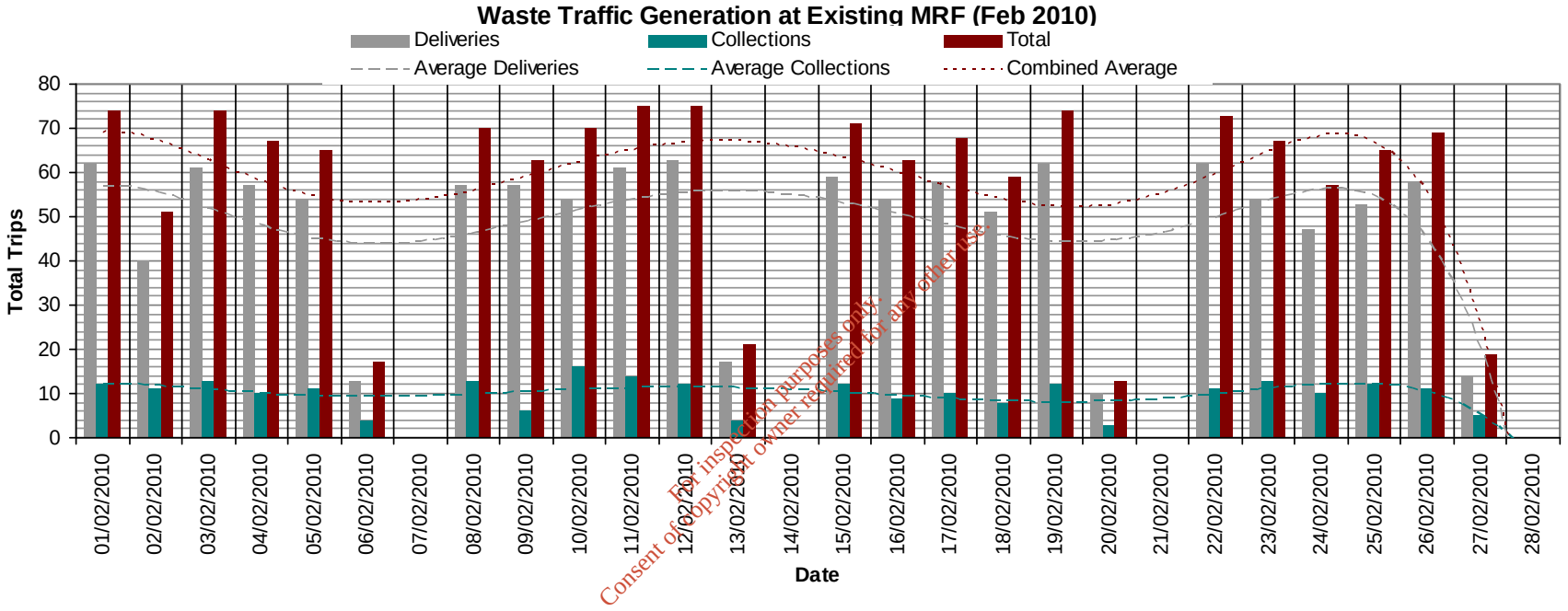
INBOUND	30	45	53	42	36	39	41	54	41	46	13	6
OUTBOUND	8	10	38	42	41	45	36	40	37	66	72	19
COMBINED	38	55	91	84	77	84	77	94	78	112	85	25

Time Period

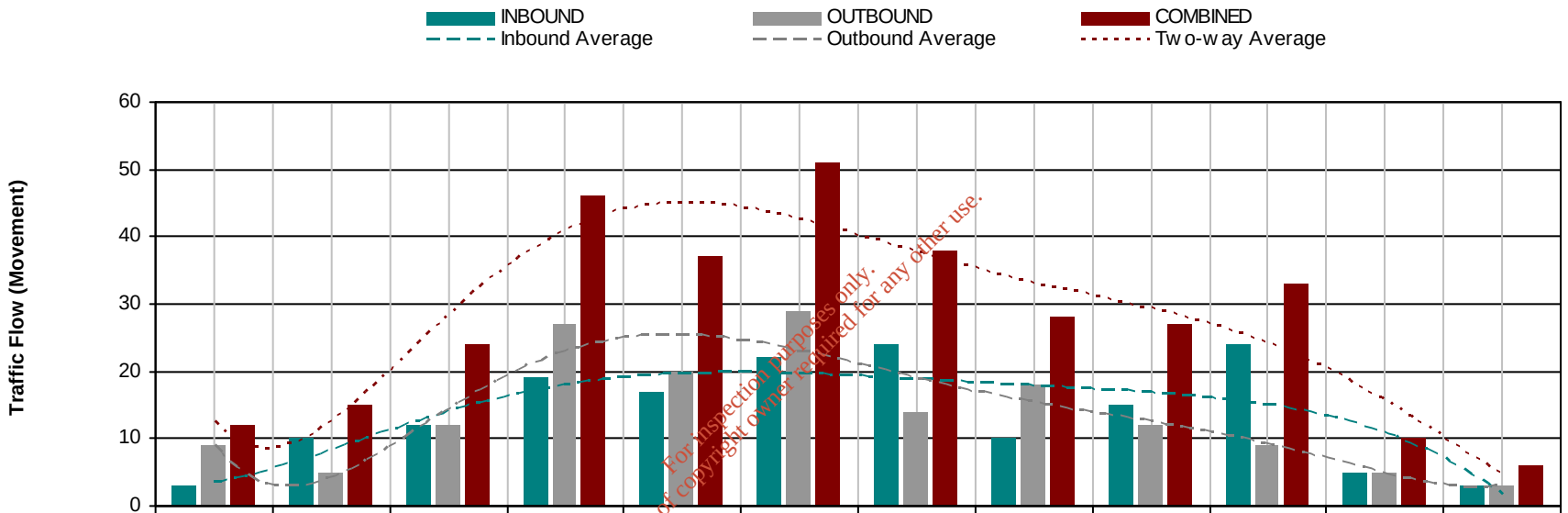






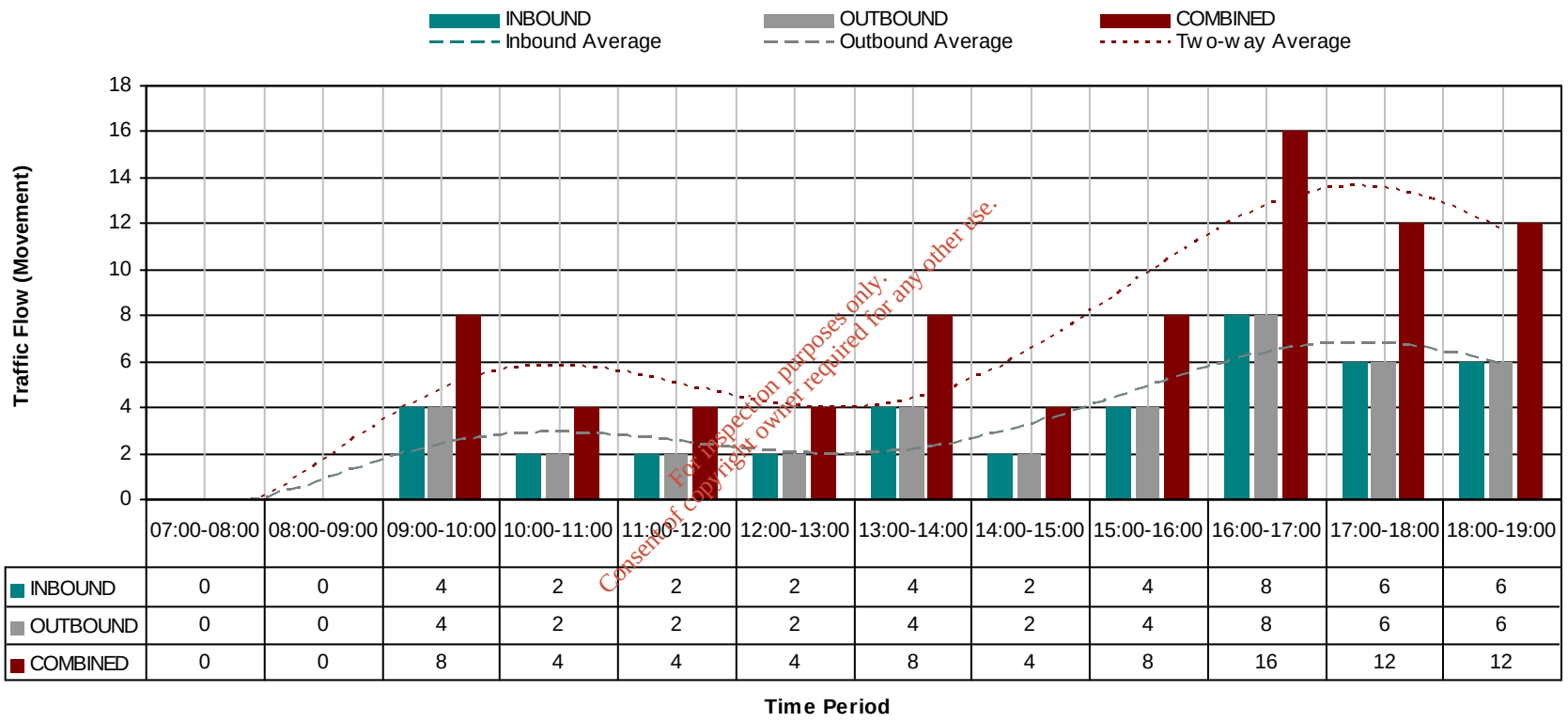


Forecast Traffic Generation arising from Increase in Waste Acceptance on Weekdays (HGV)



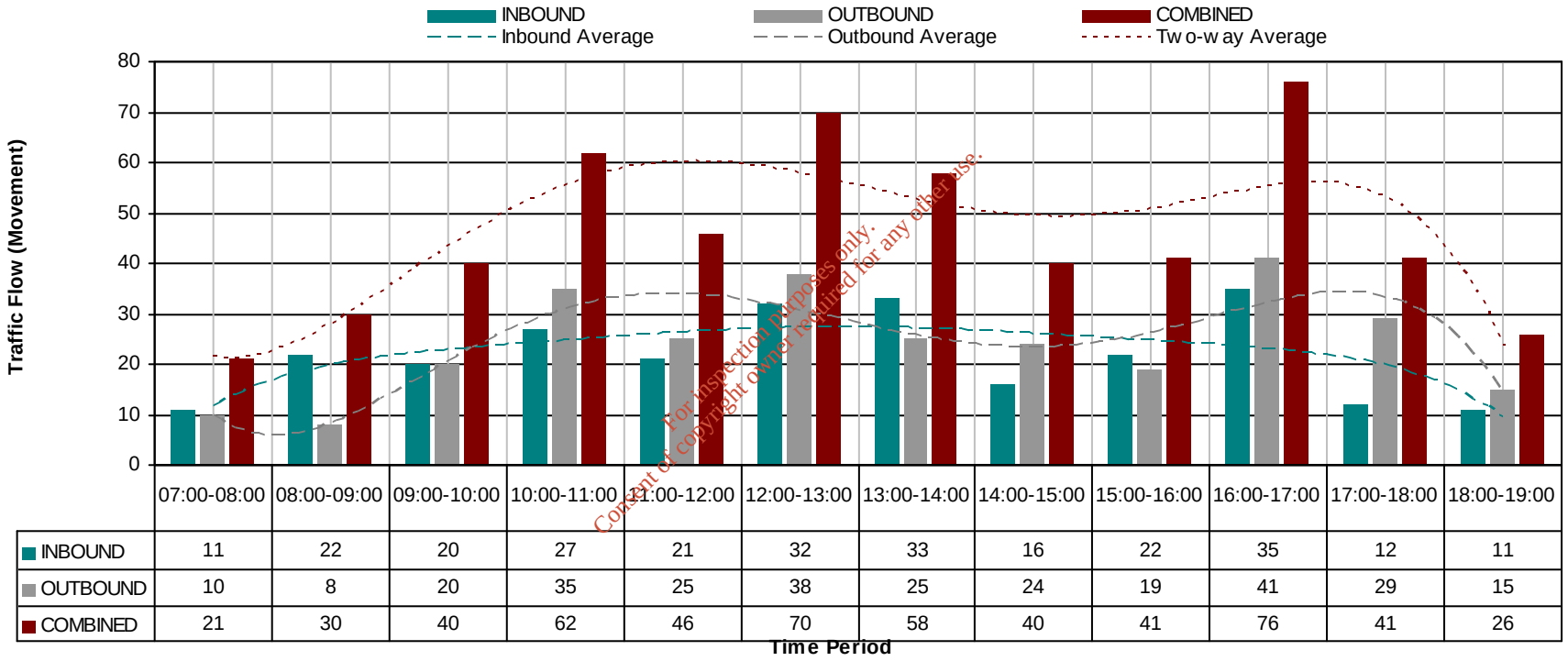
	07:00-08:00	08:00-09:00	09:00-10:00	10:00-11:00	11:00-12:00	12:00-13:00	13:00-14:00	14:00-15:00	15:00-16:00	16:00-17:00	17:00-18:00	18:00-19:00
INBOUND	3	10	12	19	17	22	24	10	15	24	5	3
OUTBOUND	9	5	12	27	20	29	14	18	12	9	5	3
COMBINED	12	15	24	46	37	51	38	28	27	33	10	6

Forecast Traffic Generation arising from Civic Amenity Site on Weekdays (LGV)



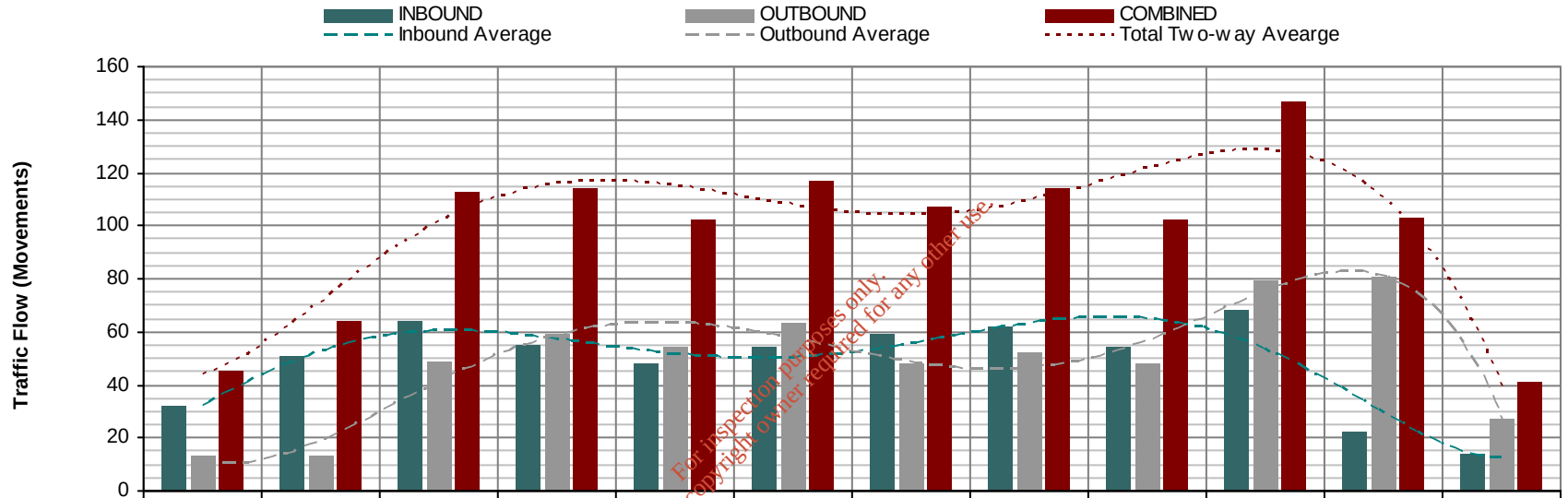
	07:00-08:00	08:00-09:00	09:00-10:00	10:00-11:00	11:00-12:00	12:00-13:00	13:00-14:00	14:00-15:00	15:00-16:00	16:00-17:00	17:00-18:00	18:00-19:00
INBOUND	0	0	4	2	2	2	4	2	4	8	6	6
OUTBOUND	0	0	4	2	2	2	4	2	4	8	6	6
COMBINED	0	0	8	4	4	4	8	4	8	16	12	12

Forecast Total Traffic Generation of Proposed Development on Weekdays
(Increase in Waste Acceptance + Civic Amenity Area)



	07:00-08:00	08:00-09:00	09:00-10:00	10:00-11:00	11:00-12:00	12:00-13:00	13:00-14:00	14:00-15:00	15:00-16:00	16:00-17:00	17:00-18:00	18:00-19:00
INBOUND	11	22	20	27	21	32	33	16	22	35	12	11
OUTBOUND	10	8	20	35	25	38	25	24	19	41	29	15
COMBINED	21	30	40	62	46	70	58	40	41	76	41	26

Forecast Traffic at Industrial Estate Access following Proposed Development on Weekdays (ALL VEHS)



	07:00-08:00	08:00-09:00	09:00-10:00	10:00-11:00	11:00-12:00	12:00-13:00	13:00-14:00	14:00-15:00	15:00-16:00	16:00-17:00	17:00-18:00	18:00-19:00
INBOUND	32	51	64	55	48	54	59	62	54	68	22	14
OUTBOUND	13	13	49	59	54	63	48	52	48	79	81	27
COMBINED	45	64	113	114	102	117	107	114	102	147	103	41

Time Period

Appendix C

PICADY Output Summary Tables

Tables C1-C10: PICADY results for Industrial Estate Access in the weekday assessment peak hour of 16:00 to 17:00hrs

Tables C11-C20: PICADY results for Buck Leary Cross Roads in the weekday assessment peak hour of 16:00 to 17:00hrs

Tables C21-C30: PICADY results for Industrial Estate Access in the Saturday assessment peak hour of 12:00 to 13:00hrs

Tables C31-C40: PICADY results for Buck Leary Cross Roads in the Saturday assessment peak hour of 12:00 to 13:00hrs

PICADY ANALYSES FOR INDUSTRIAL ESTATE ACCESS IN THE WEEKDAY ASSESSMENT PEAK HOUR OF 16:00HRS TO 17:00HRS

2010 Existing Traffic Impact in Peak Hour - 95,000 tonnes per annum						
Survey Movement	5	6	4	3	1	2
PICADY Movement	A-B	A-C	B-A	B-C	C-A	C-B
Traffic Flows	12	56	16	51	126	35
RFC			0.122		0.083	

Table C1 2010 Existing PM Peak Hour Assessment

2010 Existing Development Traffic Impact in Peak Hour - 95,000 tonnes per annum						
Survey Movement	5	6	4	3	1	2
PICADY Movement	A-B	A-C	B-A	B-C	C-A	C-B
Traffic Flows	3	0	7	21	0	10

41No veh movements

Table C2 2010 Existing Development Peak Traffic in the PM Peak Hour

Forecast Development Traffic Impact in Peak Hour - 200,000 tonnes per annum + Civic Amenity Area						
Survey Movement	5	6	4	3	1	2
PICADY Movement	A-B	A-C	B-A	B-C	C-A	C-B
Traffic Flows	9	0	16	50	0	26

101No veh movements

Table C3 Forecast Development Traffic Impact in the PM Peak Hour

Forecast Increase in Development Traffic in Peak Hour – 200,000 tonnes per annum + Civic Amenity Area						
Survey Movement	5	6	4	3	1	2
PICADY Movement	A-B	A-C	B-A	B-C	C-A	C-B
Traffic Flows	6	0	9	29	0	16

60No additional veh movements

Table C4 Forecast Increase in Development Traffic in the PM Peak Hour

PICADY ANALYSES FOR INDUSTRIAL ESTATE ACCESS IN THE WEEKDAY ASSESSMENT PEAK HOUR OF 16:00HRS TO 17:00HRS

Growth Rate

2011 Opening Year Traffic Impact in Peak Hour Do Nothing - 95,000 tonnes per annum							1.03
Survey Movement	5	6	4	3	1	2	
PICADY Movement	A-B	A-C	B-A	B-C	C-A	C-B	
Traffic Flows	12	58	16	51	130	35	
RFC			0.122		0.083		

Table C5 2011 Opening Year Do Nothing PM Peak Hour Assessment

2011 Opening Year Traffic Impact in Peak Hour Do Something – 200,000 tonnes per annum + Civic Amenity Area							1.03
Survey Movement	5	6	4	3	1	2	
PICADY Movement	A-B	A-C	B-A	B-C	C-A	C-B	
Traffic Flows	18	58	25	80	130	51	
RFC			0.193		0.121		

Table C6 2011 Opening Year Do Something PM Peak Hour Assessment

2016 Opening Year +5 Traffic Impact in Peak Hour Do Nothing - 95,000 tonnes per annum							1.18
Survey Movement	5	6	4	3	1	2	
PICADY Movement	A-B	A-C	B-A	B-C	C-A	C-B	
Traffic Flows	12	67	16	51	149	35	
RFC			0.123		0.084		

Table C7 2016 Opening Year +5 Do Nothing PM Peak Hour Assessment

2016 Opening Year +5 Traffic Impact in Peak Hour Do Something – 200,000 tonnes per annum + Civic Amenity Area							1.18
Survey Movement	5	6	4	3	1	2	
PICADY Movement	A-B	A-C	B-A	B-C	C-A	C-B	
Traffic Flows	18	67	25	80	149	51	
RFC			0.194		0.124		

Table C8 2016 Opening Year +5 Do Something PM Peak Hour Assessment

PICADY ANALYSES FOR INDUSTRIAL ESTATE ACCESS IN THE WEEKDAY ASSESSMENT PEAK HOUR OF 16:00HRS TO 17:00HRS

Growth Rate

1.48

2026 Opening Year +15 Traffic Impact in Peak Hour Do Nothing - 95,000 tonnes per annum						
Survey Movement	5	6	4	3	1	2
PICADY Movement	A-B	A-C	B-A	B-C	C-A	C-B
Traffic Flows	12	83	16	51	187	35
RFC			0.125		0.087	

Table C9 2026 Opening Year +15 Do Nothing PM Peak Hour Assessment

1.48

2026 Opening Year +15 Traffic Impact in Peak Hour Do Something – 200,000 tonnes per annum + Civic Amenity Area						
Survey Movement	5	6	4	3	1	2
PICADY Movement	A-B	A-C	B-A	B-C	C-A	C-B
Traffic Flows	18	83	25	80	187	51
RFC			0.196		0.129	

Table C10 2026 Opening Year +15 Do Something PM Peak Hour Assessment

Survey Movement:

1 R616 Eastbound
2 Right turn into Industrial Estate
3 Left turn out of Industrial Estate
4 Right turn out of Industrial Estate
5 Left turn into Industrial Estate
6 R616 Westbound

PICADY ANALYSES FOR BUCK LEARY'S CROSS ROADS IN THE WEEKDAY ASSESSMENT PEAK HOUR OF 16:00HRS TO 17:00HRS

2010 Existing Traffic Impact in Peak Hour - 95,000 tonnes per annum												
Survey Movement	7	8	9	6	4	5	2	3	1	10	11	12
PICADY Movement	A-B	A-C	A-D	B-A	B-C	B-D	C-A	C-B	C-D	D-A	D-B	D-C
Traffic Flows	32	69	6	35	41	24	122	13	6	4	17	9
RFC	0.014			0.202			0.028			0.088		

Table C11 2010 Existing PM Peak Hour Assessment

Existing Development Traffic in the Peak Hour - 95,000 tonnes per annum												
Survey Movement	7	8	9	6	4	5	2	3	1	10	11	12
PICADY Movement	A-B	A-C	A-D	B-A	B-C	B-D	C-A	C-B	C-D	D-A	D-B	D-C
Traffic Flows	21			10								

31No veh movements

Table C12 2010 Existing Development Traffic in the PM Peak Hour

Forecast Development Traffic in Peak Hour - 200,000 tonnes per annum + Civic Amenity Area												
Survey Movement	7	8	9	6	4	5	2	3	1	10	11	12
PICADY Movement	A-B	A-C	A-D	B-A	B-C	B-D	C-A	C-B	C-D	D-A	D-B	D-C
Traffic Flows	50			26								

76No veh movements

Table C13 Forecast Development Traffic in the PM Peak Hour

PICADY ANALYSES FOR BUCK LEARY'S CROSS ROADS IN THE WEEKDAY ASSESSMENT PEAK HOUR OF 16:00HRS TO 17:00HRS

Forecast Increase in Development Traffic in Peak Hour - 200,000 tonnes per annum + Civic Amenity Area												
Survey Movement	7	8	9	6	4	5	2	3	1	10	11	12
PICADY Movement	A-B	A-C	A-D	B-A	B-C	B-D	C-A	C-B	C-D	D-A	D-B	D-C
Traffic Flows	29			16								

45No veh movements

Table C14 Forecast Increase in Development Traffic in the PM Peak Hour

Growth Rate

1.03

2011 Opening Year Traffic Impact in Peak Hour Do Nothing - 95,000 tonnes per annum												
Survey Movement	7	8	9	6	4	5	2	3	1	10	11	12
PICADY Movement	A-B	A-C	A-D	B-A	B-C	B-D	C-A	C-B	C-D	D-A	D-B	D-C
Traffic Flows	33	72	7	37	43	25	126	14	7	5	18	10
RFC	0.017			0.213			0.031			0.096		

Table C15 2011 Opening Year Do Nothing PM Peak Hour Assessment

1.03

2011 Opening Year Traffic Impact in Peak Hour Do Something - 200,000 tonnes per annum + Civic Amenity Area												
Survey Movement	7	8	9	6	4	5	2	3	1	10	11	12
PICADY Movement	A-B	A-C	A-D	B-A	B-C	B-D	C-A	C-B	C-D	D-A	D-B	D-C
Traffic Flows	62	72	7	53	43	25	126	14	7	5	18	10
RFC	0.017			0.250			0.031			0.097		

Table C16 2011 Opening Year Do Something PM Peak Hour Assessment

PICADY ANALYSES FOR BUCK LEARY'S CROSS ROADS IN THE WEEKDAY ASSESSMENT PEAK HOUR OF 16:00HRS TO 17:00HRS

2016 Opening Year +5 Traffic Impact in Peak Hour Do Nothing - 95,000 tonnes per annum												
Survey Movement	7	8	9	6	4	5	2	3	1	10	11	12
PICADY Movement	A-B	A-C	A-D	B-A	B-C	B-D	C-A	C-B	C-D	D-A	D-B	D-C
Traffic Flows	38	82	8	42	49	29	144	16	8	5	21	11
RFC	0.018			0.247			0.036			0.111		

1.18

Table C17 2016 Opening Year +5 Do Nothing PM Peak Hour Assessment

2016 Opening Year +5 Traffic Impact in Peak Hour Do Something - 200,000 tonnes per annum + Civic Amenity Area												
Survey Movement	7	8	9	6	4	5	2	3	1	10	11	12
PICADY Movement	A-B	A-C	A-D	B-A	B-C	B-D	C-A	C-B	C-D	D-A	D-B	D-C
Traffic Flows	67	82	8	58	49	29	144	16	8	5	21	11
RFC	0.018			0.285			0.036			0.111		

1.18

Table C18 2016 Opening Year +5 Do Something PM Peak Hour Assessment

2026 Opening Year +15 Traffic Impact in Peak Hour Do Nothing - 95,000 tonnes per annum												
Survey Movement	7	8	9	6	4	5	2	3	1	10	11	12
PICADY Movement	A-B	A-C	A-D	B-A	B-C	B-D	C-A	C-B	C-D	D-A	D-B	D-C
Traffic Flows	48	103	9	52	61	36	181	20	9	6	26	14
RFC	0.021			0.315			0.047			0.144		

1.48

Table C19 2026 Opening Year +15 Do Nothing PM Peak Hour Assessment

PICADY ANALYSES FOR BUCK LEARY'S CROSS ROADS IN THE WEEKDAY ASSESSMENT PEAK HOUR OF 16:00HRS TO 17:00HRS

Growth Rate
1.48

2026 Opening Year +15 Traffic Impact in Peak Hour Do Something - 200,000 tonnes per annum + Civic Amenity Area												
Survey Movement	7	8	9	6	4	5	2	3	1	10	11	12
PICADY Movement	A-B	A-C	A-D	B-A	B-C	B-D	C-A	C-B	C-D	D-A	D-B	D-C
Traffic Flows	77	103	9	68	61	36	181	20	9	6	26	14
RFC	0.022			0.356			0.047			0.145		

Table C20 2026 Opening Year +15 Do Something PM Peak Hour Assessment

Survey Movement:

1	R616 Eastbound left turn	7	R616 Westbound left turn
2	R616 Eastbound	8	R616 Westbound
3	R616 Eastbound right turn	9	R616 Westbound right turn
4	Glanmire Rd left turn	10	Local Road left turn
5	Glanmire Rd Straight ahead	11	Local Road straight ahead
6	Glanmire Rd right turn	12	Local Rd right turn

PICADY ANALYSES FOR INDUSTRIAL ESTATE ACCESS IN THE SATURDAY ASSESSMENT PEAK HOUR OF 12:00HRS TO 13:00HRS

2010 Existing Traffic Impact in Peak Hour - 95,000 tonnes per annum						
Survey Movement	5	6	4	3	1	2
PICADY Movement	A-B	A-C	B-A	B-C	C-A	C-B
Traffic Flows	3	58	7	8	68	10
RFC			0.028		0.021	

Note: Traffic coming to/going from Industrial Estate is assumed to be 33% of weekday values

Table C21 2010 Existing Saturday Peak Hour Assessment

2010 Existing Development Traffic Impact in Peak Hour - 95,000 tonnes per annum						
Survey Movement	5	6	4	3	1	2
PICADY Movement	A-B	A-C	B-A	B-C	C-A	C-B
Traffic Flows	2	0	4	4	0	5

Note: Existing Development Traffic is assumed to be 50% of Industrial Estate generated traffic

Table C22 2010 Existing Development Traffic in the Saturday Peak Hour

Forecast Development Traffic Impact in Peak Hour - 200,000 tonnes per annum + Civic Amenity Area						
Survey Movement	5	6	4	3	1	2
PICADY Movement	A-B	A-C	B-A	B-C	C-A	C-B
Traffic Flows	10	0	10	29	0	29

78No veh movements

Table C23 Forecast Development Traffic Impact in the Saturday Peak Hour

Forecast Increase in Development Traffic in Peak Hour – 200,000 tonnes per annum + Civic Amenity Area						
Survey Movement	5	6	4	3	1	2
PICADY Movement	A-B	A-C	B-A	B-C	C-A	C-B
Traffic Flows	8	0	6	25	0	29

63No additional veh movements

Table C24 Forecast Increase in Development Traffic in the Saturday Peak Hour

PICADY ANALYSES FOR INDUSTRIAL ESTATE ACCESS IN THE SATURDAY ASSESSMENT PEAK HOUR OF 12:00HRS TO 13:00HRS

Growth Rate

2011 Opening Year Traffic Impact in Peak Hour Do Nothing - 95,000 tonnes per annum							1.03
Survey Movement	5	6	4	3	1	2	
PICADY Movement	A-B	A-C	B-A	B-C	C-A	C-B	
Traffic Flows	3	60	7	8	71	10	
RFC			0.084		0.072		

Table C25 2011 Opening Year Do Nothing Saturday Peak Hour Assessment

2011 Opening Year Traffic Impact in Peak Hour Do Something – 200,000 tonnes per annum + Civic Amenity Area							1.03
Survey Movement	5	6	4	3	1	2	
PICADY Movement	A-B	A-C	B-A	B-C	C-A	C-B	
Traffic Flows	11	60	13	33	71	34	
RFC			0.084		0.072		

Table C26 2011 Opening Year Do Something Saturday Peak Hour Assessment

2016 Opening Year +5 Traffic Impact in Peak Hour Do Nothing - 95,000 tonnes per annum							1.18
Survey Movement	5	6	4	3	1	2	
PICADY Movement	A-B	A-C	B-A	B-C	C-A	C-B	
Traffic Flows	3	69	7	8	81	10	
RFC			0.028		0.021		

Table C27 2016 Opening Year +5 Do Nothing Saturday Peak Hour Assessment

2016 Opening Year +5 Traffic Impact in Peak Hour Do Something – 200,000 tonnes per annum + Civic Amenity Area							1.18
Survey Movement	5	6	4	3	1	2	
PICADY Movement	A-B	A-C	B-A	B-C	C-A	C-B	
Traffic Flows	11	69	13	33	81	34	
RFC			0.085		0.073		

Table C28 2016 Opening Year +5 Do Something Saturday Peak Hour Assessment

PICADY ANALYSES FOR INDUSTRIAL ESTATE ACCESS IN THE SATURDAY ASSESSMENT PEAK HOUR OF 12:00HRS TO 13:00HRS

Growth Rate

1.48

2026 Opening Year +15 Traffic Impact in Peak Hour Do Nothing - 95,000 tonnes per annum						
Survey Movement	5	6	4	3	1	2
PICADY Movement	A-B	A-C	B-A	B-C	C-A	C-B
Traffic Flows	3	86	7	8	101	10
RFC			0.029		0.022	

Table C29 2026 Opening Year +15 Do Nothing Saturday Peak Hour Assessment

1.48

2026 Opening Year +15 Traffic Impact in Peak Hour Do Something – 200,000 tonnes per annum + Civic Amenity Area						
Survey Movement	5	6	4	3	1	2
PICADY Movement	A-B	A-C	B-A	B-C	C-A	C-B
Traffic Flows	11	86	13	33	101	34
RFC			0.086		0.074	

Table C30 2026 Opening Year +15 Do Something Saturday Peak Hour Assessment

Survey Movement:

1 R616 Eastbound
2 Right turn into Industrial Estate
3 Left turn out of Industrial Estate
4 Right turn out of Industrial Estate
5 Left turn into Industrial Estate
6 R616 Westbound

PICADY ANALYSES FOR BUCK LEARY'S CROSS ROADS IN THE SATURDAY ASSESSMENT PEAK HOUR OF 12:00HRS TO 13:00HRS

2010 Existing Traffic Impact in Peak Hour - 95,000 tonnes per annum												
Survey Movement	7	8	9	6	4	5	2	3	1	10	11	12
PICADY Movement	A-B	A-C	A-D	B-A	B-C	B-D	C-A	C-B	C-D	D-A	D-B	D-C
Traffic Flows	22	57	4	28	16	19	65	10	7	4	14	6
RFC	0.009			0.128			0.021			0.066		

Table C31 2010 Existing Saturday Peak Hour Assessment

Existing Development Traffic in the Peak Hour – 95,000 tonnes per annum												
Survey Movement	7	8	9	6	4	5	2	3	1	10	11	12
PICADY Movement	A-B	A-C	A-D	B-A	B-C	B-D	C-A	C-B	C-D	D-A	D-B	D-C
Traffic Flows	4			5								

9No veh movements

Table C32 2010 Existing Development Traffic in the Saturday Peak Hour

Forecast Development Traffic in Peak Hour - 200,000 tonnes per annum + Civic Amenity Area												
Survey Movement	7	8	9	6	4	5	2	3	1	10	11	12
PICADY Movement	A-B	A-C	A-D	B-A	B-C	B-D	C-A	C-B	C-D	D-A	D-B	D-C
Traffic Flows	29			29								

58No veh movements

Table C33 Forecast Development Traffic in the Saturday Peak Hour

PICADY ANALYSES FOR BUCK LEARY'S CROSS ROADS IN THE SATURDAY ASSESSMENT PEAK HOUR OF 12:00HRS TO 13:00HRS

Forecast Increase in Development Traffic in Peak Hour - 200,000 tonnes per annum + Civic Amenity Area												
Survey Movement	7	8	9	6	4	5	2	3	1	10	11	12
PICADY Movement	A-B	A-C	A-D	B-A	B-C	B-D	C-A	C-B	C-D	D-A	D-B	D-C
Traffic Flows	25			24								

49No veh movements

Table C34 Forecast Increase in Development Traffic in the Saturday Peak Hour

Growth Rate

1.03

2011 Opening Year Traffic Impact in Peak Hour Do Nothing - 95,000 tonnes per annum												
Survey Movement	7	8	9	6	4	5	2	3	1	10	11	12
PICADY Movement	A-B	A-C	A-D	B-A	B-C	B-D	C-A	C-B	C-D	D-A	D-B	D-C
Traffic Flows	23	59	5	29	17	20	67	11	8	5	15	7
RFC	0.011			0.134			0.023			0.074		

Table C35 2011 Opening Year Do Nothing Saturday Peak Hour Assessment

1.03

2011 Opening Year Traffic Impact in Peak Hour Do Something - 200,000 tonnes per annum + Civic Amenity Area												
Survey Movement	7	8	9	6	4	5	2	3	1	10	11	12
PICADY Movement	A-B	A-C	A-D	B-A	B-C	B-D	C-A	C-B	C-D	D-A	D-B	D-C
Traffic Flows	48	59	5	53	17	20	67	11	8	5	15	7
RFC	0.011			0.187			0.075			0.023		

Table C36 2011 Opening Year Do Something Saturday Peak Hour Assessment

PICADY ANALYSES FOR BUCK LEARY'S CROSS ROADS IN THE SATURDAY ASSESSMENT PEAK HOUR OF 12:00HRS TO 13:00HRS

2016 Opening Year +5 Traffic Impact in Peak Hour Do Nothing - 95,000 tonnes per annum												
Survey Movement	7	8	9	6	4	5	2	3	1	10	11	12
PICADY Movement	A-B	A-C	A-D	B-A	B-C	B-D	C-A	C-B	C-D	D-A	D-B	D-C
Traffic Flows	26	68	5	34	19	23	77	12	9	5	17	8
RFC	0.011			0.156			0.025			0.084		

1.18

Table C37 2016 Opening Year +5 Do Nothing Saturday Peak Hour Assessment

2016 Opening Year +5 Traffic Impact in Peak Hour Do Something - 200,000 tonnes per annum + Civic Amenity Area												
Survey Movement	7	8	9	6	4	5	2	3	1	10	11	12
PICADY Movement	A-B	A-C	A-D	B-A	B-C	B-D	C-A	C-B	C-D	D-A	D-B	D-C
Traffic Flows	51	68	5	58	19	23	77	12	9	5	17	8
RFC	0.011			0.210			0.026			0.084		

1.18

Table C38 2016 Opening Year +5 Do Something Saturday Peak Hour Assessment

2026 Opening Year +15 Traffic Impact in Peak Hour Do Nothing - 95,000 tonnes per annum												
Survey Movement	7	8	9	6	4	5	2	3	1	10	11	12
PICADY Movement	A-B	A-C	A-D	B-A	B-C	B-D	C-A	C-B	C-D	D-A	D-B	D-C
Traffic Flows	33	85	6	42	24	29	97	15	11	6	21	9
RFC	0.013			0.200			0.033			0.103		

1.48

Table C39 2026 Opening Year +15 Do Nothing Saturday Peak Hour Assessment

PICADY ANALYSES FOR BUCK LEARY'S CROSS ROADS IN THE SATURDAY ASSESSMENT PEAK HOUR OF 12:00HRS TO 13:00HRS

Growth Rate
1.48

2026 Opening Year +15 Traffic Impact in Peak Hour Do Something - 200,000 tonnes per annum + Civic Amenity Area												
Survey Movement	7	8	9	6	4	5	2	3	1	10	11	12
PICADY Movement	A-B	A-C	A-D	B-A	B-C	B-D	C-A	C-B	C-D	D-A	D-B	D-C
Traffic Flows	58	85	6	66	24	29	97	15	11	6	21	9
RFC	0.014			0.255			0.033			0.104		

Table C40 2026 Opening Year +15 Do Something Saturday Peak Hour Assessment

Survey Movement:

1	R616 Eastbound left turn	7	R616 Westbound left turn
2	R616 Eastbound	8	R616 Westbound
3	R616 Eastbound right turn	9	R616 Westbound right turn
4	Glanmire Rd left turn	10	Local Road left turn
5	Glanmire Rd Straight ahead	11	Local Road straight ahead
6	Glanmire Rd right turn	12	Local Rd right turn

APPENDIX 5

Biological Survey

Biological Assessment of the Sarsfieldcourt Stream

Greenstar Recycling (Munster) Ltd.
(Waste License W0053-03)

Prepared on behalf of

O'Callaghan Moran & Associates
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Rutland Street
Cork

27th April 2010

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1. Introduction

This report details a biological assessment undertaken on a stream which receives surface water discharges from the Sarsfieldcourt Industrial Estate, Glanmire Co Cork. The industrial estate comprises approximately 17 units one of which is a Waste Licenced non-hazardous waste Materials Recovery Facility (W0136-02). The receiving water is a 1st order stream that borders the eastern side of the industrial estate and for the purpose of this report; this stream is referred to as the Sarsfieldcourt Stream.

There is a single drainage point from the Greenstar facility (rainfall from roofed areas and paved yard areas) but on route to the Sarsfieldcourt Stream this combines with the other discharges from the other units in the Estate and diverges to discharge to the Sarsfieldcourt Stream at two locations. The lower discharge point is at the south-eastern corner of the industrial estate (Discharge point 1) and is conveyed to the stream via a 10cm pipe. The upper discharge point is located approximately 170m downstream of the R616 ï a small overland watercourse at the meeting point with Sarsfieldcourt Stream. Both of these discharges drain other premises in the industrial estate. The discharge locations can be seen in Figure 1.

To assess the environmental impact of the discharges to the Sarsfieldcourt Stream, biological sampling was carried out at three sites; a receptor site downstream of all discharges, a site between the two discharge points (SW1) and a reference site upstream of all discharges (SW2).

Samples were taken during March 2010 and with the exception of the day prior to the survey, sampling followed a prolonged period of dry weather. Water levels in the stream were considered to be low at the time of the survey.

This assessment was undertaken on behalf of OôCallaghan Moran & Associates by Ecofact Environmental Consultants Ltd.

2. Methods

Benthic macroinvertebrates were sampled qualitatively at the three sites using kick-sampling methodology outlined in McGarrigle *et al*, (2002). This field work was carried out on 4th February, 2010. This procedure involved the use of a ôDô shaped hand net (mesh size 0.5 mm; 350 mm diameter) which was submerged on the river bed with its mouth directed upstream. The substrate upstream of the net was then kicked for one minute in order to dislodge invertebrates, which were subsequently caught in the net. Stone washings and vegetation sweeps were also undertaken to ensure a representative sample of the fauna present at each site was collected. All samples were live sorted and specimens were fixed in a 10% formalin solution. Identification was undertaken in the laboratory using high-power and low-power binocular microscopes and specimens were identified using the keys produced by the Freshwater Biological Association. The list of keys used can be seen in the references section. The Quality Rating (Q) System (Toner *et al*, 2005) was used to obtain a water quality rating for each site. The use of this particular biotic index allows the comparison with data published by the EPA. This method categorises invertebrates into one of five groups, depending on their sensitivity to pollution. The higher the biological diversity and the greater the abundance of invertebrate species sensitive to organic pollution, the higher the water quality is assumed to be, and the higher the ôQ valueô assigned to that sampling station. Further details on the Q-rating system are provided in Appendix 1. There is a link between the Q-rating system and the European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. 272 of 2009). The relationship between ecological status and Q-rating is given in Table 1.

The Sarsfieldcourt Stream was not ideally suited to the Q-rating system due to its small size so the Small Stream Risk Score (SSRS) was also used in the current assessment. This system was devised by the EPA as a biological monitoring tool for first and second order streams as part of the Water Framework Monitoring Programme. This system does not define the status of a stream but is a risk assessment (Walsh, 2005). The SSRS was developed based on presence of indicator mayfly species, stonefly species, caddis fly larvae and the overall abundance of Gastropods, Oligochaetes and Dipteran larvae and *Asellus*. It is believed to be an efficient indicator of pollution

risk from either point or diffuse sources in small streams. The index categorises streams into three risk groups: at risk, probably at risk and not at risk, according to the score it attains where > 8 = probably not at risk, 6.5-8 = probably at risk, and < 6.5 = at risk.

Table 1 Water Framework Directive (WFD) ecological status classification and corresponding Q-rating.

Ecological status classification	Corresponding Q-rating
High	Q5, Q4-5
Good	Q4
Moderate	Q3-4
Poor	Q3, Q2-3
Bad	Q2, Q1

3. Site Locations

Three sites were investigated on the Sarsfieldcourt Stream that adjoins the eastern side of the Sarsfieldcourt industrial estate. Site locations are provided in Table 2 and photographs of sites are given in the Plates section. Figure 1 also gives the location of the sampling sites.

Table 2 Locations of the biological sampling sites on the Sarsfieldcourt Stream, Glanmire, Co. Cork during March 2010.

	Receptor Site	SW1	SW2
Location	Approximately 50 m downstream of the south-eastern corner of Sarsfieldcourt industrial estate	Approximately 200 m downstream of the R616	Approximately 15 m downstream of the R616
NOS Grid Reference	W72449 78869	W72350 79018	W72265 79284

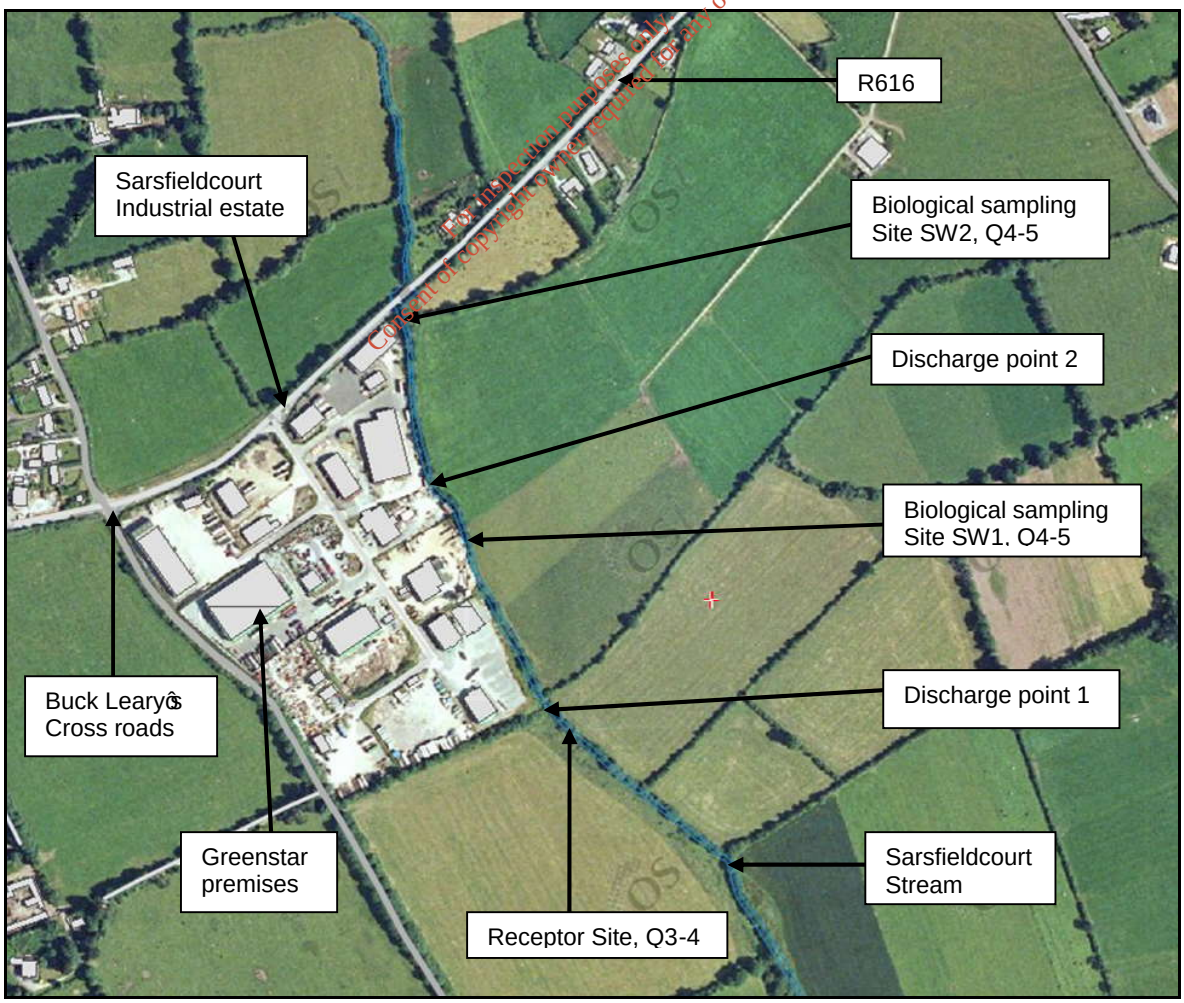

Figure 1 Location of the Greenstar facility, biological monitoring sites SW1 and SW2 and the receptor site downstream of the industrial estate (OSI licence No. to be provided by client).

4. Results

The results of the biological assessments of the sites investigated on the Sarsfieldcourt Stream are given in Table 3. Table 4 provides the derived water quality ratings for these sites, based on the macroinvertebrates recorded and their relative abundances. The results from the sites are discussed below. Plates 6-8 give examples of macroinvertebrates recorded.

4.1 Receptor Site

This site was located approximately 50 m downstream of the south-eastern corner of Sarsfieldcourt industrial estate. The wetted width of the stream was approximately 1.3 m and riffle glide pool habitat was approximately 70%, 15% and 15 % respectively. This stretch of stream had a mean depth of 5 cm and the substrate comprised cobble (15%), gravel (40%) and fine (45%). A coating of dead filamentous algae and silt was recorded on the substratum in this part of the stream.

Group ôCô pollution tolerant and Group ôDô very tolerant macroinvertebrates dominated the macroinvertebrate community at this site. These included mayfly larvae of *Baetis rhodani* (numerous) and caseless caddisfly larvae of *Hydropsyche siltali* (small numbers) along with roundworms and flatworms (both common). A single pollution sensitive specimen was recorded; larvae of the mayfly *Rhithrogena semicolorata.*

The macroinvertebrate family richness at this site was 8 and using the EPA freshwater biological water quality rating system (Toner *et al,* 2005), this stretch of stream was rated ôClass B, Slightly polluted (3-4)ô, equivalent to WFD ôModerate Statusô This site attained a Small Streams Risk Score (SSRS) of 5.6 so this part of the stream is deemed to be ôat riskô

4.2 Site SW1

This site was located approximately 200 m downstream of the R616. This site was located downstream of the confluence of the Sarsfieldcourt tributary stream. The stretch of stream containing the site had a wetted width of approximately 1 meter and gravel (ca. 40%) was the dominant substrate type. Riffle (ca. 85%) was the main flow feature and the site was well shaded (60%).

Macroinvertebrate family diversity at this site was 11. Mayfly larvae of the pollution tolerant *Baetis rhodani* was dominant while mayfly larvae of the pollution sensitive *Rhithrogena semicolorata* was common. Four species of caddisfly at larval stage were recorded. Stonefly larva of the pollution sensitive *Brachyptera risi* was recorded in small numbers.

There was some dead filamentous alga on the substrate at this site as well as light siltation. This site was rated ôUnpolluted (Q4-5)ôusing EPA methodology, equivalent to WFD ôHigh Statusô This site scored 8 using the SSRS which is borderline with the ôprobably not at riskôcategory (>8).

4.3 Site SW2

This uppermost site was located approximately 15 meters downstream of the R616, the regional road that borders the northern boundary of the Sarsfieldcourt industrial site. This site was located upstream of the Sarsfieldcourt tributary Stream. The wetted width of this stretch of the stream was approximately 1 meter and the mean depth was approximately 5 cm. This stretch of stream was predominantly riffled (ca. 90%).

Macroinvertebrate family richness at this site was 16. The most diverse group were the caddisflies with larva of 5 species occurring (*Sericostoma personatum,Potamophylax sp.*, *Agapetus fuscipes*). Fair numbers of mayfly larvae of *Baetis rhodani* (Group ôCô) were recorded while pollution sensitive larvae of *Rhithrogena semicolorata* were scarce.

The substrate in this part of the stream was clean and generally the stream appeared unpolluted. This stretch of stream was rated ôUnpolluted Q4-5ô, corresponding to WFD ôHigh statusô The SSRS score for this site was 8; borderline with the ôprobably not at riskôcategory.

Table 4 Results of the March 2010 biological assessment of the Sarsfieldcourt Stream.

Invertebrate	Pollution sensitivity group	Functional group	Site		
			Receptor	SW1	SW2
MAYFLIES (Uniramia, Ephemeroptera)					
Family Heptagenidae					
Yellow upright *Rhithrogena semicolorata*	A	Scraper & Gathering Collector	*	*****	**
Family Baetidae					
Large dark olive *Baetis rhodani*	C	Scraper & gathering collector	******	*******	****
CASELESS CADDIS FLIES (Trichoptera)					
Grey Flags (Hydropsychidae)					
Hydropsyche siltali	C	Filtering Collector	***	***	**
Primitive caddisflies (Rhyacophilidae)					
Rhyacophila dorsalis	C	Predator			
Finger-net caddisflies (Philopomatidae)					
Wormaldia occitipalis	C	Scraper & Collector		*	**
Green sedges (Rhyacophilidae)					
The sandfly *Rhyacophila dorsalis*	C	Predator			*
CASED CADDIS FLIES (Tricoptera)					
Northern caddisflies (Limnephilidae)					
Halesus radiatus	B	Shredder		*	
Potamophylax sp.	B	Shredder		*	***
Primitive caddisflies (Sericostomatidae)					
Black caperer *Sericostoma personatum*	B	Shredder			**
Family Glossosomatidae					
Little black short-horned sedges *Glossosoma sp.*	B	Shredder			***
Little black caddisfly *Agapetus sp.*	B	Shredder			*****
STONEFLIES (Order Plecoptera					
Winter stoneflies (Taeniopterygidae)					
Brachyptera risi	A	Shredder		***	
Leuctridae (Needle stoneflies)					
Leuctra sp.	B	Shredder			**
TRUE FLIES (Diptera)					
Family Chironomidae					
Green chironomid	C	Filtering Collector	*	*	
Cranefly larvae (Tipulidae)	C	Shredder			
Dicranota sp.	C	Shredder			*
Blackly larvae (Simulidae)	C	Filtering Collector			***** *
SNAILS (Mollusca, Gastropoda)					
Family Hydrobiidae					
Jenkins spire shell *Potamopyrgus jenkinsi*	C	Shredder			*
Family Ancylidae					
River limpet *Ancylus fluviatilis*	C	Grazer		***	
BEETLES (Coleoptera					
Riffle Beetle larvae (Elmidae					
Elmis sp.	C	Grazer			**
CRUSTACEANS (Crustacea, Malacostraca)		Predator			
Amphipods (Amphipoda, Gammaridae)					
Freshwater shrimp *Gammarus duebeni*	C	Shredder	**	****	**
SEGMENTED WORMS (Annelida, Clitellata)					
Lumbricidae	D	Gathering collector			*
ROUNDWORMS (Nematoda)	D	Collector	*****	*	
FLATWORMS	D	Gathering collector	*****	***	****

*Present (1 or 2 individuals), **Scarce/Few (<1%), ***Small Numbers (<5%), ****Fair Numbers (5-10%), *****Common (10-20%), ******Numerous (25-50%), *******Dominant (50-75%), ********Excessive (>75%).

Table 4 Water quality ratings of the three sites investigated during the March 2010 biological assessment of the Sarsfieldcourt Stream.

	Receptor	SW1	SW2
Diversity (no. of families)	7	11	16
Q-value	3-4	4-5	4-5
Q-status	Slightly polluted	Unpolluted	Unpolluted
Quality Class	B	A	A
WFD status	Moderate	Good	Good
SSR Score	5.6	8	8
SSRS Assessment	óat riskô	óprobably at riskô	óprobably at riskô
WFD Status	Moderate	High	High

5. Conclusions and recommendations

The results of the biological assessments carried out on the Sarsfieldcourt Stream indicate that water quality declines from upstream to downstream in the stretch adjacent to Sarsfieldcourt industrial estate. The worst location (receptor site) is however only considered slightly polluted.

Comparing the Receptor Site (ca. 50 m downstream of the estate) with Site SW1 (ca. 200 m downstream of the R616), the Q-rating drops from Q4-5 to Q3-4 over a distance of approximately 250 meters. The relative abundance of pollution sensitive mayfly larvae (*Rhithrogena semicolorata*) decreased significantly downstream of the industrial estate from common at SW1 to present at the Receptor Site. Furthermore, pollution sensitive stonefly larvae of *Brachyptera risi*, recorded in small numbers at Site SW1 were absent from the downstream site. The decrease in family richness (four less families at Receptor site) also signifies a decline in water quality downstream of the industrial estate. The SSRS scores at SW1 (8, óprobably at riskô) and the Receptor Site (5.6) is a reflection this decline. Physical differences / habitat suitability between these two sites were not considered to be of significance in influencing the structure of macroinvertebrate communities present. It is concluded therefore that Discharge point 1 at the south-eastern corner of the industrial estate is negatively affecting water quality in the Sarsfieldcourt Stream.

There was only slight variation in macroinvertebrate habitat suitability between SW1 and SW2. Comparing the macroinvertebrate communities at SW1 and SW2, it is evident that there are differences in biological water quality. The upper site (SW2) was a smaller watercourse but yet had greater macroinvertebrate diversity (11 families at SW1 vs. 16 families at SW2). Both sites scored 8 using the SSRS system. The presence of dead filamentous algae and silt on substrate at SW1 but not at SW2 indicates that the stream is being negatively affected between the two sites. The presence of pollution sensitive stonefly larvae at SW1 (N=2) may have been due to sampling effort and slight variation in microhabitat. Present at SW2 but not recorded from downstream of discharge point 2 was Group ôBô caddisfly larvae of *Glossosoma sp*., *Agapetus sp.* and *Sericostoma personatum*, notable given that these indicators were generally recorded in fair numbers upstream. Additionally, Group ôBôlarvae of *Leuctra sp.* also followed this trend. The biotic indices do not reflect these differences but the loss of diversity at SW1 (compared to SW2) shows that the Sarsfieldcourt Stream is affected between these two sites. This decline in water quality is most likely due to discharge point 2. At the time of the survey this discharge was deemed to contribute approximately 30% of the flow in the Sarsfieldcourt Stream (i.e. flow in the Sarsfieldcourt Stream downstream of the confluence of the discharge point).

There are two discharge points from the Sarsfieldcourt Industrial Estate to the Sarsfieldcourt Stream. The biological sampling assessment has shown that there is a decline in water quality downstream of both discharges. There are other premises in the industrial estate that also input to these discharges. It is therefore not possible to attribute the observed decline in water quality to the Greenstar facility.

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WFD Watermap viewer:
http://193.1.208.39/NsShare_Web/Viewer.aspx?Site=NsShare&ReloadKey=True

PLATES

Plate 1 Receptor Site on the Sarsfieldcourt Stream, approximately 50 m south of the Sarsfieldcourt industrial estate during March, 2010.

Plate 2 Biological sampling Site SW1 on the Sarsfieldcourt Stream, located approximately 200 m south of the R616.

Plate 3 Site SW2 located approximately 15 m downstream of the R616.

Plate 4 Vicinity of discharge point 1 at the south-eastern corner of the Sarsfieldcourt industrial estate.

Plate 5 Discharge point 2 was located approximately 170 meters downstream of the R616.

Plate 6 Larvae of the Group ó Apollution sensitive Heptagenid mayfly *Rhithrogena semicolorata* was recorded at the reference site (present), SW1 (common) and SW2 (scarce).

Plate 7 Larvae of the Group B less sensitive cased caddisfly *Sericostoma personatum* was scarce at the uppermost site SW2.

Plate 8 Larvae of the pollution tolerant finger-net caseless caddisfly *Wormaldia occipitalis* occurred at SW1 and SW2.

APPENDIX 6

Odour Impact Assessment
&
Odour Management Plan

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ODOUR IMPACT ASSESSMENT OF ODOUR CONTROL SYSTEM INSTALLED IN MATERIALS RECOVERY FACILITY, GREENSTAR RECYCLING (MUNSTER), SARSFIELDCOURT INDUSTRIAL ESTATE, SARSFIELDCOURT, GLANMIRE, COUNTY CORK

PERFORMED BY ODOUR MONITORING IRELAND ON BAHALF OF GREENSTAR RECYCLING (MUNSTER) LTD

REFERENCE NUMBER:	2010A114(1)
ATTENTION:	Ms. Louise Demir
PREPARED BY:	Dr. Brian Sheridan
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TABLE OF CONTENTS

This document is submitted as part of continued environmental monitoring carried out by Greenstar Recycling (Munster) Ltd. The results reported are representative of actual conditions on the day of monitoring.

Respectively submitted,

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

For and on behalf of Odour Monitoring Irelandã

Document Amendment Record

Client: ***Greenstar Recycling (Munster) Ltd***

Project: Odour impact assessment of odour control systems installed in Materials Recovery Facility Greenstar Recycling (Munster) Ltd, Sarsfieldcourt Industrial Estate, Sarsfieldcourt, Glanmire, County Cork.

Project Number: 2010A114(1)			**Document Reference:** Impact assessment of odour control systems installed in Materials Recovery Facility Greenstar Recycling (Munster) Ltd, Sarsfieldcourt Industrial Estate, Sarsfieldcourt, Glanmire, County Cork.		
2010A114(1)	Document for review	JWC	BAS	JWC	03/04/2010
Revision	**Purpose/Description**	**Originated**	**Checked**	**Authorised**	**Date**

Executive summary

Odour Monitoring Ireland was commissioned by Greenstar Recycling (Munster) to perform an odour impact assessment of the installed carbon filtration odour control system located in Sarsfieldcourt Materials Recovery Facility (MRF), Greenstar Recycling (Munster) Ltd, Sarsfieldcourt Industrial Estate, Glanmire, County Cork. The odour control system audit was performed over one day namely 23rd March 2010. This report will be used to provide an overview of the performance of the odour control system in operation in the MRF.

A representative from Odour Monitoring Ireland performed the audit in order to assess the efficiency of the installed odour control system.

The main aims of the study were as follows:

- To assess the operational and physical parameters of the odour control system including temperature, static pressures and volumetric airflow rate;
- To assess the odour loading and emission rate from the odour control system, in accordance with EN 13725:2003 (CEN, 2003);
- To assess the total volatile organic carbon (TVOC) loading and removal efficiency of the odour control system to ascertain action levels for the replacement of the carbon filtration bed media.
- The odour impact area of the odour filtration system utilising dispersion modelling software in accordance with the specified guideline value of ¢1.50 and 3.0 Ou_E m^{-3} at the 98th percentile of hourly averages over 5 years of metrological data.

It was concluded from the study that:

- The current carbon filtration system is treating approximately 81,167 Nm^3 [odourous air]/hr.
- The odour emission rate based on this data set is 6,077 Ou_E/s.
- The odour control system is achieving an odour removal efficiency range of between 89 and 86 % for Vessels 1 and 2, respectively.
- The TVOC PID instrument is capable of providing predictive analysis of the efficiency of odour capture of the carbon. The average TVOC removal efficiency was 80 to 82% across carbon Vessels 1 and 2, respectively.
- Following dispersion modelling assessment using AERMOD Prime (09292), all GLCs were below 1.10 Ou_E m^{-3} at the 98th percentile of hourly averages over 5 years of hourly sequential meteorological data.

The following recommendations are presented from the study:

- Check and top up where necessary the carbon in order to prevent short-circuiting of any untreated odourous air to atmosphere.
- Check and record the daily odour character from the outlet of the stack in order to verify odour free conditions within the exhaust air stream. The inlet air stream should be used for direct comparison in terms of odour character. As there are four sniff ports installed across the bed, the odour profile will also be used for prediction of carbon bed crash.
- Perform regular dust drum emptying of the Regenerative dust filtration plant.
- Investigate the pulsing sequence on the RJP is operational in order to ensure efficient pulsing for dust removal.
- Analyse daily record sheets and trends to identify any significant changes in static pressure and sniff port odour character rating for system upset. This will provide valuable information for carbon changeout.
- Ensure all smoke vents are sealed and not open.
- Clean and check settings on the inlet air extraction grill system to ensure no restrictions to airflow extraction from the building.
- Ensure the Odour Management Plan document management system is updated following each system check. Any deviations in documented design parameters should be investigated immediately.

1. Introduction and scope

1.1 Introduction

Odour Monitoring Ireland was commissioned by Greenstar Recycling (Munster) Ltd to perform an odour impact assessment of the installed carbon filtration system upgraded located in Sarsfieldcourt Materials Recovery Facility (MRF), Greenstar Recycling (Munster) Ltd, Sarsfield Court Industrial Estate, Glanmire, Co. Cork. The impact assessment was performed on the 23rd March 2010.

This document presents the materials and methods, results, discussion of results, conclusions and recommendations gathered throughout the study. The results conclude that the existing odour control system is adequately treating odours generated within the MRF.

1.2 Scope of the work

The main aims of the study were as follows:

To assess the operational and physical parameters of the odour control system including temperature, static pressures and volumetric airflow rate (EN13284-1:2002);
To assess the odour loading and emission rate from the odour control system, in accordance with EN 13725:2003 (CEN, 2003);
To assess the total volatile organic carbon (TVOC) loading and removal efficiency of the odour control system to ascertain action levels for the replacement of the carbon filtration bed media,
To perform an odour dispersion modelling assessment to illustrate any odour impact area of the odour control system.

This information will allow Greenstar Recycling (Munster) Ltd to assess compliance with any emission limit values and also allow them to assess the performance of the installed odour control system.

2. Materials and methods

This section describes the materials and methods used throughout the sampling period.

2.1 Physical operational parameter assessment

Using a calibrated L/S type pitot manometer, the volumetric airflow rate of odourous air that passes through the carbon filtration system was determined in accordance with EN13284-1, where possible. This allowed for the determination of physical operational parameters such as efflux velocity, current air treatment capacity and odour loading and odour emission rate. Ten measurements were carried out in a straight section of the inlet ducting to the carbon filtration systems. The duct was broken into 9 concentric circles. The overall odour control system has two individual stacks. The new annular beds have a stack diameter of 1300 mm while the stack tip diameter is 950mm. The inlet duct diameter before the RJP is 1,400 mm.

2.2 Odour sampling

In order to transport air samples to the odour free laboratory for odour assessment, a static sampling method was used where air samples were collected in 60 litre Nalophan^{NA} bags using a vacuum sampling device over an approximate 10 to 20-minute period. The sampler operates on the ólung principleô, whereby the air is removed from a rigid container around the bag by an electrically powered vacuum pump. This causes the bag to fill through a stainless steel and PTFE tube whose inlet was placed in the odour stream, with the volume of sample equal to the volume of air evacuated from the rigid container. A sampling period of approximate 10 to 15-minutes was used to eliminate smoothing of cyclic odour emission peaks. A total of 2 inlet and outlet odour samples were taken. Outlet samples were taken after the third port of each vessel. All odour samples were taken on the 23rd March 2010.

2.3 Olfactometry

An ECOMA TO8 dynamic yes/no olfactometer was used throughout the experimental period to determine the odour threshold concentration of the emission sources. The odour threshold concentration is defined as the dilution factor at which 50% of the panel can just detect the odour. Only those panel members who passed screening tests with n-butanol (certified reference gas, CAS 72-36-3) and who adhered to the code of behaviour were selected as panellists for olfactometry measurements (CEN, 2003).

The odour threshold concentration was calculated according to the response of the panel members and is displayed in $Ou_E\ m^{-3}$, which referred to the physiological response from the panel equivalent to that elicited by 40ppb/v n-butanol evaporated in one cubic metre of neutral gas (CEN, 2003). Odour units are considered a dimensionless unit, but the pseudo-dimensions of $Ou_E\ m^{-3}$ have been commonly used for odour dispersion modelling, in place of ógrams m^{-3}ô

2.4 Odour emission rate

The measurement of the strength of a sample of odourous air is, however, only part of the problem of quantifying odour. Just as pollution from a stack is best quantified by a mass emission rate, the rate of production of an odour is best quantified by the odour emission rate. For a point emission source such as the scrubber stack, this is equal to the odour threshold concentration ($Ou_E\ m^{-3}$) of the discharge air (determined by olfactometry) multiplied by its exhaust air flow-rate ($m^3.s^{-1}$). It is equal to the volume of air contaminated every second to the threshold odour limit ($Ou_E s^{-1}$).

2.5 Static pressures analysis

Static pressure readings were taken throughout the system in order to estimate pressure losses throughout the ductwork, regenerative dust filtration unit, carbon filtration vessels and stack sections of the odour control system. This allowed for direct comparison between commissioned and current running conditions in terms of pressure. Static pressure readings were taken using a calibrated Testo 400 handheld and differential pressure manometer. An L type pitot used in reverse mode was utilised as a probe and readings were logged every 3 seconds over a 3 minute period. The static pressure difference between different areas of the system allow for the calculation of total pressure loss across the operating processes and may explain any upset in system operation. All results are displayed in mm WG (water gauge).

2.6 VOC analysis with a Photo-ionisation Detector (PID)

A Photo-ionisation Detector (PID) uses an Ultraviolet (UV) light source (*photo*) to ionise a gas sample and detect its concentration. Ionisation occurs when a molecule absorbs the high energy UV light, ejecting a negatively charged electron and forming of positively charged molecular ion. The gas becomes electrically charged. These charged particles produce a current that is easily measured at the sensor electrodes. Only a small fraction of the VOCs molecules are ionised. Therefore, PID measurements are non-destructive and therefore maintain sample integrity where samples can be bagged and used for further analysis (Sheridan, 2004).

2.7 Dispersion modelling

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

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

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

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

2.8 Meteorological Data

Five years worth of hourly sequential meteorology data representative of the area will be used for the operation of Aermod Prime. This will allow for the determination of the worst-case scenario for the overall impact of odour emissions from the facility on the surrounding vicinity. Odour Monitoring Ireland currently has licensed met data for the existing site. Cork Airport 2003 to 2007 inclusive was used.

2.9 Terrain Data

All major topographically features were accounted for within the dispersion modelling assessment. Building wakes affects were also accounted for within the dispersion modelling assessment.

2.10 Dispersion models used

For this study BREEZE AERMOD Prime (09292) was used.

2.10.1 AERMOD Prime

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

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

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

2.11 Odour impact criteria

An odour impact criterion of less than or equal 1.50 and 3.0 Ou_E m^{-3} at the 98th percentile was used for the odour impact assessment criterion.

The value of less than or equal to 3.0 Ou_E/m^3 at the 98th percentile is most appropriate odour impact criterion for this emission point as this air stream is treated and the level of odour offensiveness in this air stream is negligible thereby negating the need to assess the source as a high risk high offensiveness level odour emission source. Typically, the level of less than or equal to 1.50 Ou_E/m^3 is utilised for untreated odour emissions from Waste water treatment plants, Landfill operations and Rendering plant, etc and therefore not applicable in this instance. In order to remain conservative, this GLC limit is applied for reference purposes only.

3. Results

This section presents the results obtained during the survey.

3.1 Assessment of operational parameters

The sampling locations and times chosen for each parameter are illustrated in *Table 3.1* and *Appendix II* of this report. These sampling locations and times were chosen to assess the overall performance of the complete odour control system during operations.

Table 3.1. Sampling locations and times for assessment of odour control system performance.

Date	Location identifier	Sample No.	Approx. Sampling time	Analysis performed
23/03/2010	Loc 1	Outlet from RJP	10 minutes	Odour, TVOC, Static pressure
23/03/2010	Loc 2	After Fan A vessel 1	10 minutes	TVOC, Static pressure
23/03/2010	Loc 3	After Fan B vessel 2	10 minutes	TVOC, Static pressure
23/03/2010	Loc 4	Exhaust stack Fan A - Vessel 1	10 minutes	TVOC, Static pressure, Odour
23/03/2010	Loc 5	Exhaust stack Fan B - Vessel 2	10 minutes	TVOC, Static pressure, Odour
23/03/2010	Loc 6	Inlet duct to RJP	8 minutes	Static pressure, Flow rate

The results of all analysis performed on the odour control system are presented within *Sections 3.2* to *Section 3.6* of this report.

3.2 Volumetric airflow rate measurement results

Table 3.2 illustrates the average volumetric airflow rate and temperature of air stream passing through the odour control system as measured on the 23rd March 2010.

Table 3.2. Volumetric airflow rate and temperature of air stream passing through the odour control system.

Date	Sample location	Area (m^2)	Airflow rate (m/s)	Volumetric flow rate (m^3/s)	Temperature (K)	Volumetric flow rate (m^3/hr)	Volumetric flow rate (Nm^3/hr)
23/03/2010	Average volumetric airflow rate- (ref: Loc 6)	1.53	15.60	23.87	289	85.925	81,167
Total	**-**	**-**	**-**	**23.87**	**-**	**85,925**	**81,167**

3.3 Static pressure results across the carbon filtration system

Table 3.3 illustrates the static pressure results obtained during the monitoring survey carried out on the 23rd March 2010. The overall pressure loss across the dust filtration unit, carbon filtration vessel and across the fan is also presented for the sampling event.

Table 3.3. Static and differential pressure losses across the carbon filtration system on the 23rd March 2010.

Process identity	Static pressure readings in process (mm WG)	Differential pressure loss across process (mm WG)
Ductwork side of RJP	-ive 79	-
Differential Left side RJP	-	**-**
Differential Right side RJP	-	**-**
After RJP (Loc 1)	-ive 144	**65**
Vessel 1 (Loc 2) before fan A	-ive 168	-
Vessel 1 (Loc 2) after fan A	+ 66	**234**
Vessel 2 (Loc 3) before fan B	-ive 166	-
Vessel 2 (Loc 3) after fan B	+79	**244**

A total pressure loss of approx. 234 and 244 mm WG was measured across the operating Fans A and B, respectively on the 23rd March 2010. The current Fans A and B are rated for a total static pressure loss of 300 mm WG (3000 Pa) and therefore have sufficient capacity to facilitate constant airflow at present. Fan A was operating at a total power consumption of 89 amps while Fan B was operating at a total power consumption of 94 amps.

3.4 Inlet and outlet odour threshold concentration results

Table 3.4 illustrates the inlet and outlet odour threshold concentrations obtained during the study period on the 23rd March 2010. The overall odour removal efficiency of the carbon filtration system is also presented.

Table 3.4. Inlet and outlet odour threshold concentration values on the 23rd March 2010.

Sample identity	Average Odour threshold conc. (Ou_E/m^3)	Removal efficiency (%)
Loc 1 (Outlet RJP)[1]	2,333	-
Loc 4 (Outlet vessel 1)[1]	241	89.66
Loc 5 (Outlet vessel 2)[1]	268	88.51

Notes: [1] denotes that duplicate sample taken over the measurement period. The average result is presented for clarity.

The average odour emission rate and odour character of the odourous air from the carbon filtration system is illustrated in *Table 3.5*.

Table 3.5. Odour emission rate and odour character of the carbon filtration system exhaust air at Sarsfieldcourt Materials Recovery Centre on the 23rd March 2010.

Process identity	Odour threshold conc (Ou_E/m^3)	Volumetric airflow rate (m^3/s)	Average odour emission rate (Ou_E/s)	Odour character
Loc 4	241	11.93	2,878	Musty odour
Loc 5	268	11.93	3,199	Musty odour
Total odour emission rate (Ou_E/s)	**-**	**-**	**6,077**	**-**

3.5 TVOC concentration results

Table 3.6 illustrates the TVOCs concentration as measured using a PID on the inlet and outlet airstreams of the odour control system on the 23rd March 2010.

Table 3.6. Inlet and Outlet TVOCs values for the odour control system on the 23rd March 2010.

Date	Sample location	TVOC conc (ppb)	Removal efficiency (%)
23/03/2010	Inlet to RJP-Ductwork	6200	--
23/03/2010	Outlet of RJP-Ductwork (Loc 1)	5950	--
23/03/2010	Inlet to Vessel 1	5060	--
23/03/2010	Inlet Vessel 1-1st port	4600	--
23/03/2010	Inlet Vessel 1-2nd port	3400	--
23/03/2010	Inlet Vessel 1-3rd port	2100	--
23/03/2010	Outlet Vessel 1-4th port ï Exhaust stack	1100	82.26
23/03/2010	Inlet to Vessel 2	5200	--
23/03/2010	Outlet Vessel 2-1st port	4300	--
23/03/2010	Outlet Vessel 2-2nd port	3460	--
23/03/2010	Outlet Vessel 2-3rd port	2240	--
23/03/2010	Outlet Vessel 2-4th port ï Exhaust stack	1240	80

3.6 Dispersion modelling results

Table 3.7 illustrates the overall exhaust stream characteristics used within the dispersion modelling assessment. This data is inputted into the dispersion model whereby maximum downwind ground level concentrations (GLCs) of odour are predicted for 5 years of hourly sequential meteorological data (Cork 2003 to 2007 inclusive). The 11.075 metres high recycling building was incorporated into the dispersion model in order to take into account any building wake affects. Maximum ground level concentrations of odours are presented in tabular format in *Table 3.8*.

Table 3.7. Overall exhaust stream characteristics of carbon filtration system located in Greenstar Recycling (Munster) Ltd and input data for dispersion model.

Identity	Exhaust stack characteristics for Vessel 1 and 2 (23/03/2010)
Average outlet odour concentration for stack 1 ï Fan A Vessel 1 (Ou_E/m^3)	241
Average outlet odour concentration for stack 2 ï Fan B Vessel 2 (Ou_E/m^3)	268
Average Volumetric airflow rate for stack 1 ï Fan A Vessel 1 (m^3/s)	11.93
Average Volumetric airflow rate for stack 2 ï Fan B Vessel 2 (m^3/s)	11.93
Average Odour emission rate for stack 1 ï Fan A Vessel 1 (Ou_E/s)	2,878
Average Odour emission rate for stack 2 ï Fan B Vessel 2 (Ou_E/s)	3,199
Average Exhaust air stream temperature for Vessel 1 and 2 (K)	289
Stack height for Vessel 1 and 2 (m)	15
Diameter of exit area for Vessel 1 and 2 (m)	0.95
Exit area for Vessel 1 and 2 (m^2)	0.709
Efflux velocity for Vessel 1 and 2 (m/s)	16.83
Base level of sensitive receptors (m)	1.80
Recycling building height above ground level (m)	11.025

Table 3.8 illustrates comparison of the predicted ground level concentrations and the proposed limit ground level concentration at the 98th percentile of hourly averages. In addition, the 99.50th maximum percentile odour threshold concentration is presented to assess worst case dispersion estimates. As can be observed, the predicted ground level concentrations are within the proposed limit values. In addition, *Appendix I* illustrates the odour contours generated by the dispersion model for the 98th and 99.5th percentile of hourly averages for 5 years of hourly sequential meteorological data.

Table 3.8. Predicted ground level concentrations using AERMOD Prime dispersion model.

Model used	Maximum GLC at the 98th percentile value ($Ou_E\ m^{-3}$)	Limit values
AERMOD Prime	1.10	Ò1.50 $Ou_E\ m^{-3}$ at the 98th percentile
		Ò8.0 $Ou_E\ m^{-3}$ at the 98th percentile

In addition to *Table 3.8*, odour contour plots are presented in *Appendix I* in order to allow visual interpretation of odour plume spread.

As can be observed the predicted maximum ground level concentrations of odour in the vicinity of the facility are in compliance with the odour impact criterion of less than or equal to 3.0 Ou_E/m^3 at the 98^{th} percentile of hourly averages for 5 years of meteorological data.

In addition, the ground level concentrations are also below the level of 1.50 Ou_E/m^3 at the 98^{th} percentile of hourly averages for 5 years of meteorological data.

The odour impact criterion of less than or equal to 3.0 Ou_E/m^3 at the 98^{th} percentile is the most appropriate impact criterion for this odour source since it is treated.

4. Discussion of results

This section describes the results obtained during the study.

4.1 Operational parameters

The carbon filtration system is currently treating approximately 81,167 Nm^3 [odourous air]/hr.

4.2 Odour emission rate of odour control system

The average odour emission rate from all odour control vessels based on this data set is 6,077 Ou_E/s. There was no distinct waste odour character of the exhaust airstream from Vessel 1 and 2, respectively.
The carbon filtration systems Vessel 1 and Vessel 2 are achieving average odour removal efficiency of between 89.66% to 88.51%, respectively.
The average TVOC removal efficiency was <80 % across carbon vessels 1 and 2, respectively.
There is no predicted odour impact from the carbon filtration system exhaust stacks with all ground level odour concentrations less than 1.10 Ou_E/m^3 at the 98th percentile of hourly averages over 5 years of hourly sequential meteorological data. The significant stack height and efflux velocity reduces the risks associated with any odour breakthrough from the carbon filtration system assuming carbon bed exhaustion.

5. Conclusions

The following conclusions were drawn:

1. The current carbon filtration system is treating approximately 81,167 Nm^3 [odourous air]/hr.
2. The odour emission rate based on this data set is 6,077 Ou_E/s.
3. The odour control system is achieving an odour removal efficiency range of between 89.66 to 88.51% for Vessels 1 and 2, respectively.
4. The TVOC PID instrument is capable of providing predictive analysis of the efficiency of odour capture of the carbon. The average TVOC removal efficiency was <80% across carbon Vessels 1 and 2, respectively.
5. Following dispersion modelling assessment using AERMOD Prime (07026), all GLCs were below 1.10 $Ou_E\ m^{-3}$ at the 98th percentile over 5 years of hourly sequential meteorological data.

6. Recommendations

The following recommendations are presented:

1. Check and top up where necessary the carbon in order to prevent short-circuiting of any untreated odourous air to atmosphere.
2. Check and record the daily odour character from the outlet of the stack in order to verify odour free conditions within the exhaust air stream. The inlet air stream should be used for direct comparison in terms of odour character. As there are four sniff ports installed across the bed, the odour profile will also be used for prediction of carbon bed crash.
3. Perform regular dust drum emptying of the Regenerative dust filtration plant.
4. Investigate the pulsing sequence on the RJP is operational in order to ensure efficient pulsing for dust removal.
5. Analyse daily record sheets and trends to identify any significant changes in static pressure and sniff port odour character rating for system upset. This will provide valuable information for carbon changeout.
6. Ensure all smoke vents are sealed and not open.
7. Clean and check settings on the inlet air extraction grill system to ensure no restrictions to airflow extraction from the building.
8. Ensure Odour management system is updated following each system check. Any deviations in design parameters should be reported immediately and investigated.

7. *Appendix I* - Odour contour plots for the odour control system located in Greenstar Recycling (Munster) Ltd.

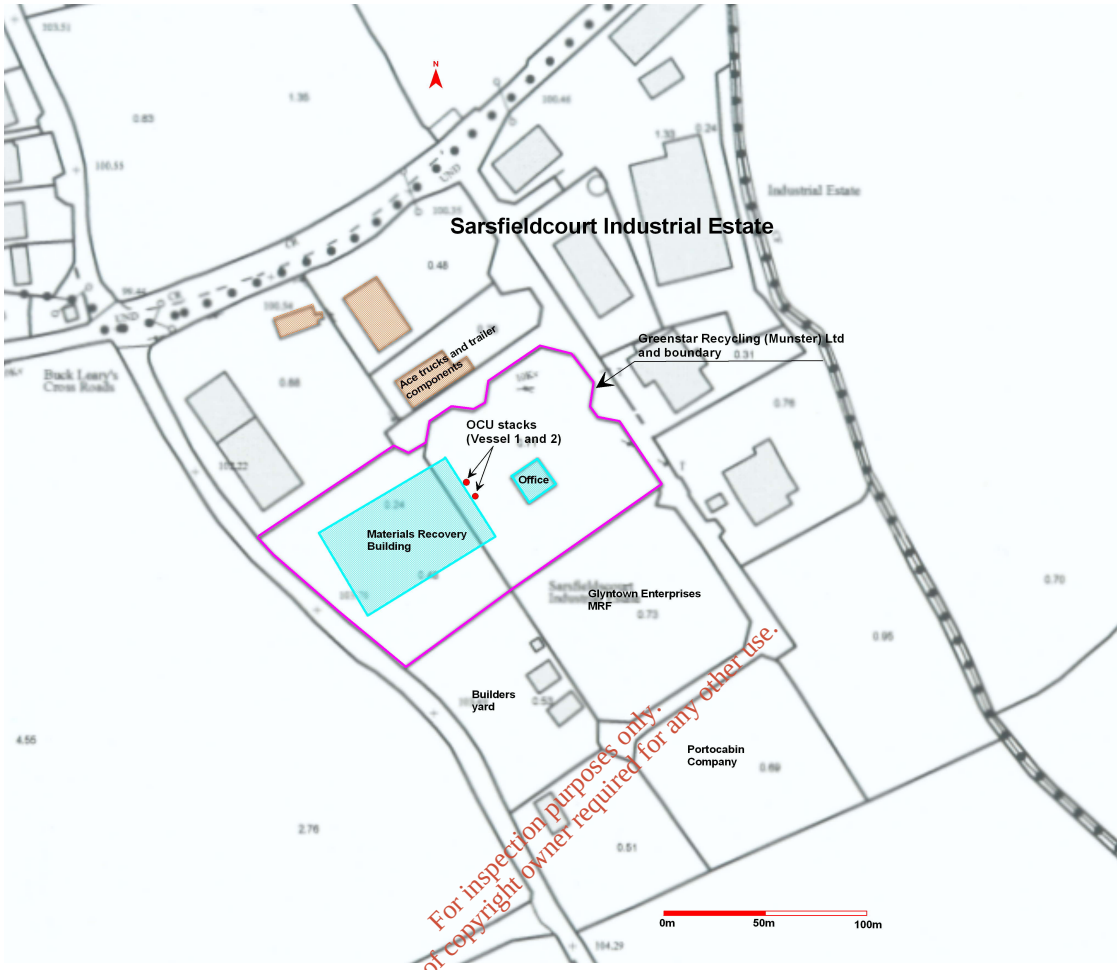


Figure 7.1. Schematic of Greenstar Recycling site location, boundary location ( ), and odour control stack locations ( ).

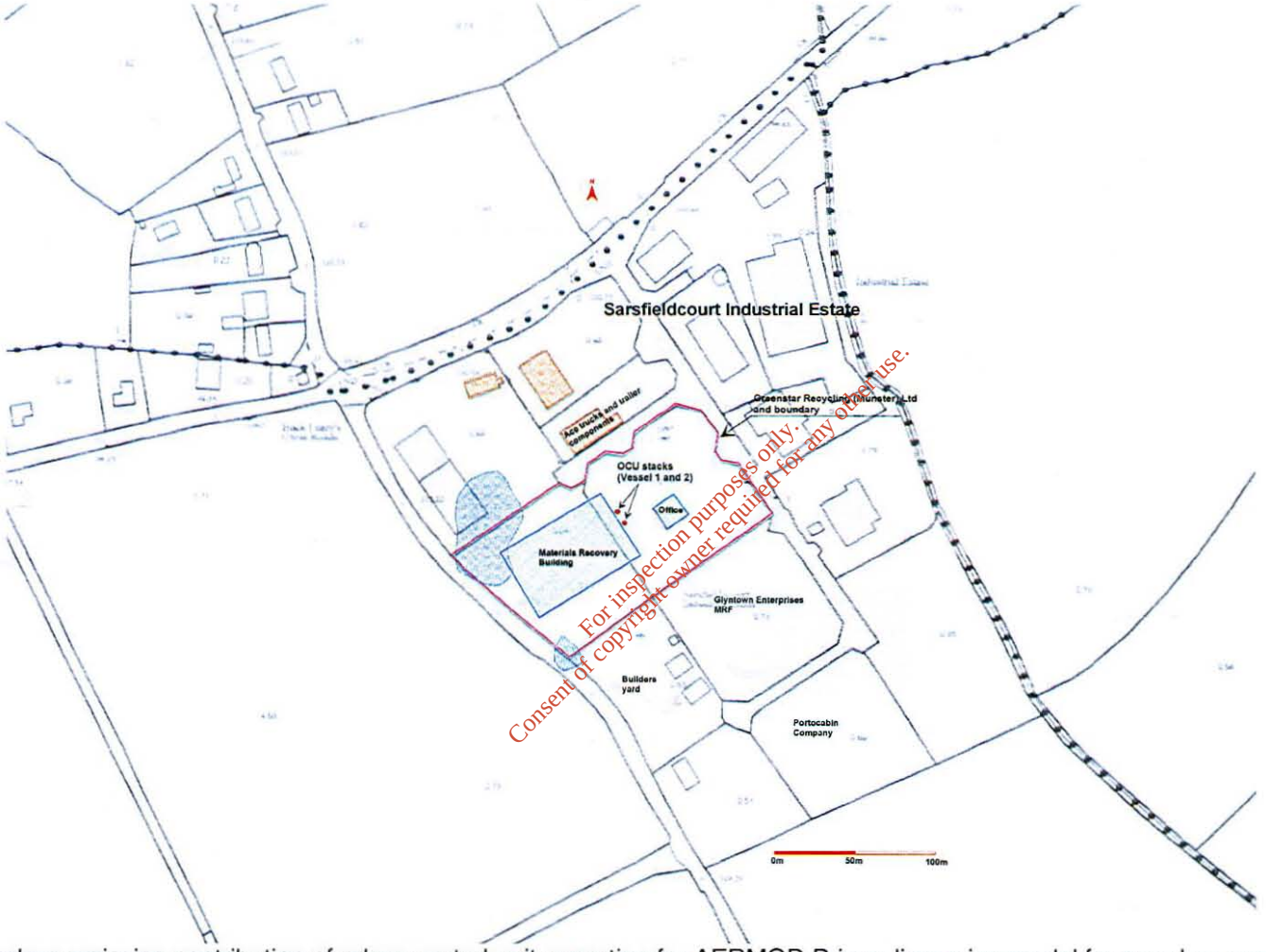
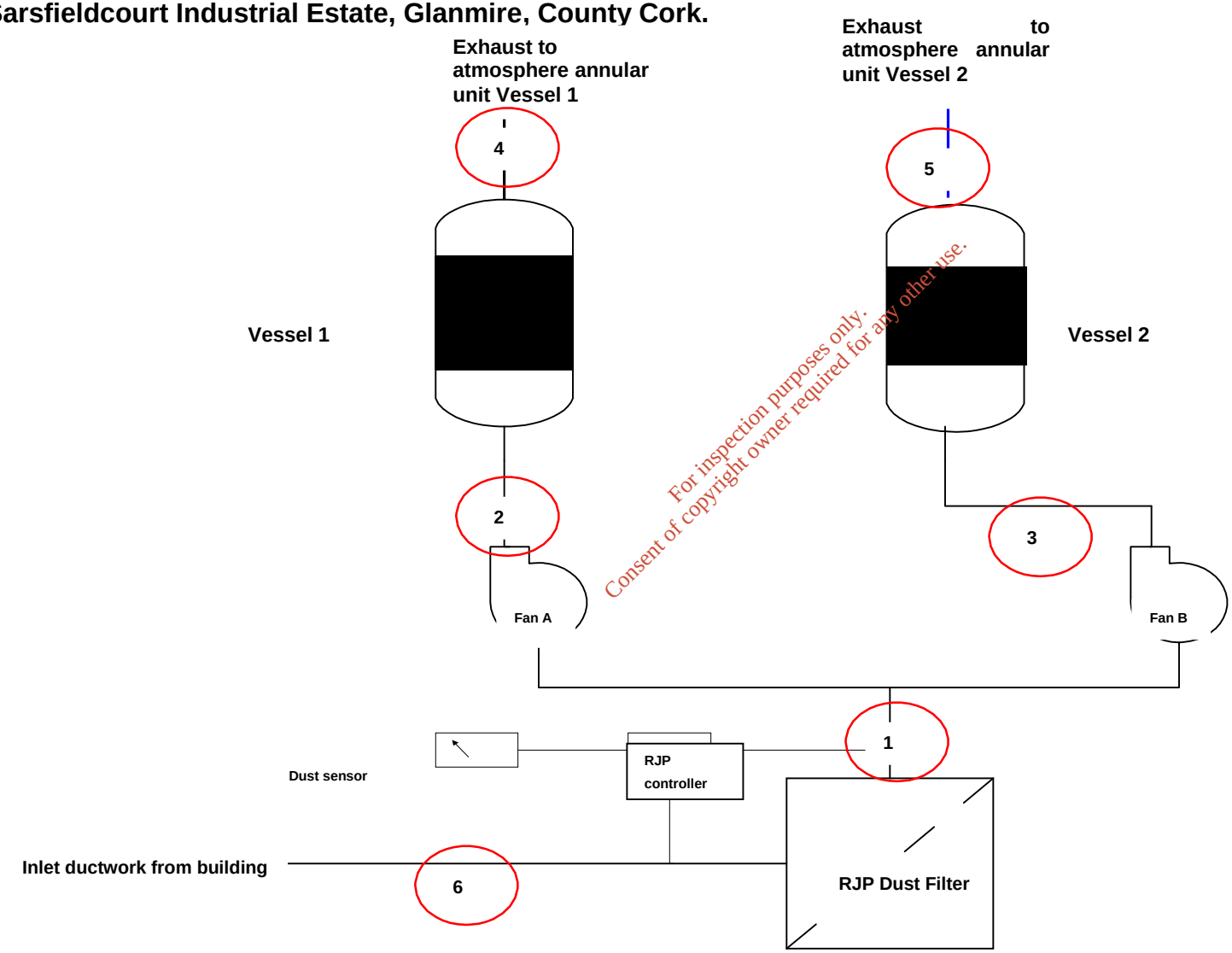


Figure 7.2. Predicted odour emission contribution of odour control unit operation for AERMOD Prime dispersion model for an odour concentration of less than or equal to 0.90 $Ou_E\ m^{-3}$ (▬) at the 98th percentile of hourly averages for 5 years of hourly sequential meteorological data.

8. *Appendix II* - Process flow diagram of odour control system installed in Sarsfieldcourt Materials Recovery Centre, Sarsfieldcourt Industrial Estate, Glanmire, County Cork.



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OVERVIEW OF ODOUR CONTROL MEASURES OPERATED IN MATERIALS RECOVERY FACILITY, GREENSTAR RECYCLING (MUNSTER), SARSFIELDCOURT INDUSTRIAL ESTATE, SARSFIELDCOURT, GLANMIRE, COUNTY CORK

PERFORMED BY ODOUR MONITORING IRELAND ON BAHALF OF GREENSTAR RECYCLING (MUNSTER) LTD

REFERENCE NUMBER:	2010A115(1)
ATTENTION:	Mr. Michael Watson
PREPARED BY:	Dr. Brian Sheridan
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Project: Overview of odour control measures operated in Materials Recovery Facility, Greenstar Recycling (Munster), Sarsfieldcourt industrial estate, Sarsfieldcourt, Glanmire, County Cork.

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Executive summary

Odour Monitoring Ireland was commissioned by Greenstar Recycling (Munster) to assess the odour management measures and systems in operation in Sarsfieldcourt Materials Recovery Facility (MRF), Greenstar Recycling (Munster) Ltd, Sarsfieldcourt Industrial Estate, Glanmire, County Cork.

Currently, the MRF handles 99,017 tonnes of waste as authorised under Waste licence WO136-02. Household waste and source separated waste make up approximately 47,129 tonnes per annum. It is intended to increase the total tonnage of waste throughput for the facility to 200,000 tonnes per annum with household and source separated waste making up approximately 120,000 tonnes per annum. This will be achieved through operation of the facility over longer hours. The overall footprint and building dimensions for the facility will not increase. All waste processing and handling operations will be carried out indoors.

The existing MRF is fitted with an advanced odour control system, which provides negative ventilation to the main building handling the putrescible waste (i.e. where odours are generated). The facility is fitted with interlocked rapid roller doors providing efficient containment of odours within the facility building. The odour control system is audited on approximately a quarterly basis to ensure it is achieving the necessary performance to prevent any odours causing impact in the vicinity of the facility. The most recent audit of the l system is provided as supporting documentation in *Appendix I* document...

In terms of future operations, it is intended to process (tromell screen) 100,000 tonnes of household waste so as to separate the organic fraction from the material. Auto loading of separated fines material will be performed onsite so that material will move directly to a trailer post trommelling. When this trailer is full, it will be removed off site. All residual fines will be removed from site by the end of the working day so as to prevent the build-up of odours within the building. A full cleaning schedule will be in place for the equipment, etc. inside and outside the building so as to ensure all surfaces are maintained in a clean state to prevent the generation of odours.

The facility Odour Management Plan (OMP) will be updated to take account of operational changes within the building as a result of the increased tonnage.

In terms of future operations, and taking into account that the building footprint and volume that the existing odour control system is servicing will not be increased, it is concluded that no increase odour impact will occur as a result of the tonnage increase.

It is recommended that the following measures be put in place before increasing the tonnage.::

1. Perform a smoke integrity test of the building to assess the containment efficiency of the existing building fabric and where necessary seal any identified leakage points using appropriate expanding foam application. This could include the eves, apex, corners, rising concrete walls, dividing walls and around access doors and windows located within the facility building. This should achieve a high integrity building fabric and enhance the existing negative pressure application of the odour control system applied to the existing building.
2. Update the existing OMP to take account of future increases in tonnages.

.

1. Introduction

Odour Monitoring Ireland was commissioned by Greenstar Recycling (Munster) Ltd to perform an overview assessment of the odour management systems located in Sarsfieldcourt Materials Recovery Centre, Greenstar Recycling (Munster) Ltd, Sarsfield Court Industrial Estate, Glanmire, Co. Cork. The overall objective of the study was to ascertain whether the existing facility odour management systems were adequate to ensure no odour impact as result of the proposed increase in the volumes of waste processed at the facility.

This document presents the overview and discussion of the existing odour management systems in place and provides recommendations that are required to ensure future operation without odour impact.

2. Existing odour management methods and proposed operations

2.1 Existing facility odour control system performance

The facility has an installed odour control system providing negative ventilation in the building where putrescible material is processed and handled. This is audited on a quarterly basis to ensure that it meets the performance specification.. The system was last audited in March 2010 and the audit report, which included odour impact assessment modelling, is presented in Appendix I. .

The audit confirmed that the odour control system is performing adequately with all ground level concentrations of odour less than or equal to 1.50 Ou_E for the 98th percentile of hourly averages for 5 years of hourly sequential meteorological data.

A weekly check is performed on the odour control system by facility management including preventative maintenance. This is specified in the facilityôs Odour Management Plan (OMP).

The proposed increase in waste inputs will not require increases to the volume or area of the building where putrescible or odorous waste are processed. Therefore the overall ventilation rate and negative pressure applied will remain unchanged. Since the existing odour control system is performing adequately, it is therefore concluded that there should be no increase odour impact as a result of increased tonnage through the facility.

In terms of enhancing the negative ventilation and to ensure no fugitive odours escape from the building, a building integrity test utilising smoke generation should be conducted to assess the building fabric. This will be performed before the new facility operations and intensification. All potential leak points will be sealed with appropriate expanding foam application with particular emphasis been paid to the eves, apex, corners, rising concrete walls, dividing walls and around access doors and windows located within the facility building.

This will further enhance the containment and capture system for odours and ensure that no odours result in impact in the vicinity of the facility.

The existing odour control system management strategy will be maintained throughout the operation of the new intensified facility operations.

2.2 Existing odour management plan

The OMP is a core document detailing operational and control measures appropriate to management and control of odour at the site. The format of the OMP provides sufficient detail to allow operators and maintenance staff to clearly understand the odour management operational procedures for both normal and abnormal conditions.

The OMP includes sufficient feedback data to enable site management (and inspectors) to audit the odour management system. An example of some of the issues that were considered in the OMP are summarised as follows.

A summary of the site , odour sources and the location of receptors,
Details of site management responsibilities and procedures for reporting faults, identifying maintenance needs, replenishing consumables and complaints procedure,
Odour management equipment operation procedures (e.g. correct use of equipment, process, materials, checks on equipment performance, maintenance and inspection
Operative training,
Housekeeping,
Maintenance and inspection of plant (both routine and emergency response),
Spillage/contaminated surface management procedures,
Record keeping ï format, responsibility for completion and location ,

Emergency breakdown and incident response planning including responsibilities and mechanisms for liaison with the local authority.
Public relations.

The OMP is regularly reviewed and updated to take account of operational changes. It also forms the basis of a document Environmental and Odour Management system for the operating site. The Odour Management System (OMS) documentation defines the roles of the facility staff and sets out templates in relation to the operating of the facility and reporting procedures to be employed. The OMP is integrated in the overall Environmental Management/Performance System for the site and the Facility Manager ensures all works are performed in accordance with the OMP. Greenstar will update and implement all aspects of the OMP before commencement of intensified operations at their facility.

3. Conclusions

The following conclusions were drawn from the overview of the existing and proposed site operations. These include:

1. The overall MRF handling capacity will be increased from 99,017 tonnes of waste to 200,000. Household waste and source separated waste will increase from approximately 47,129 tonnes per annum to approximately 120,000 tonnes per annum. This will be achieved through operation of the facility over longer hours.
2. The overall footprint and building dimensions for the MRF facility will not increase.
3. All waste processing and handling operations will be carried out indoors.
4. The existing MRF is fitted with an advance odour control system which provides negative ventilation to the main building handling the putricable waste (i.e. where odours are generated). This system is audited on approximately a quarterly basis to ensure it is achieving the necessary performance to prevent any odours causing impact in the vicinity of the facility. This will be maintained in the facility operation. The most recent audit of the control system carried out in March 2010 confirmed that the odour control system is operating adequately to ensure no odour impact in the vicinity of the facility.
5. The facility is fitted with interlocked rapid roller doors providing efficient containment of odours within the facility building. This will be maintained in the facility operation.
6. In terms of future operations, the separated organic fraction from the waste will be auto loaded into trailers so that material will move directly offsite when the trailer is full. All fines material will be removed from site by the end of the working day so as to prevent the build-up of odours within the building headspace.
7. A full cleaning schedule will be in place for the equipment, etc. inside and outside the building so as to ensure all surfaces are maintained in a clean state to prevent the generation of odours.
8. The facility OMP will be updated to take account the increased tonnage.
9. In terms of future operations and taking into account that the building footprint and volume that the existing odour control system is servicing will not be increased, it is concluded that no increase odour impact will occur as a result of the proposed tonnage increase.

4. Recommendations

The following recommendations are presented:

1. Perform a smoke integrity test of the facility building to assess the containment efficiency of the existing building fabric and where necessary seal any identified leakage points using appropriate expanding foam application. This could include the eves, apex, corners, rising concrete walls, dividing walls and around access doors and windows located within the facility building. This should achieve a high integrity building fabric and enhance the existing negative pressure application of the odour control system applied to the existing building.
2. Update the existing OMP to take account of future increase in tonnages.

5. *Appendix I* ï Odour impact assessment of existing odour control system ï March 2010.

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ODOUR MANAGEMENT PLAN (OMP) FOR A MATERIALS RECOVERY CENTRE, GREENSTAR RECYCLING(MUNSTER), SARSFIELDCOURT INDUSTRIAL ESTATE, SARSFIELDCOURT, GLANMIRE, COUNTY CORK

PERFORMED BY ODOUR MONITORING IRELAND ON THE BEHALF OF GREENSTAR HOLDINGDS LTD.

REPORT PREPARED BY:	Dr. John Casey
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1. Introduction and scope

1.1 Introduction

Odour Monitoring Ireland were commissioned by Facility Manager, Greenstar Recycling (Munster), Sarsfieldcourt Industrial Estate, Sarsfieldcourt, Glanmire, County Cork to develop an Odour Management Plan for the materials recovery centre. The practices carried out within the materials recovery centre represent advancements in the area of odour control over the past number of years and therefore are considered Best Available Techniques in terms of odour control at such facilities in general. In addition, an overall odour management procedure is presented and will form an integral part of facility operations in order to ensure the minimisation of odour emissions from the facility. The primary of focus for this document includes:

1. Management tools and techniques to provide an integrated approach in odour control and management throughout the operating facility.

2. Proactive monitoring, maintenance and control of odours in a progressive manner to ensure the minimisation of odours from the operating facility.

Each individual aspect for the monitoring and management of odours will be discussed in detail. *Section 3* will provide a synopsis of the overall approach for the control of odours within the operating facility and risk assessment matrix and management approach to be used at the facility.

This core document will be continually reviewed and updated to ensure continued management of odour emissions from the facility. An overall document management and auditing system for odour management will provide the basis of a quality system for the control of odours from the facility.

1.2 Scope of the work

The main aims of the study include:

1. Assessment of monitoring methodologies to be implemented at the operating material recovery facility,

2. Assessment of management tools and techniques to provide an integrated approach in odour control and management throughout the operating facility.

2. Odour management plan Greenstar (Munster) Ltd.

The Odour Management Plan (OMP) is a core document that details operational and control measures appropriate to management and control of odour at the site. The format of the OMP should provide sufficient detail to allow operators and maintenance staff to clearly understand the operational procedures for both normal and abnormal conditions.

The Greenstar (Munster) Ltd. facility, situated 5 miles north east of Cork city, is a state of the art Materials Recycling Facility. Completed in 2003 the facility is currently licensed by the EPA to process 96,000 tonnes annually. The Materials Recovery Facility has been fitted out with the most up to date technology in order to maximise recyclable extraction. These investments include shredder, trommels, balers, and a state of the art odour control system.

The facility manager is Ms. Louise Demir the deputy manager is Mr. Michael Hannon. The facility manager has sole responsibility for the operation of the facility and the environmental management system.

The OMP consolidates the following information:

- Odour critical plant operation and management procedures (e.g. correct use of plant, process, materials; checks on plant performance, maintenance and inspection,
- Operative training and records.
- Housekeeping,
- Maintenance and inspection of plant (both routine and emergency response procedures),
- Record keeping ï format, responsibility for completion,
- Emergency breakdown including responsibilities and mechanisms for liaison with the authorities.
- Public relations and complaint management.
- Overall Standard and emergency Operating procedures for the operating site.

The OMP is a living document and should be regularly reviewed and upgraded. It should form the basis of a documented Environmental and Odour Management system for the operating site. The OMP documentation defines the roles of the Plant Operator and staff and sets out templates in relation to the operating of the facility and reporting procedures to be employed. The facility manager should ensure all works are performed in accordance with the OMP.

3. Methodologies for the control of odours in Greenstar (Munster) Ltd.

This section will describe the general odour release risks at Greenstar (Munster) Ltd. facility and the control techniques to be used to control such releases. The general odour risk matrix is contained in *Table 3.1* of this document.

3.1 Methodologies for the control of odours in Greenstar (Munster) Ltd.

Table 3.1 and 3.2 illustrates the potential odour source categories and methodologies to control odour release at the materials recovery facility. This describes the suggested BAT techniques to be used at the facility. The odour emission source categories identified within the facility boundary are illustrated in *Table 3.1*. All operational sources have the risk of causing odour complaint beyond the boundary of the operating facility.

Table 3.1. Identified odour emission categories for the materials recovery facility.

Identity	Potential Odour Source	Sub category odour risk potential
Source category 1	Materials intake and processing. High risk category	Maintenance for all mechanical equipment used to control odours in the intake building. Ensure building integrity is maintained.
Source category 2	Spillage and drain management, housekeeping and general management High risk category	Pressure washers and access to cleaning to control odour contamination of equipment. Easy access to enclosed drains-ensure sufficient fall and sweep velocity to prevent build-up of organic matter to minimise odour formation. Access to clean around/under plant equipment to prevent build-up of odourous material. Door management and alarms on personnel doors and large doors to prevent the release of odours. Any openings either windows or vent adequately sealed to prevent the release of odours.
Source category 3	Odour control treatment technologies operation and management High risk category	SCADA monitoring of extraction system and odour control plant to ensure efficient treatment in accordance with critical parameters established via odour dispersion modelling. Meteorological data monitoring in accordance with World met organisation guidelines.
Source category 4	Waste management and control Medium risk	Truck/Trailer/Bin washing and operation can cause release of odours. General waste management including cardboard, plastic etc. can cause release of odours.

Each odour emission source category is considered an odour complaint risk within the OMP and discussed in detail in *Table 3.2*.

3.2 Assessment of odour risks in the materials recovery facility

Table 3.2. outlines those areas within the proposed facility that are potential sources of odours. Each source is identified; the risks of odour impact assessed and preventative measures are recorded to reduce such odour impact risks. Each odour source is discussed, the preferred monitoring protocol identified and suggested odour control and minimisation strategy presented. By implementing such odour control techniques the overall release of odours from the facility can be reduced and controlled thereby minimising the potential for complaints.

Table 3.2. Assessment of odour impact risks and control strategies for Greenstar (Munster) Ltd. materials recovery facility.

Odourous source categories	Activity that produces odour and the point of emission risk	Considered BAT Principle of odour control	Monitoring technique for assessment of risk	BAT effect on odour control
Source category 1	Materials intake	All materials should arrive to the facility in appropriate containers.	Subjective measurement of the odour from each load. Standard operating procedure included in Environmental Management system and odour management plan Ref; EP-05 Waste Acceptance Procedure Ref: EP-06 Unacceptable Waste Procedure Ref: EP-10 Nuisance Management Procedure	Reject strong smelling waste. If waste is accepted strong smelling waste should be processed without delay. Employ odour suppression if necessary.
	Materials processing	All materials accepted beyond the weighbridge should be tipped within the intake building. Reception area is fully enclosed. Rapid roller door to ensure unloading of material within contained area. Tipping to be performed within enclosed reception area. Reception area is under negative extraction to prevent the release of odours.	Verify integrity of building through visual observation. Interlocking mechanism on doors. Extraction system SCADA linked and alarmed to management offices. Ref Facility Inspection Sheet Ref EF 10 A1 Ref: EP-07 Waste and Material Storage Procedure Ref: EP-09 Site Infrastructure Procedure	To minimise the release of odours from the material processing.

Table 3.2 continued. Assessment of odour impact risks and control strategies for Greenstar (Munster) materials recovery facility.

Odourous source categories	Activity that produces odour and the point of emission risk	Considered BAT Principle of odour control	Monitoring technique for assessment of risk	BAT effect on odour control
Source category 2	House keeping	All surfaces finished to high standard for ease of cleaning.	Visual observation of all potential contamination surfaces on a daily basis. Ref Facility Inspection Sheet Ref EF 10 A1	To minimise the release of fugitive odours to atmosphere during operations.
	Spillage management	Closed drains and sufficient sweep velocity to prevent build-up of fine organic matter in drains. Large organic matter filtered before entry to drain system.	Visual observation of all drains and traps to ensure no deposition of organic matter resulting in odour formation. Visual observation of all drains points to ensure no blockages. Standard operating procedure included in Environmental Management system and OMP Ref Facility Inspection Sheet Ref EF 10 A1 Ref: EP-09 Site Infrastructure Procedure	To ensure the effectiveness of the spillage management system and the reduction of the formation of fugitive odours. To minimise the release of fugitive odours to atmosphere during operations.

Table 3.2 continued. Assessment of odour impact risks and control strategies for Greenstar (Munster) materials recovery facility.

Odourous source categories	Activity that produces odour and the point of emission risk	Considered BAT Principle of odour control	Monitoring technique for assessment of risk	BAT effect on odour control
Source category 3	Odour Control System	Dual vessel annular bed carbon filtration system (Odour Control System) with a regenerative dust filtration system for dust removal.	Daily system critical parameter check in house including differential pressure, flowrate (from BMS) and compressor operational check. Check sheet included in Environmental Management system and OMP Daily odour check in house including subjective sniff assessment. Standard operating procedure included in Environmental Management system and OMP Quarterly independent system assessment by nominated external consultants. The critical operating parameters of the system assessed are odour emission rate, differential pressure assessment across the system, volumetric airflow rate measurement, TVOC assessment inlet and across each bed on the annular vessels and dispersion modelling assessment with measured data.	To minimise and prevent the release of odours from equipment that requires routine maintenance.

Odourous source categories	Activity that produces odour and the point of emission risk	Considered BAT Principle of odour control	Monitoring technique for assessment of risk	BAT effect on odour control
Source category 3	Odour Control System	Dual vessel annular bed carbon filtration system (Odour Control System) with a regenerative dust filtration system for dust removal.	Corrective action is taken if any of the critical parameters are not met daily or quarterly[1]. These critical parameters are outlined in each quarterly monitoring report and within the Environmental Management system and OMP Maintenance shall be carried out on the system Ref: EP-09 Site Infrastructure Procedure Ref SP-02 Maintenance and Calibration Procedure	To minimise and prevent the release of odours from equipment that requires routine maintenance.

Notes:[1] Corrective action shall be taken if any of the system critical parameters are not met either daily or quarterly. If any one critical parameter is not met the system shall be thoroughly checked and the problem rectified. If the problem requires the system to be shut down for a period the emergency response plan shall be enacted Standard operating procedure included in Environmental Management system and OMP

[2] The system critical parameters have been derived through dispersion modelling (i.e. the expected volumetric airflow rate to ensure there are no fugitive emissions from the facility in conjunction with the adequate odour emission rate to ensure there are no odour exceedances beyond the facility boundary. This shall be carried on a quarterly basis).

Table 3.2 continued. Assessment of odour impact risks and control strategies for Greenstar (Munster) materials recovery facility.

Odourous source categories	Activity that produces odour and the point of emission risk	Considered BAT Principle of odour control	Monitoring technique for assessment of risk	BAT effect on odour control
Source category 4	Truck/Trailer/Bin washing and operation	Transport trailers, bins and transport vehicles to be washed in dedicated wash area. Truck wash area to be washed following each vehicle cleaning	Visual inspection of truck wash area, and operation. Standard operating procedure included in Environmental Management system and OMP) Ref Facility Inspection Sheet Ref EF 10 A1	To prevent the release of odours form contaminated surfaces
	General waste management	All waste to be handled in environmentally responsible manner so as to prevent odour release.	Ensure waste management plan is implemented as part of the Environmental management system. Standard operating procedure included in Environmental Management system and OMP Ref: IP-03 Environmental Aspects and Impacts Procedure Ref: IP-04 Legal and Regulatory Requirements Procedure Ref: IP-05 Objectives Targets and Management Programmes Procedures	To prevent the release of odours from waste products generated within the site.

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3.3 Daily Odour survey (sniff assessment)

This is a very useful fast test, which can provide a subjective ñsnap-shotò assessment of the presence, strength and character of an odour either within an installation boundary, at the boundary or in the area/community surrounding the site. A sniff assessment is carried three times daily in accordance with IP-08 Monitoring, Measurement and Improvement Procedure, IP-14 H&S Environmental Monitoring Procedure, EP-10 Nuisance Management Procedure, EF-10B Odour Log in the vicinity of the Greenstar (Munster) Ltd facility.

General considerations: When undertaking an assessment, the following guideline procedures need to be considered.

Consideration needs to be given to evaluating the sensitivity of the person(s) carrying out this form of assessment. If necessary this can be confirmed by means of olfactometry of odour sniff standards which can be purchased and utilised onsite before a survey. Obviously anyone with a poor sense of smell should be excluded. It is important to remember that regular exposure to a particular odour can produce olfactory fatigue.

The person(s) undertaking the assessment should avoid strong food or drinks, including coffee, for at least one hour before undertaking the assessment. Strongly scented toiletries should be avoided as well as the use of deodorisers in the vehicle used transporting the person to the survey point during the assessment.

Colds, sinusitis or sore throat can affect the sense of smell. Planned assessments should be re-scheduled if possible or undertaken by someone else, otherwise the fact should be clearly noted on the report.

The health and safety of the individual undertaking the assessment should not be compromised.

Testing location:

Where possible move from areas of weaker strength to stronger odours.

To evaluate a facility you should start upwind of the area,

When investigating offsite installation odours start well down wind and move towards the installation. It should be remembered that an odour may change in character over a distance as a result of dilution and/or conversion.

Testing method:

1. Sense of smell verified in normal range (by means of Olfactometry or sniff standards).
2. Survey is started on the day upwind of facility,
3. Survey is carried out at selected points around the boundary of the facility,
4. A survey timeline of up to 10 minutes is utilised at each location. During this time the intensity and extent of any detected odour is evaluated utilising the recommendations with the guidance for sniffing.
5. All relevant weather information is recorded,
6. Data collated & recorded:

   DETECTABILITY / INTENSITY: 1 No detectable odour, 2 Faint odour (barely detectable, need to stand still and inhale facing into the wind), 3 Moderate odour (odour easily detected while walking & breathing normally), 4 Strong odour, 5 Very strong odour (possibly causing nausea).

   EXTENT & PERSISTENCE: (assuming odour detectable, if not then 0) 1 Local & transient (only detected on installation or at installation boundary during brief periods when wind drops or blows), 2 Transient as above, but detected away from installation boundary, 3 Persistent, but fairly localized, 4 Persistent and pervasive up to 50m from plant or installation boundary, 5 Persistent and widespread (odour detected >50 m from installation boundary)

Results are recorded on the Odour Log EF 10B

4. *Appendix I*-Complaints management procedures and recording

As part of an Environmental Management System Greenstar (Munster) Ltd., has a dedicated recording system put in place to allow for the analysis of odour complaints. As part of this Environmental Management System quickly accessible records available for odour abatement system controlling odour emissions on site. This allows for the analysis of system upset in conjunction with the receipt of complaint.

The odour complaint investigation begins as soon as the complaint is received. The person registering the complaint should know that the issue is being taken seriously and that an investigation will be quickly undertaken. Donôt take offence to the complaint and donôt be surprised if the complainant is upset, odours can elicit strong emotional responses. The professionalism exhibited by the staff member taking the call can go a long way to calming someone upset by nuisance odours. Information from the complainant should be taken in a systematic process.

Complaints pertaining too odour should be dealt with in accordance with IP-07 Communication and Consultation Procedure,IF-09 B Communication Database,

Table 4.1 illustrates the odour complaint recording form EF-10B for use within the Environmental Management System. This will be used in conjunction with the Odour abatement equipment management procedures/system in the OMP.

Table 4.1. EF-10B. (*See appendix III & IV for odour descriptors*)

Odour complaint recording form EF-10B			
Complainant details			
Complainant name		**Date of complaint**	
Complainant location		**Time of complaint (24hr clock)**	
Duration of complaint (minutes)		**Type of complaint**	
Name of person logging complaint		**How was complaint received (phone, etc)**	
How long till complainant contacted back (minutes)		**Complainant address:**	
Notes:			

Odour characteristics			
Odour intensity (0 to 5)	**Please tick one**	Odour hedonic tone (0 to 4)	**Please tick one**
No odour (0)		Neutral odour (0)	
Very weak odour (1)		Mildly unpleasant (-1)	
Weak odour (2)		Moderately Unpleasant odour(-2)	
Distinct (they can clearly recognise the odour) (3)		Unpleasant odour (-3)	
Strong odour (4)		Very unpleasant odour (-4)	
Very strong odour (5)			

What did the odour smell like-Descriptor? Please refer to *Appendix III*	
Is the odour fluctuating or constant?	
Is the complainant a resident (R) of commercial receptor (C)?	
Notes:	

Weather condition ***Please append historical records from met station to this record***			
Wind speed (m/s)		**Relative humidity (%)**	
Wind direction (from plant to complainant)		**Cloud cover (0 to 8)**	
Temperature (^{0}C)		**Cloud height (low, medium, high)**	
Notes:			

Complaint logging personnel only			
Name of personnel:			
How fast was your response time (minutes)		**What did it smell like-Descriptor?**	
Did you detect an odour?		**Distance of odour detection to facility as crow flies (m)**	
Odour Intensity (0 to 5)		**Odour hedonic tone (0 to ï 4)**	
Is the odour fluctuating?		**Are there any other odour sources in the immediate location**	

Plant operation synopsis ***Please append odour abatement plant overview***			
Material quantity into plant (tonnes/on the floor)		**Are there any process upsets (Y/N)**	
Describe upsets			
Are all odour abatement plant operating accordingly	Please refer to *Appendix II* for verification procedure.		
Notes:			

5. *Appendix II*-Odour abatement management system/procedures

An operational verification procedure is performed daily in house see Table 3.2 and independently on a quarterly basis see Table 3.2.

All system checks are document controlled and available for viewing by odour complaints verification personnel, chief maintenance personnel and plant manager.

The system is rigorously checked on a daily basis in accordance with a standard operating procedures included in Environmental Management system and OMP (Ref **IP-08 MONITORING, MEASUREMENT AND IMPROVEMENT PROCEDURE, IP-14 H&S ENVIRONMENTAL MONITORING PROCEDURE, EP-10 NUISANCE MANAGEMENT PROCEDURE, EF-10B ODOUR LOG**) A spares inventory is maintained for essential spares.
In the case of emergency breakdown of equipment the emergency response procedure shall be followed. Standard operating procedure Ref IP-15 included in Environmental Management system .

Table 5.1 is the odour control plant daily critical parameter check. Additionally a full systems check with odour threshold concentration determination is carried out independently on a quarterly basis. The status of the carbon change out is assessed on quarterly basis via the full independent system check. Any significant changes in the character of the odour exhausting from the vessels on a daily basis shall trigger a full systems independent check. Carbon is changed out as necessary based on these principles.

Table 5.1. Sample Odour control unit (OCU) daily checking procedure and recording.

Daily check Odour abatement Date: Signed : Time:				
Activity:	**e.g. Loading**			
	RJP (b/n 50 and 120 mmWG)	mm		
	Critical Parameter: Read electronic controller and check manual clock, controller should read under 120 mm, Clock under 5 inches, if outside report immediately			
	Unit 1 (Left)			
	Carbon Bed Pressure Differential			inches
	Unit 2 (right)			
	Carbon Bed Pressure Differential			inches
	Critical Parameter: Expect Between 1 inches and 3 inches, depending on airflow rate, if not within this range report immediately			
	Flowrate (BMS)			m/s
	Critical Parameter: Expect 10-12 m/s, if below 10 report immediately			
	Sniff test			
		Port 1	Port 2	Port 3	Port 4
	Unit 1				
	Unit 2				
	If a change in odour at the sniff ports occurs other than a ñclearò status it should be noted and corrective action taken as necessary.			
	Compressor operational		5 to 6	bar
	Notes:			

The implementation of such quality checking procedures provides both system confidence and preventative maintenance thereby reducing any risk associated with odour control/minimisation equipment and indeed overall emissions.

In assessing these risks, it must be taken into account that response to odours is almost immediate. In order to manage these odour detection and complaint risks, a number of actions may be considered:

Plan high-risk activities in periods where receptor sensitivity to annoyance is low like during wet weather when they are indoors, or during colder winter months, or during early morning/late evenings during periods of low atmospheric turbulence, etc.

6. *Appendix III*-Odour descriptors for sniff survey

Descriptors can help to establish the source of an odour and it is useful, when recording information from a complainant, to seek their description of the odour.

Table 6.1. Odour descriptors for commonly encountered compounds.

Substance	Odour	Substance	Odour
Acetaldehyde	Apple, stimulant	Dimethyl sulphide	Rotten vegetable
Acetic acid	sour vinegar	Diphenylamine	Floral
Acetone	chemical/sweetish/solvent	Diphenyl sulphide	Burnt rubber
Acetonitrile	Ethereal	Ethanol	Pleasant, sweet
Acrylaldehyde	Burning fat	Ethyl acetate	Fragrant
Acrolein	Burnt sweet, pungent	Ethyl acrylate	Hot plastic, earthy
Acrylonitrile	Onion, garlic, pungent	Ethylbenzene	Aromatic
Aldehydes C9	Floral, waxy	Ethyl mercaptan	Garlic/onion, sewer, decayed cabbage, earthy
Aldehydes C10	Orange peel	Formaldehyde	Disinfectant, hay/straw-like, pungent
Allyl alcohol	Pungent, mustard like	Furfuryl alcohol	Ethereal
Allyl chloride	Garlic onion pungent	n-Hexane	Solvent
Amines	Fishy, pungent	Hydrogen sulphide	Rotten eggs
Ammonia	Sharp, pungent odour	Indole	Excreta
Aniline	Pungent	Iodoform	Antiseptic
Benzene	Solvent	Methanol	Medicinal, sweet
Benzaldehyde	Bitter almonds	Methyl ethyl ketone	Sweet
Benzyl acetate	Floral (jasmine), fruity	Methyl isobutyl ketone	Sweet
Benzyl chloride	Solvent	Methyl mercaptan	Skunk, sewer, rotten cabbage
Bromine	Bleach, pungent	Methyl methacrylate	Pungent, sulphide like
Sec-Butyl acetate	Fruity	Methyl sulphide	Decayed vegetables
Butyric acid	Sweat, body odour	Naphthalene	Moth balls
Camphor	Medicinal	Nitrobenzene	Bitter almonds
Caprylic acid	Animal like	Phenol	Sweet, tarry odour, carbolic acid
Carbon disulphide	Rotten vegetable	Pinenes	Resinous, woody, pine-like
Chlorine	Irritating, bleach, pungent	Propyl mercaptan	Skunk
Chlorobenzene	Moth balls	Putrescine	Decaying flesh
2-Chloroethanol	Faint, ethereal	Pyridine	Nauseating, burnt
Chloroform	Sweet	Skatole	Excreta, faecal odour
Chlorophenol	Medicinal	Styrene	Penetrating, rubbery, plastic
p-Cresol	Tar-like, pungent	Sulphur dioxide	Pungent, irritating odour
Cyclohexane	Sweetish when pure, pungent when contaminated	Thiocresol	Rancid, skunklike odour
Cyclohexanol	Camphor, methanol	Toluene	Floral, pungent, moth balls
Cyclohexanone	Acetone-like	Trichloroethylene	Solventy
Diamines	Rotten flesh	Triethylamine	Fishy, pungent
1,1-Dichloroethane	Ether-like	Valeric acid	Sweat, body odour, cheese
1,2-Dichloroethylene	Chloroform-like	Vinyl chloride	Faintly sweet
Diethyl ether	Pungent	Xylene	Aromatic, sweet
Dimethylacetamide	Amine, burnt, oily		

Hedonic Scores (1)

These scores are also referred to as ñDravnieksò and are derived from laboratory-based experiments. They give an indication of the relative pleasantness or unpleasantness of one odour when compared to another. When considering odours from industrial activities, the descriptors given in the previous table can be used.

Use of these scores

The higher the positive ñscoreò, the more ñpleasantò the odour descriptor, and the greater the negative figure the more ñunpleasantò the odour descriptor. The terms pleasant and unpleasant are used to indicate relative response rather than a sign of a positive or negative level of satisfaction. Zero cannot be considered to be neutral.

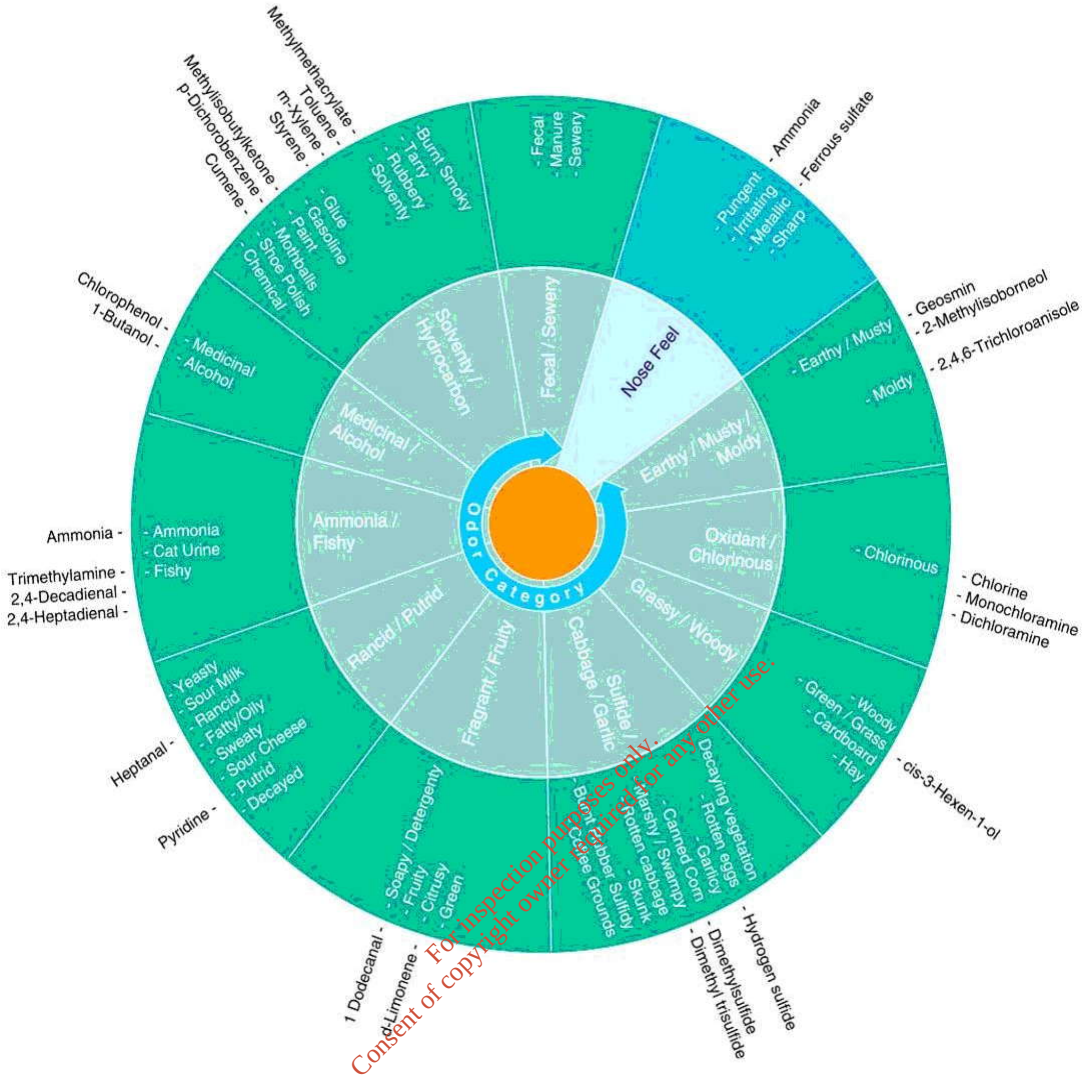
Table 6.2. Hedonic scores

Description	Hedonic Score	Description	Hedonic Score	Description	Hedonic Score
Cadaverous (dead animal)	-3.75	Fishy	-1.98	Wet paper	-0.94
Putrid, foul, decayed	-3.74	Musty, earthy, mouldy	-1.94	Medicinal	-0.89
Sewer odour	-3.68	Sooty	-1.69	Chalky	-0.85
Cat urine	-3.64	Cleaning fluid	-1.69	Varnish	-0.85
Faecal (like manure)	-3.36	Kerosene	-1.67	Nail polish remover	-0.81
Sickening (vomit)	-3.34	Blood, raw meat	-1.64	Paint	-0.75
Urine	-3.34	Chemical	-1.64	Turpentine (pine oil)	-0.73
Rancid	-3.15	Tar	-1.63	Kippery-smoked fish	-0.69
Burnt rubber	-3.01	Disinfectant, carbolic	-1.60	Fresh tobacco smoke	-0.66
Sour milk	-2.91	Ether, anaesthetic	-1.54	Sauerkraut	-0.60
Stale tobacco smoke	-2.83	Burn, smoky	-1.53	Camphor	-0.55
Fermented (rotten) fruit	-2.76	Burnt paper	-1.47	Cardboard	-0.54
Dirty linen	-2.55	Oily, fatty	-1.41	Alcoholic	-0.47
Sweaty	-2.53	Bitter	-1.38	Crushed weeds	-0.21
Ammonia	-2.47	Creosote	-1.35	Garlic, onion	0.17
Sulphurous	-2.45	Sour, vinegar	-1.26	Rope	-0.16
Sharp, pungent, acid	-2.34	Mothballs	-1.25	Beery	-0.14
Household gas	-2.30	Gasoline, solvent	-1.16	Burnt candle	-0.08
Wet wool, wet dog	-2.28	Animal	-1.13	Yeasty	-0.07
Mouse-like	-2.20	Seminal, sperm-like	-1.04	Dry, powdery	-0.07
Burnt milk	-2.19	New rubber	-0.96		
Stale	-2.04	- Metallic	0.94		

Table 6.2 continued. Hedonic scores.

Description	Hedonic Score	Description	Hedonic Score	Description	Hedonic Score
Cork	0.19	Crushed grass	1.34	Maple syrup	2.26
Black pepper	0.19	Celery	1.36	Pear	2.26
Musky	0.21	Green pepper	1.39	Caramel	2.32
Raw potato	0.26	Tea leaves	1.40	Coffee	2.33
Eggy (fresh eggs)	0.45	Aromatic	1.41	Meaty (cooked, good)	2.34
Mushroom	0.52	Raisins	1.56	Melon	2.41
Beany	0.54	Cooked vegetables	1.58	Popcorn	2.47
Geranium leaves	0.57	Clove	1.67 Minty, peppermint	2.50	
Grainy (as grain)	0.63	Nutty	1.92	Lemon	2.50
Dill	0.87	Coconut	1.93	Fragrant	2.52
Woody, resinous	0.94	Grapefruit	1.95	Fried chicken	2.53
Soapy	0.96	Perfumery	1.96	Cinnamon	2.54
Laurel leaves	0.97	Peanut butter	1.99	Cherry	2.55
Eucalyptus	0.99	Spicy	1.99	Vanilla	2.57
Molasses	1.00	Banana	2.00	Pineapple	2.59
Incense	1.01	Almond	2.01	Apple	2.61
Malty	1.05	Sweet	2.03	Peach	2.67
Caraway	1.06	Buttery, fresh butter	2.04	Violets	2.68
Soupy	1.13	Grape juice	2.07	Fruity, citrus	2.72
Bark, birch bark	1.18	Honey	2.08	Chocolate	2.78
Anise (liquorice)	1.21	Cedarwood	2.11	Floral	2.79
Oak wood, cognac	1.23	Herbal, green cut grass	2.14	Orange	2.86
Seasoning (for meat)	1.27	Cologne	2.16	Strawberry	2.93
Leather	1.30	Fresh green vegetables	2.19	Rose	3.08
Raw cucumber	1.30	Fruity, other than citrus	2.23	Bakery (fresh bread)	3.53
Hay	1.31	Lavender	2.25		

7. *Appendix IV*-Odour wheel



8. Appendix V- Greenstar (Munster) Ltd. Forms and management procedures.

APPENDIX 7

Noise Surveys

DixonBrosnan

environmental consultants

dixonbrosnan.com

Project

2009 annual noise survey at Greenstar MRF, Sarsfieldcourt, Glanmire, Co. Cork

Client

O'Callaghan Moran & Associates

Project no	No pages	Client reference
07063	12	W0136-02

v280409

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Report no	Date	Status	Prepared by	Chkd
07063.3.1	09.07.09	Release to client	Damian Brosnan	CD
07063.3.2	11.07.09	Additional details included	Damian Brosnan	CD
07063.3.3	06.04.10	Update re proposed night ops	Damian Brosnan	CD

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Contents

1 Introduction

1.1 DixonBrosnan Environmental Consultants were commissioned by O'Callaghan Moran & Associates to carry out the 2009 annual noise survey at a materials recovery facility operated by Greenstar Ltd. at Sarsfieldcourt Industrial Estate, Sarsfieldcourt, Glanmire, Co. Cork. The facility is regulated by the Environmental Protection Agency (EPA) through waste licence W0136-02. Several conditions and schedules relating to noise included in the licence are summarised in **Appendix 2**.

1.2 This report was originally prepared in July 2009, shortly following the 2009 annual noise survey. The report was updated in April 2010 in order to address a query raised by the regulatory authorities regarding a current proposal to extend facility operations to night-time hours. The update relates to the potential impact of night-time operations on the nearest noise sensitive location (NSL): station N9 located at Buck Leary's crossroads to the northwest of Sarsfieldcourt Industrial Estate. Further analysis of data recorded during the survey of July 2009 has been undertaken, and paragraphs 1.2, 2.6 and 3.1 of this report have been updated accordingly.

1.3 The noise survey was undertaken on Tuesday 23.06.09. Measurements were recorded at six monitoring stations as described in **Appendix 2** and indicated in **Appendix 3**. Weather conditions, monitoring methodology and equipment specifications are described in **Appendix 4**.

1.4 Throughout the survey, noise emissions arose from vehicle movements throughout the surrounding industrial estate, most of which were not associated with the Greenstar facility. At the facility itself, noise emissions arose from several sources:

- Truck movements through entrance and weighbridge.
- Truck and plant movements around yard areas.
- Air handling system operating continuously.
- Compressor operating almost continuously at rear of materials recovery building.
- Generator operating continuously at western site boundary.

2 Results & analysis

2.1 Noise levels recorded at the six measurement stations are presented in **Appendix 5**. Recorded frequency spectra are presented in **Appendix 6**.

2.2 At onsite station N1, near the site entrance, the $L_{Aeq\ 30\ min}$ level recorded was 67 dB, arising from frequent truck movements throughout surrounding areas of the industrial estate, including movements through the gate of the Greenstar facility. In contrast, the noise environment at the other onsite station N2 was dominated by emissions from the compressor and generator located near the western site boundary. The $L_{Aeq\ 30\ min}$ level recorded at N2 was 66 dB.

2.3 Stations N5, N6 and N7 are located outside the Greenstar facility boundaries, adjacent to industrial estate access roads. Noise levels at these stations were dominated by traffic movements throughout the estate, and particularly by trucks accessing surrounding premises. Noise emissions from trucks accessing the Greenstar site also contributed to the noise environment. $L_{Aeq\ 30\ min}$ levels recorded were 53, 62 and 65 dB at these stations respectively. Apart from the air handling system and a single bottle tipping event, there were no onsite Greenstar emissions audible, although Greenstar traffic contributed slightly to local traffic noise.

2.4 The $L_{Aeq\ 30\ min}$ level measured at N9, the only station outside the industrial estate, was 66 dB. Traffic movements through the adjacent Buck Leary crossroads were almost continuous and dominant here. Although noise emissions from the nearest industrial premises contributed to the noise environment at N9, no emissions were audible from the Greenstar facility.

2.5 Schedule C.1 of EPA waste licence W0136-02 specifies a daytime noise emission limit of 55 dB at the measurement stations. Most waste licences currently issued by the Agency state that specified noise limits are to apply to noise sensitive locations only. Given that the Greenstar facility under discussion is located in a busy industrial estate, it is considered practical to adopt this approach here i.e. the 55 dB daytime and 45 dB night-time limits are most relevant to the offsite noise sensitive location N9. Due to the significant influence of offsite noise sources, chiefly vehicle movements throughout the surrounding industrial estate, noise levels at the remaining onsite and offsite stations (N1, N2, N5, N6 and N7) will exceed 55 dB during daytime hours, regardless of operations at the study site. As the waste facility does not operate during night-time hours, a night-time survey was not undertaken.

2.6 As noted in 2.4, Greenstar emissions were not audible at N9. The $L_{AF90\ 30\ min}$ level recorded here was 48 dB. As Greenstar emissions did not contribute to this level, noise levels attributable to the Greenstar facility were most likely more than 9 dB lower at N9, ie. less than 39 dB. It follows that emissions were highly unlikely to have exceeded the 55 dB daytime or 45 dB night-time limits specified in the site licence. The other monitoring stations are not considered noise sensitive locations, and their positions within the site boundary and the industrial estate render the licence limits unachievable here.

2.7 There were no audible tonal or impulsive components in the noise emissions from the Greenstar facility at N9, and therefore Condition 6.7 was not breached. One third octave band analysis detected a tone in the 25 Hz band at station N2, traced to the nearby onsite generator. The tone was not of audible significance. This station is not a noise sensitive location, and the closest sensitive location is approximately 230 m to the north at Buck Leary crossroads (N9).

3 Conclusions

3.1 In line with current EPA practice, it is considered that the 55 dB daytime noise limit specified in EPA waste licence W0136-02 relates most importantly to the offsite noise sensitive location N9. Noise emissions from the Greenstar facility were not audible at N9, and therefore the 55 dB daytime and 45 dB night-time limits were highly unlikely to have been exceeded here.

3.2 $L_{Aeq\ 30\ min}$ levels recorded at the remaining five stations measured 53-67 dB, due chiefly to vehicle movements throughout the surrounding industrial estate not exclusively associated with Greenstar activities.

3.3 At the noise sensitive location N9, no tones or impulses were attributable to operations at the Greenstar facility, and therefore Condition 6.7 of the licence was not breached.

Appendix 1: Glossary

Ambient	The total noise environment at a location, including all sounds present.
A-weighting	The weighting or adjustment applied to sound level recordings to approximate the non-linear frequency response of the human ear. The A-weighting is denoted by the suffix A in the parameters listed below such as L_{Aeq}, L_{A10}, etc.
Background noise	The A-weighted sound pressure level of the residual noise in decibels exceeded for 90% of a given time interval. The L_{A90}.
Decibel (dB)	The units of the noise measurement scale. Based on logarithmic scale so cannot be simply added or subtracted. A 3 dB difference is the smallest change perceptible to the human ear. A 10 dB difference is perceived as a doubling or halving of the sound level. **Throughout this report noise levels are presented as decibels relative to 20 µPa**. Examples of decibel levels are as follows: 20 Very quiet room; 35 Rural environment at night; 65 Conversation; 80 Busy pub; 100 Nightclub; 120 Jet take-off
Free-field	Noise environment away from all surfaces other than the ground. Noise levels recorded near walls will be artificially increased due to reflections. Where there is more than one wall, noise levels will be further increased. Levels recorded within such 'near-field' conditions will be increased by up to 3 dB, and up to 6 dB near a corner. In practice, free-field conditions will be achieved by maintaining a separation distance of at least 3.5 m from walls.
Frequency	The number of cycles per second of a sound or vibration wave. An example of a low frequency noise is a hum, while a whine represents a higher frequency. The range of human hearing approaches 20-20,000 Hz.
Hertz (Hz)	The unit of frequency measurement.
Impulse	A noise which is of short duration, typically less than one second, the sound pressure level of which is significantly higher than the background.
Interval	The time period t over which noise monitoring is conducted. May be 5-60 minutes, depending on the standard applied. The interval is usually denoted by t as in $L_{Aeq\,t}$, $L_{A90\,t}$, etc.
L_{AE}	The sound exposure level is a measure of the noise level of an event, standardised to an interval of one second, and containing the same acoustical energy as the actual event.
$L_{Aeq\,t}$	The equivalent continuous sound level during a measurement interval, effectively representing the average A-weighted noise level.

L_{AF}	The A-weighted sound pressure level measured using a fast time weighting and averaged over one second. The L_{AF} value therefore changes each second.
L_{AIeq}	The A-weighted sound pressure level at a particular instant, measured using an impulse time weighting on the sound level meter. May be used in the assessment of impulse noise.
$L_{An\ t}$	The A-weighted sound level which is exceeded for n% of the measurement interval.
L_{Cpeak}	The peak C-weighted sound pressure level recorded during the measurement interval. The highest peak on the sound pressure wave before any time constant is applied. The C-weighting is used rather than the A-weighting as the latter screens out low frequency sources.
$L_{Req\ t}$	The rating noise level, derived from the $L_{Aeq\ t}$ plus specified adjustments for tonal and impulsive characteristics.
L_{WA}	The sound power generated by a noise source due to the conversion of work energy into noise energy. Measured with A-weighting.
$L_{AF10\ t}$	The A-weighted sound level measured using a fast time weighting which is exceeded for 10% of the measurement interval, usually used to quantify traffic noise.
$L_{AF90\ t}$	The A-weighted sound level measured using a fast time weighting which is exceeded for 90% of the measurement interval, usually used to quantify background noise. May also be used to describe the noise level from a continuous steady or almost-steady source, particularly where the local noise environment fluctuates.
Near-field	Area where free field conditions do not apply.
Noise sensitive location	Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels.
1/3 octave band analysis	Frequency analysis of sound such that the frequency spectrum is subdivided into bands of one third of an octave each. An octave is taken to be a frequency interval, the upper limit of which is twice the lower limit in Hertz.
Residual noise	The noise level remaining at a given position in a given situation when the specific noise source is absent or does not contribute to the noise level.
Specific noise	The noise source under investigation for assessing the likelihood of complaints.
Tone	A character of the noise caused by the dominance of one or more frequencies which may result in increased noise nuisance.
Z-weighting	Standard weighting applied by sound level meters to represent linear scale.

Appendix 2: Waste licence W0136-02 noise conditions

Condition 6.7

There shall be no clearly audible tonal component or impulsive component in the noise emissions from the activity at the noise sensitive locations.

Schedule C.1

Noise emissions: (Measured at the monitoring points indicated in Table D.1 Monitoring Locations)

Day dB(A) $L_{Aeq\ 30\ min}$	Night dB(A) $L_{Aeq\ 30\ min}$
55	45

Schedule D.1

From Table D.1 Monitoring locations:

N1 N2 N5 N6 N7 Nearest noise sensitive location (designated N9)

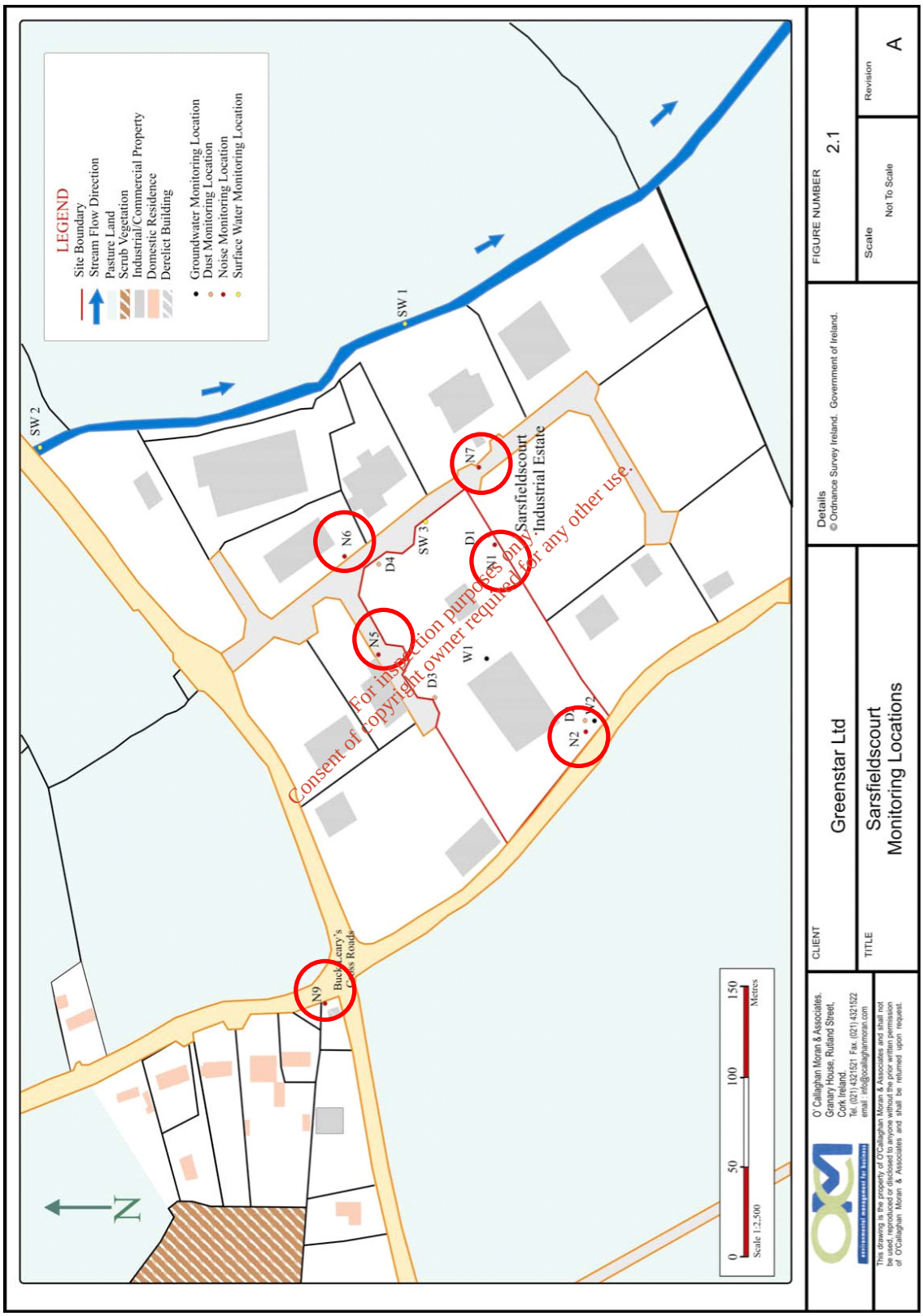
The station locations are indicated in **Appendix 3**.

Schedule D.3

Table D.3.1 Noise Monitoring Frequency and Technique

Parameter	Monitoring frequency	Analysis method/technique
$L_{Aeq\ 30\ min}$	Annual	Standard[Note1]
$L_{A10\ 30\ min}$	Annual	Standard[Note1]
$L_{A90\ 30\ min}$	Annual	Standard[Note1]
Frequency analysis (1/3 octave band analysis)	Annual	Standard[Note1]

Note 1: *International Standards Organisation ISO1996 Acoustics: Description and measurement of environmental noise Parts 1-3.*



Appendix 4: Methodology

Survey	Project ref.	07063
	Purpose	2009 annual noise survey
	Locations	N1 N2 N5 N6 N7 N9
	Comment	Facility operating
Event	Date	23.06.09
	Day	Tuesday
	Time	Morning & afternoon
Operator	On behalf of DixonBrosnan	Damian Brosnan
Conditions	Cloud cover	50-70%
	Precipitation	0 mm
	Temperature	22-24 ^{0}C
Wind	Speed	0-1 m/s
	Direction	S
	Measurement	Anemo anemometer 2 m above ground level
Sound level meter	Instrument	Bruel & Kjaer Type 2250-L
	Instrument serial no.	2566801
	Microphone serial no.	2571655
	Application	BZ7130 Version 2.0
	Bandwidth	Broadband
	Max input level	142.66 dB
	Broadband (excl. peak)	Time: FSI Frequency: AC
	Broadband peak	Frequency: C
	Windscreen correction	UA-0237
	Sound Field correction	Free-field
	UKAS calibration	16.01.07
	UKAS calibration certificate	Available on request
Onsite calibration	Time	23/06/2009 10:15:09
	Calibration type	External
	Sensitivity	41.41 mV/Pa
	Post measurement check	93.9 dB
Onsite calibrator	Instrument	Bruel & Kjaer Type 4231
	Instrument serial no.	1723667
	UKAS calibration	14.08.08
	UKAS calibration certificate	Available on request
Monitoring methodology	International Standard ISO 1996	*Acoustics: Description and measurement of environmental noise Part 1 (2003) & Part 2 (2007)*
	Exceptions	None
	Intervals	30 min

Appendix 5: Noise levels

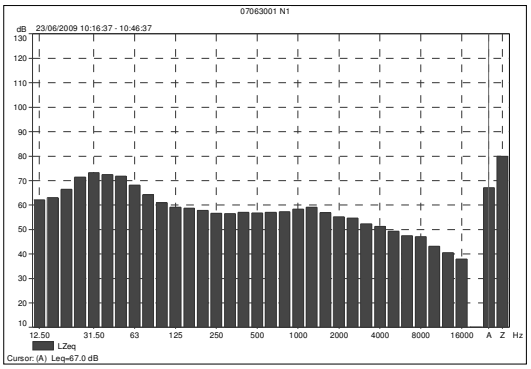
Recorded 23.06.09.

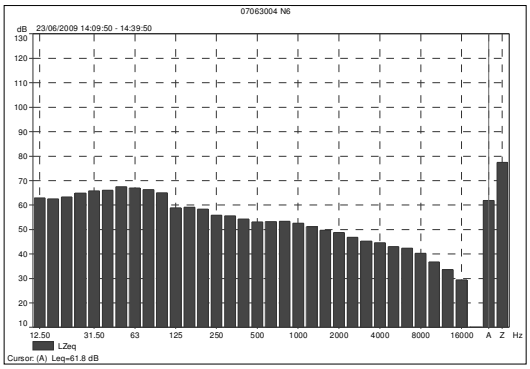
Station	Time	$L_{Aeq\ 30\ min}$ dB	$L_{A10\ 30\ min}$ dB	$L_{A90\ 30\ min}$ dB	Noise audible
N1	1016-1046	67	72	52	Intermittent truck movements through entrance dominant when present, particularly trucks idling close to SLM while queuing for weighbridge. Between movements, air handling system and generator/compressor audible continuously at low level. Offsite, emissions from frequent vehicle movements through surrounding industrial estate, most of which not associated with facility. General commercial/industrial noise also arising across estate.
N2	1050-1120	66	67	64	Generator set and compressor audible continuously and dominant. Latter audibly tonal. No other noise audible.
N5	1214-1244	53	55	49	Emissions from Greenstar air handling system audible at low level. Truck movements through site also audible. Offsite, compressor at nearby premises audible continuously and dominant. Regular power washing nearby also dominant. Vehicle movements through surrounding industrial estate audible.
N6	1409-1439	62	63	50	No emissions audible from site apart from bottle tipping event x1. Frequent vehicle movements in industrial estate roadway dominant, some of which Greenstar. Power tools at nearby premises regularly audible.
N7	1444-1514	65	65	53	No emissions audible from facility apart from intermittent truck movements through entrance. Noise from surrounding premises continuously clearly audible. Vehicle movements on industrial estate roadway dominant when present.
N9	1520-1550	66	69	48	Road traffic through adjacent junction dominant, and on approaches. No emissions audible from industrial estate apart from AHU at closest premises and truck movements near entrance. No Greenstar emissions audible.

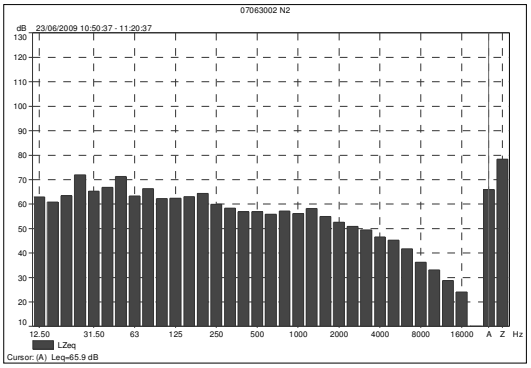
SLM: Sound level meter

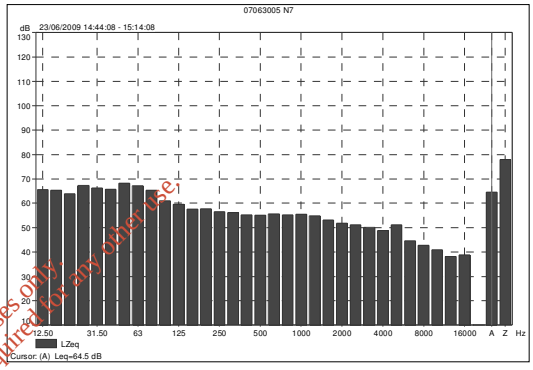
AHU: Air handling unit

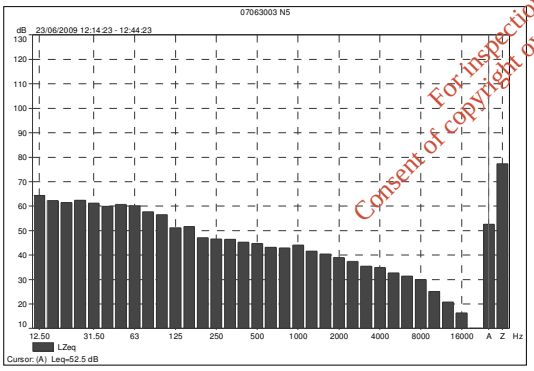
Appendix 6: Frequency spectra

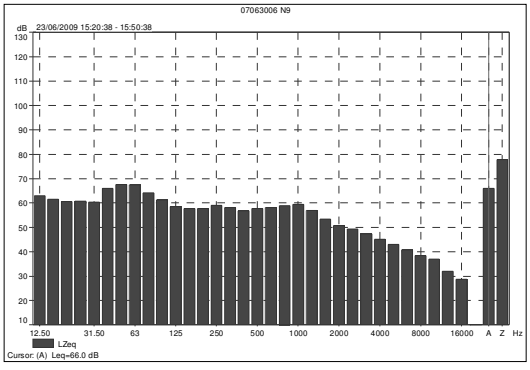












DixonBrosnan

environmental consultants

dixonbrosnan.com

Project

Noise survey at Greenstar MRF, Sarsfieldcourt, Glanmire, Co. Cork re proposed night-time operations

Client

Greenstar

Project no	No pages	Client reference	©DixonBrosnan 2009
07063	12	W0136-02	v250809

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Report no	Date	Status	Prepared by	Chkd
07063.4.1	22.09.09	Release to client	Damian Brosnan	CD

Contents

1 Introduction

1.1 DixonBrosnan Environmental Consultants were commissioned by Greenstar to carry out a noise survey at their materials recovery facility (MRF) located at Sarsfieldcourt Industrial Estate, Sarsfieldcourt, Glanmire, Co. Cork. The facility is regulated by the Environmental Protection Agency (EPA) through waste licence W0136-02. Several conditions and schedules relating to noise included in the licence are summarised in **Appendix 2**.

1.2 Waste licence W0136-02 currently permits waste processing operations until 2000 hours. Greenstar intends to apply to the Agency to extend operations beyond 2000 hours. A review of noise conditions presented in **Appendix 2** indicates that the following limits will apply to the extended operations: 55 dB until 2200 hours, and 45 dB from 2200 hours to 0800 hours. At present, these limits apply to all six measurement stations specified in Schedule D.1 of the licence and shown in **Appendix 3**. It is likely that the opportunity will be taken during the application process to update Schedule D.1; as recent waste licences typically apply limits only to noise sensitive locations (NSLs), it is expected that the opportunity will be taken to update licence W0136-02 to reflect same. Only one of the six measurement stations currently specified is a NSL, and it is therefore assumed in this report that the 55/45 dB limits are relevant to this station.

1.3 A noise survey was undertaken on Thursday 17.09.09 during the period 1840-2000 hours. Measurements were recorded at the six monitoring stations indicated in **Appendix 3**. Weather conditions, monitoring methodology and equipment specifications are described in **Appendix 4**. Throughout the survey, noise emissions arose from several sources at the Greenstar facility which will arise after 2000 hours if the extended operations are approved. These sources are:

- Odour abatement system (OAS) operating continuously at eastern façade of MRF building.
- Reverse pressure jets (RPJ) arising regularly at OAS.
- Compressor operating continuously at western façade of MRF building.
- Generator set operating continuously at western façade of MRF building.
- Shredder, trommel, baler and conveyors operating continuously within MRF building.
- Grab, front end loader and forklift truck operating almost continuously within MRF building.

1.4 All doors to the MRF building remained closed throughout the survey. Emissions measured are therefore representative of those which will arise after 2000 hours. The limited time available required the use of measurement intervals of 10 minutes, and thus shorter than the 30 minute intervals specified in the site waste licence. However, the steady nature of the emissions is such that levels recorded over short intervals are representative of longer intervals.

2 Results & analysis

2.1 Noise levels recorded at the six measurement stations are presented in **Appendix 5**. Recorded frequency spectra are presented in **Appendix 6**.

2.2 At both measurement stations inside the site boundary (**N1** and **N2**), the continuous emissions from the OAS, compressor and genset are most accurately represented by the $L_{AF90\ 10\ min}$ parameter. Levels measured here were 51 and 59 dB respectively. **Neither station is a NSL**. A minor tone in the 25 Hz band detected at N1 was linked to a truck onsite; such emissions will **not** arise after 2000 hours.

2.3 At two of the three monitoring stations within the industrial estate (**N5** and **N6**), continuous emissions from the Greenstar compressor, genset and OAS are most accurately described by the $L_{AF90\ 10\ min}$ parameter as before. $L_{AF90\ 10\ min}$ levels measured at N5 and N6 were 47 and 44 dB respectively. **Neither station is a NSL**.

2.4 At the third station located within the industrial estate (**N7**), noise levels were influenced by ongoing waste management operations at an adjacent premises. The $L_{AF90\ 10\ min}$ level recorded here (47 dB) was influenced by these operations, and this parameter is therefore not considered representative of Greenstar emissions. It can be concluded that Greenstar emissions were less than 47 dB here. As before, **this station is not a NSL**.

2.5 The $L_{Aeq\ 10\ min}$ level measured at station **N9**, the only NSL included in Schedule D.1 of the licence, was 67 dB, arising entirely from road traffic noise. The time history profile presented in **Appendix 7** shows the dominance of road traffic. Between traffic movements, the L_{AF} level decreased towards 40 dB. Later in the interval, as traffic volume decreased following the ending of a nearby football match, L_{AF} levels decreased below 40 dB. The overall $L_{AF90\ 10\ min}$ level measured was 38 dB. This level is considered partly representative of the continuous emissions from the Greenstar facility ie. these emissions are **likely to have been less than 38 dB**. It follows that noise levels at N9 attributable to Greenstar operations were less than the 55 dB daytime limit which will apply until 2200 hours, and **less than the 45 dB limit** which will apply thereafter.

2.6 There were **no tonal components** in the noise emissions from the Greenstar facility at N9, and therefore Condition 6.7 of the licence was not breached. One third octave band frequency analysis did not detect tones at any of the stations, other than that noted in paragraph 2.2. While RPJ emissions associated with the OAS were impulsive when heard onsite at the Greenstar facility, these emissions were only faintly audible with difficulty at station N9. The RPJ emissions were not 'clearly audible' at this NSL as required by Condition 6.7, and were therefore **in compliance** with this condition.

Appendix 1: Glossary

Ambient	The total noise environment at a location, including all sounds present.
A-weighting	The weighting or adjustment applied to sound level recordings to approximate the non-linear frequency response of the human ear. The A-weighting is denoted by the suffix A in the parameters listed below such as L_{Aeq}, L_{A10}, etc.
Background noise	The A-weighted sound pressure level of the residual noise in decibels exceeded for 90% of a given time interval. The L_{A90}.
Decibel (dB)	The units of the noise measurement scale. Based on logarithmic scale so cannot be simply added or subtracted. A 3 dB difference is the smallest change perceptible to the human ear. A 10 dB difference is perceived as a doubling or halving of the sound level. **Throughout this report noise levels are presented as decibels relative to 20 µPa**. Examples of decibel levels are as follows: 20 Very quiet room; 35 Rural environment at night; 65 Conversation; 80 Busy pub; 100 Nightclub; 120 Jet take-off
Free-field	Noise environment away from all surfaces other than the ground. Noise levels recorded near walls will be artificially increased due to reflections. Where there is more than one wall, noise levels will be further increased. Levels recorded within such 'near-field' conditions will be increased by up to 3 dB, and up to 6 dB near a corner. In practice, free-field conditions will be achieved by maintaining a separation distance of at least 3.5 m from walls.
Frequency	The number of cycles per second of a sound or vibration wave. An example of a low frequency noise is a hum, while a whine represents a higher frequency. The range of human hearing approaches 20-20,000 Hz.
Hertz (Hz)	The unit of frequency measurement.
Impulse	A noise which is of short duration, typically less than one second, the sound pressure level of which is significantly higher than the background.
Interval	The time period t over which noise monitoring is conducted. May be 5-60 minutes, depending on the standard applied. The interval is usually denoted by t as in $L_{Aeq\,t}$, $L_{A90\,t}$, etc.
L_{AE}	The sound exposure level is a measure of the noise level of an event, standardised to an interval of one second, and containing the same acoustical energy as the actual event.
$L_{Aeq\,t}$	The equivalent continuous sound level during a measurement interval, effectively representing the average A-weighted noise level.

L_{AF}	The A-weighted sound pressure level measured using a fast time weighting and averaged over one second. The L_{AF} value therefore changes each second.
L_{AIeq}	The A-weighted sound pressure level at a particular instant, measured using an impulse time weighting on the sound level meter. May be used in the assessment of impulse noise.
$L_{An\ t}$	The A-weighted sound level which is exceeded for n% of the measurement interval.
L_{Cpeak}	The peak C-weighted sound pressure level recorded during the measurement interval. The highest peak on the sound pressure wave before any time constant is applied. The C-weighting is used rather than the A-weighting as the latter screens out low frequency sources.
$L_{Req\ t}$	The rating noise level, derived from the $L_{Aeq\ t}$ plus specified adjustments for tonal and impulsive characteristics.
L_{WA}	The sound power generated by a noise source due to the conversion of work energy into noise energy. Measured with A-weighting.
$L_{AF10\ t}$	The A-weighted sound level measured using a fast time weighting which is exceeded for 10% of the measurement interval, usually used to quantify traffic noise.
$L_{AF90\ t}$	The A-weighted sound level measured using a fast time weighting which is exceeded for 90% of the measurement interval, usually used to quantify background noise. May also be used to describe the noise level from a continuous steady or almost-steady source, particularly where the local noise environment fluctuates.
Near-field	Area where free field conditions do not apply.
Noise sensitive location	Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels.
1/3 octave band analysis	Frequency analysis of sound such that the frequency spectrum is subdivided into bands of one third of an octave each. An octave is taken to be a frequency interval, the upper limit of which is twice the lower limit in Hertz.
Residual noise	The noise level remaining at a given position in a given situation when the specific noise source is absent or does not contribute to the noise level.
Specific noise	The noise source under investigation for assessing the likelihood of complaints.
Tone	A character of the noise caused by the dominance of one or more frequencies which may result in increased noise nuisance.
Z-weighting	Standard weighting applied by sound level meters to represent linear scale.

Appendix 2: Waste licence W0136-02 noise conditions

Condition 6.7

There shall be no clearly audible tonal component or impulsive component in the noise emissions from the activity at the noise sensitive locations.

Schedule C.1

Noise emissions: (Measured at the monitoring points indicated in Table D.1 Monitoring Locations)

Day dB(A) $L_{Aeq\ 30\ min}$	Night dB(A) $L_{Aeq\ 30\ min}$
55	45

Schedule D.1

From Table D.1 Monitoring locations:

N1 N2 N5 N6 N7 Nearest noise sensitive location (designated N9)

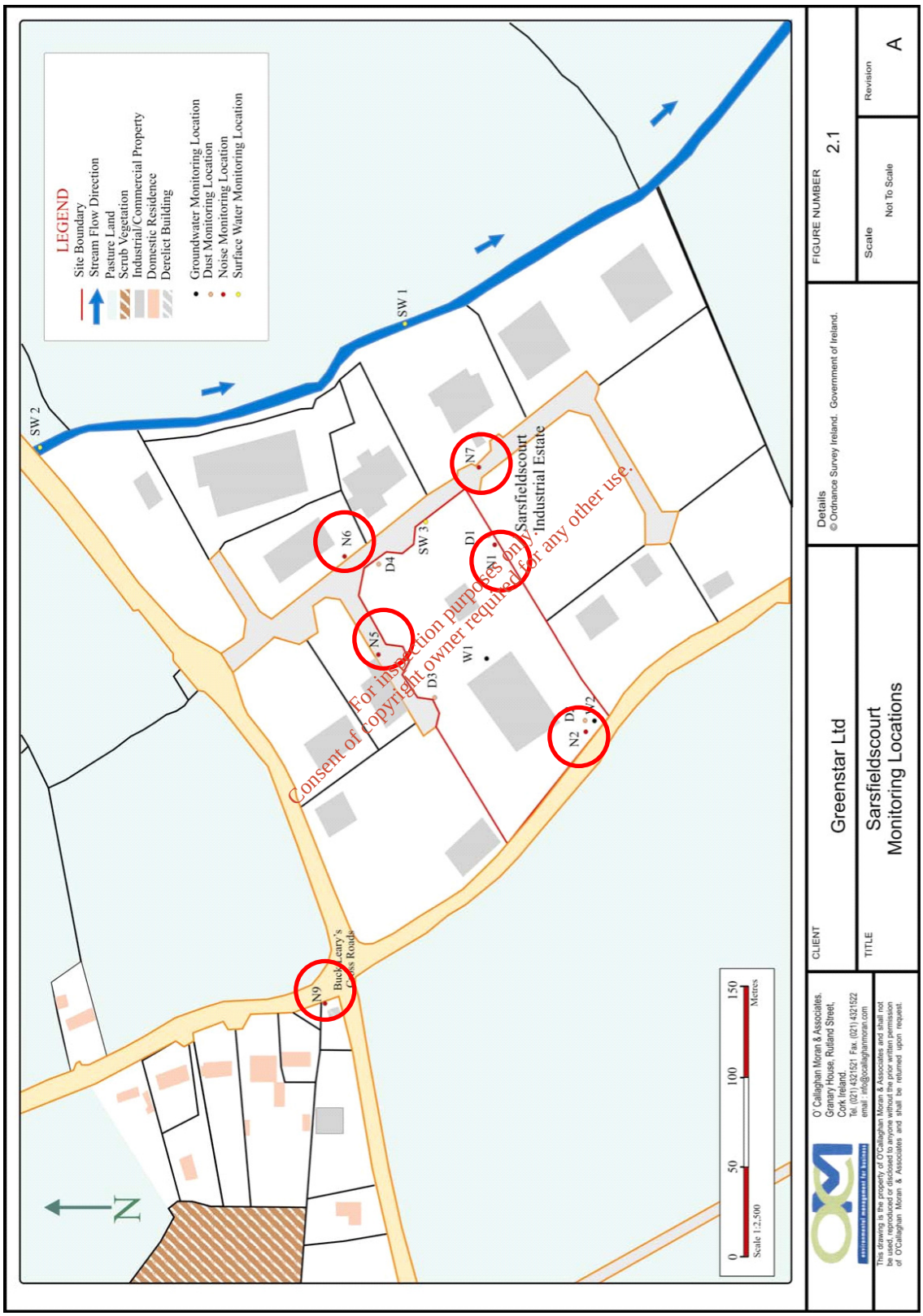
The station locations are indicated in **Appendix 3**.

Schedule D.3

Table D.3.1 Noise Monitoring Frequency and Technique

Parameter	Monitoring frequency	Analysis method/technique
$L_{Aeq\ 30\ min}$	Annual	Standard[Note1]
$L_{A10\ 30\ min}$	Annual	Standard[Note1]
$L_{A90\ 30\ min}$	Annual	Standard[Note1]
Frequency analysis (1/3 octave band analysis)	Annual	Standard[Note1]

Note 1: *International Standards Organisation ISO1996 Acoustics: Description and measurement of environmental noise Parts 1-3*.



Appendix 4: Methodology

Survey	Project ref.	07063
	Purpose	Noise survey re proposed night-time operations
	Locations	N1 N2 N5 N6 N7 N9
	Comment	Facility operating as proposed after 2000 hours
Event	Date	17.09.09
	Day	Thursday
	Time	1840-2000
Operator	On behalf of DixonBrosnan	Damian Brosnan
Conditions	Cloud cover	90%
	Precipitation	0 mm
	Temperature	13 ^{0}C
Wind	Speed	0-1 m/s
	Direction	NE
	Measurement	Anemo anemometer 2 m above ground level
Sound level meter	Instrument	Bruel & Kjaer Type 2250-L
	Instrument serial no.	2566801
	Microphone serial no.	2571655
	Application	BZ7130 Version 2.0
	Bandwidth	Broadband
	Max input level	142.66 dB
	Broadband (excl. peak)	Time: FSI Frequency: AC
	Broadband peak	Frequency: C
	Windscreen correction	UA-0237
	Sound Field correction	Free-field
	UKAS calibration	16.01.07
	UKAS calibration certificate	Available on request
Onsite calibration	Time	17/09/2009 18:31:18
	Calibration type	External
	Sensitivity	41.88 mV/Pa
	Post measurement check	93.9 dB
Onsite calibrator	Instrument	Bruel & Kjaer Type 4231
	Instrument serial no.	1723667
	UKAS calibration	14.08.08
	UKAS calibration certificate	Available on request
Monitoring methodology	International Standard ISO 1996	*Acoustics: Description and measurement of environmental noise Part 1 (2003) & Part 2 (2007)*
	Exceptions	-
	Intervals	10 min

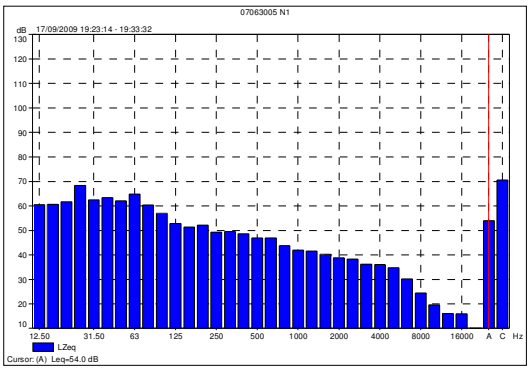
Appendix 5: Noise data

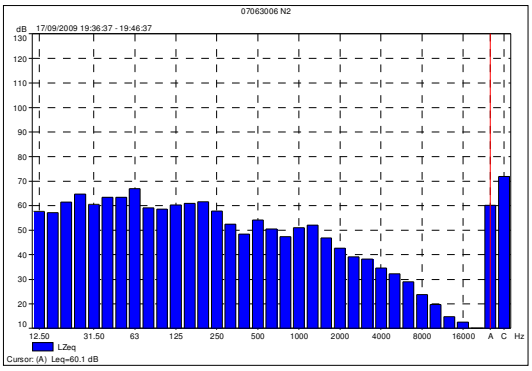
Recorded 17.09.09.

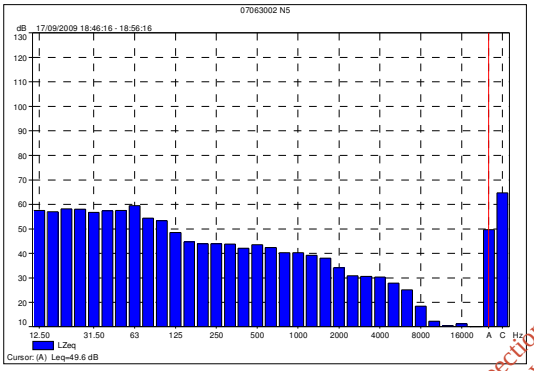
Station	Time	$L_{Aeq\ 10\ min}$ dB	$L_{AF10\ 10\ min}$ dB	$L_{AF90\ 10\ min}$ dB	Noise audible
N1	1923-1933	54	54	51	Odour abatement emissions clearly audible continuously. RPJ pulses also audible. Paused for passing truck onsite 1925. Sporadic vehicle movements on access road audible. Emissions from adjacent waste management premises also audible sporadically.
N2	1936-1946	60	61	59	Genset and compressor on rear facade continuously dominant. RPJ pulses slightly audible. Road traffic outside wall faintly audible.
N5	1846-1856	50	52	47	Continuous emissions audible at low level from odour abatement system, compressor and genset. Sporadic vehicle movements on industrial estate access road. Traffic audible on public roads. Birdsong. RPJ pulses audible.
N6	1858-1908	63	58	44	Odour abatement system continuously audible at low level. RPJ also audible. Sporadic vehicle movements on industrial estate access road. Traffic noise to N audible. Birdsong.
N7	1910-1920	57	56	47	Greenstar odour abatement system slightly audible, screened by wall. Operations at adjacent waste management premises continuously audible and dominant. Traffic on road to N audible. Sporadic vehicle movements on access road.
N9	1951-2000	67	68	38	Road traffic almost continuously audible through junction and on approaches. During lulls, compressor and genset noise at Greenstar faintly audible. RPJ faintly audible with difficulty.

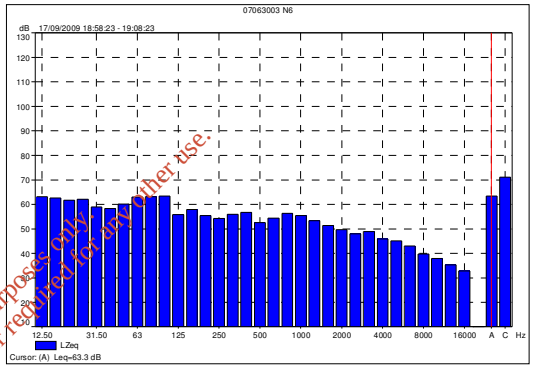
RPJ: Reverse pressure jet

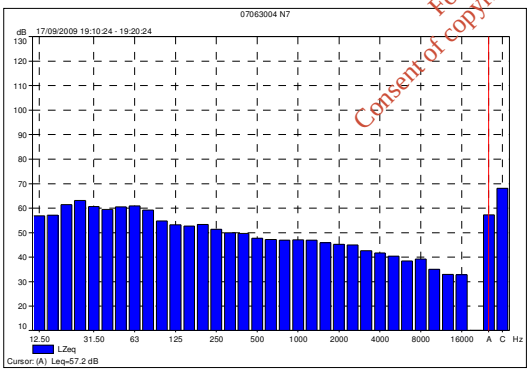
Appendix 6: Frequency spectra

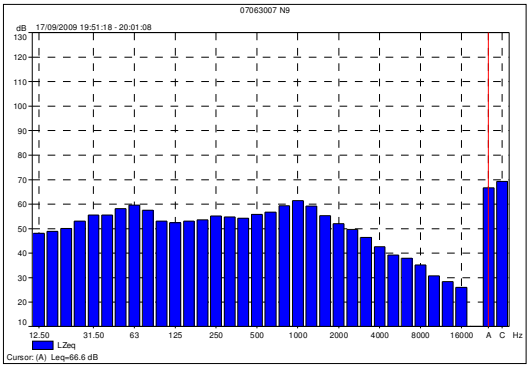




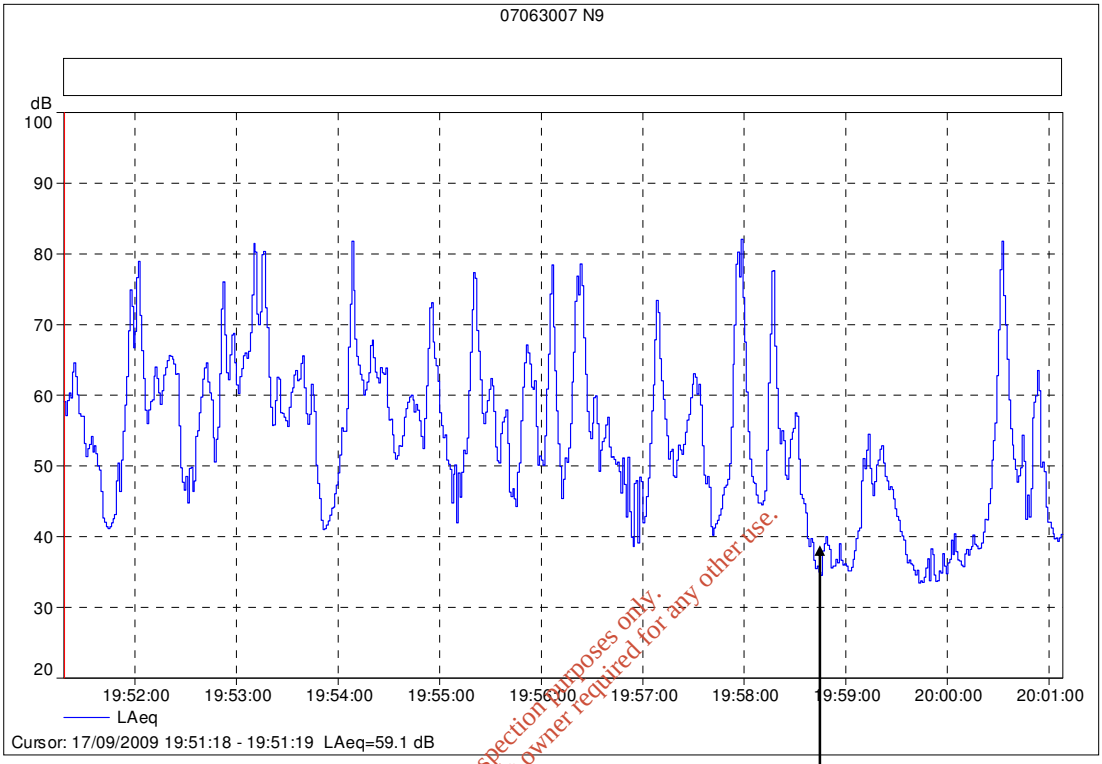








Appendix 7: N9 time history profile



Decrease in traffic volume following ending of local football match is evident in greater lulls between individual vehicle movements, thus allowing profile to decrease to background level which is partly attributable to continuous Greenstar emissions.