

ENVIRONMENTAL PROTECTION  
AGENCY WASTE LICENSING  
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## APPENDIX 2

AER 2003

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**ANNUAL ENVIRONMENTAL REPORT**  
**FOR**  
**GREENSTAR MATERIALS RECOVERY LTD**  
**FASSAROE DEPOT**  
**LICENCE NO. 53-2**  
**2003 - 2004**

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**Prepared For: -**

*greenstar* Materials Recovery Ltd.,  
Fassaroe,  
Bray,  
Co. Wicklow.

**Prepared By: -**

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

**24<sup>th</sup> May 2004**

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## 1. INTRODUCTION

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This is the third Annual Environmental Report (AER) for *greenstar* Materials Recovery Ltd. (*greenstar*), Fassaroe, Bray, Co. Wicklow and covers the reporting period January 2003 to March 2004. *greenstar* received a revised waste licence (Register Number 53-2) on 3<sup>rd</sup> April 2003. The AER has been prepared in compliance with Condition 11.6 of the revised Waste Licence and includes information from the final quarter (January, February and March 2003) regulated by the previous licence (Register Number 53-1).

The content of the AER is based on Schedule G of the Waste Licence and the report format follows guidelines set in the "Draft Guidance on Environmental Management Systems and Reporting to the Agency" issued by the Environmental Protection Agency (Agency).

The Waste Licence allows *greenstar* to accept Commercial, Household and Construction and Demolition non-hazardous waste on-site and compost biodegradable and green wastes recovered from the incoming waste streams. The various waste streams are processed and stored on-site pending removal to authorised off-site recycling and disposal facilities. The annual waste throughput is limited to 129,502 tonnes.

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## 2. SITE DESCRIPTION

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### 2.1 Waste Management Activities

The licence allows *greenstar* to accept and process on site for recovery and disposal 129,502 tonnes of waste per annum, comprising commercial/industrial non-hazardous waste, household waste and construction and demolition wastes. Waste processing takes place inside the transfer station as well as outdoors. The outdoor activities specified in the licence are wood chipping, in-vessel trial composting of biodegradable waste and green waste and segregating and shredding of construction and demolition waste and non-putrescible commercial/industrial waste. The trial composting has not yet started at the site.

Suitable inert materials recovered during the processing of the construction and demolition wastes are used to restore portions of the site formerly used for landfill.

#### 2.1.1 Waste Type

The facility is licensed to accept the following waste types as specified in Schedule A of the Waste Licence: -

- Household,
- Commercial,
- Construction & Demolition,
- Hazardous (2 tonnes).

Hazardous waste is not accepted at the facility, with the exception of small quantities of machinery batteries that inadvertently arrive in waste deliveries. Such batteries are stored in a designated skip pending collection by an off-site recycling organisation as specified in the licence conditions. Any other materials suspected either to be hazardous or not acceptable under licence conditions (e.g. gas cylinders, sheets of asbestos) are temporarily stored on-site in the waste quarantine area, before removal off-site for treatment/disposal at an appropriate facility.

### *Household and Commercial Waste Containing Putrescible Materials*

Household and commercial wastes (originating in factories, hotels, pubs and supermarkets) containing an organic fraction are either deposited on the floor of the transfer building, or tipped directly into open trailers. All the household waste deposited on the floor is either pushed into an open trailer, or compacted for removal off-site for disposal at an off-site landfill, as agreed with the Agency.

The commercial waste is inspected and segregated into recyclable cardboard, bottles, domestic waste, or compactor waste (supermarkets are generally the main origin of this waste). All uncontaminated cardboard and plastic packaging material, which is suitable for baling, is collected for recycling. Drink cans are collected, baled and stored on-site pending removal off-site for recycling. Glass bottles, which are either segregated prior to arrival on-site or deposited at the civic amenity area, are stored on-site pending removal for recycling off-site.

### *Non Putrescible Household and Commercial Waste*

Non putrescible household wastes, arising from the kerbside collection, and non putrescible commercial/industrial waste is deposited onto the floor of the transfer building and inspected for disposable and/or recoverable fractions. Non-recyclable/recoverable waste is stored within the building before transfer for disposal to an off-site landfill, as agreed with the Agency.

### *Construction and Demolition Waste*

All construction and demolition waste is inspected to determine if it is suitable for transfer and/or recovery. Wood and metal are separated using a mechanical grab and subsequently removed off-site to approved recovery/recycling facilities. The residual material is passed through a trommel to remove the fine fraction containing subsoil and topsoil. This material is either used on-site for restoration purposes, or is sold for agricultural and/or horticultural purposes. The heavy fraction from the trommel containing concrete, brick etc is then passed through the crusher to produce a crushed inert aggregate.

### *Wood, Timber and Green Waste*

Wood and timber delivered to and recovered on-site is shredded and removed off-site for disposal. Green waste delivered to the facility is stored pending transfer to an off-site composting facility. Although the licence allows for in-vessel trial composting of biodegradable waste, this has yet to be established at the facility.

### *Civic Amenity Facilities*

There are two Ro-Ro containers located opposite the front of the waste transfer building, which are provided for use by the general public for deposition of household waste. There are a number of receptacles for the recyclable materials located beside the Ro-ros including glass, metals and textiles. The materials collected in these are removed off-site for recovery/recycling.

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### 3. EMISSION MONITORING

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*greenstar* implements a comprehensive environmental monitoring programme to assess the significance of emissions from site activities. The programme includes groundwater, surface water, leachate, landfill gas, biological, noise and dust monitoring. The monitoring locations are shown on Drawing No. J.1.0 Rev E in Appendix 1.

The monitoring results are submitted to the Agency in quarterly reports. An overview of the results of the monitoring is presented in this Section, with summary data in tables included in Appendix 2. The results are discussed in the context of the impact of the emissions on the environment and compared with available data on background and/or ambient conditions.

#### 3.1 Groundwater Monitoring

There are four (4) groundwater monitoring wells (BH-2, BH-5, BH-6 and BH-7). The wells are positioned up and downgradient of the former landfill area. BH-2 and BH-7 are downgradient and to the north east and north respectively of the former landfill area. BH-5 is to the east of the fill area and downgradient of the on-site sanitary wastewater treatment system (Puraflo system). BH-6 is upgradient of the landfill.

##### Groundwater Levels

Groundwater levels were recorded at quarterly intervals in each of the wells. Based on the level data the direction of groundwater flow is northerly.

##### Groundwater Quality

Groundwater quality was monitored in the wells on a quarterly and annual basis. The range of analysis was as specified in Schedule D of the Waste Licence and includes pH, electrical conductivity, and organic, inorganic and microbiological parameters. The sampling and analysis was carried out in accordance with recognised quality assurance and control procedures.

The monitoring in the first quarter of 2003 (January - March 2003) identified the presence of elevated ammonia in both the upgradient and downgradient wells. The results for BH-6 indicated the presence of an off-site upgradient source of contamination, however there was no readily identifiable source. There was an increase in Total Organic Carbon (TOC) levels in BH-2, BH-5 and BH-7 compared to previous monitoring results and the levels remained elevated compared to the levels in upgradient well BH-6.

In the second quarter of 2003 (April - June 2003) the monitoring confirmed the continued presence of elevated ammonia in BH-5 and BH-6. The level in BH-5 was higher than previously measured. The TOC levels in each of the boreholes was significantly below levels recorded for the previous quarter including BH-5, where the level of 20mg/l, was much lower than the level in the first quarter (50 mg/l). The sanitary wastewater treatment plant upgradient of BH-5 is a potential source of the elevated TOC.

In the third quarter of 2003 (July - September 2003) the ammonia levels in all of the boreholes had decreased compared to the previous quarter. The presence of ammonia in BH-6, confirmed an off-site upgradient source of contamination. The TOC levels for each of the boreholes displayed similar results to the first and second quarters. All of the parameters were within the previously recorded ranges.

In the fourth quarter of 2003 (October - December 2003) the samples were analysed for the annual range of parameters (Boron, Cadmium, Calcium, Chromium, Copper, Cyanide (total), Fluoride, Iron, Lead, List I/II Organic Substances, Magnesium, Manganese, Mercury, Sulphate, Total Alkalinity, Total Phosphorus/Orthophosphate, Residue on Evaporation, Zinc, Faecal Coliforms and Total Coliforms).

The levels of the parameters monitored annually were generally at or below the levels measured in 2002. However, the calcium, magnesium and sulphate levels at BH-7 were above the 2002 levels, while BH-5 showed slightly elevated levels of magnesium, phosphorous and sulphate compared to previous results. The ammonia levels in BH-5 decreased from that measured in the third quarter from 6.0 mg/l to 4.3 mg/l. The TOC levels in BH-5 remain elevated compared to the upgradient level in BH-6 and remained higher than expected for uncontaminated groundwater.

The first quarter 2004 (January - March 2004) confirmed the continued presence and pattern to ammonia concentrations in each of the wells. The ammonia levels in BH-5 (4.4 mg/l), while lower than levels recorded previously, remained higher than expected for uncontaminated groundwater. The chloride, ammonia, total organic carbon, electrical conductivity, dissolved oxygen and pH levels in all four boreholes were within the previously recorded ranges.

### *3.1.1 Estimated Annual and Cumulative Quantity of Emissions to Groundwater*

The AER for 2000 presented the first assessment of the potential for the indirect emission to groundwater from on-site activities. Potential sources identified included incident rainfall and storm water run-off from paved areas.

All surface water from the paved areas and buildings is diverted away from the filled areas thereby reducing the potential indirect impact of surface water on groundwater quality. There have been no changes to the site layout during the reporting period that resulted in new or additional sources of discharges to groundwater. Section 3.3 discusses the quantities of emissions to groundwater.

### 3.2 Surface Water Quality Monitoring

The surface water drainage system in and around the site is dominated by the proximity of the nearby Glenmunder Stream, which is to the northeast of the facility. The Glenmunder ultimately drains to the River Dargle, which is a designated salmonid river. Surface water quality is monitored at four locations (SW-1, SW-2, SW-3 and SW-4) on the Glenmunder. SW-1 is upstream of the site, SW-2 and SW-3 is on the site boundary and SW-4 is downstream of the site.

The monitoring was conducted at quarterly and annual intervals and included in-situ and laboratory testing. The range of analysis was as specified in Schedule D of the Waste Licence and includes dissolved oxygen, pH, electrical conductivity, and organic and inorganic parameters. The sampling and analysis was carried out in accordance with recognised quality assurance and control procedures.

In the first quarter of 2003 (January - March 2003) ammonia was not detected at SW-1 and SW-4, but was detected at low levels in the mid stream samples, SW-2 and SW-3 at 0.6 mg/l and 0.7 mg/l respectively. Nitrite levels were within the ranges previously detected. COD levels were below method detection limits of 15mg/l at all monitoring locations. The BOD levels in the downstream location SW-4 were consistent with the upstream monitoring location SW-1.

In the second quarter 2003 (April - June 2003) elevated ammonia (3 mg/l) was detected at the upstream monitoring location SW-1. Mid stream and downstream samples ranged from 1.0 mg/l at SW-3 to 1.4 mg/l at SW-4. The source of the elevated ammonia is not known, but is not attributable to site activities. The chloride levels were within those previously detected. COD levels were below method detection limits of 15 mg/l at all monitoring locations. The BOD levels were also below the method detection limit of 2 mg/l.

In the third quarter 2003 (July - September 2003) ammonia was not detected in any of the samples. The chloride levels were within those previously detected with the highest level (29 mg/l) detected at the upstream monitoring location SW-1. Nitrite levels were within the ranges previously detected.

The annual suite of parameters was analysed in the fourth quarter 2003 (October-December 2003). Ammonia, COD, phosphorus, mercury, cadmium, chromium, copper, lead, zinc, organo-chlorine & organo-phosphorus pesticides and volatile organic compounds (VOC) were not detected in any of the samples. Magnesium and sulphate levels were slightly higher than previous monitoring events at locations SW-1, SW-3 and SW-4, while only magnesium at SW-2 was above its previous level.

The temperature, BOD, pH, nitrite, suspended solids, phenols, conductivity and dissolved oxygen (quarterly monitoring parameters) levels were within or below the ranges previously measured at all monitoring locations.

In the first quarter 2004 (January - March 2004) ammonia was not detected in any of the samples. The chloride levels were within the range previously detected, with the highest level (26 mg/l) was detected at the upstream monitoring location SW-1 as well as SW-2 and SW-3. Nitrite levels were within the ranges previously detected.

### 3.3 Leachate

Leachate is generated by incident rainfall in the active and completed landfill area. Other potential sources of leachate generation, such as surface water run-off entering the waste fill areas, is eliminated by being diverted away from the fill area.

Two leachate monitoring boreholes (L-1 and L-2) were installed at the site in January 2001. L-1 was lost during site works in the area of the borehole in September 2001, but was replaced in March 2002. The monitoring locations are shown on the drawing in Appendix 1.

Condition 3.17.3.1 requires the installation of an additional leachate monitoring borehole to be located downgradient of the existing leachate boreholes. OCM agreed the proposed location with the Agency in advance of the drilling programme. Three (3) attempts were made to drill the well to the base of the waste in July 2003, however the presence of obstructions at various depths prevented the wells reaching the required depth. A proposed alternative location and timescale for the installation of the well has been agreed with the Agency.

#### 3.3.1 Leachate Levels

Levels were monitored at monthly intervals during the reporting period. It was not possible to record levels at L-02 in November and December 2003 and January 2004 due to the presence of a retaining wall partially covering the access point.

The total depth of L-01 is 16.08 m bgl and L-02 is 7.37 m bgl. The average depth of leachate in L-01 for the reporting period was 15.84 m bgl. This equates to an average of 23cm of leachate present in L-01 through out the year, with seasonal fluctuations. The average depth to leachate in L-02 for the reporting period was 6.8 m bgl. This equates to an average of 57 cm of leachate present in this well throughout the year with slight fluctuations.

### 3.3.2 Leachate Quality

The licence requires that leachate be collected for once off analyses and subsequent monitoring would be as directed by the Agency. *greenstar* intended to collect leachate samples during the wetter late Autumn to early Spring months when it was anticipated that the maximum leachate levels would occur. However, during the monitoring events from October 2003 to March 2004 there was an insufficient volume in the leachate wells to collect a representative sample.

### 3.4 Landfill Gas

Monitoring was carried out in accordance with Table D.1.1 of the Waste Licence in the groundwater monitoring wells GS-01, GS-05, GS-06, GS-07, GS-08, GS-09, GS-11, BH-2, BH-5, BH-6 and BH-7 and leachate boreholes L-01 and L-02.

Four new landfill gas monitoring wells were installed in July 2003 (GS-07, GS-08, GS-09, GS-11) in accordance with Condition 3.17.1 of the Licence. While the condition requires the installation of 5 wells the location of the fifth well, which had been agreed in advance with the Agency, was not accessible at the time of drilling. The Agency was informed in advance of this and agreed to the deferral of the installation.

Monitoring location L-02 was not accessible for monitoring in January 2004 due to the presence of a retaining wall partially covering the access point. This point was accessible in February and March 2004. GS-07 was irreparably damaged in February 2004 by site construction plant therefore readings are only available for January 2004 for this location. The Agency was informed of this incident and a replacement well was installed on the 21<sup>st</sup> April 2004.

GS-01, GS-05, GS-06, BH-2, BH-5, BH-6 and BH-7 are located outside the fill area. GS-7, GS-8, GS-9, GS-11, L-01 and L-02 are located in the fill area. The nearest buildings to the filled area are the Transfer Station and the site offices. OCM conducted gas monitoring in the transfer station building and the site offices during all monitoring events. The monitoring did not detect the presence of carbon dioxide or methane in any of the buildings.

Out of approximately one hundred and eighty five (185) landfill gas measurements made during the fifteen month reporting period, methane was detected on three occasions. In July methane was detected in BH-5 at 1.1% v/v, this borehole is outside the waste body and this measurement therefore constitutes an incident according to the licence. This incident was reported to the Agency on the 23<sup>rd</sup> July 2003. In September methane was measured in L-01 at 1.0% v/v and in October at GS-11 at 0.3% v/v. Monitoring points L-01 and GS-11 are in the fill material. BH-5 is located outside the fill. Carbon dioxide concentrations ranged from not detected to a maximum of 18% v/v in L-02 which is a borehole located in the fill material. Landfill gas was not detected in the site buildings.



### 3.4.1 Landfill Gas Volumes

The elevated carbon dioxide concentrations and the presence of methane on occasion indicate that some degree of degradation of organic waste is occurring within the fill area. Based on the available information on the site history it appears that some biodegradable material may historically have been deposited at the site.

Given that the type and quantity of biodegradable waste deposited on-site is not known, it is impossible to predict the volumes of landfill gas that may be generated. However, the monitoring results indicate that the volume of such degradable material is likely to be small and will reduce over time.

### 3.4.2 Landfill Gas Control

There is currently no landfill gas control system on-site. The landfill gas concentrations measured in the routine monitoring programme indicate there is no need for such control measures. However, this will be kept under review based on the ongoing results of the landfill gas monitoring programme.

## 3.5 Noise Survey

*greenstar* carried out the annual noise survey at the facility on 27<sup>th</sup> November 2003. The report was submitted to the Agency on the 2<sup>nd</sup> February 2004. Monitoring was carried out at the four noise monitoring locations, N-1, N-2, N-3 and N-4 specified in the licence. The survey was conducted between the hours of 10.45 and 15.15 when the site was fully operational. The survey concluded that the facility was in compliance with its licence requirements.

## 3.6 Dust Monitoring

*greenstar* conducted dust monitoring three times a year at four on-site locations (DS-1, DS-2, DS-3 and DS-4). The licence requires that two of these monitoring events be carried out between May and September. The results of the dust monitoring are included in Appendix 3.

The first monitoring event in March 2003 found that the dust deposition limit (350 mg/m<sup>2</sup>/day) was not exceeded at any of the monitoring locations. The highest total dust recording was at DS-4, which is located at the base of a cliff behind a fuel bund on the western site boundary. The high dust level at this point is mainly attributable to the inorganic fraction of the total dust, and may be associated with windblown materials from the nearby cliff.

The second monitoring event in June - July 2003 found that the dust deposition limit was exceeded at each of the four monitoring locations. The Agency was informed of the exceedances. The high dust levels were attributable to extensive construction work at the site including the new transfer building and landscaping mounds.

The third and final monitoring event July - August 2003 found that the deposition limit was exceeded at two of the monitoring locations (DS-2 and DS-4). The Agency was informed of the exceedances. The high dust levels at these locations were attributable to the on-going construction works at the facility.

### **3.7 Dust Control Measures Evaluation Report**

A Dust Control Measures Evaluation Report was prepared and submitted to the Agency in accordance with Condition 3.14.2b of the licence (Reg. No. 53-2) on the 30<sup>th</sup> May 2003. A copy of the report is included in Appendix 3.

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## 4. SITE DEVELOPMENT WORKS

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### 4.1 Engineering Works

In 2003 *greenstar* began the construction of the new waste transfer building and commenced the restoration and aftercare works for the facility.

### 4.2 Site Restoration

The licence (Reg. No. 53-2) permits the use of inert construction and demolition waste, both delivered to and recovered on-site in the reclamation and restoration of the partially infilled areas of the site. The approved materials are listed in Table A of Schedule A of the licence and includes stones & soil, topsoil, brick, natural sand and concrete. A restoration and aftercare plan, which describes the scope of the site restoration, was submitted to the Agency on the 29<sup>th</sup> September 2003. A copy of that report is included in Appendix 4.

### 4.3 Site Survey

A detailed site survey was prepared and submitted to the Agency on 2<sup>nd</sup> September 2003. A copy of the drawing (Drawing No. 00-034\_1 Rev H) is included in Appendix 1.

### 4.4 Future Developments

Future developments proposed for the site are listed in Schedule B of the licence, are as follows: -

- New transfer building (Phases I and II),
- Trial composting area,
- Civic Amenity Facility,
- Final capping,
- Restoration and aftercare works.



#### 4.5 Summary of Resource & Energy Consumption

Table 4.1 presents an estimate of the resources used on-site during the reporting period.

**Table 4.1: Estimate of Resources Used On-Site**

Resources	Quantities
Diesel	257,343 litres
Hydraulic and Engine Oil	5325 litres
Disinfectant (concentrate)	3 litres
Truck Wash Detergent	2081 litres
Electricity	12,600 KWH
Antifreeze	261.25 litres

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## 5. WASTE RECEIVED AND CONSIGNED FROM THE FACILITY

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Table 5.1 and 5.2 show the total quantities of waste received at and consigned from the facility for the periods January 2003 to December 2003 and January 2004 to March 2004. A breakdown of the waste types is provided in accordance with the European Waste Catalogue and Hazardous Waste list. The total quantity of waste received at the facility from January 2003 to December 2003 (126,122 tonnes) did not exceed the Waste Licence limit (129,502 tonnes). The Recycling rate for the facility is estimated at 35%.

The balance between the wastes received and consigned off-site amounts to 38,892 tonnes. This predominantly comprised inert construction and demolition materials. Schedule A of the licence limits the volume of C&D accepted at the facility to 35,000 tonnes per annum but allows for an increase in this volume for restoration purposes provided agreement is obtained from the Agency. The facility accepted 50,961 tonnes of C&D during 2003 but inadvertently failed to seek the Agency's approval in accordance with Schedule A Note 1 of the licence. On discovering this oversight, *greenstar* wrote to the Agency on the 17<sup>th</sup> May 2004 informing them of the situation and requesting approval for an increase in the volume of C&D wastes accepted at the facility to 55,000 tonnes per annum. It is not proposed to increase the total volumes of wastes accepted at the facility.

For the first three (3) months of 2004, 33,978.22 tonnes of waste have been received at the facility and 18,302.80 consigned. The next AER for the facility will incorporate these figures in order to show the twelve-month volume of wastes received and consigned from the facility for 2004.

All the wastes consigned from the site went to recovery and disposal facilities agreed with the Agency. The name and location of the facilities are given in Table 5.3.

**Table 5.1 - Waste Received and Consigned (January 2003 - December 2003)**

<b>EWC</b>	<b>Description</b>	<b>In</b>	<b>Out</b>
13 08 99	Oil Not Specified	8.25	32.43
15 01 01	Paper and Cardboard Packaging	247.42	923.69
15 01 02	Plastic Packaging	306.626	272.27
15 01 02	Plastic Packaging (PET bottles)	1391.26	2.82
15 01 03	Wooden Packaging (pallets)	1.52	8.3
15 01 04	Metallic Packaging (cans)	81.975	6.84
15 01 06	Mixed Packaging	30.78	0
15 01 07	Glass Packaging	14.51	1.92
16 05 04	Gas Cylinders	0	11.8
16 06 01	Batteries	0	1.82
17 06 05	Asbestos	0	2.66
17 02 01	C&D Wood	53.28	2697.68
17 05 04	Soil and Stones	27643.89	0
17 09 04	Mixed C and D	23263.48	0
19 08 01	C&D Fines	0.02	16714.99
19 13 06	Sludges	7.41	2.92
20 01 01	Paper and Cardboard	177.19	42.63
20 01 02	Glass	7.49	2.93
20 01 08	Biodegradeable kitchen & Canteen waste	2.82	0
20 01 11	Textiles	0	5.72
20 01 38	Wood	104.39	188.81
20 01 39	Plastic	9.69	0
20 01 40	Metals	100.29	1652.74
20 02 01	Biodegradeable green waste	366.9	412.95
20 03 01	Mixed Municipal waste	39612.61	37742.79
20 03 07	Bulky Waste	32690.15	26500.82
		<b>126121.95</b>	<b>87229.53</b>

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**Table 5.2 - Waste Received and Consigned (January 2004 - March 2004)**

<b>EWC</b>	<b>Description</b>	<b>In</b>	<b>Out</b>
13 08 99	Oil Not Specified		1.99
15 01 01	Paper and Cardboard Packaging	1599.69	566
15 01 02	Plastic Packaging	17.48	40.84
	Plastic Packaging (PET bottles)	1.72	
15 01 03	Wooden Packaging (pallets)		510.52
15 01 04	Metallic Packaging (cans)	14.59	3.25
	Mixed Packaging	44.37	
	Glass Packaging	6.7	
16 05 04	Gas Cylinders		0.94
16 06 01	Batteries		4.06
	Asbestos		
17 02 01	C&D Wood	11.26	484.46
17 05 04	Soil and Stones	1907.27	
17 09 04	Mixed C and D	6958.34	
19 08 01	C&D Fines	3947	2534.68
19 13 06	Sludges		
20 01 01	Paper and Cardboard		
20 01 02	Glass		
20 01 08	Biodegradeable kitchen & Canteen waste	2.62	
20 01 11	Textiles	1.66	1.45
20 01 38	Wood		
20 01 39	Plastic		
20 01 40	Metals	21.22	688.57
20 02 01	Biodegradeable green waste	97.64	
20 03 01	Mixed Municipal waste	8511.91	8294.34
20 03 07	Bulky Waste	9834.75	5171.7
		<b>32978.22</b>	<b>18302.8</b>

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**Table 5.3: Off-Site Disposal / Recovery Agents**

Name	License/Permit	Address	Waste Consigned
Returnbatt	WL 105-1	Kill, Co. Kildare	Batteries
SITA Environmental Ltd.	WL 35-1	Sherrif Street, Dublin	Interceptor waste
Materials Recovery Ltd.	TWE/674462/B (UK)		Cardboard & Plastic
Ballyvenny Landfill	WL 78-1		Mixed municipal/Bulky waste
Textile Recycling Ltd.	WPR 014		Textile
KTK Landfill	WL 81-2	Kilcullen Co. Kildare	Non-hazardous commercial and industrial waste
Hammond Lane	WP 98067	Pigeon House Rd Dublin 4	Steel
Finsa	IPC 22-1	Finsa Scariff Co Clare	Shredded Wood
Plastics Recovery	LAN/494395B (UK)	18 Bellis Way Walton Le Dale Preston PR 5 4NS UK	Plastics (HDPE/PE)
Smurfit	WPR 021	Ballymount Road, Dublin 12	Cardboard & Newsprint
Padraig Thornton	WL 44-1	Killeen Rd Dublin 10	Wood Waste
Atlas Oil	WL 184-1	Greenhills Rd. Dublin 24	Oil Wastes
Calor	n/a	Longmile Rd Dublin 12	Gas Cylinders

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## 6. ENVIRONMENTAL INCIDENTS AND COMPLAINTS

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### 6.1 Incidents

The routine monitoring programme identified a number of incidents mainly associated with exceedance of carbon dioxide levels in the landfill gas monitoring boreholes but including the exceedance of the methane emission limit at BH-5 in July 2003. There have also been occasional exceedances of the limits for dust deposition at the site. The incidents have been reported to the Agency in the quarterly monitoring reports and separately as the case required. The incidents are summarised in Table 6.1.

A fire occurred at the facility on the 26<sup>th</sup> November 2003, which was reported to the Agency on the same day. A copy of the report is included in Appendix 5. Emissions from the site were minimal, as the fire was contained where it began and was promptly brought under control.

### 6.2 Register of Complaints

*greenstar* maintains a register of complaints received in accordance with Condition 10.4 of the waste licence. There were no complaints received about facility operations during the reporting period.

**Table 6.1: Summary of Incidents**

Date	Nature of Incidents	Cause	Corrective Action
<b>Fire</b>			
26/11/2003	Fire at the C&I processing area	Unknown	One unit of Fire Brigade used to extinguish
Date	Nature of Incidents	Cause	Corrective Action
<b>Landfill Gas Monitoring</b>			
21/01/03 17/02/03 24/03/03 29/04/03 30/05/03 16/06/03 23/07/03 22/08/03 08/09/03 31/10/03 26/11/03 10/12/03 27/01/04 26/02/04 29/03/04	Carbon dioxide > trigger limit at monitoring borehole GS-1 in 12 events, at GS-5 in 13 events, at GS-6 in 12 events, at BH-5 in 6 events, at L-01 in 14 events, at L-02 in 8 event and BH-6 in 3 events. GS-07 in 4 events, GS-08 in 7 events, GS-11 in 9 events. Methane > trigger limit at monitoring borehole BH-5 in 1 event.	Possible anaerobic degradation of small quantities of organic waste.	Continue routine monitoring to determine if landfill gas is being produced and is migrating off-site.
Date	Nature of Incidents	Cause	Corrective Action
<b>Dust Monitoring</b>			
Jun - Jul	Dust levels at each of the monitoring locations were above the emission limit.	The elevated dust levels were attributed to extensive construction work including the new transfer building and landscaping mounds.	Dust Control Measures Evaluation report submitted 30/05/03
Jul - Aug	Dust levels at DS-2 and DS-4 were above the emission limit.		



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## 7. ENVIRONMENTAL DEVELOPMENT

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### 7.1 Environmental Management Programme Report

It is an objective of *greenstar* to implement its Environmental Management System fully by December 2004 and employ an accreditation body to carry out a pre-certification audit to ISO 14001 for the site by April 2005. The schedule of objectives and targets, including their status for 2003 as well as the proposed objectives and targets for 2004 are outlined below.

#### 7.1.1 Schedule of Objectives and Targets 2003

The Schedule of Objectives and Targets for 2003 included 8 objectives, which are summarised in Table 7.1. The table also includes an evaluation of what has been achieved to date.

For Objective 1, a target of 50% recovery rate was set for wood material received on-site. During the period April 2003 to March 2004, 3,704 tonnes of wood waste was recycled at the facility. It was also proposed to recover and recycle 50% of green wastes, start the collection of source segregated food waste and begin trial composting which was authorised in the revised licence. These targets have been deferred pending the setting up of the trial composting operation.

Objectives 2, 3 and 4, which included the control of hazardous waste acceptance, minimising the environmental impacts of the site and the implementation of the EMS have been completed fully as outlined in the 2003 AER.

In order to minimise the environmental impact of discharges to groundwater (Objective 5) a series of targets were developed. The first of these involved the preparation of containment options to prevent wastewater from the transfer building and vehicle wash area discharging to ground. The review of containment options is ongoing and once completed will be implemented.

It was also proposed to assess and remediate an area of suspected oil contaminated soil at the site. OCM were commissioned by *greenstar* to conduct an assessment of the contamination which included soil sample analysis and an intrusive site investigation. The assessment concluded that there was no evidence of significant hydrocarbon contamination in the suspected contaminated area. The report was submitted to the Agency on the 2<sup>nd</sup> October 2003.



Objective 6 required the preparation and issue of procedures to improve environmental record keeping at the facility. This objective was completed by July 2003.

A staff training programme has been developed and implemented by July 2003 as outlined in Objective 7. The programme includes a procedure to train employees to an appropriate level and also prepare and issue procedures and implement requirements for environmental operating procedures. Training records for the reporting period are included in Appendix 6.

For Objective 8, a litter management improvement procedure has been prepared, issued and implemented and includes non-conformance and corrective action, management of nuisances, handling of complaints and facility inspections. This was completed by the target date of July 2003. Litter containment options are being prepared and reviewed with the intention to implement the preferred litter containment infrastructure as soon as possible.

#### *7.1.2 Corrective Actions*

In order to improve the distribution of landfill gas monitoring data four new landfill gas monitoring wells (GS-07, GS-08, GS-09 and GS-11) were installed at the facility in July 2003. Monitoring well GS-07 was irreparably damaged in February 2004 by site construction plant. The Agency was informed of this incident and a replacement well was installed on the 21st April 2004. A new leachate monitoring well (L-03) was also installed on the 21<sup>st</sup> April 2004.

#### *7.1.3 Site Management Structure*

Details of the site management structure are included in Appendix 7. The current management structure was submitted to the Agency on the 13<sup>th</sup> November 2003.

## **7.2 Environmental Management Programme Proposal**

### *7.2.1 Schedule of Objective and Targets 2004*

*greenstar* has developed a Schedule of Objectives and Targets for the year 2004. These are presented in Table 7.2, which also designates responsibilities for their achievement and timescale.

## 7.2.2 Programme to Achieve Targets

The targets will be achieved by the implementing the following programme: -

### **Objective 1 - Reduce Disposal of Materials to Landfill**

It is an objective to achieve a recycling rate of 30% of waste received at the site by the end of 2004. This will be accomplished by sourcing and obtaining approval for new outlets for recyclables and increasing the capacity of the household recyclables picking line in order to expand this service to householders.

### **Objective 2 - Staff Training**

It is an objective to re-train staff in environmental awareness/Environmental Management Systems. It is also proposed to train staff in good segregation methods, which should aid objective 1 requirement.

### **Objective 3 - Minimise Environmental Impacts**

Daily and weekly environmental inspection records are to be maintained in order to keep any environmental impacts at the site to a minimum. It is expected to have Commercial/Industrial activities moved indoors by December 2004.

### **Objective 4 - Implement EMS**

It is proposed to employ an accreditation body to carry out a pre-certification audit to ISO 14001 for the site by April 2005. An environmental policy for the site is also expected to be issued by December 2004.

### **Objective 5 - Ensure Hazardous Waste Does Not Cause Pollution**

It is proposed to ensure hazardous waste does not cause pollution. This is scheduled to be accomplished before the end of 2004 by notifying customers where hazardous materials are discovered and issuing information on facilities licensed to accept such wastes. This will help minimise the receipt of hazardous waste on-site thereby reducing the potential for hazardous waste pollution.

### **Objective 6 - Environmental Monitoring**

It is an on-going objective to conduct the environmental monitoring programme in accordance with licence Conditions.

### **Objective 7 - Improve Record Keeping**

It is an objective to improve the maintenance and storage of records at the facility and train designated staff in this regard.

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**Table 7.1: Operational Objectives and Targets 2003**

	Objective	Target	Responsibility	Timescale	Status
1.	Reduce disposal of materials to landfill	Recover and recycle at least 50% of wood waste	Location Manager	31 December 2003	3,704 tonnes of wood waste recycled in the period Apr'03 to Mar '04
		Recover and recycle at least 50% of green waste	Location Manager	31 December 2003	Deferred
		Start collection of source segregated food waste	Location Manager	31 December 2003	Deferred
		Start composting trial	Location Manager	31 December 2003	Deferred
2.	Ensure that Hazardous waste does not cause pollution	Continue training programme for drivers and off-site operatives on hazardous waste recognition handling and refusal procedures	Location Manager	31 December 2003	Completed
		Continue training programme for on-site operatives on hazardous waste recognition and handling procedures	Location Manager	31 December 2003	Completed
		Collect and maintain records for all hazardous waste movements at Fassaroe	Location Manager	31 December 2003	Completed
3.	Keep environmental impacts of site to a minimum	Maintain the daily and weekly environmental inspection records	Location Manager	31 December 2003	Completed
4.	Implement EMS Fully	Complete all outstanding documentation to the agreement of the EPA	Environmental Affairs Manager	1 July 2003	Completed

No.	Objective	Target	Responsibility	Timescale	Status
5.	Minimise environmental Impact of Discharges to Groundwater	1 Prepare containment options to Prevent Wastewater from Transfer Building / Vehicle Wash Area discharging to ground 2 Review containment options 3 Implement preferred containment option	Location Manager	1 March 2003  1 April 2003 1 December 2003	Ongoing  Ongoing Ongoing
		Prepare and Issue procedure and implement requirements for vehicle maintenance	Location Manager	1 July 2003	Completed
		Formalise a procedure for the storage and handling of liquids on-Site Prepare and issue procedure and implement requirements	Location Manager	1 July 2003	Deferred
		Remediate existing oil contaminated soil by 1 Investigate the extent of contamination 2 Prepare remedial options 3 Implement preferred remedial option	Location Manager	1 July 2003	Ongoing
6.	Improve Record Keeping	Prepare and Issue procedures and implement requirements for activities requiring environmental records	Location Manager	1 July 2003	Completed
		Prepare and Issue a procedure and implement requirements to control and retain records	Location Manager	1 July 2003	Completed
7.	Train All Employees to an Appropriate Level	Prepare and Issue procedure and implement requirements to train all employees to an appropriate level	Location Manager	1 July 2003	Completed
		Prepare and Issue procedures and implement requirements for environmental operating procedures	Location Manager	1 July 2003	Completed
8.	Improve Litter Management	Prepare and Issue procedure and implement requirements for non-conformance and corrective action procedure	Location Manager	1 July 2003	Completed
		Prepare and Issue procedure and implement requirements to manage nuisance	Location Manager	1 July 2003	Completed
		Prepare and Issue procedure and implement requirements to handle complaints	Location Manager	1 July 2003	Completed

No.	Objective	Target	Responsibility	Timescale	
		Prepare and Issue procedure and implement requirements for facility inspections	Location Manager	1 July 2003	Completed
		1 Prepare litter containment options 2 Review litter containment options 3 Implement preferred litter containment option	Location Manager	1 March 2003 1 April 2003 1 December 2003	Ongoing Ongoing Ongoing

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**Table 7.2: Schedule of Objective and Targets 2004**

No	Objective	Target	Responsibility	Timescale
1	Reduce disposal of materials to landfill.	Source and Obtain approval for new outlets for recyclables, e.g. greenwaste, food waste, C&D waste.	Facility Manager	31/12/04
		Achieve a recycling rate of 30%.	Facility Manager	31/12/04
		Increase the capacity of the household recyclables picking line, though relocation/additional storage space, to facilitate increasing this service to additional households	Facility Manager	31/12/04
2	Train all employees to an appropriate level	Re-train all staff in Environmental Awareness/Environmental Management Systems	Facility Manager	31/12/04
		Train staff in good segregation methods, to improve recycling rates on picking lines	Facility Manager	31/12/04
3	Keep environmental impacts of site to a minimum	Maintain the daily and weekly environmental inspection records.	Facility Manager	On-going
		Move C&I activities indoors	Facility Manager	30/12/04
		Remove Stock-piles of C&D material, Commence site restoration and capping works	Facility Manager	30/4/05
4	Implement EMS fully	Compile and issue Environmental Policy for site.	Facility Manager	31/12/04
		Compile and re-assess a list of significant Environmental Aspects for the site	Facility Manger	31/12/04
		Employ accreditation body to carry out a pre-certification audit to ISO 14001 for site	Facility Manager	30/4/05
5	Ensure that Hazardous waste does not cause pollution	Carry out an assessment on the quantity and type of hazardous waste required to be quarantined at the site	Facility Manager	31/12/04
		Develop a system of notification and warning letter, for customers, where hazardous waste is discovered in loads.	Facility Manager	31/12/04



No	Objective	Target	Responsibility	Timescale
		Issue flyers to customers, detailing contact names/locations where they can legally dispose of their hazardous waste, e.g. fridges, asbestos, batteries.	Facility Manager	31/12/04
6	Environmental Monitoring	Carry out all environmental monitoring requirements as per licence requirements	Facility Manager	On-going
		Report and investigate any breaches of monitoring limits	Facility Manager	On-going
		Ensure monitoring equipment is maintained and calibrated, and accessible at all times.	Facility Manager	On-going
7	Improve Record Keeping	Improve the maintenance and storage of records at the facility.	Facility Manager	31/12/04
		Designate staff to retain specific records, and carry out training to facilitate them in this regard.	Facility Manager	31/12/04

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## 8. OTHER REPORTS

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### 8.1 Duty & Standby Capacity Report

A report on the plant infrastructure operated at the facility for the processing of waste showed the facility has adequate duty and standby capacity to handle the authorised waste volumes. A copy of the report is included in Appendix 8.

### 8.2 Bund Integrity Testing

*greenstar* commissioned Logan Earthmoving Ltd. to conduct an assessment of banded areas at the site to BS8007 (Section 9.2) standards. The assessment was conducted in February 2002 and concluded that measurements remained constant. A copy of the report was submitted to the Agency.

### 8.3 Environmental Liability Risk Assessment

*greenstar* completed and submitted to the Agency on the 5<sup>th</sup> September 2003 an Environmental Liability Risk Assessment (ELRA) of the facility as required by the Waste Licence. The ELRA concluded that there were minimal potential liabilities associated with current indirect emissions to groundwater, surface water and landfill gas generation and future incidents. Potential future liabilities are considered to be limited to emergency situations such as oil spills and fire. *greenstar* has adopted Emergency Procedures to manage such incidents and minimise associated environmental impacts.

*greenstar's* current insurance policy cover is in excess of any environmental liability that may arise. The policy includes for cover up to €6,350,000. In relation to environmental pollution/contamination the indemnity applies "to damage to any buildings or other structures or of water or land or atmospheres caused by pollution or contamination. The policy covers pollution caused by a sudden, identifiable, unintended and unexpected event and not gradual pollution". There is also a €2,000,000 accrual on the balance sheet for *greenstar* Recycling Holdings Ltd for 2003. This fund is also available to cover any environmental damage caused by *greenstar* Materials Recovery (Bray) Ltd.

#### **8.4 Written Procedures**

*greenstar* has developed and implemented an EMS for the site. As part of the EMS, a series of written procedures have been developed. The titles of these procedures are shown in Appendix 9. These are available for inspection at the *greenstar* facility.

#### **8.5 Nuisance Controls**

A proposal for the control and eradication of vermin and fly infestations at the facility was submitted to the Agency on the 19<sup>th</sup> June 2003, a copy is included in Appendix 10.

A proposal for the operation of the wood chipper, including nuisance abatement measures, was submitted to the Agency on the 24<sup>th</sup> April 2003, a copy is included in Appendix 10.

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# **APPENDIX 1**

## **Drawings**

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## **APPENDIX 2**

### **Environmental Monitoring Summary Tables**

**1<sup>st</sup> Quarter 2003 / 2<sup>nd</sup> Quarter 2003 / 3<sup>rd</sup> Quarter 2003 / 4<sup>th</sup> Quarter 2003**

**1<sup>st</sup> Quarter 2004**

**Noise / Gas / Biological Summary**

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Groundwater Monitoring - BH-2 - greenstar Materials Recovery Ltd. - Bray Depot

	Results (mg/l)						
	1st Quarter 2003			Previous Ranges *	Sampling Method	Method Detection Limit	Analysis method/ technique
	21/01/2003	17/02/2003	21/03/2003				
Temperature (°C)	8.2	8.1	9.0	6.9 - 18.5	Beller	0-100	Temperature probe
Chloride		102		25 - 57	Beller	<1	Spectrophotometric analysis
TON		1.1		0.2 - 11.9	Beller	<0.3	Spectrophotometric analysis
Ammoniacal Nitrogen -N	0.2	1.0	<0.2	<0.16 - 2.5	Beller	<0.2	Colometric Spectrophotometry
Potassium		7.4		5.4 - 11.0	Beller	<0.2	Flame Photometer
Sodium		29.5		20.5 - 74	Beller	<0.2	Flame Photometer
TOC		72		3.0 - 22	Beller	<1	IR
Elec. Conductivity (mS/cm)	0.930	0.918	0.872	0.640 - 0.998	Beller	<0.014	Meter
Dissolved Oxygen		4.8		0.8 - 8.9	Beller	<0.1	Meter
pH	7.28	7.66	6.98	6.77 - 8.10	Beller	<0.01	Meter

Groundwater Monitoring - BH-6 - greenstar Materials Recovery Ltd. - Bray Depot

	Results (mg/l)						
	1st Quarter 2003			Previous Ranges **	Sampling Method	Method Detection Limit	Analysis method/ technique
	21/01/2003	17/02/2003	21/03/2003				
Temperature (°C)	16.3	14.6	16.0	13.3 - 16.4	Beller	0-100	Temperature probe
Chloride		168		34 - 135	Beller	<1	Spectrophotometric analysis
TON		2.1		<0.3 - 6.6	Beller	<0.3	Spectrophotometric analysis
Ammoniacal Nitrogen -N	7.1	6.9	6.10	1.3 - 8.4	Beller	<0.2	Colometric Spectrophotometry
Potassium		16.8		9.6 - 27.3	Beller	<0.2	Flame Photometer
Sodium		138		32 - 128	Beller	<0.2	Flame Photometer
TOC		50		5.0-25	Beller	<1	IR
Elec. Conductivity (mS/cm)	2.400	2.494	2.411	1.998 - 2.270	Beller	<0.014	Meter
Dissolved Oxygen		4.5		1.8 - 8.6	Beller	<0.1	Meter
pH	7.01	7.07	6.93	6.19 - 7.70	Beller	<0.01	Meter

Groundwater Monitoring - BH-6 - greenstar Materials Recovery Ltd. - Bray Depot

	Results (mg/l)				Previous Ranges **	Sampling Method	Method Detection Limit	Analysis method/ technique
	1st Quarter 2003							
	21/01/2003	17/02/2003	21/03/2003					
Temperature (°C)	11.5	8.4	10.3	10.5 - 14.8	Baffler	0-100	Temperature probe	
Chloride		80		19 - 48	Baffler	<1	Spectrophotometric analysis	
TON		2.8		<0.3 - 8.4	Baffler	<0.3	Spectrophotometric analysis	
Ammoniacal Nitrogen -N	0.2	<0.2	1.2	<0.16 - 3.7	Baffler	<0.2	Colorimetric Spectrophotometry	
Potassium		1.0		0.3 - 2.8	Baffler	<0.2	Flame Photometer	
Sodium		20.8		16.0 - 32.5	Baffler	<0.2	Flame Photometer	
TOC		28		<2 - 37	Baffler	<1	IR	
Elec. Conductivity (mS/cm)	0.75	0.663	0.707	0.661 - 0.661	Baffler	<0.014	Meter	
Dissolved Oxygen		8.0		3.4 - 9.04	Baffler	<0.1	Meter	
pH	7.46	7.12	7.43	6.95 - 7.60	Baffler	<0.01	Meter	

Groundwater Monitoring - BH-7 - greenstar Materials Recovery Ltd. - Bray Depot

	Results (mg/l)				Previous Ranges **	Sampling Method	Method Detection Limit	Analysis method/ technique
	1st Quarter 2003							
	21/01/2003	17/02/2003	21/03/2003					
Temperature (°C)	10.3	9.8	9.9	8.1 - 13.1	Baffler	0-100	Temperature probe	
Chloride		82		23 - 68	Baffler	<1	Spectrophotometric analysis	
TON		<0.3		0.4 - 2.8	Baffler	<0.3	Spectrophotometric analysis	
Ammoniacal Nitrogen -N	3.9	1.8	6.4	0.16 - 3.2	Baffler	<0.2	Colorimetric Spectrophotometry	
Potassium		1.8		0.5 - 2.4	Baffler	<0.2	Flame Photometer	
Sodium		17.8		16 - 48	Baffler	<0.2	Flame Photometer	
TOC		49		2 - 10	Baffler	<1	IR	
Elec. Conductivity (mS/cm)	0.713	0.688	0.695	0.655 - 0.655	Baffler	<0.014	Meter	
Dissolved Oxygen		4.8		1.4 - 9.19	Baffler	<0.1	Meter	
pH	7.09	7.04	7.17	6.68 - 8.23	Baffler	<0.01	Meter	



Surface Water Monitoring - SW-1 - greenstar Materials Recovery Ltd. - Bryi Depot

	Results (mg/l)	Previous Ranges*	Sampling Method	Method Detection Limit	Analysis method/ technique
Temperature (°C)	6.8	6.1 - 13.6	Grab	1-100	Temperature probe
Chloride	60	21 - 42	Grab	<1	Spectrophotometric analysis
COD	<18	<10 - 49	Grab	<10	Spectrophotometric analysis
Nitrite	0.09	<0.03 - 22.58	Grab	<0.06	Spectrophotometric analysis
BOD	3	<1 - 19	Grab	<2	ATU
Ammoniacal Nitrogen -N	<0.2	<0.2 - 0.95	Grab	<0.2	Colorimetric Spectrophotometry
Tot. Susp. Solids	<10	<8 - 48	Grab	<10	Grav
Total Phosphorus	<0.01	0.01 - <0.1	Grab	<0.01	HPLC
Elec. Conductivity (µS/cm)	0.699	0.480 - 0.626	Grab	<0.014	Meter
Dissolved Oxygen	6.3	4.4 - 10.5	Grab	<0.1	Meter
pH	6.26	7.35 - 8.40	Grab	<0.01	Meter

Surface Water Monitoring - SW-2 - greenstar Materials Recovery Ltd. - Bryi Depot

	Results (mg/l)	Previous Ranges*	Sampling Method	Method Detection Limit	Analysis method/ technique
Temperature (°C)	6.8	7.9 - 13.9	Grab	1-100	Temperature probe
Chloride	61	22 - 58	Grab	<1	Spectrophotometric analysis
COD	<18	<10 - 34	Grab	<10	Spectrophotometric analysis
Nitrite	0.06	<0.03 - 24.13	Grab	<0.06	Spectrophotometric analysis
BOD	3	<1 - 11	Grab	<2	ATU
Ammoniacal Nitrogen -N	0.6	0.16 - 3.00	Grab	<0.2	Colorimetric Spectrophotometry
Tot. Susp. Solids	<10	<10 - 61	Grab	<10	Grav
Total Phosphorus	<0.01	<0.01 - 0.02	Grab	<0.01	HPLC
Elec. Conductivity (µS/cm)	0.690	0.445 - 0.622	Grab	<0.014	Meter
Dissolved Oxygen	6.1	0.3 - 9.7	Grab	<0.1	Meter
pH	6.18	7.37 - 8.47	Grab	<0.01	Meter

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Surface Water Monitoring - 614-3 - Greenstar Materials Recovery Ltd. - Bray Depot

	Results (mg/l)	Previous Ranges *	Sampling Method	Method Detection Limit	Analysis method/ technique
	1st Quarter 2009 17/02/2009				
Temperature (°C)	7.2	7.8 - 13.6	Grab	1-100	Temperature probe
Chloride	94	21 - 64	Grab	<1	Spectrophotometric analysis
CO <sub>2</sub>	<15	<10 - 42	Grab	<10	Spectrophotometric analysis
Nitrite	0.05	<0.03 - 23.92	Grab	<0.05	Spectrophotometric analysis
BOD	2	<1 - 13	Grab	<2	ATU
Ammoniacal Nitrogen -N	0.7	<0.16 - 1.70	Grab	<0.2	Colorimetric Spectrophotometry
Tot. Susp. Solids	<10	<6 - 112	Grab	<10	Grav
Total Phospho	<0.01	<0.01 - 0.02	Grab	<0.01	HPLC
Elec. Conductivity (microhm)	0.555	0.465 - 1.057	Grab	<0.014	Meter
Dissolved Oxygen	5.6	<0.1 - 9.6	Grab	<0.1	Meter
pH	7.83	7.44 - 8.52	Grab	<0.01	Meter

Surface Water Monitoring - 614-4 - Greenstar Materials Recovery Ltd. - Bray Depot

	Results (mg/l)	Previous Ranges *	Sampling Method	Method Detection Limit	Analysis method/ technique
	1st Quarter 2009 17/02/2009				
Temperature (°C)	7.2	7.7 - 13.7	Grab	1-100	Temperature probe
Chloride	91	22 - 59	Grab	<1	Spectrophotometric analysis
CO <sub>2</sub>	16	<10 - 36	Grab	<10	Spectrophotometric analysis
Nitrite	<0.05	<0.03 - 23.12	Grab	<0.05	Spectrophotometric analysis
BOD	2	<1 - 6	Grab	<2	ATU
Ammoniacal Nitrogen -N	<0.2	0.16 - 2.50	Grab	<0.2	Colorimetric Spectrophotometry
Tot. Susp. Solids	<10	<10 - 94	Grab	<10	Grav
Total Phospho	0.02	<0.01 - 0.01	Grab	<0.01	HPLC
Elec. Conductivity (microhm)	0.553	0.466 - 0.631	Grab	<0.014	Meter
Dissolved Oxygen	5.40	<0.1 - 9.9	Grab	<0.1	Meter
pH	7.75	7.39 - 8.40	Grab	<0.01	Meter

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Groundwater Monitoring - BH-6 greenstar Materials Recovery Ltd. - Bray Depot

	Results (mg/l)		Sampling Method	Method Detection Limit	Analysis method/ technique
	2nd Quarter 2003				
	29/04/2003				
Temperature (°C)	13.1	8.4 - 14.9	Bailer	0-100	Temperature probe
Chloride	21	19 - 90	Bailer	<1	Spectrophotometric analysis
Ammoniacal Nitrogen -N	1.8	<0.16 - 3.7	Bailer	<0.2	Colometric Spectrophotometry
TOC	<2	<2 - 37	Bailer	<1	IR
Elec. Conductivity (mS/cm)	0.68	0.581 - 0.861	Bailer	<0.014	Meter
Dissolved Oxygen	3.6	3.4 - 9.04	Bailer	<0.1	Meter
pH	7.48	6.95 - 7.90	Bailer	<0.01	Meter

Groundwater Monitoring - BH-7 greenstar Materials Recovery Ltd. - Bray Depot

	Results (mg/l)		Sampling Method	Method Detection Limit	Analysis method/ technique
	2nd Quarter 2003				
	29/04/2003				
Temperature (°C)	12.3	9.1 - 13.1	Bailer	0-100	Temperature probe
Chloride	27	23 - 92	Bailer	<1	Spectrophotometric analysis
Ammoniacal Nitrogen -N	2.9	0.16 - 6.4	Bailer	<0.2	Colometric Spectrophotometry
TOC	3	2 - 49	Bailer	<1	IR
Elec. Conductivity (mS/cm)	0.675	0.485 - 0.835	Bailer	<0.014	Meter
Dissolved Oxygen	2.8	1.4 - 9.19	Bailer	<0.1	Meter
pH	8.91	6.88 - 8.23	Bailer	<0.01	Meter

**Groundwater Monitoring - BH-2 Greenstar Materials Recovery Ltd. - Bray Depot**

	Results (mg/l)		Sampling Method	Method Detection Limit	Analysis method/ technique
	2nd Quarter 2003				
	30/03/2003				
		Previous Ranges *			
Temperature (°C)	12.5	6.9 - 16.5	Bailer	0-100	Temperature probe
Chloride	32	25 - 102	Bailer	<1	Spectrophotometric analysis
Ammoniacal Nitrogen -N	1.0	<0.16 - 2.5	Bailer	<0.2	Colorimetric Spectrophotometry
TOC	<2	3.0 - 72	Bailer	<1	IR
Elec. Conductivity (mS/cm)	0.736	0.540 - 0.996	Bailer	<0.014	Meter
Dissolved Oxygen	4.6	0.5 - 6.9	Bailer	<0.1	Meter
pH	7.42	6.77 - 8.10	Bailer	<0.01	Meter

**Groundwater Monitoring - BH-5 Greenstar Materials Recovery Ltd. - Bray Depot**

	Results (mg/l)		Sampling Method	Method Detection Limit	Analysis method/ technique
	2nd Quarter 2003				
	29/04/2003				
		Previous Ranges **			
Temperature (°C)	18.9	13.3 - 16.4	Bailer	0-100	Temperature probe
Chloride	123	24 - 166	Bailer	<1	Spectrophotometric analysis
Ammoniacal Nitrogen -N	9.8	1.3 - 8.4	Bailer	<0.2	Colorimetric Spectrophotometry
TOC	20	5.0-50	Bailer	<1	IR
Elec. Conductivity (mS/cm)	2.401	1.093 - 2.484	Bailer	<0.014	Meter
Dissolved Oxygen	2.6	1.6 - 6.6	Bailer	<0.1	Meter
pH	6.8	6.10 - 7.70	Bailer	<0.01	Meter

Surface Water Monitoring - SW-3 - greenstar Materials Recovery Ltd. - Bray Depot

	Results (mg/l)	Previous Ranges*	Sampling Method	Method Detection Limit	Analysis method/ technique
	2nd Quarter 2003 30/06/2003				
Temperature (°C)	13.3	7.8 - 13.8	Grab	1-100	Temperature probe
Chloride	27	21 - 94	Grab	<1	Spectrophotometric analysis
COD	<15	<10 - 42	Grab	<10	Spectrophotometric analysis
Phos	0.1	<0.03 - 23.82	Grab	<0.05	Spectrophotometric analysis
BOD	<2	<1 - 13	Grab	<2	ATU
Ammoniacal Nitrogen -N	1.0	<0.16 - 1.70	Grab	<0.2	Colorimetric Spectrophotometry
Tot. Susp. Solids	<10	<5 - 112	Grab	<10	Grav
Total Phenols	<0.01	<0.01 - 0.02	Grab	<0.01	HPLC
Elec. Conductivity (µS/cm)	0.595	0.405 - 1.007	Grab	<0.014	Meter
Dissolved Oxygen	8.1	<0.1 - 9.8	Grab	<0.1	Meter
pH	8.04	7.44 - 8.52	Grab	<0.01	Meter

Surface Water Monitoring - SW-4 - greenstar Materials Recovery Ltd. - Bray Depot

	Results (mg/l)	Previous Ranges*	Sampling Method	Method Detection Limit	Analysis method/ technique
	2nd Quarter 2003 30/06/2003				
Temperature (°C)	13.2	7.7 - 13.7	Grab	1-100	Temperature probe
Chloride	28	22 - 91	Grab	<1	Spectrophotometric analysis
COD	<15	<10 - 36	Grab	<10	Spectrophotometric analysis
Phos	0.1	<0.03 - 23.82	Grab	<0.05	Spectrophotometric analysis
BOD	<2	<1 - 8	Grab	<2	ATU
Ammoniacal Nitrogen -N	1.4	0.16 - 2.90	Grab	<0.2	Colorimetric Spectrophotometry
Tot. Susp. Solids	<10	<10 - 64	Grab	<10	Grav
Total Phenols	<0.01	<0.01 - 0.01	Grab	<0.01	HPLC
Elec. Conductivity (µS/cm)	0.598	0.406 - 0.631	Grab	<0.014	Meter
Dissolved Oxygen	8.20	<0.1 - 9.9	Grab	<0.1	Meter
pH	8.00	7.63 - 8.40	Grab	<0.01	Meter

Surface Water Monitoring - SW-1 greentier Materials Recovery Ltd. - Bray Depot

	Results (mg/l)		Sampling Method	Method Detection Limit	Analysis method/ technique
	2nd Quarter 2003	Previous Range*			
Temperature (°C)	13.4	8.1 - 13.8	Grab	1-100	Temperature probe
Chloride	24	21 - 30	Grab	<1	Spectrophotometric analysis
COD	<15	<10 - 40	Grab	<10	Spectrophotometric analysis
Nitrite	0.00	<0.03 - 22.88	Grab	<0.05	Spectrophotometric analysis
BOD	<2	<1 - 19	Grab	<2	ATU
Ammoniacal Nitrogen -N	3.0	<0.2 - 0.63	Grab	<0.2	Colorimetric Spectrophotometry
Tot. Susp. Solids	<10	<5 - 48	Grab	<10	Grav
Total Phenols	<0.01	0.01 - <0.1	Grab	<0.01	HPLC
Elec. Conductivity (µS/cm)	0.590	0.400 - 0.628	Grab	<0.014	Meter
Dissolved Oxygen	8.8	4.4 - 10.5	Grab	<0.1	Meter
pH	8.10	7.35 - 8.40	Grab	<0.01	Meter

Surface Water Monitoring - SW-2 greentier Materials Recovery Ltd. - Bray Depot

	Results (mg/l)		Sampling Method	Method Detection Limit	Analysis method/ technique
	2nd Quarter 2003	Previous Range*			
Temperature (°C)	13.4	7.6 - 13.9	Grab	1-100	Temperature probe
Chloride	27	22 - 31	Grab	<1	Spectrophotometric analysis
COD	<15	<10 - 34	Grab	<10	Spectrophotometric analysis
Nitrite	0.12	<0.03 - 23.13	Grab	<0.05	Spectrophotometric analysis
BOD	<2	<1 - 11	Grab	<2	ATU
Ammoniacal Nitrogen -N	1.1	0.16 - 3.00	Grab	<0.2	Colorimetric Spectrophotometry
Tot. Susp. Solids	<10	<10 - 51	Grab	<10	Grav
Total Phenols	<0.01	<0.01 - 0.02	Grab	<0.01	HPLC
Elec. Conductivity (µS/cm)	0.590	0.445 - 0.622	Grab	<0.014	Meter
Dissolved Oxygen	8.8	0.3 - 9.7	Grab	<0.1	Meter
pH	8.1	7.37 - 8.47	Grab	<0.01	Meter

**Groundwater Monitoring - BH-6 greenstar Materials Recovery Ltd. - Bray Depot**

	Results (mg/l)		Sampling Method	Method Detection Limit	Analysis method/ technique
	3rd Quarter 2003	Previous Ranges **			
	22/08/2003				
Temperature (°C)	12.9	8.4 - 14.9	Bailer	0-100	Temperature probe
Chloride	28	19 - 90	Bailer	<1	Spectrophotometric analysis
Ammoniacal Nitrogen -N	0.3	<0.16 - 3.7	Bailer	<0.2	Colometric Spectrophotometry
TOC	3	<2 - 37	Bailer	<1	IR
Elec. Conductivity (mS/cm)	0.778	0.581 - 0.861	Bailer	<0.014	Meter
Dissolved Oxygen	7.9	3.4 - 9.04	Bailer	<0.1	Meter
pH	7.31	6.95 - 7.90	Bailer	<0.01	Meter

**Groundwater Monitoring - BH-7 greenstar Materials Recovery Ltd. - Bray Depot**

	Results (mg/l)		Sampling Method	Method Detection Limit	Analysis method/ technique
	3rd Quarter 2003	Previous Ranges **			
	22/08/2003				
Temperature (°C)	13.1	9.1 - 13.1	Bailer	0-100	Temperature probe
Chloride	28	23 - 92	Bailer	<1	Spectrophotometric analysis
Ammoniacal Nitrogen -N	0.3	0.16 - 6.4	Bailer	<0.2	Colometric Spectrophotometry
TOC	3	2 - 49	Bailer	<1	IR
Elec. Conductivity (mS/cm)	0.688	0.468 - 0.835	Bailer	<0.014	Meter
Dissolved Oxygen	6.7	1.4 - 9.19	Bailer	<0.1	Meter
pH	6.79	6.68 - 8.23	Bailer	<0.01	Meter

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**Groundwater Monitoring - BH-2 Greenstar Materials Recovery Ltd. - Bray Depot**

	Results (mg/l)		Sampling Method	Method Detection Limit	Analysis method/ technique
	3rd Quarter 2003	Previous Ranges *			
	22/08/2003				
Temperature (°C)	12.5	6.9 - 16.5	Bailer	0-100	Temperature probe
Chloride	31	25 - 102	Bailer	<1	Spectrophotometric analysis
Ammoniacal Nitrogen -N	<0.2	<0.16 - 2.5	Bailer	<0.2	Colometric Spectrophotometry
TOC	2	<2 - 72	Bailer	<1	IR
Elec. Conductivity (mS/cm)	0.730	0.540 - 0.996	Bailer	<0.014	Meter
Dissolved Oxygen	8.3	0.5 - 8.9	Bailer	<0.1	Meter
pH	7.47	6.77 - 8.10	Bailer	<0.01	Meter

**Groundwater Monitoring - BH-6 Greenstar Materials Recovery Ltd. - Bray Depot**

	Results (mg/l)		Sampling Method	Method Detection Limit	Analysis method/ technique
	3rd Quarter 2003	Previous Ranges **			
	22/08/2003				
Temperature (°C)	16.0	13.3 - 18.9	Bailer	0-100	Temperature probe
Chloride	93	34 - 186	Bailer	<1	Spectrophotometric analysis
Ammoniacal Nitrogen -N	6.0	1.3 - 9.8	Bailer	<0.2	Colometric Spectrophotometry
TOC	18	8.0-80	Bailer	<1	IR
Elec. Conductivity (mS/cm)	2.256	1.093 - 2.484	Bailer	<0.014	Meter
Dissolved Oxygen	8.1	1.6 - 8.6	Bailer	<0.1	Meter
pH	6.86	6.19 - 7.70	Bailer	<0.01	Meter

Surface Water Monitoring - SW-3 - greenstar Materials Recovery Ltd. - Bray Depot

	Results (mg/l)	Previous Ranges *	Sampling Method	Method Detection Limit	Analysis method/ technique
	3rd Quarter 2003				
	22/08/2003				
Temperature (°C)	14.2	7.8 - 13.8	Grab	1-100	Temperature probe
Chloride	28	21 - 84	Grab	<1	Spectrophotometric analysis
COD	<16	<10 - 42	Grab	<10	Spectrophotometric analysis
Nitrite	<0.05	<0.03 - 23.82	Grab	<0.05	Spectrophotometric analysis
BOD	<2	<1 - 13	Grab	<2	ATU
Ammoniacal Nitrogen -N	<0.2	<0.16 - 1.70	Grab	<0.2	Colometric Spectrophotometry
Tot. Susp. Solids	<10	<8 - 112	Grab	<10	Grav
Total Phenols	<0.01	<0.01 - 0.02	Grab	<0.01	HPLC
Elec. Conductivity (mS/cm)	0.588	0.466 - 1.067	Grab	<0.014	Meter
Dissolved Oxygen	7.9	<0.1 - 9.8	Grab	<0.1	Meter
pH	7.81	7.44 - 8.82	Grab	<0.01	Meter

Surface Water Monitoring - SW-4 greenstar Materials Recovery Ltd. - Bray Depot

	Results (mg/l)	Previous Ranges *	Sampling Method	Method Detection Limit	Analysis method/ technique
	3rd Quarter 2003				
	22/08/2003				
Temperature (°C)	14.3	7.7 - 13.7	Grab	1-100	Temperature probe
Chloride	28	22 - 91	Grab	<1	Spectrophotometric analysis
COD	<16	<10 - 36	Grab	<10	Spectrophotometric analysis
Nitrite	<0.05	<0.03 - 26.12	Grab	<0.05	Spectrophotometric analysis
BOD	2	<1 - 8	Grab	<2	ATU
Ammoniacal Nitrogen -N	<0.2	0.16 - 2.80	Grab	<0.2	Colometric Spectrophotometry
Tot. Susp. Solids	<10	<10 - 84	Grab	<10	Grav
Total Phenols	<0.01	<0.01 - 0.01	Grab	<0.01	HPLC
Elec. Conductivity (mS/cm)	0.583	0.466 - 0.631	Grab	<0.014	Meter
Dissolved Oxygen	8.1	<0.1 - 9.9	Grab	<0.1	Meter
pH	7.87	7.63 - 8.40	Grab	<0.01	Meter

Surface Water Monitoring - SW-1 greenstar Materials Recovery Ltd. - Bray Depot

	Results (mg/l)		Previous Ranges*	Sampling Method	Method Detection Limit	Analysis method/ technique
	3rd Quarter 2003					
	22/08/2003					
Temperature (°C)	14.2		8.1 - 13.8	Grab	1-100	Temperature probe
Chloride	29		21 - 90	Grab	<1	Spectrophotometric analysis
COD	<18		<10 - 49	Grab	<10	Spectrophotometric analysis
Nitrite	<0.05		<0.03 - 22.88	Grab	<0.05	Spectrophotometric analysis
BOD	2		<1 - 19	Grab	<2	ATU
Ammoniacal Nitrogen -N	<0.2		<0.2 - 3.0	Grab	<0.2	Colometric Spectrophotometry
Tot. Susp. Solids	<10		<5 - 48	Grab	<10	Grav
Total Phenols	<0.01		0.01 - <0.1	Grab	<0.01	HPLC
Elec. Conductivity (mS/cm)	0.58		0.460 - 0.628	Grab	<0.014	Meter
Dissolved Oxygen	8.0		4.4 - 10.5	Grab	<0.1	Meter
pH	7.5		7.35 - 8.40	Grab	<0.01	Meter

Surface Water Monitoring - SW-2 greenstar Materials Recovery Ltd. - Bray Depot

	Results (mg/l)		Previous Ranges*	Sampling Method	Method Detection Limit	Analysis method/ technique
	3rd Quarter 2003					
	22/08/2003					
Temperature (°C)	14.9		7.6 - 13.9	Grab	1-100	Temperature probe
Chloride	26		22 - 91	Grab	<1	Spectrophotometric analysis
COD	<18		<10 - 34	Grab	<10	Spectrophotometric analysis
Nitrite	<0.05		<0.03 - 24.13	Grab	<0.05	Spectrophotometric analysis
BOD	2		<1 - 11	Grab	<2	ATU
Ammoniacal Nitrogen -N	<0.2		0.16 - 3.00	Grab	<0.2	Colometric Spectrophotometry
Tot. Susp. Solids	<10		<10 - 51	Grab	<10	Grav
Total Phenols	<0.01		<0.01 - 0.02	Grab	<0.01	HPLC
Elec. Conductivity (mS/cm)	0.582		0.445 - 0.622	Grab	<0.014	Meter
Dissolved Oxygen	8.6		0.3 - 9.7	Grab	<0.1	Meter
pH	7.83		7.37 - 8.47	Grab	<0.01	Meter

**Groundwater Monitoring - BH-2 - greenstar Materials Recovery Ltd - Bray Depot**

	Results (mg/l)				
	4th Quarter 2003	Previous	Sampling Method	Method Detection Limit	Analysis method/ technique
	28/11/2003	Range*			
Temperature (°C)	10.1	6.9 - 16.5	Baker	0-100	Temperature probe
Chloride	25	25 - 57	Baker	<5	Spectrophotometric analysis
TOM	<0.3	0.2 - 11.9	Baker	<0.3	Spectrophotometric analysis
Ammoniacal Nitrogen -N	<0.2	<0.16 - 2.5	Baker	<0.2	Colorimetric Spectrophotometry
Potassium	0.6	6.4 - 11.0	Baker	<0.2	Flame Photometer
Sodium	13.6	20.5 - 74	Baker	<0.2	Flame Photometer
TOC	5	3.0 - 22	Baker	<1	IR
Elec. Conductivity (mS/cm)	0.911	0.840 - 0.996	Baker	<0.025	Meter
Dissolved Oxygen	9.5	0.5 - 8.9	Baker	<0.1	Meter
pH	8.91	6.77 - 8.10	Baker	<0.01	Meter
Boron	<0.05	0.05-0.07	Baker	<0.05	ICP
Calcium	118.5	124-133.6	Baker	<0.05	ICP
Magnesium	10.48	10.55-11.78	Baker	<0.05	ICP
Phosphorus	<0.05	<0.05	Baker	<0.05	ICP
ortho Phosphate as PO4	-	<0.03	Baker	<0.03	KONE
Fluoride	0.1	0.20-<0.05	Baker	<0.01	Spectrophotometric analysis
Sulphate	31	40-33	Baker	<5	Spectrophotometric analysis
Total Cyanide	<0.05	<0.05	Baker	<0.05	Spectrophotometric analysis
Mercury (ug/L)	<0.05	<0.05	Baker	<0.05	CVAAS
Total Solids	-	348-468	Baker	-	Grav
Cadmium (ug/L)	<0.4	<0.4	Baker	<0.4	ICP-USB
Chromium (ug/L)	5	<1	Baker	<1	ICP-USB
Copper (ug/L)	<5	29-<0.05	Baker	<5	ICP-USB
Iron (ug/L)	<1	2-420	Baker	<1	ICP-USB
Manganese (ug/L)	5	<1-16	Baker	<1	ICP-USB
Lead (ug/L)	<5	<5	Baker	<5	ICP-USB
Zinc (ug/L)	<5	32-<0.05	Baker	<5	ICP-USB
Total Alkalinity	280	360-410	Baker	<1	Titration
Total Coliforms (mpn/100ml)	6	8-1203	Baker	<1	Count
Faecal Coliforms (mpn/100ml)	<1	<1	Baker	<1	Count
VOC (ug/L)	<1	<1	Baker	<1	GCMS
SVOC (ug/L)					
Naphthalene	<1	2, 5	Baker	<1	GCMS
2-Methylnaphthalene					
Organo-Chlorine and Organo-Phosphorous Pesticides (ng/L)	<10	<10	Baker	<10	GCMS

\* denotes range between February 2001 and September 2003

**Groundwater Monitoring - BH-5 - greenstar Materials Recovery Ltd - Bray Depot**

	Results (mg/l)				
	4th Quarter 2003	Previous	Sampling Method	Method Detection Limit	Analysis method/ technique
	20/11/2003	Range**			
Temperature (°C)	16.1	13.3 - 16.4	Baker	0-100	Temperature probe
Chloride	74	34 - 136	Baker	<8	Spectrophotometric analysis
TON	0.4	<0.3 - 6.6	Baker	<0.3	Spectrophotometric analysis
Ammoniacal Nitrogen -N	4.3	1.3 - 8.4	Baker	<0.2	Colorimetric Spectrophotometry
Potassium	4.6	9.6 - 27.8	Baker	<0.2	Flame Photometer
Sodium	148	32 - 125	Baker	<0.2	Flame Photometer
TOC	11	6.0-28	Baker	<1	IR
Elec. Conductivity (mS/cm)	3.100	1.063 - 2.270	Baker	<0.028	Meter
Dissolved Oxygen	9.2	1.8 - 8.8	Baker	<0.1	Meter
pH	6.64	6.19 - 7.70	Baker	<0.01	Meter
Boron	0.21	0.65-0.16	Baker	<0.05	ICP
Calcium	348.3	357.70-347.9	Baker	<0.05	ICP
Magnesium	37.2	32.75-30.75	Baker	<0.05	ICP
Phosphorus	0.34	0.16-<0.05	Baker	<0.05	ICP
ortho Phosphate as PO4	0.09	<0.03	Baker	<0.03	KONE
Fluoride	<0.1	0.60-<0.5	Baker	<0.01	Spectrophotometric analysis
Sulphate	502	402-432	Baker	<1	Spectrophotometric analysis
Total Cyanide	<0.05	<0.05	Baker	<0.05	Spectrophotometric analysis
Mercury (mg/L)	<0.05	-	Baker	-	CVAAS
Total Solids	-	1822-2053	Baker	<1	Grav
Cadmium (mg/L)	<0.05	mdl	Baker	<0.05	ICP-USN
Chromium (mg/L)	<0.05	mdl	Baker	<0.05	ICP-USN
Copper (mg/L)	<0.05	mdl	Baker	<0.05	ICP-USN
Iron (mg/L)	<0.05	0.011 - 0.74	Baker	<0.05	ICP-USN
Manganese (mg/L)	0.48	0.15 - 0.222	Baker	<0.05	ICP-USN
Lead (mg/L)		<5	Baker		ICP-USN
Zinc (mg/L)	<0.05	0.047-mdl	Baker	<0.05	ICP-USN
Total Alkalinity	380	580-620	Baker	<1	Titration
Total Coliforms (mpn/100ml)	<1	>180-73	Baker	<1	Count
Faecal Coliforms (mpn/100ml)	<1	21-<1	Baker	<1	Count
VOC (ug/L)	<1	<1	Baker	<1	GCMS
SVOC (ug/L)	<1	<1	Baker	<1	GCMS
Organo-Chlorine and Organo-Phosphorous Pesticides (ng/L)	<10	<10	Baker	<10	GCMS

mdl = Method Detection Limit

\*\* denote range between February 2001 and September 2003

**Groundwater Monitoring - BH-6 - greenstar Materials Recovery Ltd - Bray Depot**

	Results (mg/l)		Sampling Method	Method Detection Limit	Analysis method/ technique
	4th Quarter 2003	Previous Ranges **			
	20/11/2003				
Temperature (°C)	13	10.5 - 14.9	Batter	0-100	Temperature probe
Chloride	31	19 - 46	Batter	<3	Spectrophotometric analysis
TON	<0.03	<0.3 - 6.4	Batter	<0.3	Spectrophotometric analysis
Ammoniacal Nitrogen -N	<0.6	<0.16 - 3.7	Batter	<0.2	Colorimetric Spectrophotometry
Potassium	1.6	0.3 - 2.6	Batter	<0.2	Flame Photometer
Sodium	16.6	16.0 - 32.6	Batter	<0.2	Flame Photometer
TOC	4	<2 - 37	Batter	<1	IR
Elec. Conductivity (mS/cm)	0.66	0.661 - 0.661	Batter	<0.025	Meter
Dissolved Oxygen	10.2	3.4 - 9.04	Batter	<0.1	Meter
pH	6.97	6.65 - 7.60	Batter	<0.01	Meter
Boron	<0.05	<0.05	Batter	<0.05	ICP
Calcium	115.3	192.90-131.3	Batter	<0.05	ICP
Magnesium	9.79	10.04-6.98	Batter	<0.05	ICP
Phosphorus	0.94	0.07-<0.05	Batter	<0.05	ICP
ortho Phosphate as PO4	0.05	<0.03	Batter	<0.03	KONE
Fluoride	0.2	0.20-<0.05	Batter	<0.01	Spectrophotometric analysis
Sulphate	22	45-58	Batter	<3	Spectrophotometric analysis
Total Cyanide	0.05	<0.05	Batter	<0.03	Spectrophotometric analysis
Mercury (mg/L)	<0.05	<0.05	Batter	<0.05	GVAAS
Total Solids	-	2222-1955	Batter	<1	Grav
Cadmium (mg/L)	<0.05	mdl	Batter	<0.05	ICP-USB
Chromium (mg/L)	<0.05	mdl	Batter	<0.05	ICP-USB
Copper (mg/L)	<0.05	mdl	Batter	<0.05	ICP-USB
Iron (mg/L)	<0.05	mdl-0.44	Batter	<0.05	ICP-USB
Manganese (mg/L)	<0.05	0.003 - 0.011	Batter	<0.05	ICP-USB
Lead (mg/L)		<3	Batter		ICP-USB
Zinc (mg/L)	<0.05	0.057-mdl	Batter	<0.05	ICP-USB
Total Alkalinity	360	590-310	Batter	<1	Titration
Total Coliforms (mpn/100ml)	960	91-28	Batter	<1	Count
Faecal Coliforms (mpn/100ml)	<1	16-<1	Batter	<1	Count
VOC (ug/l)	<1	<1	Batter	<1	GCMS
SVOC (ug/L)	<1	<1	Batter	<1	GCMS
Organo-Chlorine and Organo-Phosphorous Pesticides (ng/L)	<10	<10	Batter	<10	GCMS

mdl = Method Detection Limit

\*\* denotes range between February 2001 and September 2003

NS - no sample taken - well dry



**Groundwater Monitoring - BH-7 - greenstar Materials Recovery Ltd - Bray Depot**

	Results (mg/l)		Sampling Method	Method Detection Limit	Analysis method/ technique
	4th Quarter 2003	Previous Ranges **			
	29/11/2003				
Temperature (°C)	11.1	9.1 - 13.1	Baker	0-100	Temperature probe
Chloride	23	23 - 58	Baker	<5	Spectrophotometric analysis
TON	3.2	0.4 - 2.8	Baker	<0.3	Spectrophotometric analysis
Ammoniacal Nitrogen -N	<0.2	0.15 - 3.2	Baker	<0.2	Colorimetric Spectrophotometry
Potassium	0.8	0.8 - 2.4	Baker	<0.2	Flame Photometer
Sodium	17	18 - 46	Baker	<0.2	Flame Photometer
TOC	<2	2 - 10	Baker	<1	IR
Elec. Conductivity (mS/cm)	0.416	0.456 - 0.636	Baker	<0.025	Meter
Dissolved Oxygen	9.7	1.4 - 9.19	Baker	<0.1	Meter
pH	6.8	6.68 - 8.29	Baker	<0.01	Meter
Boron	<0.05	<0.05	Baker	<0.05	ICP
Calcium	169.4	136.40-103.7	Baker	<0.05	ICP
Magnesium	10.06	9.69-9.08	Baker	<0.05	ICP
Phosphorus	0.50	0.06-<0.05	Baker	<0.05	ICP
ortho Phosphate as PO4	0.05	<0.03	Baker	<0.03	KONE
Fluoride	<0.01	0.20<0.5	Baker	<0.01	Spectrophotometric analysis
Sulphate	57	25-26	Baker	<3	Spectrophotometric analysis
Total Cyanide	<0.05	<0.05	Baker	<0.05	Spectrophotometric analysis
Mercury (mg/L)	<0.05	<0.05	Baker	<0.05	CVAAS
Total Solids	-	552-508	Baker	<1	Grav
Cadmium (mg/L)	<0.05	mdl	Baker	<0.05	ICP-USEN
Chromium (mg/L)	<0.05	mdl	Baker	<0.05	ICP-USEN
Copper (mg/L)	<0.05	mdl	Baker	<0.05	ICP-USEN
Iron (mg/L)	0.05	0.002 - 0.320	Baker	<0.05	ICP-USEN
Manganese (mg/L)	2.9	0.001 - 1.231	Baker	<0.05	ICP-USEN
Lead (mg/L)	<0.05	<5	Baker	<0.05	ICP-USEN
Zinc (mg/L)	<0.05	0.050-mdl	Baker	<0.05	ICP-USEN
Total Alkalinity	320	330-300	Baker	<1	Titration
Total Coliforms (mpn/100ml)	<1	2-<1	Baker	<1	Count
Faecal Coliforms (mpn/100ml)	<1	<1	Baker	<1	Count
VOC (ug/L)	<1	<1	Baker	<1	GCMS
SVOC (ug/L)	<1	<1	Baker	<1	GCMS
Organo-Chlorine and Organo-Phosphorous Pesticides (ng/L)	<10	<10	Baker	<10	GCMS

\*\* denotes ranges between February 2001 and September 2003  
mdl = Method Detection Limit



**Surface Water Monitoring - SW-1 - greenstar Materials Recovery Ltd - Bray Depot**

	Results (mg/l)	Previous Ranges*	Sampling Method	Method Detection Limit	Analysis method/ technique
	4th Quarter 2003 28/11/2003				
Temperature (°C)	8.88	6.1 - 13.6	Grab	1-100	Temperature probe
Chloride	28	21 - 42	Grab	<6	Spectrophotometric analysis
COD	<15	<10 - 49	Grab	<15	Spectrophotometric analysis
Nitrite	<0.05	<0.03 - 22.66	Grab	<0.05	Spectrophotometric analysis
BOD	2	<1 - 19	Grab	<1	ATU
Ammoniacal Nitrogen -N	<0.2	<0.2 - 0.63	Grab	<0.2	Colometric Spectrophotometry
Tot. Susp. Solids	<10	<6 - 48	Grab	<10	Grav
Total Phenols	<0.01	<0.01 - 0.01	Grab	<0.01	HPLC
Elec. Conductivity (mS/cm)	0.91	0.490 - 0.628	Grab	<0.025	Meter
Dissolved Oxygen	9.2	4.4 - 10.6	Grab	<0.1	Meter
pH	8.88	7.85 - 8.40	Grab	<0.01	Meter
Calcium	95.7	110.50-62.39	Grab	<0.05	ICP
Magnesium	8.61	8.47-5.99	Grab	<0.05	ICP
Phosphorus	<0.05	0.12-<0.05	Grab	<0.05	ICP
ortho Phosphate as PO4	0.06	0.1	Grab	<0.03	KONE
Sulphate	26	21-24	Grab	<3	Spectrophotometric analysis
Total Oxidised Nitrogen	6.5	7.5-6.0	Grab	<0.3	Spectrophotometric analysis
Mercury (ug/L)	<0.05	0.26-<0.05	Grab	<0.05	CVAAS
Potassium	0.6	2.1-2.2	Grab	<0.2	Flame Photometry
Sodium	16.6	19-15	Grab	<0.2	Flame Photometry
Cadmium (ug/L)	<0.4	<0.4	Grab	<0.4	ICP-USN
Chromium (ug/L)	8	<1	Grab	<1	ICP-USN
Copper (ug/L)	<5	<5	Grab	<5	ICP-USN
Iron (ug/L)	<1	250-4	Grab	<1	ICP-USN
Manganese (ug/L)	5	<1-4	Grab	<1	ICP-USN
Lead (ug/L)	<5	<5	Grab	<5	ICP-USN
Zinc (ug/L)	<5	60<5	Grab	<5	ICP-USN
Total Alkalinity as CaCO3	360	270-170	Grab	<1	Titration
VOC (ug/L)	<1	<1	Grab	<1	GCMS
SVOC (ug/L)					
2-Methylnaphthalene	3	<1	Grab	<1	GCMS
Organo-Chlorine and Organo-Phosphorous Pesticides (ng/L)	<10	<10	Grab	<10	GCMS

\* denotes range between March 2000 and September 2003

**Surface Water Monitoring - SW-2 - greenstar Materials Recovery Ltd - Bray Depot**

	Results (mg/l)		Sampling Method	Method Detection Limit	Analysis method/ technique
	4th Quarter 2003	Previous Ranges *			
	26/11/2003				
Temperature (°C)	8.33	7.5 - 13.0	Grab	1-100	Temperature probe
Chloride	28	22 - 30	Grab	<6	Spectrophotometric analysis
COD	<15	<10 - 84	Grab	<15	Spectrophotometric analysis
Nitrite	<0.05	<0.03 - 24.13	Grab	<0.05	Spectrophotometric analysis
BOD	2	<1 - 11	Grab	<1	ATU
Ammoniacal Nitrogen -N	<0.2	0.10 - 3.00	Grab	<0.2	Colorimetric Spectrophotometry
Tot. Susp. Solids	<10	<10 - 51	Grab	<10	Grav
Total Phenols	<0.01	<0.01 - 0.02	Grab	<0.01	HPLC
Elec. Conductivity (mS/cm)	0.316	0.446 - 0.622	Grab	<0.025	Meter
Dissolved Oxygen	9.7	0.3 - 9.7	Grab	<0.1	Meter
pH	8.34	7.37 - 8.47	Grab	<0.01	Meter
Calcium	95.72	103.50-63.21	Grab	<0.05	ICP
Magnesium	8.82	6.10-6.09	Grab	<0.05	ICP
Phosphorus	<0.05	0.09-<0.5	Grab	<0.05	ICP
ortho Phosphate as PO4	0.06	0.1	Grab	<0.03	KONE
Sulphate	26	28-25	Grab	<3	Spectrophotometric analysis
Total Oxidised Nitrogen	6.7	7.6-6.1	Grab	<0.3	Spectrophotometric analysis
Mercury (ug/L)	<0.05	0.07-<0.05	Grab		CVAAS
Potassium	1	2.1-2.2	Grab	<0.2	Flame Photometry
Sodium	16.6	22-15.3	Grab	<0.2	Flame Photometry
Cadmium (ug/L)	<0.4	<0.4	Grab	<0.4	ICP-MS
Chromium (ug/L)	<1	<1	Grab	<1	ICP-MS
Copper (ug/L)	<5	<5	Grab	<5	ICP-MS
Iron (ug/L)	<1	340-<1	Grab	<1	ICP-MS
Manganese (ug/L)	6	<1-4	Grab	<1	ICP-MS
Lead (ug/L)	<5	<5	Grab	<5	ICP-MS
Zinc (ug/L)	<5	34-<5	Grab	<5	ICP-MS
Total Alkalinity as CaCO3	270	260-170	Grab	<1	Titration
VOC (ug/L)	<1	<1	Grab	<1	GCMS
SVOC (ug/L)	<1	<1	Grab	<1	GCMS
Organo-Chlorine and Organo-Phosphorous Pesticides (ng/L)	<10	<10	Grab	<10	GCMS

\* denotes range between March 2000 and September 2003

# Surface Water Monitoring - SW-3 - greenstar Materials Recovery Ltd -Bray Depot

	Results (mg/l)		Sampling Method	Method Detection Limit	Analyse method/ technique
	4th Quarter 2003 28/11/2003	Previous Range *			
Temperature (°C)	8.34	7.8 - 13.8	Grab	1-100	Temperature probe
Chloride	28	21 - 64	Grab	<5	Spectrophotometric analysis
COD	<15	<10 - 42	Grab	<15	Spectrophotometric analysis
Nitrite	<0.05	<0.03 - 23.82	Grab	<0.05	Spectrophotometric analysis
BOD	<2	<1 - 13	Grab	<1	ATU
Ammoniacal Nitrogen -N	<0.2	<0.18 - 1.70	Grab	<0.2	Colorimetric Spectrophotometry
Tot. Susp. Solids	<10	<8 - 112	Grab	<10	Grav
Total Phenols	<0.01	<0.01 - 0.02	Grab	<0.01	HPLC
Elec. Conductivity (mS/cm)	0.307	0.485 - 1.067	Grab	<0.025	Meter
Dissolved Oxygen	10.2	<0.1 - 9.8	Grab	<0.1	Meter
pH	8.33	7.44 - 8.82	Grab	<0.01	Meter
Calcium	95.28	104.60-63.72	Grab	<0.05	ICP
Magnesium	9.03	8.19-6.1	Grab	<0.05	ICP
Phosphorus	<0.05	0.06-<0.05	Grab	<0.05	ICP
ortho Phosphate as PO4	0.05	0.1	Grab	<0.03	KONE
Sulphate	26	24-23	Grab	<3	Spectrophotometric analysis
Total Oxidised Nitrogen	6.5	7.6-6.0	Grab	<0.3	Spectrophotometric analysis
Mercury (ug/L)	<0.05	4.49-<0.05	Grab		CVAAS
Potassium	2.2	2.1-2.2	Grab	<0.2	Flame Photometry
Sodium	17.0	21-15.8	Grab	<0.2	Flame Photometry
Cadmium (ug/L)	<0.4	<0.4	Grab	<0.4	ICP-USB
Chromium (ug/L)	8	<1	Grab	<1	ICP-USB
Copper (ug/L)	<5	<5	Grab	<5	ICP-USB
Iron (ug/L)	<1	330-<1	Grab	<1	ICP-USB
Manganese (ug/L)	5	<1-4	Grab	<1	ICP-USB
Lead (ug/L)	<5	<5	Grab	<5	ICP-USB
Zinc (ug/L)	<5	55-<5	Grab	<5	ICP-USB
Total Alkalinity as CaCO3	230	260-150	Grab	<1	Titration
VOC (ug/L)	<1	<1	Grab	<1	GCMS
BVOC (ug/L)	<1	<1	Grab	<1	GCMS
Organo-Chlorine and Organo-Phosphorous Pesticides (ng/L)	<10	<10	Grab	<10	GCMS

\* denotes range between March 2000 and September 2003

**Surface Water Monitoring - SW-4 - greenstar Materials Recovery Ltd - Bray Depot**

	Results (mg/l)		Sampling Method	Method Detection Limit	Analysis method/ technique
	4th Quarter 2003 28/11/2003	Previous Ranges *			
Temperature (°C)	8.98	7.7 - 13.7	Grab	1-100	Temperature probe
Chloride	28	22 - 39	Grab	<5	Spectrophotometric analysis
COD	<16	<10 - 36	Grab	<16	Spectrophotometric analysis
Nitrite	<0.05	<0.03 - 25.12	Grab	<0.05	Spectrophotometric analysis
BOD	<2	<1 - 6	Grab	<1	ATU
Ammoniacal Nitrogen -N	<0.2	0.16 - 2.60	Grab	<0.2	Colorimetric Spectrophotometry
Tot. Susp. Solids	<10	<10 - 84	Grab	<10	Grav
Total Phenols	<0.01	<0.01 - 0.01	Grab	<0.01	HPLC
Elec. Conductivity (mS/cm)	0.311	0.466 - 0.631	Grab	<0.025	Meter
Dissolved Oxygen	10.00	<0.1 - 9.9	Grab	<0.1	Meter
pH	8.98	7.63 - 8.40	Grab	<0.01	Meter
Calcium	95.36	106.90-63.36	Grab	<0.05	ICP
Magnesium	8.87	8.33-6.06	Grab	<0.05	ICP
Phosphorus	<0.05	0.06-0.05	Grab	<0.05	ICP
ortho Phosphate as PO4	0.05	0.1	Grab	<0.03	KONE
Sulphate	27	24-22	Grab	<3	Spectrophotometric analysis
Total Oxidised Nitrogen	6.5	7.5-6.2	Grab	<0.3	Spectrophotometric analysis
Mercury (ug/L)	<0.05	<0.05	Grab		CVAAS
Potassium	2.0	2.2-20	Grab	<0.2	Flame Photometry
Sodium	16.8	21.5-15.5	Grab	<0.2	Flame Photometry
Cadmium (ug/L)	<0.4	<0.4	Grab	<0.4	ICP-USN
Chromium (ug/L)	<1	<1	Grab	<1	ICP-USN
Copper (ug/L)	<5	<5	Grab	<5	ICP-USN
Iron (ug/L)	<1	300-<1	Grab	<1	ICP-USN
Manganese (ug/L)	5	<1-3	Grab	<1	ICP-USN
Lead (ug/L)	<5	<5	Grab	<5	ICP-USN
Zinc (ug/L)	<5	49-<5	Grab	<5	ICP-USN
Total Alkalinity as CaCO3	260	260-170	Grab	<1	Titration
VOC (ug/L)	<1	<1	Grab	<1	GCMS
SVOC (ug/L)	<1	<1	Grab	<1	GCMS
Organo-Chlorine and Organo-Phosphorous Pesticides (ng/L)	<10	<10	Grab	<10	GCMS

\* denotes range between March 2000 and September 2003

**Groundwater Monitoring - BH-6 Greenstar Materials Recovery Ltd. - Bray Depot**

	Results (mg/l)		Sampling Method	Method Detection Limit	Analysis method/ technique
	1st Quarter 2004	Previous Ranges			
	29/03/2004				
Temperature (°C)	NDP	8.4 - 14.9	Baller	0-100	Temperature probe
Chloride	21	19 - 90	Baller	<1	Spectrophotometric analysis
Ammoniacal Nitrogen -N	<0.2	<0.16 - 3.7	Baller	<0.2	Colormetric Spectrophotometry
TOC	7	<2 - 37	Baller	<1	IR
Elec. Conductivity (mS/cm)	0.717	0.681 - 0.861	Baller	<0.014	Meter
Dissolved Oxygen	5.4	3.4 - 9.04	Baller	<0.1	Meter
pH	7.62	6.95 - 7.90	Baller	<0.01	Meter

**Groundwater Monitoring - BH-7 Greenstar Materials Recovery Ltd. - Bray Depot**

	Results (mg/l)		Sampling Method	Method Detection Limit	Analysis method/ technique
	1st Quarter 2004	Previous Ranges			
	29/03/2004				
Temperature (°C)	NDP	9.1 - 13.1	Baller	0-100	Temperature probe
Chloride	28	23 - 92	Baller	<1	Spectrophotometric analysis
Ammoniacal Nitrogen -N	0.3	0.16 - 6.4	Baller	<0.2	Colormetric Spectrophotometry
TOC	7	2 - 49	Baller	<1	IR
Elec. Conductivity (mS/cm)	0.613	0.465 - 0.835	Baller	<0.014	Meter
Dissolved Oxygen	5.6	1.4 - 9.19	Baller	<0.1	Meter
pH	7.09	6.68 - 8.23	Baller	<0.01	Meter

Groundwater Monitoring - BH-2 Greentax Materials Recovery Ltd. - Bray Depot

	Results (mg/l)		Sampling Method	Method Detection Limit	Analysis method/ technique
	1st Quarter 2004	Previous Ranges			
	29/03/2004				
Temperature (°C)	NDP	6.9 - 16.5	Bailer	0-100	Temperature probe
Chloride	20	25 - 102	Bailer	<1	Spectrophotometric analysis
Ammoniacal Nitrogen -N	<0.2	<0.16 - 2.5	Bailer	<0.2	Colometric Spectrophotometry
TOC	10	<2 - 72	Bailer	<1	IR
Elec. Conductivity (mS/cm)	0.689	0.540 - 0.996	Bailer	<0.014	Meter
Dissolved Oxygen	4.9	0.5 - 8.9	Bailer	<0.1	Meter
pH	7.38	6.77 - 8.10	Bailer	<0.01	Meter

Groundwater Monitoring - BH-6 Greentax Materials Recovery Ltd. - Bray Depot

	Results (mg/l)		Sampling Method	Method Detection Limit	Analysis method/ technique
	1st Quarter 2004	Previous Ranges			
	29/03/2004				
Temperature (°C)	NDP	13.3 - 18.9	Bailer	0-100	Temperature probe
Chloride	74	34 - 188	Bailer	<1	Spectrophotometric analysis
Ammoniacal Nitrogen -N	4.4	1.3 - 9.8	Bailer	<0.2	Colometric Spectrophotometry
TOC	23	5.0-50	Bailer	<1	IR
Elec. Conductivity (mS/cm)	2.007	1.093 - 2.494	Bailer	<0.014	Meter
Dissolved Oxygen	4.9	1.6 - 8.6	Bailer	<0.1	Meter
pH	6.91	6.19 - 7.70	Bailer	<0.01	Meter



Surface Water Monitoring - SW-3 - greenstar Materials Recovery Ltd. - Bray Depot

	Results (mg/l)		Previous Ranges *	Sampling Method	Method Detection Limit	Analysis method/ technique
	1st Quarter 2004					
	29/03/2004					
Temperature (°C)	NDP	7.8 - 13.8	Grab	1-100	Temperature probe	
Chloride	26	21 - 84	Grab	<1	Spectrophotometric analysis	
COD	<16	<10 - 42	Grab	<10	Spectrophotometric analysis	
Nitrite	<0.05	<0.03 - 23.82	Grab	<0.05	Spectrophotometric analysis	
BOD	2	<1 - 13	Grab	<2	ATU	
Ammoniacal Nitrogen -N	<0.2	<0.16 - 1.70	Grab	<0.2	Colometric Spectrophotometry	
Tot. Susp. Solids	<10	<5 - 112	Grab	<10	Grav	
Total Phenols	<0.01	<0.01 - 0.02	Grab	<0.01	HPLC	
Elec. Conductivity (mS/cm)	0.529	0.485 - 1.067	Grab	<0.014	Meter	
Dissolved Oxygen	5.9	<0.1 - 9.8	Grab	<0.1	Meter	
pH	8.35	7.44 - 8.62	Grab	<0.01	Meter	

Surface Water Monitoring - SW-4 greenstar Materials Recovery Ltd. - Bray Depot

	Results (mg/l)		Previous Ranges *	Sampling Method	Method Detection Limit	Analysis method/ technique
	1st Quarter 2004					
	29/03/2004					
Temperature (°C)	NDP	7.7 - 13.7	Grab	1-100	Temperature probe	
Chloride	25	22 - 91	Grab	<1	Spectrophotometric analysis	
COD	<16	<10 - 38	Grab	<10	Spectrophotometric analysis	
Nitrite	<0.05	<0.03 - 25.12	Grab	<0.05	Spectrophotometric analysis	
BOD	<2	<1 - 8	Grab	<2	ATU	
Ammoniacal Nitrogen -N	<0.2	0.16 - 2.80	Grab	<0.2	Colometric Spectrophotometry	
Tot. Susp. Solids	<10	<10 - 84	Grab	<10	Grav	
Total Phenols	<0.01	<0.01 - 0.01	Grab	<0.01	HPLC	
Elec. Conductivity (mS/cm)	0.53	0.466 - 0.831	Grab	<0.014	Meter	
Dissolved Oxygen	5.8	<0.1 - 9.9	Grab	<0.1	Meter	
pH	8.33	7.63 - 8.40	Grab	<0.01	Meter	

Surface Water Monitoring - SW-1 greenstar Materials Recovery Ltd. - Bray Depot

	Results (mg/l)		Previous Ranges*	Sampling Method	Method Detection Limit	Analysis method/ technique
	1st Quarter 2004	2nd Quarter 2004				
	Temperature (°C)	NDP				
Chloride	26		21 - 90	Grab	<1	Spectrophotometric analysis
COD	<15		<10 - 49	Grab	<10	Spectrophotometric analysis
Nitrite	<0.05		<0.03 - 22.88	Grab	<0.05	Spectrophotometric analysis
BOD	<0.2		<1 - 19	Grab	<2	ATU
Ammoniacal Nitrogen -N	<0.2		<0.2 - 3.0	Grab	<0.2	Colometric Spectrophotometry
Tot. Susp. Solids	<10		<5 - 48	Grab	<10	Grav
Total Phenols	0.01		0.01 - <0.1	Grab	<0.01	HPLC
Elec. Conductivity (mS/cm)	0.538		0.460 - 0.628	Grab	<0.014	Meter
Dissolved Oxygen	5.7		4.4 - 10.6	Grab	<0.1	Meter
pH	8.25		7.35 - 8.40	Grab	<0.01	Meter

Surface Water Monitoring - SW-2 greenstar Materials Recovery Ltd. - Bray Depot

	Results (mg/l)		Previous Ranges *	Sampling Method	Method Detection Limit	Analysis method/ technique
	1st Quarter 2004	2nd Quarter 2004				
	Temperature (°C)	NDP				
Chloride	26		22 - 91	Grab	<1	Spectrophotometric analysis
COD	<15		<10 - 34	Grab	<10	Spectrophotometric analysis
Nitrite	<0.05		<0.03 - 24.13	Grab	<0.05	Spectrophotometric analysis
BOD	<0.2		<1 - 11	Grab	<2	ATU
Ammoniacal Nitrogen -N	<0.2		0.16 - 3.00	Grab	<0.2	Colometric Spectrophotometry
Tot. Susp. Solids	<10		<10 - 81	Grab	<10	Grav
Total Phenols	<0.01		<0.01 - 0.02	Grab	<0.01	HPLC
Elec. Conductivity (mS/cm)	0.532		0.446 - 0.622	Grab	<0.014	Meter
Dissolved Oxygen	5.7		0.3 - 9.7	Grab	<0.1	Meter
pH	8.29		7.37 - 8.47	Grab	<0.01	Meter



**Noise Survey - greenstar Materials Recovery Ltd - Bray**

Measurements were conducted over the course of a single survey period 10:47hrs to 16:13hrs on 27/11/03

Location	Time	Period			Comments
			Leq (dB)	LA90 (dB)	
N1	12.29 - 12.59	Day	71	50	Vehicle movements into and out of site.
N1	14.43 - 15.13	Day	66	54	
N2	10.46 - 11.16	Day	60	55	Roadsweeper Audible 1st Period
N2	13.02 - 13.32	Day	52	45	
N3	11.18 - 11.48	Day	60	53	Roadsweeper Audible 1st Period
N3	13.35 - 14.05	Day	54	49	
N4	11.53 - 12.23	Day	47	43	Noise From Stream
N4	14.09 - 14.39	Day	44	41	

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greentier - Bray - Methane Levels (% v/v) for Jan 2003 - Mar 2004

	21/01/2003	17/02/2003	24/03/2003	29/04/2003	30/05/2003	16/06/2003	22/07/2003	22/08/2003	09/09/2003	31/10/2003	29/11/2003	10/12/2003	27/01/2004	26/02/2004	26/03/2004
GS-01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GS-05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GS-06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GS-07							0	0	0	0	0	0	0	0	0
GS-08							0	0	0	0	0	0	0	0	0
GS-09							0	0	0	0	0	0	0	0	0
GS-10							0	0	0	0	0	0	0	0	0
GS-11							0	0	0	0.3	0	0	0	0	0
BH-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BH-5	0	0	0	0	0	0	1.1	0	0	0	0	0	0	0	0
BH-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BH-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L-01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L-02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

greentier - Bray - Carbon Dioxide Levels (% v/v) for Jan 2003 - Mar 2004

	21/01/2003	17/02/2003	24/03/2003	29/04/2003	30/05/2003	16/06/2003	22/07/2003	22/08/2003	09/09/2003	31/10/2003	29/11/2003	10/12/2003	27/01/2004	26/02/2004	26/03/2004
GS-01	2.3	6.7	3.7	0	8.9	8.8	3.4	1.4	2.3	0	2.1	2.3	4.2	2.2	6.5
GS-05	0	2.9	2.1	0.2	3.2	5.6	3.8	3.4	2.7	0.2	2.2	2.2	2.9	3.8	2.2
GS-06	0	5.2	6.7	7.6	7.7	10	10	1.1	0.8	5.8	0.7	2.3	7.9	7.8	3.7
GS-07							7.1	4.3	0	0	0.2	9	9		
GS-08							10.1	4.7	0.2	6.3	0.6	1.1	2.1	7.9	11
GS-09							3.6	4.1	2.3	0	2.3	2.1	7.9	9.3	2.2
GS-10															
GS-11							11	11	11	9.3	10	12	12.4	13	12
BH-2	0.6	0.3	0.2	0	0	0	0	0	0	0.4	0	0.1	0.1	0	0.1
BH-5	0.1	4.8	0	0	16	15	13	0.1	0.3	0	0.4	0.1	0.1	2.8	0.1
BH-6	0.2	0.1	0.7	2.3	0	5	1.4	0.1	0	0.1	0.1	0.1	0.4	0.4	0.1
BH-7	0	0.1	20.1	0	0	0.1	0	0.2	0.1	0	0	0	0.6	14	0
L-01	13	8	8.2	0	13	12.8	3.8	0.8	12	3.8	6.5	6.5	2.6	11	6.5
L-02	7.2	0	18.8	0	7.1	8	18	3.1	18	0.4					6.5

greentier - Bray - Oxygen Levels for Jan 2003 - Mar 2004

	21/01/2003	17/02/2003	24/03/2003	29/04/2003	30/05/2003	16/06/2003	22/07/2003	22/08/2003	09/09/2003	31/10/2003	29/11/2003	10/12/2003	27/01/2004	26/02/2004	26/03/2004
GS-01	16	8.9	8.8	19.7	6.9	7.3	14	17.9	18.2	17.7	17.2	17	13.2	17.2	16.8
GS-05	15.8	17.8	18.6	19.4	16.1	12.9	14.3	16.2	17.9	15.1	17.1	17	15.8	14.5	15.9
GS-06	13	15.2	12.8	11.5	11.8	9	7.7	18	19	6.5	17.8	17.1	11.5	11.5	13.4
GS-07							9.6	6	18.2	17.6	18	9.5	9.5		
GS-08							6.4	3.4	18	3.9	17.9	12.9	17.2	11.5	9.3
GS-09							13	13.6	14.1	17.5	17.1	17.2	11.3	7.5	17.2
GS-10															
GS-11							7.8	6.8	6.6	5	8	7	7	4.6	7
BH-2	20.3	20.1	20.1	19.7	19.6	19.3	19.2	18.3	19.2	17.8	18	17.5	12.9	17.2	17.5
BH-5	20.3	17.8	19.7	12.5	0	0	0.9	18.4	18.8	17.8	17.9	17	17.8	14	17
BH-6	20.1	20.4	18.9	17.5	19.5	13.6	18	18.3	19.8	17.8	18.1	17.5	17.7	17	17.5
BH-7	20.4	20.4	20.1	19.7	19.6	19.4	19.2	18.5	19.1	17.7	18.1	18.1	17	16.9	18.1
L-01	2.1	14.5	3.2	10	6.7	2.4	13.5	16.9	3.7	14.4	16.3	16.3	14.4	0.2	16.3
L-02	9.1	19.6	18.6	19.7	3.4	8.9	0.4	16.8	0	17.4				4.9	16.3

**Biological Monitoring SW-1**

River	Site Number	Date	Temp	Flow	Turbidity
Glenmunder	SW-1 (T2)	25/08/2003	14.4	Moderate	Low

Group A		Group B		Group C		Group D		Group E	
Name	Number	Name	Number	Name	Number	Name	Number	Name	Number
Plecoptera	1	Ephemeroptera (excl. Heptagenilidae, Ephemeridae and <i>B. rhodani</i> )	9	Gammaridae	97	Asellidae	0	<i>Chironomus sp.</i>	0
Heptagenilidae	0	Cased Caddis	5	<i>B. rhodani</i>	19	Hirudinea	16	Tubificidae	43
Ephemeridae	0	<i>Rheotanytarsus sp.</i>	0	Simuliidae	3	Sphaeriidae	0	Eristalinae	0
Margartifera sp.	0	<i>Aphelocheirus sp.</i>	0	Uncased Caddis	4				
				Gastropoda	9				
				Coleoptera	2				
				Astacidae	0				
				Tricladida	0				
				Odonta	0				
				Hemiptera (excl. <i>Aphelocheirus sp.</i> )	0				
				Sialidae	0				
				Hydracarina	0				
				Chironomidae (excl. <i>Chironomus sp.</i> , <i>Rheotanytarsus sp.</i> )	13				
				Tipulidae	0				
				Anodonta sp.	0				
<b>Total # organisms</b>	<b>1</b>		<b>14</b>		<b>147</b>		<b>16</b>		<b>43</b>
<b>Group %</b>	<b>0.48</b>		<b>6.33</b>		<b>66.82</b>		<b>7.24</b>		<b>19.46</b>
<b>Q-value</b>					<b>Q 3-4</b>				

**Biological Monitoring SW-1**

River	Site Number	Date	Temp	Flow	Turbidity
Glenmunder	SW-1	26/08/2003	14.4	Moderate	Low
	(T 1)				

Group A		Group B		Group C		Group D		Group E	
Name	Number	Name	Number	Name	Number	Name	Number	Name	Number
Trichoptera	3	Ephemeroptera (excl. Heptageniidae, Ephemeridae and <i>B. rhodani</i> )	17	Gammaridae	72	Asellidae	0	<i>Chironomus sp.</i>	0
Heptageniidae	0	Cased Caddis	13	<i>B. rhodani</i>	10	Hirudinea	21	Tubificidae	2
Ephemeridae	0	<i>Rheotanytarsus sp.</i>	0	Simuliidae	3	Sphaeriidae	0	Erstaliniae	0
<i>Lamprolittora sp.</i>	0	<i>Aphelocheirus sp.</i>	0	Uncased Caddis	6				
				Gastropoda	0				
				Coleoptera	0				
				Astacidae	0				
				Tricladida	0				
				Odonta	0				
				Hemiptera (excl. <i>Aphelocheirus sp.</i> )	0				
				Stalidae	0				
				Hydracarina	0				
				Chironomidae (excl. <i>Chironomus sp.</i> , <i>Rheotanytarsus sp.</i> )	7				
				Tipulidae	0				
				<i>Anodonta sp.</i>	0				
<b>Total # organisms</b>	<b>3</b>		<b>30</b>		<b>102</b>		<b>21</b>		<b>2</b>
<b>Group %</b>	<b>1.90</b>		<b>18.99</b>		<b>64.56</b>		<b>13.29</b>		<b>1.27</b>
<b>-value</b>									

**Biological Monitoring SW-4**

River	Site Number	Date	Temp	Flow	Turbidity
Glenmunder	SW-4	25/08/2003	14.4	Moderate	Low
	(T1)				

Group A		Group B		Group C		Group D		Group E	
Name	Number	Name	Number	Name	Number	Name	Number	Name	Number
Plecoptera	1	Ephemeroptera (excl. Heptageniidae, Ephemeridae and <i>B. rhodani</i> )	28	Gammaridae	148	Asellidae	0	<i>Chironomus sp.</i>	0
Heptageniidae	0	Cased Caddis	16	<i>B. rhodani</i>	21	Hirudinea	6	Tubificidae	11
Ephemeridae	0	<i>Rhectanytarsus sp.</i>	0	Simuliidae	8	Sphaeriidae	1	Eristalinae	0
Margaritifera sp.	0	<i>Aphelocheilus sp.</i>	0	Uncased Caddis	6				
				Gastropoda	9				
				Coleoptera	0				
				Astacidae	0				
				Tricladida	0				
				Odonta	1				
				Hemiptera (excl. <i>Aphelocheilus sp.</i> )	0				
				Sialidae	0				
				Hydracarina	0				
				Chironomidae (excl. <i>Chironomus sp.</i> , <i>Rhectanytarsus sp.</i> )	6				
				Tipulidae	4				
				Anodonta sp.	0				
<b>Total # organisms</b>	<b>1</b>		<b>44</b>		<b>202</b>		<b>7</b>		<b>11</b>
<b>Group %</b>	<b>0.38</b>		<b>16.60</b>		<b>76.23</b>		<b>2.64</b>		<b>4.15</b>
<b>Q-value</b>					<b>Q 3-4</b>				

**Biological Monitoring SW-4**

River	Site Number	Date	Temp	Flow	Turbidity
Glenmunder	SW-4	25/08/2003	14.4	Moderate	Low
	(T2)				

Group A		Group B		Group C		Group D		Group E	
Name	Number	Name	Number	Name	Number	Name	Number	Name	Number
Plecoptera	1	Ephemeroptera (excl. Heptageniidae, Ephemeridae and <i>B. rhodani</i> )	33	Gammaridae	84	Asellidae	0	<i>Chironomus sp.</i>	0
Heptageniidae	1	Cased Caddis	12	<i>B. rhodani</i>	11	Hirudinea	12	Tubificidae	21
Ephemeridae	0	<i>Rheotanytarsus sp.</i>	0	Simuliidae	4	Sphaeriidae	0	Eristalinae	0
<i>Margaritifera sp.</i>	0	<i>Aphelocheirus sp.</i>	0	Uncased Caddis	10				
				Gastropoda	8				
				Coleoptera					
				Astacidae	0				
				Tricladida	0				
				Odonta	0				
				Hemiptera (excl. <i>Aphelocheirus sp.</i> )	0				
				Stalidae	0				
				Hydracarina	0				
				Chironomidae (excl. <i>Chironomus sp.</i> , <i>Rheotanytarsus sp.</i> )	16				
				Tipulidae	0				
				<i>Anodonta sp.</i>	0				
<b>Total # organisms</b>	<b>2</b>		<b>45</b>		<b>131</b>		<b>12</b>		<b>21</b>
<b>Group %</b>	<b>0.95</b>		<b>21.33</b>		<b>62.09</b>		<b>5.69</b>		<b>9.95</b>
<b>Q-value</b>					<b>Q 3-4</b>				

# **APPENDIX 3**

## **Dust Evaluation Measures Report & Dust Monitoring Results**

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# **Review of Dust Controls at greenstar Materials Recovery Ltd. (Bray)**

## **Introduction**

The following report reviews the measures in place to minimise dust generation at greenstar Materials Recovery Ltd. (Bray), and includes a review of historic dust monitoring data, the effectiveness of existing dust control measures and the requirement for the implementation of further dust control measures.

This report was prepared and is submitted to the EPA in accordance with the requirements of condition 3.14.2b of the site's waste licence (53-2). Condition 3.14.2b states:

*"Within two months of the date of grant of this licence, the licensee shall review the measures in place to minimise dust generation at this facility and shall provide a report to the Agency for its agreement, making recommendations on the necessity of installing a sprinkling irrigation system for the control of dust nuisance from the facility. Any remedial works recommended in this report must be implemented within a time-scale to be agreed with the Agency."*

## **Historic Dust Monitoring Data**

greenstar Materials Recovery Ltd (Bray) carry out dust monitoring in 4 locations 3 times per year. Dust levels were exceeded in two locations (DS-2 and DS-4) in June-July '02, were exceeded once (DS-4) in Jul-Aug '02, and exceeded once (DS-2) in Oct-Nov '02. However, the reports suggested that the high levels of inorganic dust encountered at some of the monitoring points may have been associated with windblown materials from the nearby unvegetated side slopes and unpaved areas.

## **Existing and Proposed Dust Control Measures**

Every effort is made to maintain the stockpiles of processed C& D waste in a manner that does not cause dust nuisance. The size of stockpiles are minimised and waste is not processed in very windy conditions. Commercial and Industrial waste will shortly be processed on concrete hardstanding and inside an enclosed picking line. The site water bowser is used to dampen dust on site roads and all hardstanding areas, as required. The previously unvegetated side slopes have since been planted.



## **Conclusion and Recommendations**

Measures to minimise dust nuisance at the site are ongoing. On completion of phase 1 of the new transfer building towards the latter end of 2003 all processing of C&I waste will be carried out indoors.

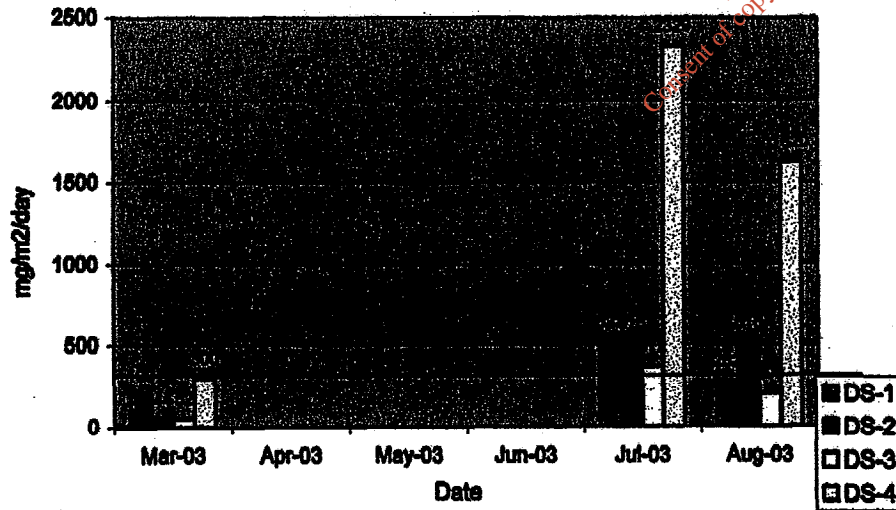
The processing of C&D will be carried out indoors within 2 years, when the proposed Transfer station phase II is constructed. As the activities will be confined within a building, the amount of dust nuisance to the environment will be reduced even further. The building will also feature dust abatement measures, such as negative air pressure. Therefore it is felt that the installation of a sprinkling irrigation system, for the control of dust nuisance is unnecessary.

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**Dust Analysis Results - greenstar Materials Recovery Ltd - Bray**

Location Number	IPC Licence Dust Deposition Limit	Mar-03	Jul-03	Aug-03
	(mg/m <sup>2</sup> /day)	Dust (mg/m <sup>2</sup> /day)	Dust (mg/m <sup>2</sup> /day)	Dust (mg/m <sup>2</sup> /day)
DS-1	350	199 (24mg organic, 175mg Inorganic)	523 (149mg organic, 374mg Inorganic)	282 (59mg organic, 223mg Inorganic)
DS-2	350	44 (15mg organic, 29mg Inorganic)	516 (169 mg organic, 347mg Inorganic)	516 (147 mg organic, 369mg Inorganic)
DS-3	350	52 (22mg organic, 30mg Inorganic)	372 (290mg organic, 82mg Inorganic)	208 ( 41mg organic, 165mg Inorganic)
DS-4	350	300 (30mg organic, 270mg Inorganic)	2329 (1181 mg organic, 1148 mg Inorganic)	1620 (418 mg organic, 1202 mg Inorganic)

**Dust Deposition Levels 2003**



# **APPENDIX 4**

## **Extent of Capping & Landfilling Report**

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# **Extent of Capping and Landfilling at greenstar Fassaroe**

## **Introduction**

Condition 4.4.1 of EPA Waste Licence Register No. 53-2 states:

*"Within four months of the date of grant of this licence, the licensee shall submit a report on the extent of capping and landfilling at the site. This report shall include details on (i) waste types previously landfilled at the site, (ii) the areas landfilled, (iii) the areas that have been restored, (iv) the type of capping employed, (v) the condition of the restored areas and (vi) recommendations on final capping to be installed. Any recommendations arising from this report and a timetable for implementation shall be agreed with the Agency and implemented."*

The following report provides details on each of the above sections. Further details are provided in Appendix A, environmental monitoring data, and in Appendix B, drawings indicating previously landfilled areas and development works at the facility.

### **(i) Waste Types previously landfilled**

On the 24<sup>th</sup> November 2000 greenstar (formerly Celtic Waste) acquired the Fassaroe facility. Landfill activities ceased immediately after the acquisition. The Fassaroe facility operated as both a quarry and landfill site between 1947 and 2000. For many years, sand and gravel was excavated at the quarry and transported to construction sites. Trucks returning from deliveries, brought with them construction and demolition waste for disposal at the facility. Thus, quarrying and landfilling of construction and demolition waste occurred simultaneously. From the period 1947 to 1995 records were not kept of the waste types nor of the quantities accepted at the Facility.

Since 1995 approximately 350,000 tonnes of inert waste material has been deposited at the facility. Most of this material was deposited at the beginning of this period to provide a base on which to construct the present waste transfer building. The quantity of inert waste subsequently decreased to approximately 40,000 tonnes per annum until the end of 2000 when landfilling activities ceased.

Environmental monitoring undertaken at the facility over the past 3 years (see extracts from the Facility's Annual Environmental Reports for 2001 and 2002 contained within Appendix A) and inspection of previously landfilled areas indicate that the facility has negligible impact on its surrounding environment and poses a minimal threat in the future. The monitoring data supports anecdotal evidence that construction and demolition waste, comprised principally of subsoil and stone, was landfilled at the facility historically. As one would expect from this waste, which is predominantly inert, environmental monitoring indicates that little or no degradation of organic matter is occurring within previously landfilled areas. There is no spoiling of the extensive sideslopes by fugitive emissions of leachate, and landfill gas, surface water and groundwater monitoring indicate that the landfill has negligible impact on its environs.

## **(ii) The areas landfilled**

It is not possible to accurately define previously landfilled areas because a pre-deposition topographic survey of the facility was never undertaken. Hence, most areas within the facility boundary other than those that follow the ground contours of neighbouring lands and appear to be original ground level (the river area and immediate surrounds and the eastern boundary etc.) are indicated as having been landfilled.

The areas suspected of having been landfilled are shown on the attached drawing no. D.1.6.

## **(iii) The areas that have been restored**

No areas have yet been fully restored. Since recording of waste quantities and waste types was initiated in 1995, inert waste was landfilled at the facility. This has provided previously landfilled construction and demolition waste with some 350,000 tonnes of subsoil and stone capping.

## **(iv) The type of capping employed**

As mentioned above, the temporary capping in place at present consists of subsoil and stone of varying depths. As no topographic survey was undertaken prior to its installation, the depth of capping cannot be confirmed at any given location. However, in recent years, excavations for various activities have indicated that the depth of capping varies between 0.5-1.5m.

## **(v) The condition of the restored areas**

The construction of Phase I of the planned development works is currently underway. The landscaped mounds shown along the northern boundary of the landfill are nearing completion. On completion of Phase I in early 2004 much of the previously landfilled area will be capped to final restoration level and to the specification detailed below. The landscape mounds at the perimeter will be complete, screening operations from neighbouring properties and directing rainwater away from landfilled areas.

## **(vi) Recommendations on final capping to be installed**

Drawing B7498-C010-B details the proposed development works. Both Phases I and II are scheduled for completion by the end of 2004. On completion of these Works, most areas previously landfilled other than sideslopes will be covered by impermeable hardstand. Areas not covered by hardstand will be topsoiled and planted. Both hardstanding and topsoiled areas will be profiled in accordance with the restoration plan (Drawing OCM-01). The restoration profile, the extent of hardstand and planting of topsoiled areas will minimise the entry of incident rainfall through the capping to previously landfilled material. This will further reduce the minimal risk of negative impacts on the facility's environs. The profile indicated on the restoration plan provides for placement of the capping materials to the following depths on top of the existing temporary capping:

**Landscaped Areas**

**1-2m of subsoil and 0.25-0.5m topsoil finish**

**Hardstand Areas**

**1-2m of subsoil and 0.25-0.5m stone sub-base and concrete/tarmacadam finish.**

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# **APPENDIX 5**

## **Fire Incident Report**

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## **Notification of Incident at greenstar Materials Recovery Ltd. (Bray) Waste licence 53-2**

**This report (as required under condition 9.1 and 11.2 of waste licence 53-2) details the incident that took place on the site on the 26<sup>th</sup> of November, and the measures that were taken to limit its effect,**

- a) **Date: 26<sup>th</sup> of November, Time: 12.00am, Place: On hardstanding in the Commercial and Industrial waste processing area.**
- b)
  - **Nature of Incident/Description**
    - i. **The Security Guard on the site noticed a fire, in a small quantity of metal waste, contained in the C&I processing area, at approximately 12.00am.**
    - ii. **After initially attempting to tackle the fire himself using fire extinguishers, the fire brigade was called.**
    - iii. **One Unit of the fire brigade arrived on site and quickly brought the fire under control.**
  - **Source & Cause: The source and cause of the fire is un-known.**
  - **Emissions: Emissions from the site were minimal, as the fire was brought under control promptly, was contained, and was on hardstanding, therefore any fire water would have discharged to foul sewer.**
- c) **The fire was put out promptly, thereby isolating the source of any emissions.**
- d) **Minimal environmental pollution was caused by the fire.**
- e) **The fire was brought under control promptly, and all fire water was directed to foul water drains, thereby all measures to minimise any control any emissions were achieved.**
- f) **A proposal will be forwarded to the Agency within one month, to identify measures to prevent reoccurrence and put in place any other remedial action.**

# **APPENDIX 6**

## **Staff Training Records**

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Training Record - GS025

Name: JAMES BEADY  
 Date of Birth: \_\_\_\_\_  
 Job Title: OPERATIONS MANAGER  
 Employment Started: \_\_\_\_\_  
 Location: BECKY  
 Promotion Date: \_\_\_\_\_ Promotion Date: \_\_\_\_\_  
 New Title: \_\_\_\_\_ New Title: \_\_\_\_\_  
 Driving Licence Details: \_\_\_\_\_

Training Details	Date/Reference	Employee Signature	Trained/Assessed by
<u>RECOVERY &amp; DISPOSAL</u>	<u>6/11/04</u>		
<u>"</u>	<u>7/11/04</u>		
<u>COMMUNICATIONS &amp; CONSULTING ENVIRONMENTAL MGT SYSTEMS</u>	<u>11/11/04</u>		

Annual Training Review

Job Title and Description:	Training Requirements:

Signature of Reviewer:	Signature of Reviewee:
Date:	Date:

Job Title and Description:	Training Requirements:

Signature of Reviewer:	Signature of Reviewee:
Date:	Date:

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# **APPENDIX 7**

## **Site Management Structure**

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**Management Structure - greenstar Materials Recovery Ltd - Bray**





# **APPENDIX 8**

## **Duty & Standby Capacity Report**

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# **Duty and Standby Capacity of Waste Handling and Processing Equipment at greenstar Materials Recovery Ltd (Bray) - Waste Licence No. 53-2**

## **Introduction**

Condition 3.9.2 of greenstar Material Recovery Ltd's (Bray) site licence requires the licensee to submit a report for the agreement of the Agency detailing the duty and standby capacity in tonnes per day, of all waste handling and processing equipment and infrastructure used at the facility. The following report seeks to satisfy the requirements of this condition.

The report provides details of the daily waste throughput at the site. Also provided is an inventory of all waste handling and processing equipment and infrastructure on site and the average daily throughput and duty and standby capacities.

## **Daily Waste Throughput**

Schedule A of the licence permits the licensee to accept 35,000 tonnes of construction and demolition (C&D) waste, 69,500 tonnes of commercial waste, 25,000 tonnes of household waste per annum. Condition 1.6 of the site licence permits waste to be accepted at the facility between the hours of 7.30 and 19.00 Monday to Saturday inclusive. Excluding Sundays and 10 bank holidays, the site is open 303 days per year. If the annual waste input to the site is taken pro rata over 303 days the average daily waste input to the site is approximately 427 tonnes per day, equivalent to 116 tonnes of C&D waste, 229 tonnes of C&I waste, and 82 tonnes of household waste.

## **Waste Handling and Processing Equipment and Infrastructure**

Table 1 provides an inventory of the site's waste handling and processing plant and infrastructure and plant details of the site. The table also provides details of the handling/processing capacity of the site's equipment/infrastructure's and the type of waste material it processes on site.

**Table 1. - Inventory of Waste Handling and Processing Equipment and Infrastructure**

No	Description	Waste Type	Average Throughput (t/day)	Duty Capacity (t/day)	Standby Capacity (t/day)
1	Waste Transfer Building	Household	82	150	0
1	Can Compactor (SFL Sorting System (2))	Household	5	50	0
1	Plastic sorting/picking line (SFL Engineering Sorting System?)	Household	5	50	0
2	Fork lifts	Household	82	100	0
1	Cardboard Baler	Household	2	5	0
1	Large Compactor (municipal waste)	Household	70	150	150
1	Extec Shredder	C&I	116	500	0
1	Powerscreen Trommel	C&D waste	116	500	0
1	Powerscreen Trommel	C&I Waste			0
1	Liebherr grabs	C&D/C&I	172.5	400	400
2	FUCHs grabs	C&D/C&I	172.5 (Based on one unit, one unit standby)	400	0
1	Liebherr loading Shovel	C&D/C&I	345	500	500
1	JCB Loading Shovel (Standby)	C&I/C&D	0	500	0
1	JCB bucket	C&D/C&I	345	500	0
1	Wood Shredder	C&D	23.2	100	0
1	Wood Granulator	C&D	23.2	100	0
4	Tractor Units	C&D/C&I	345	690 (based on 3 units)	230
5	Trailer Units	C&D/C&I waste	345	690 (based on 4 units)	172.5 (Based on 1 unit)

## **Conclusion**

**The inventory of waste handling and processing plant and infrastructure provided in Table 1 demonstrates that a minimum of 100% standby capacity is provided on essential items of waste handling plant.**


**Essential items of plant are deemed to be the Liebherr loading shovel, and Liebherr grab and the tractors and trailers for road haulage. While these items of plant are operational, all waste streams accepted at the facility can be loaded and transferred from the facility for disposal/recovery at appropriate facilities. The provision of this standby capacity ensures the site remains operational at all times while repairs are carried out on duty plant.**

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# **APPENDIX 9**

## **Written Procedures Index**

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<b>DOCUMENT TYPE</b>		
<b>TITLE</b>	<b>Procedures list</b>	
<b>Controlled Document</b>		

	<b>ISO standard procedures</b>
SOP 001	Document control
SOP 002	Management Review
SOP 003	Environmental Aspects
SOP 004	Objectives & Targets, Environmental Management Programme
SOP 005	Environmental Legislation
SOP 006	Environmental Management System Audit
SOP 007	Environmental Complaints
SOP 008	Non-Conformance & Corrective action
SOP 009	Environmental Training
SOP 010	Communications
SOP 011	Records
SOP 012	Emergency Response Procedure
SOP 013	Environmental Monitoring & Reporting/Emissions Management
	<b>Operating Procedures-all facilities</b>
SOP 014	Facility Inspection
SOP 015	Incident Recording and Reporting
SOP 016	Waste Management Facility /Collector approval
SOP 017	Maintenance
SOP 018	Unacceptable Waste
SOP 019	Nuisance Management
SOP 020	Raw materials/Resource control and usage
SOP 021	Permits to work
SOP 022	Health and Safety
SOP 023	Operation of Forklift
	<b>Operating Procedures - Transfer only</b>
SOP 024	Customer Enquiries
SOP 025	Control of Visitors and Contractors
SOP 026	Vehicle Movements
SOP 027	Load Receipt and Acceptance Route
SOP 028	Inspection and Testing of Waste
SOP 029	Processing, Recovery, Storage and Transfer of Non-hazardous waste and recyclables
SOP 030	Site Closure
	<b>Operating Procedures - Bray Only</b>
SOP 031	Processing of Commercial & Industrial Waste
SOP 032	Processing of Construction & Demolition Waste
SOP 033	Chipping of Timber
SOP 034	Processing of Dry Recyclables
SOP 035	Operation of Baler

<b>DOCUMENT NUMBER</b>	<b>SOP List</b>	<b>ISSUE DATE</b>	5/1/04	<b>REVISION NUMBER</b>	2	<b>PAGE</b>	1 of 1	<b>ISSUED BY</b>		<b>AUTHORISED BY</b>	
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# **APPENDIX 10**

## **Nuisance Abatement Reports**

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## **Proposal for the Control and Eradication of Vermin and Fly Infestations at greenstar Materials Recovery Ltd. (Bray) – Waste licence No. 53-2**

### **Introduction**

Condition 11.4.1 of greenstar Materials Recovery Ltd.'s (Bray) site licence requires the licensee to submit to the Agency for its agreement a proposal for the control and eradication of vermin and fly infestations at the facility. 11.4.1 states that,

*The proposal should include as a minimum, operator training, details on the rodenticide(s) and insecticide(s) to be used, mode and frequency of application and measures to contain sprays within the facility boundary.*

This report seeks to satisfy the requirements of this condition.

### **Current Monitoring and Controls**

Historically, vermin and flies have caused very little nuisance at the site because putrescible wastes are managed indoors, and the only waste currently processed out of doors is non-putrescible C&I waste, and C&D waste. The processing of C&D will be carried out indoors within two years, when the proposed Transfer station phase II is constructed. As the activities will be confined within a building, the potential for nuisance from vermin and flies will be reduced even further.

Condition 10.3 of the site licence requires the licensee to inspect the site, and maintain written records, for nuisances caused by vermin and flies at a minimum of one week intervals. This requirement is met by the licensee and a record of the inspections is maintained on the site's facility inspection form (See attached). Non-compliances arising from these inspections are addressed by the site management.

### **Pest Control Agreement**

greenstar Materials Recovery Ltd. (Bray) have a pest control agreement with PestGuard, an independent pest control company. This agreement provides for a 6 day inspections at regular intervals against fly spray per year, and 12 day inspections per annum, at reg. intervals against general nuisances. Should flies cause nuisance at the site, greenstar Materials Recovery Ltd. will seek PestGuard advice and take appropriate action. If spraying for flies is required it is not envisaged it will be required outside the transfer building. Should spraying be required outside the waste transfer building it will only be undertaken on calm days and at low level to ensure sprays are contained within the facility.

**PestGuard's operator's are given training, information, and supervision in accordance with their health and safety policy. The rodenticide and insecticide used are as follows.**

**Rodenticide:**

**Drat (Chlorophacinon)  
Klerat Wax block (0.005% of Brodifacoun)**

**Insecticide:**

**Ficamw**

**Conclusion**

**Good housekeeping, the waste type transferred through the facility and storage of waste for a minimal period of time ensure that vermin and flies cause minimal nuisance on-site. Daily facility inspections and an agreement with an independent pest control company ensure regular nuisance monitoring and control of such nuisances at the facility.**

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