

Attachment I .1 Assessment of Atmospheric Emissions

Existing Conditions

The facility is located in an industrial area occupied by commercial and industrial operations. The principle atmospheric pollutants associated with industrial and commercial areas are nitrous and sulphur oxides, particulates and dust. These are primarily associated with road traffic, however emissions from industrial activities are also a source of other pollutants.

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

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

The Dock Road facility is in Zone C.

The EPA implements an air quality monitoring programme at a number of monitoring stations across the city in Limerick. The station considered representative of air quality at facility is the one at Park Road. Monitoring for ozone and nitrous oxides was conducted between 2005 and March 2012 and the results indicate the air quality is good

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

Statement on Main Polluting Substances

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

Assessment of Impacts

Facility activities are not a source of odour nuisance outside the site boundary and Greenstar has never received a complaint about odour nuisance. The proposed additional wastes include mixed municipal wastes, however the existing buildings and plant and equipment have the capacity to accommodate the increase volumes and there will be no change to the time taken to process and consign these wastes.

Dust is not currently a significant issue at the facility. The routine monitoring has confirmed that the existing operations do not give rise to elevated dust emissions. The proposed changes will not give rise to any new or additional sources of dust emissions. The waste handling and processing procedures will also remain the same as recent years.

The additional emissions associated with the increase traffic movements will be minimal in the context of the facilities location within a busy commercial/industrial area. The level of traffic associated with the proposal to increase the waste volumes is not particularly intensive and will not exceed the existing capacity of the local road network. Further information on traffic is in Chapter 6 of the EIS that accompanies this licence application. In this context, the additional traffic associated with the proposed changes will not have any discernible cumulative adverse impact on air quality in the area.

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

Existing Conditions

The facility is in the catchment of the Ballinacloy River, which rises to the south east of the site and flows northwest to confluence with the River Shannon via the Ballinacloy Creek. Both the Ballinacloy Creek and the Shannon are tidally influenced.

The lower reaches of the Shannon are tidal and are part of the Shannon Transitional and Coastal Water Management Unit (WMU) designated in the Shannon River Basin District (ShIRBD) Management Plan prepared under the EU Water Framework Directive (WFD). The WMU comprises twenty Water Bodies and the stretch of the river to the north of the site is in the Limerick Dock Water Body.

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

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

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

The Limerick Dock Water Body Status Report states that the water overall status of is 'Good', with a High status for Biochemical Oxygen Demand, nutrients (phosphate and nitrogen) and dissolved oxygen. However, the overall chemical status is classified as 'Fail' and the water body is 'At Risk' of not achieving its restoration objective of reducing chemical pollution by 2021.

However, the assessment of the risk was prepared in 2008 and at that time the primary pressure on water quality was combined sewer overflows and wastewater treatment plant overflows. Since then, the completion of the Limerick Main Drainage Scheme has significantly reduced the pressures on the Limerick Dock Water Body

In December 2012, Limerick County Council monitored the water quality in the perimeter drain, approximately 2m downstream of the facility's surface water discharge point as part of a wider surface water assessment being completed by the Council in this area of Dock Road. At the time there was no discharge from the facility. The results are presented in Table 1. There were elevated BOD and ammonia levels in the drain.

Table 1 Surface Water Quality in Perimeter Drain, December 2012

Parameter	Units		ELV	EQS
COD	pH units	25	-	
BOD	mg/l	6	25	1.5
TSS	mg/l	23	60	
Ammonia	mg/l	0.99	4	0.65
Nitrate	mg/l	<2	-	
Ortophosphate	mg/l	<0.025	-	0.035
Hydrocarbons	mg/l	<0.01	-	

A description of the existing conditions in terms of flood risk is in Section 8.4 of the EIS that accompanies this licence application.

Statement on Main Polluting Substances

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

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

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

Assessment of Impacts

The proposed increase in the amount of waste accepted will not result in any changes to either the volume of the surface water run-off from the site nor does it not involve the abstraction of surface water or groundwater for use in site operations. The proposed changes to the surface water drainage system, which involve diversion of run-off from the dirty area to the foul sewer, will minimise the risk of future adverse impacts on the receiving water course.

The proposed change does not involve the provision of any additional hard surfaces that would increase the volume of rainfall run-off from the site and therefore does not present an increased flood risk either within, or outside the site boundaries.

Attachment I.3 Assessment of Impact of Sewage Discharge.

Existing Conditions

There is no sewage discharge to sewer. Sanitary wastewater and water from the canteen is treated in the on-site wastewater treatment plant, with the treated effluent discharged to the associated percolation area. The quality of the treated effluent meets the recommended minimum performance standards set by the EPA Wastewater Treatment Manual and the manufacturer's design standards.

Compliance with Article 15 of the IED Directive.

It is proposed to discharge the sanitary wastewater and wash water from the truck wash and bin washing area to the foul sewer. The competent authority will specify the quality and flow emission limit values that must be met and the monitoring that must be carried out to assess compliance. In setting the ELVs the competent authority will take into consideration the need to ensure that no significant pollution is caused and that a high level of protection of the environment is achieved.

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Attachment I.4 Assessment of Impacts on Groundwater.

Existing Conditions

The aquifer beneath the site is part of the Limerick Urban Area Water Body as defined in the ShIRBD Plan. The condition of a water body is defined by its chemical and quantitative status, whichever is worse, and groundwater quality is ranked in one of two status classes: Good or Poor. The Limerick Urban Water Body is categorised as being of 'Poor' status and is ~At Risk of not achieving its restoration objectives by 2021.

The Waste Licence requires Greenstar to monitoring groundwater quality bi-annually at three wells, GWM1, GWM2 and GWM3. GWM1 is close to the entrance to Building 1. GWM2 is at the northern site boundary and is down-gradient of site activities, while GWM3 is outside the operational area and is up-gradient of site activities. The Agency also carries out groundwater monitoring at unspecified frequencies

The monitoring parameters specified in the Licence are electrical conductivity, dissolved oxygen (DO) TSS, ammonia, BOD, FOG, total phosphorous, Diesel Range Organics (DRO) Aliphatic Hydrocarbons and Undecane.

The results of the monitoring carried out by the Greenstar in 2012 and 2013 are presented in Tables 1,2,3 and 4. The Tables include, for comparative purposes, the Interim Guideline Values (IGV) for groundwater published by the EPA and the Threshold Values for groundwater (TV) quality introduced by the European Communities Environmental Objectives (Groundwater) Regulations 2010 S.I. No 9 of 2010.

The IGV levels represent typical background or unpolluted conditions, however higher concentrations than IGV can occur naturally, depending on the local geological and hydrogeological conditions. While the TVs are more appropriate for large scale abstraction wells used for potable supply, they can be used to assess the significance of contamination where present in groundwater. Because not all parameters monitored have been assigned a TV, the relevant IGV is used for comparative purposes.

Table 1 Groundwater Monitoring Results – February 2012

Parameter	Units	GWM1	GWM2	GWM3	GTV	IGV
BOD	mg/l	6	1	<1	-	-
TSS	mg/l	6316	310	94	-	-
Dissolved Oxygen	mg/l	7	10	8	-	NAC
Oils, Fats & Greases	mg/l	<0.01	<0.01	<0.01	-	-
Total Phosphorus	mg/l	4.643	0.635	0.100	-	-
Ammoniacal Nitrogen	mg/l	10.51	2.66	0.68	0.175	0.12
Conductivity	mS/cm	0.955	0.882	0.696	1.875	1.000
DRO	mg/l	<0.01	<0.01	<0.01	-	0.01
Aliphatic Hydrocarbons	mg/l	<0.01	<0.01	<0.01	-	0.01
Undecane	mg/l	<0.01	<0.01	<0.01	-	-

Table 2- Groundwater Monitoring Results – 2nd August 2012

Parameter	Units	GWM1	GWM2	GWM3	GTV	IGV
BOD	mg/l	<1	2	<1	-	-
TSS	mg/l	6066	2188	345	-	-
Dissolved Oxygen	mg/l	5	7	7	-	NAC
Oils, Fats & Greases	mg/l	<0.01	<0.01	<0.01	-	-
Total Phosphorus	mg/l	1.755	0.705	0.184	-	-
Ammoniacal Nitrogen	mg/l	9.77	3.90	1.11	0.175	0.12
Conductivity	mS/cm	0.747	0.965	0.855	1.875	1.000
DRO	mg/l	<0.01	<0.01	<0.01	-	0.01
Aliphatic Hydrocarbons	mg/l	<0.01	<0.01	<0.01	-	0.01
Undecane	mg/l	<0.01	<0.01	<0.01	-	-

Table 3 – Groundwater Monitoring Results – May 2013

Parameter	Units	GWM1	GWM2	GWM3	GTV	IGV
BOD	mg/l	25	2	7	-	-
TSS	mg/l	2748	2708	420	-	-
Dissolved Oxygen	mg/l	4.47	6.09	4.98	-	NAC
Oils, Fats & Greases	mg/l	2	<1	<1	-	-
Total Phosphorus	mg/l	2.8	0.52	0.41	-	-
Ammoniacal Nitrogen	mg/l	7.45	0.89	0.66	0.175	0.12
Conductivity	mS/cm	0.868	0.935	0.815	1.875	1.000
DRO	mg/l	0.66	<0.01	1.88	-	0.01
TPH	mg/l	0.861	<0.01	3.37	-	0.01
Undecane (C10-C12)	mg/l	<0.01	<0.01	<0.01	-	-

Table 4 - Groundwater Monitoring Results – December 2013

Parameter	Units	GWM1	GWM2	GWM3	GTV	IGV
BOD	mg/l	6	<1	2	-	-
TSS	mg/l	648	247	920	-	-
Dissolved Oxygen	mg/l	8	6	4	-	NAC
Oils, Fats & Greases	mg/l	<0.1	<0.1	<0.1	-	-
Total Phosphorus	mg/l	1.8	0.618	0.456	-	-
Ammoniacal Nitrogen	mg/l	12.57	3.70	1.04	0.175	0.12
Conductivity	mS/cm	1.291	1.004	0.903	1.875	1.000
Mineral Oil	mg/l	<0.01	<0.01	<0.01	-	0.01
EPH/DRO	mg/l	0.730	<0.01	<0.01	-	0.01
Undecane (C10-C12)	mg/l	<0.01	<0.01	<0.01	-	-

The results confirm that the hydrocarbon levels have declined over time, however elevated ammonia levels persist.

Assessment of Impacts

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

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BASELINE ASSESSMENT REPORT
GREENSTAR
MATERIALS RECOVERY FACILITY
DOCK ROAD
LIMERICK
WASTE LICENCE REG. NO. W0082-02

Prepared For: -

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March 2014

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1. INTRODUCTION

Greenstar operates its Materials Recovery Facility (MRF) at Dock Road Road under Waste Licence Reg. No.W0082-02 issued by the Environmental Protection Agency (Agency) in November 2003. Greenstar intends to increase the amount of waste accepted at the facility to 130,000 tonnes annually and this requires Agency approval.

As Greenstar is pre-treating waste for waste co-incineration, which is Class 11 4 (b)(ii) of the New First Schedule of the EPA Act 1992 to 2013, Greenstar must apply for an Industrial Emissions Directive (IED) Licence.

An application for an IED licence for an activity that involves the use, production or release of relevant hazardous substances (as defined in Section 3 of the EPA Act 1992 as amended), must be accompanied by a baseline report prepared in accordance with section 86B of the EPA Act 1992d. The purpose of the report is to determine the status of soil and groundwater conditions at a site. As the existing operations involve the storage and use of diesel, both of which are classified as hazardous substances, a baseline report is required.

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

1.1 Methodology

OCM's assessment was based on the site history, information contained in the Environmental Impact Statement (EIS) prepared in support of the application and the results of the routine groundwater monitoring carried out in compliance with the Licence conditions.

2. CURRENT USE

2.1 Facility Location

The site is located on the Dock Road on the western fringe of Limerick City, an area dominated by industrial use. The land to the south is occupied by commercial and industrial operations including BCS Crane Hire Limited/Cussen & Co Crane Hire Limited (Cussen), Dore Commercials and MW Fuels. The Ballinacurra Creek is to the east and the lands to the north and west are undeveloped.

2.2 Facility Layout

The current Waste License area encompasses approximately 2.38 hectares (ha) and comprises two discrete parts. The first, which is outlined in green on Figure No 4.2, is controlled by GES and contains the facility (20,000 m²). The second (3,800m²), which is outlined in blue, is controlled by BCS Crane Hire Limited, the landowners of the entire licensed area and is not used for waste activities.

The layout of the part of the site that is used for waste activities is shown on Drawing No.002. The facility is approximately 120m off the Dock Road and is accessed by a common access road serving the facility and other occupiers of the industrial lands. There are two adjoining waste handling buildings (Building 1 and 2). Building 1 is currently used for sorting and compacting (baling) recyclables (paper, cardboard, plastics etc.) recovered from the incoming wastes. Building 2 is currently used for compacting and wrapping the mixed municipal solid wastes.

There is a separate office building and adjoining vehicle and plant maintenance workshop near the site entrance. An electrical substation along the south-western boundary wall is owned by Electric Ireland.

The open yards are paved and are used for external waste storage bays (C&D, glass, metals, timber and baled waste), skip storage, truck parking and a vehicle wash area, which is to the north of Building 1.

2.3 Services

The facility obtains water from the municipal water supply system formerly provided by Limerick County Council, but now vested in Irish Water. The electricity power supply is provided by Electric Ireland and there is an electrical substation at the rear of the office.

2.4 Waste Types & Volumes

It is proposed to accept 130,000 tonnes of non-hazardous waste annually. These comprise:

- Commercial and Industrial Waste ,

- Municipal ,
- Construction & Demolition.

The maximum amount of each waste type accepted may be altered with the prior agreement of the Agency, as long as the annual total of 130,000 tonnes is not exceeded.

2.5 Waste Acceptance & Handling Procedures

The wastes accepted at the facility are and will be subject to documented waste acceptance procedures to ensure that only suitable wastes are accepted. The waste is delivered by GES collection vehicles and third parties, including permitted waste collectors and commercial waste producers.

The C&D and C&I waste is typically delivered in covered open top trailers, compactors, and skips. The MSW is typically delivered in enclosed rear end loaders. All waste delivery vehicles are obliged to enter onto the weighbridge at the site entrance where they are weighed and any accompanying documentation checked. The vehicle is directed to the relevant building where the wastes are off loaded. .

Any waste identified as not suitable following off-loading is immediately removed to the designated quarantine area inside each building where it is stored pending removal to an appropriately authorised waste facility. GES maintains records of the waste type, quantity and ultimate disposal/treatment facility.

Commercial and Industrial (C&I) Waste

The C&I wastes comprises mixed and segregated recyclables (paper, cardboard, glass, metal, green waste and wood). The mixed packaging is processed inside Building 1 to separate out the plastic, card and paper, which are then baled and stored prior to transfer to a suitable permitted/licensed off-site recycling outlet. Biodegradable wastes that are suitable for composting are bulked and sent to an offsite composting facility. The remaining non-recyclable material is bulked up and sent to appropriate licensed disposal facilities.

Construction and Demolition (C & D) Waste

The C&D waste comprises mixed wastes (rubble, stone, timber, metal etc) and soil and stone. The material arrives in skips of varying sizes. The loads are inspected, with any plasterboard removed and placed in a dedicated skip located inside the building, and the remainder off loaded into an external C&D bay. The majority of the incoming waste is recovered and sent off-site either for re-use or recycling. The non-recyclable materials are transferred to a licensed landfill.

Municipal Waste

The incoming waste is deposited on the floor of Building 2 and is then either bulked up for removal and disposal at an approved residual landfill facility or directed to the baler where it is compacted into bales and wrapped in plastic sheeting. The wrapped bales are then stored on the paved yard outside the building pending consignment to overseas waste to energy recovery plants. The bales are wrapped in eight layers of plastic sheeting that protects the wastes from rainfall and prevents the infiltration that could generate a leachate. The average storage time for a bale is 1 week.

In the future it is envisaged that further processing of the waste may be required to produce a higher quality product, for example Solid Recovered Fuel (SRF), that is suitable for use as a replacement for non-renewable fossil fuel. This will involve the removal of poorly combustible materials so as to increase the calorific value.

Timber Shredding

Up until 2012, untreated timber pallets and untreated construction timbers were shredded in the northern area of the yard and stored in a dedicated shredded timber bay before being sent for use as a compost bulking/aeration agent, or as raw material in chipboard/MDF manufacturer. This activity has ceased, but may restart in the future.

2.6 Waste Storage

A large portion of the open yard to the east of Buildings 1 and 2 is used for empty skip storage. There are open metals, glass and timber storage bays at the northeast corner of the yard and along the northern boundary. Bales of compacted, mixed, municipal, solid waste are stored externally in the north east of the site. The bales are wrapped in eight layers of plastic sheeting that protects the wastes from rainfall and prevents the infiltration that could generate a leachate.

The remaining wastes that are stored externally comprise inert construction and demolition wastes in the designated C& D Bay to the north of Building 2 and baled clean cardboard, paper and plastics and scrap metal.

2.7 Plant & Equipment

The type and numbers of fixed and mobile plant used to handle and process the waste is shown in Table 4.1. The proposed increase in the amount of wastes accepted does not require the provision of any additional equipment. All key plant items have 100% duty and 50% standby capacity to handle 130,000 tonnes per annum.

Critical spares are maintained on-site and a preventative maintenance programme is implemented. In the event of a breakdown supporting plant items may be hired in for use for short periods.

Table 4.1 Current Plant List REPLACE TABLE WITH ONE BELOW

No.	Plant	Operational Capacity Tonnes/day	Standby Capacity Tonnes/day
1	360° case Excavator	300	200
1	Volvo Loading Shovel	500	350
2	Doppstadt shredders	200	150
1	Cardboard baler	100	75
1	Waste Baler	350	200
3	New Holland teleporters	350	200
1	Hyster forklift	100	75
1	Scarab minor roadsweeper	n/a	n/a

In addition to the larger plant items, there are welding units and a compressor in the maintenance workshop. The skip lorries and rear end loaders (REL) based at the facility are not refuelled or serviced on-site.

2.8 Hazardous Substances

Operations involve the storage and handling of fuel, engine hydraulic and lubricating oils and anti-freeze. Lubricating and engine oil and waste oils generated in plant servicing are stored in the Maintenance Workshop. There is a 3,200 litre diesel oil self bunded plastic storage tank located in a concrete bund adjacent to the electrical sub-station at south west boundary, which is used for fuelling the onsite plant items (forklifts, grabs etc). Road vehicles are not refuelled at the facility.

2.9 Emergency Response

Greenstar has prepared and implemented an Emergency Response Plan (ERP) to minimise the risk of accidents or incidents that could result in adverse environmental impacts. The ERP ensures a rapid response to any incident by trained staff so as to minimise the impact on the environment of any associated emissions.

All facility personnel and visitors are obliged to comply with Greenstar safety guidelines regarding access to and from the facility and on-site traffic movement. All site personnel are provided with, and are obliged to wear, personal protective equipment (PPE) appropriate for their particular functions. PPE includes facemasks, gloves, safety glasses, steel-toed footwear, overalls, reflective jackets and helmets.

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3. PAST USE

3.1 Site History

The site is on lands that were reclaimed in the 1970's. The landowner, CLIIB Holdings, (previously Cussen & Co Crane Hire Limited (Cussen)), began a skip hire business on the site sometime afterwards and also used it for truck sales, vehicle hire and repair.

In 1994, Cussen obtained planning permission for the retention of a workshop extension, vehicle wash and compound and the erection of 2 No. 5,000 gallon fuel tanks with pumps and security fencing. In 1995, Cussen obtained planning permission for the erection of 6 No. industrial units and the provision of a wastewater treatment plant. Cussen also obtained planning permission (968/95) for the retention of raised lands.

In November 1998, Cussen applied to the Agency for a Waste Licence to accept 75,000 tonnes of commercial, industrial and domestic non-hazardous wastes and also applied for planning permission for upgrade works, which included the construction of Building 1 and ancillary works. The planning permission and Waste Licence (W0082-01) were issued in 2000 and Building 1 was constructed in 2001.

IPODEC Ireland Ltd. which was renamed Onyx and subsequently Veolia Environmental Services Ireland Ltd (VESI), acquired the Cussen waste business in 2001. The Waste Licence was transferred to VESI in April 2002, however, Cussen retained ownership of the site and control of a portion of the licensed area for use in their crane hire business. In October 2002, VESI was granted planning permission for the construction of Building 2 and ancillary works and these were completed in 2003.

In November 2002, VESI applied to the Agency to review the Licence and the revised Licence (W0082-02) was granted in November 2003. In 2010, Greenstar acquired the trade and assets of VESI, which included the Dock Road facility.

4. SOILS & GROUNDWATER ASSESSMENT

4.1 Geology

Geological Survey Ireland (GSI) information indicates that the site is underlain by Made Ground and this is likely underlain by Estuarine Sediments (silts/clays). Previous site investigations at the site, which comprised the installation of fourteen shallow soil borings to a depth of 3m and two cable percussion boreholes that extended to 10.6m below ground level, confirmed these conditions.

In general the subsoil sequence beneath the site is 0.0-2.5m – Made Ground comprising gravely sand containing ash, wood, glass, metals, slates and plastics. This is underlain by natural ground comprising approximately 1m of silty clay alluvium with sand and gravel lenses, which in turn is underlain by up to 4m of Silts overlying a minimum of 1.5m of sandy Clay.

The site is underlain by Visean Undifferentiated Limestone, which is a pure bedded limestone. In the site investigations, bedrock was encountered at between 9 and 10m below ground level.

4.2 Hydrogeology

The available information on the aquifer indicates that the subsoils at the site are not significantly water bearing. The underlying bedrock is classified by the GSI as being Locally Important Aquifer Generally Moderately Productive (Lm).

The GSI assigned aquifer vulnerability rating for the site, based on the information it has on the type and depth of the subsoils, is Low. The site investigations proved approximately 9 to 10m of primarily low permeability subsoils in the vicinity of Building 2, which supports this vulnerability rating.

4.3 Soil and Groundwater Quality

A report prepared by RPS in 2004 describes the soil and groundwater investigations carried out at the site from 2001 to 2004 (Ref.: Appendix 1). The 2001 investigations were carried out on foot of a condition in the original Licence, issued in 2000, which required the licensee to carry out a hydrogeological investigation of the site.

The hydrogeological investigation was carried out in 2001 and involved the sampling (at 14 locations) of the soils across the entire site. The results indicated localised (4 of the 14 sampling points) areas of contamination with petroleum hydrocarbon compounds.

The contaminated areas were at the skip storage area, the waste transfer area and the former diesel storage area, which is located on the Cussens controlled area. Diesel Range Organic (DRO) hydrocarbon concentrations of >1,000mg/kg (up to 13,000mg/kg) were detected, mainly at shallow depths, with the exception of the former diesel storage area, where impacts were detected at depths of up to 3m within silt and gravel deposits.

Following on from the soils investigation three groundwater monitoring wells (GWM-1 to 3) were installed in 2002 and groundwater samples were collected and tested. GWM-1 is adjacent to the eastern (downgradient) boundary of Building 1, GWM-2 is at the north eastern site boundary and is generally downgradient of the site, GWM-3 is adjacent to the former diesel storage area on the CLIIB Holdings controlled part of the licence area.

A copy of the report on the well installation and groundwater monitoring is not available, however according to the Agency Inspector's report on the application for a revised licence (Appendix 2) the groundwater monitoring identified the presence of DRO in all three wells. The highest level (1.67mg/l) was in GWM-3 near the diesel storage area.

In 2004, RPS carried out a further soil investigation programme (eight trial pits and seventeen soil samples) in the vicinity of the former diesel storage area. The investigation found DRO contamination within the soils at varying levels, with a maximum of 3,915 mg/kg detected at one location at 1.6m below ground level.

RPS concluded that natural attenuation, whereby the levels would reduce over time, was the most appropriate remediation option and recommended that groundwater monitoring be continued for DRO and Mineral Oil on a bi-annual basis at GWM-3 (adjacent to the former diesel storage area) and the trends assessed following one year's results, and further upgrade of the paving in the area around the former fuel store.

In April 2008 VESI carried out further soil sampling in the vicinity of the former diesel storage area. DRO, Mineral Oil and Polyaromatic Hydrocarbons (PAHs) were detected in two of the three sample locations, at approximately 0.5-0.6m below ground level. The DRO levels ranged from 1mg/kg to 556mg/kg, which indicated a potential reduction in the level of oil contamination.

OCM tabulated the groundwater monitoring results for all three wells for the period 2011 to 2013 (Appendix 3). The data includes the results of the bi-annual monitoring carried out by the licensee and where available, annual monitoring by the Agency. The monitoring parameters electrical conductivity, dissolved oxygen (DO), TSS, ammonia, BOD, FOG, total phosphorous, DRO Aliphatic Hydrocarbons and Undecane.

There are no ELVs or approved Trigger Levels specified in the Licence. In October 2013, GES submitted proposed groundwater trigger levels for the Agency's approval. The Agency requested the methodology that had been used be amended to take into consideration the presence of groundwater contamination. A revised proposal was submitted to the Agency in January 2014.

In the absence of ELVs for interpretation purposes the results had, up to Q2 2011, been compared to the Interim Guideline Values (IGV) for groundwater published by the Agency. Subsequently the results were compared to the Groundwater Threshold Values (GTV) introduced by the European Communities Environmental Objectives (Groundwater) Regulations 2010 S.I. No 9 of 2010.

The IGVs represent typical background or unpolluted conditions; however levels higher than the IGV can occur naturally, depending on the local geological and hydrogeological conditions. While the GTV are more appropriate for large scale abstraction wells used for potable supply, they can be used to assess the significance of contamination where present in groundwater. Because not all parameters monitored have been assigned a GTV, the relevant IGV continues to be used for comparative purposes.

The monitoring has confirmed the consistent presence of elevated levels of ammonia in each of the three groundwater wells. The levels, which range from 0.6 to 10.1 mg/l are significantly above the GTV (0.175mg/l) with the highest level occurring in GWM1

Hydrocarbons were not detected at any location in the monitoring carried out in 2011. In January 2012, the Agency detected hydrocarbons at GWM1 and GWM2, but not at GWM3. Subsequent monitoring by GES in February and August 2012 did not detect hydrocarbons at any location. Hydrocarbons were detected in GWM1 and GWM3 in May 2013 and in GWM1 in December 2013. The reason for the intermittent occurrence of low levels of hydrocarbons is unknown.

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APPENDIX 1

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DOCUMENT CONTROL SHEET

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Client	Onyx Ireland Ltd.					
Project Title	Soil Investigation at the Onyx Dock Road Site in Limerick					
Document Title	Results of Soil Investigation at Onyx Ireland Ltd. (Waste Licence Register No.82-2) Dock Road, Limerick.					
Document No.	MDE0292Rp0002					
This Document Comprises	DCS	TOC	Text	List of Tables	List of Figures	No. of Appendices
	1	1	9	1	1	1

Rev.	Status	Author(s)	Reviewed By	Approved By	Office of Origin	Issue Date
D02	Final	Tony Doyle	Paul Chadwick	Shane Herlihy	Carnegie House	6 TH October 2004

1 EXECUTIVE SUMMARY

A soil investigation was carried out at the Onyx site in Limerick by excavating eight trial pits and taking 17 grab soil samples. The samples were despatched to an accredited laboratory and analysed for DRO, PRO, BTEX and PAH's.

Following analysis of the samples a zone of DRO contamination was observed in the vicinity of the former fuel storage area in addition to an isolated zone in the same general area of unsurfaced ground. Further minor isolated zones of DRO contamination were detected however these were not considered to be significant and were more localised in nature.

It is recommended that on going groundwater monitoring is carried out in the well adjacent to the main zone of DRO contamination and that additional measures are taken to reduce the risk posed by the contamination.

2 INTRODUCTION

RPS McHugh Planning and Environment (RPS) were requested by Ms. Mary Dwane of Onyx to conduct a soil investigation at the Cussen & Co. Crane Hire lands adjacent to the ONYX Waste Transfer facility on the Dock Road in Limerick. The investigation was carried out in line with RPS's proposal of the March 2004 reference number 2004.030.

Whilst it is understood that the land in this part of the site is now owned by Cussen & Co. Crane Hire, the responsibility for assessing contamination and conducting any remediation works (if necessary) lies with ONYX under Condition 1.2 of their waste licence Reg. No.82-2. This condition states that these lands come within the remit of the company's Waste Licence "until decontaminated as agreed by the Agency".

3 SCOPE OF WORK

3.1 GENERAL SCOPE OF WORK

The project included the following scope of work:

- A detailed walk over survey of the site and surrounding area;
- The excavating of 8 trial pits across the subject area on the ONYX site
- The collection of 17 grab soil samples and analysis of each for diesel Range Hydrocarbons (by GC), Petrol Range Hydrocarbons and BTEX compounds by GC and Polycyclic Aromatic Hydrocarbons.
- A qualitative risk assessment of any contamination observed
- A comprehensive report summarising the findings and conclusions of the investigation

Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(123cd)pyrene, Dibenzo(ah)anthracene, Benzo(ghi)perylene.)

- Natural Moisture Content

All samples were despatched to Alcontrol Laboratories, who are UKAS accredited laboratory, for analysis.

4 PREVIOUS INVESTIGATIONS

RPS have carried out 2 separate investigations at the ONYX site which have acted as precursors to this soil investigation.

In May 2001 a site investigation was carried out by RPS which involved a hydrogeological review, a detailed site walkover, window sampling at 14 locations across the site and analysis of the soil samples taken. The investigation found that elevated diesel range hydrocarbon concentrations were present in shallow fill within localised areas of the waste transfer area, the skip storage area and the diesel storage area (Cussen & Co. lands.).

In April 2002 a hydrogeological investigation was carried out at the site which involved the installation of three groundwater monitoring wells and subsequent groundwater sample collection and analysis. In addition each well was levelled to ordnance datum and rising/falling head tests were carried out in order to determine the hydraulic conductivity of the aquifer below the site. Diesel range hydrocarbons were detected at two locations in groundwater at the site including at the diesel storage area. Iron and manganese were found to be slightly elevated in the groundwater at the site.

In addition RPS were retained to carry out quarterly groundwater monitoring at the site and results for DRO at GW3, which is adjacent to the former fuelling area, during 2003 indicate fluctuating levels from non detectable levels during June 2003 to a peak level of 0.132 mg/l in February 2003. These fluctuations are most likely due to seasonal variations between drier low leaching conditions in Summer and wetter higher leaching conditions during Winter. However these results would clearly indicate a significant decline from the levels detected during the hydrogeological survey of the previous year which reached a high of 1.67 mg/l and would indicate a degree of natural attenuation of the contaminated material. DRO concentrations at the two groundwater monitoring wells on the ONYX site showed similar seasonal trends.

The fuelling area was recently relocated by Cussen & Co. to a location within the northwest of the site inside a bunded enclosure. ONYX now wish to remove the lands within which the former fuelling area was located from being under the conditions of their waste licence through the requirements under condition 1.2 of their Waste Licence Register No.82-2.

Table 1: Summary of Results

Sample Ref.	Sample Depth (m bgl)	Diesel Range Organics (mg/kg)	Mineral Oil (mg/Kg)	Petrol Range Organics C10+ (µg/kg)	Petrol Range Organics C5-C9 (µg/kg)	Benzene (µg/kg)	Toluene (µg/kg)	Ethyl Benzene (µg/kg)	Total Xylene (µg/kg)	Total 16 EPA PAH's (ug/l)	Total Of 10 Dutch Guidance PAH's (ug/l)	Natural Moisture Content (%)
TP1A	0.70	<1	<1	<10	<10	<10	<10	<10	<10	4552	3449	20.2
TP1B	2.40	<1	<1	<10	<10	<10	<10	<10	<10	1715	1262	18.1
TP2A	0.90	369	148	<10	<10	<10	<10	<10	<10	648	466	20.1
TP2B	1.90	<1	<1	<10	<10	<10	<10	<10	<10	1109	813	18.8
TP3A	0.60	1038	415	<10	<10	<10	<10	<10	<10	856	620	6.2
TP3B	1.60	618	247	<10	<10	<10	<10	<10	<10	545	389	10.9
TP3C	1.90	281	112	<10	<10	<10	<10	<10	<10	3189	2455	13.3
TP4A	0.55	768	307	<10	<10	<10	<10	<10	<10	597	370	23.5
TP4B	1.50	2478	1487	<10	<10	<10	<10	<10	<10	2703	2019	20.2
TP5A	1.60	311	<1	<10	<10	<10	<10	<10	<10	5527	3977	12.7
TP5B	2.10	<1	<1	<10	<10	<10	<10	<10	<10	4321	3118	53.5
TP6A	0.60	523	209	<10	<10	<10	<10	<10	<10	704	491	10.7
TP6B	2.30	273	109	<10	<10	<10	<10	<10	<10	753	563	25.9
TP7A	0.80	124	50	<10	<10	<10	<10	<10	<10	520	378	8.8
TP8A	0.40	2349	940	<10	<10	<10	<10	<10	<10	1777	1116	2.5
TP8B	0.70	936	374	<10	<10	<10	<10	<10	<10	411	255	7.5
TP8C	1.60	3915	1566	<10	<10	<10	<10	<10	<10	1989	1192	10.4
**Dutch Target	-	50	50	50000	50000	10	<10	30	10	*1000	*1000	-
**Dutch Interv.	-	5000	5000	5000000	5000000	10	130000	50000	25000	*40,000	*40,000	-

*Dutch target and intervention values relate only to 10 PAH compounds namely naphthalene, atracene, phenatrene, fluoranthene, benzo(a)anthracene, chrysene, benzo(a)pyrene, benzo(ghi)perylene, benzo(k)fluoranthene and ideno(1,2,3-cd)pyrene.

**Comparison with Dutch Guidance is for indicative purposes and should be interpreted with a degree of caution due to differing soil conditions in Ireland.

6 DISCUSSION OF RESULTS

6.1 INTRODUCTION

In order to assess the significance of the results obtained comparisons have been made to prevailing guidance on soil, groundwater and surfacewater quality.

The soil sample results have been compared to the Dutch Ministry of Housing, Spatial Planning and Environment's Circular on target values and intervention values for soil remediation which were issued in February 2000. The target value is used as guidance in indicating if the soil quality is unpolluted or has similar qualities to natural uncontaminated soils. The intervention value indicates if the soil requires consideration for remediation or if there are soil quality issues relating to specific chemical parameters. Soil Guidance Values (SGV's) under the UK CLEA assessment process were consulted however none were found to exist for the main compounds of analysis namely DRO and PRO.

6.2 SOIL SAMPLING AND ANALYSIS

The main findings at each location shall be discussed followed by a discussion of all the general findings.

6.2.1 Location TP1

Both the shallow and deeper grab soil samples taken were generally of good quality with no PRO BTEX or DRO's being detected. This would indicate that there is no significant soil contamination down gradient of the main fuelling area. Total PAH's were however detected in this area and were found to be relatively high in comparison with other locations particularly in the shallow layer. The relevant PAH levels whilst above the Dutch target values were within the intervention values.

6.2.2 Location TP2

In contrast to TP1 DRO's were detected in the shallow zone at this location. There was however no detection of any PRO or BTEX compounds. The level of DRO at 369 mg/Kg, whilst in exceedance of the Dutch target value of 50 mg / Kg, was however well within the intervention value. The levels detected however are considered to be due mainly to some localised small scale surface spillages of diesel most likely arising from parked up cranes and other vehicles which were observed nearby. Total PAH's at this location, in common with other locations, does show an increase with depth however the relevant PAH levels detected are relatively low in comparison with other locations and were within both the target and intervention Dutch values.

6.2.3 Location TP3

Prior to excavation at this location some localised surface staining was observed on the face of the gravel surfacing. Whilst PRO and BTEX compounds were not detected at this location DRO was detected in both the shallow and deeper layers. Levels of 1038 mg/Kg were observed at shallower depths in comparison with levels of 618 mg/Kg and 281 mg/Kg in the deeper layer. The levels were therefore found to be above the Dutch target value but fell well below the intervention level of 5,000 ug/Kg. Total PAH levels appear to increase with depth at this location with a peak level of 3189 ug/Kg

compounds were detected in any of the samples taken. The Total PAH level was found to be relatively low at 520 mg/Kg which, with respect to the relevant PAH's, was below both the Dutch target and intervention values at this location.

6.2.8 Location TP8

Some of the highest values for DRO were observed at TP8 which is in the general vicinity of the former fuelling area but further away than TP4 and TP5. The high DRO levels were observed across all depths being highest in the deepest layer at 3915 mg/Kg. Whilst the levels were greater than the Dutch target values they did fall short of the intervention value. Possible sources for these elevated levels would include wastewater overspill from the nearby truckwash or a significant diesel spillage or leak in this area. Given the distance of TP8 from the former fuel storage area it is considered that the DRO contamination here is an isolated incident. Total PAH values showed similar trend with values ranging from 411 ug/Kg to 1989 ug/Kg. The relevant PAH's were above the target value but less than the intervention value for this location. In common with all the other locations no PRO's or BTEX compounds were detected in any of the samples taken.

6.2.9 Summary

The main contamination observed during the soil investigation was DRO contamination. Whilst localised levels of DRO were observed at TP2 and TP3 the main zone of contamination is in the shallow and deep layers of the unsurfaced ground to the east, north east and south east of the former fuelling area incorporating a number of the trial pit locations but in particular TP4 TP6 and TP7 with a separate smaller zone around TP8. Possible sources include the former fuelling area activities and truck wash activities.

In comparison with the previous soil investigation carried out by RPS during 2001 the general scale of DRO levels obtained was similar to the findings of this investigation with some values coming out slightly higher.

7. RISK ASSESSMENT

In order to assess the risk that the observed DRO levels in shallow groundwater represent, a Source - Pathway - Receptor assessment methodology has been used. Given the nature of the soil contamination observed a qualitative risk assessment has been conducted and full details of the conceptual models are outlined below.

7.1. SOURCES

There are several sources of contamination that are considered in this risk assessment and which have been identified in this investigation and previous investigations.

7.3 RECEPTORS

Surface Waters

Shallow groundwater is considered to be a potential pathway, and the closest surface water receptor is the River Shannon, which is located approximately 500m to the northwest of the site. Although the Ballinacurra Creek is located adjacent to the site, the groundwater flow measured under the site indicates a northwest flow direction parallel to the Creek towards the River Shannon. Diesel and PAH's have relatively low solubility and are more prone to adsorb to soil surfaces than migrate in groundwater, as has been observed from historic groundwater monitoring on the site. The mobility of the observed contamination is therefore considered to be low and when considered with the distance to the nearest receptor (the River Shannon) the risk to surface water is considered to be low.

Site Redevelopment Personnel

Should any work involving excavation be carried out at the site, then excavation contractors and other workers may be exposed to the fumes arising from the contamination or through direct contact with contaminated soils. Due to the extent and nature of fill material at the site the extent of future groundworks is considered to be minimal.

8 RECOMMENDATIONS

This soil investigation has revealed the presence of DRO contamination to varying degrees within the soil in the vicinity of the former fuelling area at the Cussen & Co. site. Whilst the contamination observed exceeded Dutch target values the levels were in most cases well within the intervention values. On this basis and the qualitative risk assessment carried out as part of this investigation the following recommendations are made;

- Groundwater monitoring at location GW1 for DRO and Mineral Oil should be continued on a bi-annual basis and DRO result trends should be assessed in order to confirm the current downward trend. The entire monitoring programme should then be reviewed after one year.
- Consideration should be given to concrete surfacing of the areas around the zone of contamination adjacent to the former fuelling area in order to prevent further leaching of the contamination within the soil.
- Oil disposal and spill management practices at the Cussen & Co. site should be managed in order to ensure that further localised spills are prevented where possible.

In summary, RPS would recommend that the subject area of the Onyx site should be transferred to Cussen & Co and removed from the Onyx Licence. Although hydrocarbon contamination has been observed in this area of the site, the results of ongoing groundwater monitoring on the Onyx site and the results of this investigation indicate that it is not posing a significant risk to the environment and that natural attenuation processes represent the most appropriate remedial strategy. Minor recommendations have been made in relation to extending additional hard standing areas and continuing groundwater monitoring at one location.

APPENDIX 2

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INSPECTORS REPORT

WASTE LICENCE REGISTER NUMBER

(1) Summary:

The facility is a licensed waste transfer station located on the Dock Road in Limerick, close to Limerick City. The original licensee was Cussen & Co. (Crane Hire) Ltd but the licence was transferred to Ipodec (Ireland) Ltd in April 2002.

Name of Applicant	Ipodec (Ireland) Ltd
Facility Name (s)	Ipodec (Ireland) Ltd Waste Transfer Station, Dock Road, Limerick
Quantity of waste (tpa)	90,000
Environmental Impact Statement Required	No
Number of Submissions Received	1
Inspector's Recommendation	That the licence be granted subject to conditions

(2) Activity Summary

The licensee accepts waste from households, commercial and industrial customers and also deals with a small overall percentage of construction and demolition waste. The classes of activity as per the Third and Fourth Schedules of the Waste Management Act (the Act) applied for in this review application are the same classes of activity as are referred to in the existing licence. In the review application the licensee does not propose to carry out composting at the facility, which is referred to in the existing licence. Class 2 of the 4th Schedule of the Act is still included in the list of licensed waste activities, as it refers to the recovery of certain organic wastes such as cardboard and wood. Another proposed change to the waste activities is the installation of a picking line in the extension to the transfer building for the separation of dry recyclables. This could potentially result in a significant increase in the levels of recycling, which have traditionally been low at this facility (approximately 6.8% per annum).

(3) Facility Location

The facility is located on the Dock Road, close to Limerick city centre in an industrial, non-residential area.

(4) Waste Types and Quantities

The existing licence allows the acceptance of 75,000tpa of waste at the facility. The review application proposes an increase to 90,000tpa. This increase is below the E.I.A threshold and it is my opinion that the licensee will be capable of dealing with this tonnage. The existing licence prescribes maximum annual tonnage limits for three waste categories i.e.: commercial and household waste, construction and demolition waste (C+D), and Industrial non-hazardous waste. For the reviewed licence the licensee proposes just two waste categories: C+D, which comprises only 5% of the total tonnage amount and 'non-hazardous solid waste' which would allow for the remaining categories. It is my opinion however that for the purposes of national reporting, the categories of waste and the relevant tonnages should be as specified in Schedule A. The proposed PD allows for the total tonnage allotted to each waste category to be changed, subject to the agreement of the Agency (see Schedule A).

(5) Facility Design

Infrastructure: Changes to facility boundary

The revised facility boundary proposed by the licensee includes a new wedge-shaped area of land to the Northeast of the facility, as well as an area to include the new facility offices which have been built and are already in use. It would also result in the exclusion of some office space which is now solely used by Cussen & Co. Crane Hire Ltd and, importantly it would result in the exclusion of an area of contaminated land. See Appendix 1 for a drawing showing the 'Existing facility boundary' (Drawing No. C98-101-B2-01) and Appendix 2 for the facility boundary proposed by the applicant (Drawing No. C98-101-B2-01 Rev.2).

Issues arise with regard to the excluded area and conditions of the licence must cover any relevant legal requirements. This issue is further discussed under the heading 'Hydrogeology' below.

Waste Water treatment

The licensee has been required by the Agency in a notice of non-compliance (82-1NC03MMcH), dated 03/05/01 to tanker all foul sewer discharges offsite for treatment because the appropriate on-site wastewater treatment infrastructure was not in place. The licensee states that following the completion of the Limerick Main Drainage Scheme the foul water and sewage arising on-site will be discharged to the treatment plant directly.

The licensee proposes to divert vehicle wash wastewater and foul water from the transfer building to a grit trap/solids separator, via a full retention Class 1 interceptor to a sand filter percolation area. In other words there is no proposal for the use of an on-site treatment system. This is not an appropriate proposal, in my opinion.

Condition 5.6 of the PD provides for the direct discharge to sewer of effluent once the Limerick Main Drainage Scheme treatment plant is completed. Prior to this the licensee has the option to (1) install and use an on-site wastewater treatment plant, as per the requirements of Condition 3.10 or (2) collect all waste water and sewage and tanker it offsite to an appropriate treatment facility.

Materials Recovery/Recycling

One of the purposes of the review application is to allow for the extension of the existing waste transfer building, for which planning permission has been received (see Drawing No. C98-101-B2-01-Rev 2). The existing transfer building will be used as the recycling area of the facility with a baler and a conveyor system/picking line for the separation of dry recyclables.

Dust and Noise Monitoring Locations

As part of the enforcement of the existing licence the licensee in July 2002 requested to change the location of 2 monitoring points – dust monitoring location DM3 and noise monitoring location NI3. The relocation of the noise monitoring location to the Southeast of facility was considered appropriate but the relocation of the dust monitoring location to the Northwest of the facility was not considered appropriate as it would leave the downwind side of the facility without a dust monitoring point. The Agency required therefore that the dust monitoring point DM3 be situated at the most north-easterly point of the facility.

As part of the review application the licensee has again requested the same changes to monitoring locations. My opinion remains as outlined above.

(6) Facility Operation/Management

The existing licence (82-1) requires that the floor of the transfer building is cleared of waste at the end of the working day and that no waste shall be stored overnight at the facility other than in designated secure storage areas. The licensee has expressed difficulty with complying with these conditions and cited the closure of Gortadroma landfill during adverse weather conditions and on Saturdays as a reason. The recommended Proposed Decision therefore allows storage of waste generally for forty eight hours and seventy two hours in case of the closure of the landfill, subject to additional record-keeping requirements for loads of waste stored for longer than forty eight hours.

• Waste Acceptance/Handling Procedures

For the reasons listed above the licensee feels that it will not be possible to clear the floor of the transfer building each night. The licensee therefore proposes to store any waste remaining (i.e. waste that will not be transferred on that day) in the waste transfer section of the proposed MRF stating that it considers this area to be a 'secure

storage area'. Condition 5.3 of the PD allows overnight storage of unprocessed waste at the end of the day but requires that it is processed at the start of the following working day. The construction of the 'secure storage area' is included in the schedule of Specified Engineering Works (Schedule B).

Materials Recovery/Recycling

The licensee proposes to install a materials recovery/recycling facility to increase the recycling rate at the facility.

- **Nuisance Control**

Nuisances caused by the operation of the facility are controlled by Conditions 6.2 and 7 of the recommended Proposed Decision.

- **Hours of Waste Acceptance/Removal**

The licensee proposes to change the hours of operation and waste acceptance at the facility from 7.30 to 20.00 Monday to Saturday inclusive to 24 hours per day, seven days per week. The licensee does not anticipate that large quantities of waste will be accepted outside of the current operational hours but that it may be necessary to provide night-time collections for some clients. Condition 1.7 controls the hours of waste acceptance and removal at the facility.

(7) Restoration and Aftercare

The Restoration and Aftercare of the facility is controlled by Condition 4.

(8) Hydrogeology

- **Hydrogeology**

Groundwater Monitoring Locations

When the licence was granted (May '02) waste activities and fuel storage etc. had been carried out for some time and much of the site was not surfaced with impervious. Condition 4.18 of the existing licence therefore required the licensee to carry out a hydrogeological investigation of the site. This investigation was carried out in two stages. Firstly window sampling (at 14 locations) of the soils underlying the site was carried out and the results indicated localised areas (4 of the 14 locations) of contamination with petroleum hydrocarbon compounds. These contaminated areas were in were at the skip storage area, the waste transfer area and the diesel storage area. Diesel range hydrocarbon concentrations of >1,000mg/kg (up to 13,000mg/kg) were observed but were mostly observed at shallow depths with the exception of the diesel storage area where diesel odours were observed at depths of up to 3m within silt and gravel deposits.

Based on the results of the first part of the investigation the installation of three groundwater monitoring boreholes was recommended. The boreholes were installed and the results of groundwater monitoring showed that the concentration of diesel

range organics in the monitoring borehole (GMB3) near the diesel storage area were 1.67mg/l, which exceeds the Dutch Intervention Value for Mineral Oil (0.6mg/l). In the other boreholes the Dutch Intervention Value was not exceeded.

The facility boundary proposed by the applicant excludes the old diesel storage area (GMB3). When the licence was transferred to the current licensee from Co. Crane Hire Ltd in April '02 the current licensee accepted the requirements of S.47(6) of the Waste Management Act, 1996 i.e. that 'a person to whom a licence is transferred under this section shall be deemed to have assumed and accepted all liabilities, requirements and obligations provided for or arising under the licence, regardless of how and in what period, including a period prior to the licence, they may arise'. This being the case it is my opinion that the area shown in green in Drawing No. C98-101-B2-01 should remain within the facility boundary until such time as the agreement of the Agency has been granted, subject to the licensee having carried out any such works as required by the Agency. In conclusion the facility boundary will therefore be a composite of the facility boundary proposed by the applicant (in Drawing No. C98-101-B2-01 Rev.2) and including the area shown in green in Drawing No. C98-101-B2-01 unless otherwise agreed with the Agency.

(9) Emissions to Air/Water/Sewer

Condition 6 of the PD specifically addresses emissions. In addition sewage and surface water management are controlled by Conditions 3.10 and 5.6 of the PD.

(10) Other Significant Environmental Impacts of the Development

The facility is adjacent to the Lower River Shannon SAC, site code 2165. If the facility is operated in accordance with the conditions of the licence emissions from the facility should not have an impact on this watercourse.

(11) Waste Management, Air Quality and Water Quality Plans

Air Quality Management Plan

None

Water Quality Management Plan

A 'Water Quality Management Plan for the Lower Shannon Catchment' was published in 1990.

Waste Management Plan

The relevant Plan is the Waste Management Plan for Limerick/Clare/Kerry Region, adopted September 2001. The plan identifies the need for a regional approach to waste management and the benefits of partnership between Local Authorities and the private sector.

(12) Compliance History

From the date of grant of the licence the original licensee's state of compliance was very poor with regard to the infrastructural, reporting and other requirements of the licence. The current licensee purchased the business and took over its operation and subsequently the licence was transferred to them. Significant improvements have been documented in inspection reports and audits since that time and the reviewed licence would allow better levels of compliance, for reasons outlined above.

(13) Submissions/Complaints

One submission was received from Dr. Kevin Kelleher, Director of Public Health at the Mid-Western Health Board within the appropriate timeframe. It was as follows:

The Board had no objection to the granting of the revised licence provided that a number of conditions are met: (1) The plant must be operated in such a manner as not to give rise to a statutory Public Health nuisance. (2) Measures must be taken to ensure that there is no significant increase in noise levels at adjacent noise sensitive locations from the operation of the plant. (3) Continuous measures for dust suppression must be employed at the waste handling facility. (4) Pest control and prevention measures must be continued at the facility and, if necessary an increased level of baiting and inspection employed. (5) All soiled surface water from the extended facility must be collected and removed offsite for final disposal or alternatively treated on site. (6) The Board is not in favour of the storage of refuse for a 68 hour period on site and would be concerned about the potential odour nuisances arising from such an arrangement. Such an arrangement could also provide greater attraction for rodents.

The licensee is responsible for complying with noise and dust emission limit values (ELVs) which are controlled by Schedule C of the recommended Proposed Decision. Nuisances are controlled by Conditions 6.2 and 7. Wastewater generated at the facility must be either collected and taken offsite for treatment or treated at the facility, as stated by the objector. The storage of waste for up to a maximum of 72 is permitted at the facility subject to the following requirements: these wastes loads will be subject to additional recording requirements and designated secure storage areas will have to be constructed in the waste transfer building and the specification of these areas will have to be agreed in advance with the Agency.

Signed _____
Maeve McHugh

Dated: _____
29 May 2003

Inspector, Environmental Management & Planning

APPENDIX 1
Drawing No. C98-101-B2-01

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APPENDIX 2
Drawing No. C98-101-B2-01 Rev.2

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APPENDIX 3

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O'Callaghan Moran & Associates - Granary House, Rutland St. Cork
W0082-02 Groundwater Monitoring Results - Greenstar Limerick

Groundwater Monitoring

Results – May 2011

Parameter	Units	GWM1	GWM2	GWM3	IGV
BOD	mg/l	21	6	<1	-
TSS	mg/l	908	1809	1013	-
Dissolved Oxygen	mg/l	8	7	8	NAC
Oils, Fats & Greases	mg/l	<0.01	<0.01	<0.01	-
Total Phosphorus	mg/l	1.232	1.379	0.495	-
Ammoniacal Nitrogen	mg/l	10.03	6.97	0.9	0.12
Conductivity	mS/cm	1.148	1.273	0.84	1
DRO	mg/l	<0.01	<0.01	<0.01	0.01
Aliphatic Hydrocarbons	mg/l	<0.01	<0.01	<0.01	0.01
Undecane	mg/l	<0.01	<0.01	<0.01	-

Groundwater Monitoring

Results – November 2011

Parameter	Units	GWM1	GWM2	GWM3	GTV	IGV
BOD	mg/l	13	6	<1	-	-
TSS	mg/l	315	121	<10	-	-
Dissolved Oxygen	mg/l	4	6	7	-	NAC
Oils, Fats & Greases	mg/l	<0.01	<0.01	<0.01	-	-
Total Phosphorus	mg/l	1.248	2.825	0.014	-	-
Ammoniacal Nitrogen	mg/l	9.33	6.63	0.71	0.175	0.12
Conductivity	mS/cm	0.812	1.045	0.598	1.875	1
DRO	mg/l	<0.01	<0.01	<0.01	-	0.01
Aliphatic Hydrocarbons	mg/l	<0.01	<0.01	<0.01	-	0.01
Undecane	mg/l	<0.01	<0.01	<0.01	-	-

**Groundwater Monitoring
Results – February 2012**

Parameter	Units	GWM1	GWM2	GWM3	GTV	IGV
BOD	mg/l	6	1	<1	-	-
TSS	mg/l	6316	310	94	-	-
Dissolved Oxygen	mg/l	7	10	8	-	NAC
Oils, Fats & Greases	mg/l	<0.01	<0.01	<0.01	-	-
Total Phosphorus	mg/l	4.643	0.635	0.1	-	-
Ammoniacal Nitrogen	mg/l	10.51	2.66	0.68	0.175	0.12
Conductivity	mS/cm	0.955	0.882	0.696	1.875	1
DRO	mg/l	<0.01	<0.01	<0.01	-	0.01
Aliphatic Hydrocarbons	mg/l	<0.01	<0.01	<0.01	-	0.01
Undecane	mg/l	<0.01	<0.01	<0.01	-	-

**Groundwater Monitoring
Results – August 2012**

Parameter	Units	GWM1	GWM2	GWM3	GTV	IGV
BOD	mg/l	<1	<1	<1	-	-
TSS	mg/l	6066	2188	345	-	-
Dissolved Oxygen	mg/l	5	7	7	-	NAC
Oils, Fats & Greases	mg/l	<0.01	<0.01	<0.01	-	-
Total Phosphorus	mg/l	0.755	0.705	0.184	-	-
Ammoniacal Nitrogen	mg/l	9.77	3.9	1.11	0.175	0.12
Conductivity	mS/cm	0.747	0.965	0.855	1.875	1
DRO	mg/l	<0.01	<0.01	<0.01	-	0.01
Aliphatic Hydrocarbons	mg/l	<0.01	<0.01	<0.01	-	0.01
Undecane	mg/l	<0.01	<0.01	<0.01	-	-

**Groundwater Monitoring
Results – May 2013**

Parameter	Units	GWM1	GWM2	GWM3	GTV	IGV
BOD	mg/l	25	2	7	-	-
TSS	mg/l	2748	2708	420	-	-
Dissolved Oxygen	mg/l	4.47	6.09	4.98	-	NAC
Oils, Fats & Greases	mg/l	2	<1	<1	-	-
Total Phosphorus	mg/l	2.8	0.52	0.41	-	-
Ammoniacal Nitrogen	mg/l	7.45	0.89	0.66	0.175	0.12
Conductivity	mS/cm	0.868	0.935	0.815	1.875	1
DRO	mg/l	0.66	<0.01	1.88	-	0.01
TPH	mg/l	0.861	<0.01	3.37	-	0.01
Undecane (C10-C12)	mg/l	<0.01	<0.01	<0.01	-	-

**Groundwater Monitoring
Results – December 2013**

Parameter	Units	GWM1	GWM2	GWM3	GTV	IGV
BOD	mg/l	6	<1	2	-	-
TSS	mg/l	648	247	920	-	-
Dissolved Oxygen	mg/l	8	6	4	-	NAC
Oils, Fats & Greases	mg/l	<0.1	<0.1	<0.1	-	-
Total Phosphorus	mg/l	1.8	0.618	0.456	-	-
Ammoniacal Nitrogen	mg/l	12.57	3.7	1.04	0.175	0.12
Conductivity	mS/cm	1.291	1.004	0.903	1.875	1
Mineral Oil	mg/l	<0.01	<0.01	<0.01	-	0.01
EPH/DRO	mg/l	0.73	<0.01	<0.01	-	0.01
Undecane (C10-C12)	mg/l	<0.01	<0.01	<0.01	-	-

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

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

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Attachment I.7 Assessment of Atmospheric Emissions

Existing Conditions

The facility is accessed off the N69 Limerick to Tralee National Primary Route. It is located in the northern section of an area developed for commercial and industrial uses. The lots to the south of the site are occupied by warehousing units, oil distribution centres, truck sales and repair facilities and Cussen Crane Hire.

There are no Noise Sensitive Locations (NSLs), which are defined by the EPA as dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels within 250m of the facility

The current Waste Licence sets daytime noise emission limits of 55 dB(A) LAeq(30 minutes) and requires annual noise surveys to be carried out. The surveys completed in 2010, 2011 and 2012 confirmed that noise levels from the facility complied with the licence requirements and were not a cause of off-site nuisance

The results of the 2013 survey, which was completed are presented below. The survey involved noise measurement at the four locations specified in the Waste Licence, three of which (N11, N12 and N13) are within the site boundary and one (N14) at the access junction off the Dock Road.

Table 1 Noise Monitoring Results 2013

Station	Time	L _{Aeq} 30 min dB	L _{AF10 30} min dB	L _{AF90 30} min dB	Specific level* dB	Noise audible
NI1	1057- 1127	60	62	45	58	Little or no site activity from 1100 apart from sporadic truck movements on yard, audible at low level when present, with one nearby movement significant. No other site noise audible. Road traffic to W clearly audible and significant. Bird calls significant.
NI2	1024- 1054	54	53	43	54	Telescopic loader operating in yard almost continuously dominant. Baling plant in building also clearly audible. No other onsite sources audible during interval. Distant road traffic to NW faintly audible during loader lulls. Bird calls occasionally significant.

NI3	0945-1015	57	62	49	57	Conveyor and baler in adjacent building continuously audible and dominant. Frequent forklift truck movements in nearest parts of building and yard also significant. No other noise audible, apart from slightly audible road traffic to W.
NI4	1136-1206	71	73	62	<<62	No site emissions audible. Passing road traffic continuously dominant and intrusive. No other noise audible apart from occasional vehicles on site access road.

Assessment of Impacts

The proposed changes will not result in any changes to the noise emissions from the facility and therefore will not have any impact.

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Attachment I.8 Environmental Considerations and BAT

Alternatives

Alternative Locations

The facility is specifically designed for and has established use for waste management. It is located in an Industrial Estate, where other occupants operate outside normal business hours. It has the capacity to process the increased waste volumes without the provision of any new infrastructure, plant and equipment.

The alternative to not increasing amount of wastes accepted would be to develop a new facility at another location. This would involve either the acquisition/leasing of a suitable building, or the construction of a new facility and the provision of new processing equipment. Given the relatively small amount of wastes involved (40,000 tonnes/annum), the development of a new facility by Greenstar at another location is not economically viable.

Site activities are not a source of significant adverse environmental impacts and do not result in the impairment of the amenities in the surrounding area. The proposed changes will not result in any new emissions and, with the exception of the provision of an oil interceptor on the run-off from the yard that will discharge to the foul sewer, will not require the provision of any new or additional emission control and mitigation measures. Therefore, relocation to an alternative site is not necessary from an environmental viewpoint.

The facility is close to Limerick Docks, which is the shipping point for the municipal solid waste exported to overseas waste to energy recovery facilities. Relocating to another site would result in an increase in both emissions from transport vehicles and transport costs. Therefore, continuing to use the Ballykeefe facility is the best environmental and economic option.

Alternative Site Layout & Processes

The existing site layout, buildings, plant and equipment can readily accommodate the proposed increase in waste inputs. Therefore, there is no need for alternative configurations or technologies.

BAT

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

BREF

The BREF addresses design, operational and procedural matters, including efficient processing, waste acceptance, emission controls and environmental management systems

(EMS). Section 2.1 describes the Common Techniques that are applied in the sector. It requires the provision of appropriate waste reception and acceptance measures (2.1.1); appropriate management techniques (2.1.2); energy systems (2.1.3); storage and handling measures (2.1.4); blending and mixing (2.1.5); facility decommissioning (2.1.6) and baling (2.1.9). Section 4.6.22 describes the appropriate odour reduction techniques.

Draft Agency BAT Guidance

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

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

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

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

An EMS that incorporates the following features:

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

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

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

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

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

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

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

Existing BAT Measures

Condition 2 of the current Waste Licence requires Greenstar to develop and implement an EMS for the facility. The EMS, which is accredited to ISO 14001, is consistent with Chapter 5 of the Agency's BAT Guidance Note and BAT Conclusions 1 to 6 of the BREF. It requires Greenstar to prepare operational control procedures for all waste activities and ensure that facility staff are provided with the appropriate skills and training to perform their assigned functions.

The Licence conditions require the implementation of BAT Conclusions 7 to 64 of the BREF, in so far as they apply to non-hazardous solid waste processing. The applicability of the BREF BAT Conclusions to the facility and the status are described in Table 1.8

The conditions also specify the relevant control techniques referenced in Sections 4.3.1, 4.3.2.1, 4.3.2.2, 4.3.2.3, 4.3.3.1, 4.3.3.2, 4.3.3.3, 4.3.3.4, 4.3.3.5 and 4.3.3.6 of the Agency's BAT Guidance, and in particular

- The location of the facility with regard to sensitive off-site receptors to emissions to air, including odours and noise, and.

- The operational procedures applied to the waste types being accepted and the waste processing activities at the facility, including the wrapping of the baled MSW within 24 hours of receipt at the facility, that minimise the risk of odours.
- Surface water run-off from areas of the site not used for waste storage is directed into the surface water system. The surface water from hardstanding areas passes through a silt trap and oil interceptor before final discharge and only roof water goes directly to the surface water system

Proposed BAT Measures

The proposed changes take into consideration the requirements of BAT Conclusions 24 (b) and 42 and 4.6.22 of the BREF and Section 4.3.3.2 of the Agency's BAT Guidance. In particular;

- Waste handling and storage areas and vehicle washing areas will drain into the foul sewer. The run off from storage areas and vehicle washing areas will pass through a silt trap and oil interceptor before to discharge to the foul sewer. This is also a condition of the planning permission.

Risk of Pollution

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

Waste Production

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

Energy and other Resource Consumption;

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

Measures to prevent accidents and limit their consequences;

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

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

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

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Table I.8 (i) CONCLUSIONS ON BAT (One table for each relevant BAT reference document)

Title of Document			
BAT reference Number	Waste Industries Treatment BREF	Applicability to installation	Proposed/ in place
BAT 1	<i>BAT is to implement and adhere to an environmental management system (EMS)....</i>	<i>Applicable</i>	<i>ISO 14001 EMS in place</i>
BAT 2	<i>BAT is to. ensure the provision of full details of the activities carried out on-site.</i>	<i>Applicable</i>	<i>In place. Provided in Licence Application and EIS</i>
BAT 3	<i>BAT is to have a good housekeeping procedure in place, which will also cover the maintenance procedure, and an adequate training programme, covering the preventive actions that workers need to take on health and safety issues and environmental risks</i>	<i>Applicable</i>	<i>Operational procedures in place: Training programme in place; Health & Safety Policy in place</i>
BAT 4	<i>BAT is to try to have a close relationship with the waste producer/holder</i>	<i>Applicable</i>	<i>In place. Greenstar regularly liaises with its commercial customers and waste contractors that deliver wastes to the facility</i>
BAT 5	<i>BAT is to have sufficient staff available and on duty with the requisite qualifications at all times. All personnel should undergo specific job training and further education</i>	<i>Applicable</i>	<i>In place. Site Manager and/or Deputy Manager have appropriate qualifications and are on site at all times. Staff training programme in place</i>
BAT 6	<i>BAT is to have a concrete knowledge of the waste IN</i>	<i>Applicable</i>	<i>Waste acceptance procedure (EP05) in place that specifies the wastes that can be accepted</i>
BAT 7	<i>BAT is to implement a pre-acceptance procedure</i>	<i>Not Applicable</i>	<i>Given the nature of the wastes accepted and the types of processing carried out, pre-acceptance procedures are not required</i>
BAT 8	<i>BAT is to implement a waste acceptance procedure</i>	<i>Applicable</i>	<i>Waste acceptance procedure in place</i>
BAT 9	<i>BAT is to implement different sampling procedures for all different incoming waste vessels</i>	<i>Not Applicable</i>	<i>Given the nature of the wastes accepted and the types of processing carried out, sampling procedures are not required</i>
BAT 10	<i>BAT is to have a reception facility that includes inter alia a quarantine area;</i>	<i>Applicable</i>	<i>In place. Quarantine area provided</i>
BAT 11	<i>BAT is to analyse the waste OUT according to the relevant parameters important for the facility</i>	<i>Applicable</i>	<i>In place. All wastes consigned are recorded using EWC codes</i>

BAT 12	BAT is to have a system in place to guarantee the traceability of waste treatment	Not Applicable	Given the nature of the wastes accepted and the types of processing carried out, traceability of waste treatment is not required
BAT 13	BAT is to have and apply mixing / blending rules	Not applicable	Given the nature of the wastes accepted and the types of processing carried out, mixing and blending rules are not required.
BAT 14	BAT is to have a segregation and compatibility procedure in place	Applicable	In place. Waste acceptance procedure (EP06) to remove and store non suitable wastes in quarantine area
BAT 15	BAT is to have an approach for improving waste treatment efficiency	Applicable	In place. Greenstar regularly reviews performance efficiency
BAT 16	BAT is to produce a structured accident management plan	Applicable	Health & Safety Statement and ERP in place.
BAT 17	BAT is to have and properly use an incident diary	Applicable	Incident log in place
BAT 18	BAT is to have a noise and vibration management plan in place as part of the EMS	Not Applicable	Noise and vibration are not an issue at the site
BAT 19	BAT is to consider future decommissioning	Applicable	Decommissioning Management Plan prepared and approved by the Agency.
BAT 20	BAT is to provide a breakdown of the energy consumption and generation	Applicable	In place. Energy consumption recorded and reported in the AER
BAT 21	BAT is to continuously increase the energy efficiency of the installation	Applicable	In place. Greenstar reviews energy usage annually to identify where efficiencies can be made.
BAT 22	BAT is to carry out an internal benchmarking (e.g. on an annual basis) of raw materials consumption	Applicable	In place. Greenstar reviews material consumption annually as part of the AER.
BAT 23	BAT is to explore the options for the use of waste as a raw material for the treatment of other wastes	Not Applicable	Given the nature of the wastes accepted and the types of processing carried out, the use of waste as a raw material is not applicable.
BAT 24	Storage and Handling		
a)	BAT is to ensure storage areas are away from watercourses and sensitive perimeters, and located to eliminate or minimise the double handling of wastes within the installation	Applicable	In place

b)	BAT is to ensure that the storage area drainage infrastructure can contain all possible contaminated run-off and that drainage from incompatible wastes cannot come into contact with each other	Applicable	Proposed. Surface water drainage system will be changed to ensure run-off from the yard areas where waste are stored is diverted to the foul sewer.
c)	BAT is to ensure use of a dedicated area/store equipped with all necessary measures related to the specific risk of the wastes for sorting and repackaging laboratory smalls or similar waste.	Not applicable	Laboratory wastes not accepted or generated at the site.
d)	BAT is to handle odorous materials in fully enclosed or suitably abated vessels and storing them in enclosed buildings connected to abatement	Not Applicable	This relates to odorous liquid wastes, which are not accepted at the site
e)	BAT is to ensure that all connections between the vessels are capable of being closed via valves.	Not Applicable	No waste liquid storage vessels on-site
f)	BAT is to ensure measures are available to prevent the building up of sludges higher than a certain level and the emergence of foams that may affect such measures in liquid tanks,	Not Applicable	No liquid waste tanks on site.
g)	BAT is equipping tanks and vessels with suitable abatement systems when volatile emissions may be generated.	Not Applicable	Liquid organic wastes not accepted at the site
h)	BAT is to store organic waste liquid with a low flashpoint under a nitrogen atmosphere to keep it inertised	Not Applicable	Organic waste liquids not accepted at the site
BAT 25	BAT is to separately bund the liquid decanting and storage areas using bunds which are impermeable and resistant to the stored materials	Applicable	In place. Diesel storage tank bund
BAT 26	Tank and Process Pipework		
a)	BAT is to clearly label all vessels with regard to their contents and capacity	Applicable	In place. Diesel tank labelled
b)	BAT is to ensure the label differentiates between wastewater and process water, combustible liquid and combustible vapour and the direction of flow.	Applicable	In place. Surface water gullies and foul water inspection chambers colour coded
c)	BAT is to keep records for all tanks, detailing the unique identifier; capacity; its construction, including materials; maintenance schedules and inspection results; fittings; and the waste types which may be stored / treated in the vessel, including flashpoint limits	Not Applicable	
BAT 27	BAT is to take measures to avoid problems that may be generated from the storage/accumulation of waste	Applicable	In place. Licence limits on site storage of waste to 72 hours.

BAT 28	Waste Handling Techniques		
a)	BAT is to have systems and procedures in place to ensure that wastes are transferred to the appropriate storage safely	Applicable	Waste handling procedure (EP08) in place
b)	BAT is to have a management system for the loading and unloading of waste in the installation, which also takes into consideration any risks that these activities may incur.	Applicable	Waste handling procedure in place and risks assessed as part of EPR
c)	BAT is to ensure that a qualified person attends the site to check the laboratory samples, the old original waste, waste from an unclear origin or undefined waste (especially if drummed), to classify the substances accordingly and to package into specific containers.	Not Applicable	The site does not have a laboratory and does not accept hazardous waste
d)	BAT is to ensure that damaged hoses, valves and connections are not used	Not Applicable	The site does not accept liquid wastes
e)	BAT is to collect exhaust gas from vessels and tanks when handling liquid waste	Not Applicable	The site does not accept liquid wastes
f)	BAT is to unload solids and sludge in closed areas which are fitted with extractive vent systems linked to abatement equipment when the handled waste can potentially generate emission to air (e.g. odours, dust, VOCs)	Applicable	Not in place, as site is not a source of odour /dust nuisance.
g)	BAT is to use a system to ensure the bulking of different batches only takes place with compatibility testing	Not Applicable	Given the nature of the wastes accepted and the types of processing carried out, compatibility testing is not required.
BAT 29	BAT is to ensure that the bulking /mixing to or from packaged waste only takes place under instruction and supervision and is carried out by trained personnel	Applicable	In place. All waste handling, including baling, is carried out by trained personnel.
BAT 30	BAT is to ensure that chemical incompatibilities guide the segregation required during storage	Not Applicable	Chemically incompatible wastes are not accepted at the site.
BAT 31	Handling of Containerised Waste	Not Applicable	Wastes are not stored in drums or other containers.
BAT 32	BAT is to perform crushing, shredding and sieving operations in areas fitted with extractive vent systems linked to abatement equipment when handling materials that can generate emission to air (e.g. odours, dust, VOCs)	Not Applicable	Wastes are not crushed, shredded or sieved at the site
BAT 33	BAT is to perform crushing/shredding operations under full encapsulation and under an inert atmosphere for drums/containers containing	Not Applicable	Wastes are not crushed, shredded or sieved at the site

	flammable or highly volatile substances.		
BAT 34	Washing Processes		
a)	BAT is to identify the washed components that may be present in the items to be washed (e.g. solvents)	Applicable	Proposed: Washwater from the vehicle and bin wash area will be routinely tested.
b)	BAT is to transfer washings to appropriate storage and then treating them in the same way as the waste from which they were derived	Not Applicable	Waste are not washed at the site
c)	BAT is to use treated waste water from the WT plant for washing instead of fresh water	Not Applicable	Existing on-site wastewater treatment plant will be decommissioned after connection to the Bunlickey WWTP
	Air Emission Treatment		
BAT 35	BAT is to restrict the use of open topped tanks, vessels and pits	Not Applicable	There are no open topped tanks, vessels or pits at the site.
BAT 36	BAT is to use an enclosed system with extraction, or under depression, to a suitable abatement plant. This technique is especially relevant to processes which involve the transfer of volatile liquids, including during tanker charging/discharging	Not Applicable	Volatile liquid waste are not accepted at the facility.
BAT 37	BAT is to apply a suitably sized extraction system which can cover the holding tanks, pre-treatment areas, storage tanks, mixing/reaction tanks and the filter press areas, or to have in place a separate system to treat the vent gases from specific tanks	Not Applicable	Liquid wastes are not accepted at the site
BAT 38	BAT is to correctly operate and maintain the abatement equipment, including the handling and treatment /disposal of spent scrubber media.	Not Applicable	No air emission abatement plant at the site.
BAT 39	BAT is to have a scrubber system in place for the major inorganic gaseous releases from those unit operations which have a point discharge for process emissions	Not Applicable	There are no point discharges from waste processing.
BAT 40	BAT is to have leak detection and repair procedures in place in installations a) handling a large number of piping components and storage and b) compounds that may leak easily and create an environmental problem	Not Applicable	The site does not handle a large number of piping components or use compounds that leak easily.
BAT 41	BAT is to reduce air emission to the following levels VOC 7-20mg/Nm ³ and PM to 2-20mg/Nm ³	Not Applicable	The site does not have point emission sources for either VOC or PM

	Wastewater Management		
BAT 42	<i>Reduce the water use and the contamination of water</i>		
a)	<i>BAT is to apply site waterproofing and storage retention methods.</i>	<i>Applicable</i>	<i>In place. The site is covered by paved yards and buildings. There is a shut-off valve on the oil interceptor that can be closed to retain surface water within the site boundary.</i>
b)	<i>BAT is to carry out regular checks of the tanks and pits especially when they are underground</i>	<i>Applicable</i>	<i>In place. Waste licence requires regular checks and integrity testing of bunds, tanks and containers.</i>
c)	<i>BAT is to apply separated water drainage according to the pollution load (roof water, road water, process water)</i>	<i>Applicable</i>	<i>In place. Separate collection systems provided for process water (sanitary waste water and waste water from the vehicle and bin wash area) and surface water run-off.</i>
d)	<i>BAT is to apply a security collection basin</i>	<i>Not Applicable</i>	
e)	<i>BAT is to performing regular water audits, with the aim of reducing water consumption and preventing water contamination</i>	<i>Applicable</i>	<i>In place. Greenstar reviews water consumption annually as part of the preparation of the AER. Greenstar also carries out regular inspections of the drains</i>
f)	<i>BAT is to segregate process water from rainwater</i>	<i>Applicable</i>	<i>In place(ref BAT 42c)</i>
BAT 43	<i>BAT is to have procedures in place to ensure that the effluent specification is suitable for the on-site effluent treatment system or discharge</i>	<i>Applicable</i>	<i>In place. Greenstar monitors the quality of the treated effluent from the on-site wastewater treatment plant</i>
BAT 44	<i>BAT is to avoid the effluent by-passing the treatment plant systems</i>	<i>Applicable</i>	<i>In place. Greenstar has commissioned surveys of the drainage system that confirms sanitary wastewater and process wastewater lines connect to the on-site wastewater treatment plant.</i>
BAT 45	<i>BAT is to have in place and operate an enclosure system whereby rainwater falling on the processing areas is collected along with tanker washings, occasional spillages, drum washings, etc. and returned to the processing</i>	<i>Not Applicable</i>	<i>All waste processing is carried out inside the buildings.</i>

	<i>plant or collected in a combined interceptor</i>		
BAT 46	<i>BAT is to segregate the water collecting systems for potentially more contaminated waters from less contaminated water</i>	<i>Applicable</i>	<i>Proposed. Surface water drainage system will be changed to ensure that run-off from the yard areas where waste are stored is diverted to the foul sewer, following connection to the Bunlickey WWTP</i>
BAT 47	<i>BAT is to have a full concrete base in the whole treatment area, that falls to internal site drainage systems which lead to storage tanks or to interceptors that can collect rainwater and any spillage. Interceptors with an overflow to sewer usually need automatic monitoring systems, such as pH checks, which can shut down the overflow</i>	<i>Applicable</i>	<i>In place/Proposed. All waste processing carried out inside the buildings. Drainage from operational yards, where wastes are stored, will be diverted via a new oil interceptor to the foul sewer following connection to the Bunlickey WWTP. Run-off from the remaining yards will continue to discharge to surface water drain via the existing oil separators.</i>
BAT 48	<i>BAT is to collect the rainwater in a special basin for checking, treatment if contaminated and further use</i>	<i>Not Applicable</i>	
BAT 49	<i>BAT is to maximise the re-use of treated waste waters and use of rainwater in the installation</i>	<i>Applicable</i>	<i>Proposed. Greenstar will assess the potential for rainwater harvesting to supplement the mains water supply. There is not potential to re-use treated wastewater in the operations.</i>
BAT 50	<i>BAT is to conduct daily checks on the effluent management system and to maintain a log of all checks carried out, by having a system for monitoring the effluent discharge and sludge quality in place</i>	<i>Applicable</i>	<i>In place. The on-site WWTP is relatively simple and does not require daily checks. Greenstar monitors the quality of the treated effluent from the on-site wastewater treatment plant</i>
BAT 51	<i>BAT is to firstly identify waste waters that may contain hazardous compounds, secondly segregate the previously identified wastewater streams on-site and thirdly, specifically treat waste water on-site or off-site</i>	<i>Applicable</i>	<i>In place. Wastewater from the vehicle and bin wash may contain hydrocarbons. The wastewater streams are segregated from the surface water run-off and</i>

			<i>treated in the on-site WWTP.</i>
BAT 52	<i>BAT is to ultimately after the application of BAT number 42, select and carry out the appropriate treatment technique for each type of waste water</i>	<i>Applicable</i>	<i>In place/Proposed. The sanitary waste water is treated in the on-site WWTP. The vehicle and bin wash wastewater, and run-off from the yards where wastes are stored will be discharged to the Bunlickey WWTP.</i>
BAT 53	<i>BAT is to implement measures to increase the reliability with which the required control and abatement performance can be carried out.</i>	<i>Applicable</i>	<i>Greenstar commissioned an assessment of the performance of the on-site WTP in 2012. It should be noted that the on-site WWTP will be decommissioned following the connection to the Bunlickey WWTP</i>
BAT 54	<i>BAT is to identify the main chemical constituents of the treated effluent and to then make an informed assessment of the fate of these chemicals in the environment</i>	<i>Applicable</i>	<i>In place. Greenstar monitors the quality of the treated effluent and an assessment of the impact of this percolation are is included in the EIS that accompanies this application</i>
BAT 55	<i>BAT is to only discharge the waste water from its storage after the conclusion of all the treatment measures and a subsequent final inspection</i>	<i>Applicable</i>	<i>In place. Treated effluent from the on-site WWTP is discharged to the percolation area. The quality of the treated effluent is routinely monitored.</i>
BAT 56	<i>BAT is to achieve the following water emission values before discharge</i> <i>Water parameter Emission values associated with the use of BAT (ppm)</i> <i>COD 20 – 120</i> <i>BOD 2 – 20</i> <i>Heavy metals (Cr, Cu, Ni, Pb, Zn)</i> <i>0.1 – 1</i> <i>Highly toxic heavy metals:</i> <i>As <0.1</i> <i>Hg 0.01 – 0.05</i> <i>Cd <0.1 – 0.2</i> <i>Cr(VI) <0.1 – 0.4</i>	<i>Not applicable</i>	<i>Treated effluent from the on-site WWTP discharges to ground and not to surface waters. The monitoring results indicate the BOD and COD levels are within the BAT emission levels. The licence does not require monitoring for the other listed parameters. Following connection to the Bunlickey WWTP, the on-site WWTP will be decommissioned.</i>

	Management of Process Related Residues		
BAT 57	BAT is to have a residue management plan as part of the EMS including a) basic housekeeping techniques and b) internal benchmarking techniques	Applicable	In place. Greenstar has procedures to manage waste arising from site activities, which include canteen and office waste and waste oils
BAT 58	BAT is to maximise the use of re-usable packaging (drums, containers, IBCs, palletes, etc.)	Applicable	In place.
BAT 59	BAT is to re-use drums when they are in a good working state. In other cases, they are to be sent for appropriate treatment	Not Applicable	The site does not accept drums
BAT 60	BAT is to keep a monitoring inventory of the waste on-site by using records of the amount of wastes received on-site and records of the wastes processed	Applicable	In place. Greenstar maintains records of all wastes accepted and consigned from the site.
BAT 61	BAT is to re-use the waste from one activity/treatment possibly as a feedstock for another	Not Applicable	Given the nature of the wastes accepted and the type of processing carried out, there is no opportunity to re-use waste on-site
	Soil Contamination		
BAT 62	BAT is to provide and then maintain the surfaces of operational areas, including applying measures to prevent or quickly clear away leaks and spillages, and ensuring that maintenance of drainage systems and other subsurface structures is carried out	Applicable	In place. All operational and waste storage areas are paved. Greenstar has documented procedures in place to ensure a rapid response by trained staff to any incident that has the potential to cause soil contamination. Licence requires regular inspection of drainage systems.
BAT 63	BAT is to utilise an impermeable base and internal site drainage	Applicable	In place. All operational and waste storage areas have an impermeable base. Surface water and foul drainage systems provided.
BAT 64	BAT is to reduce the installation site and minimise the use of underground vessels and pipework	Applicable	In place. There no underground vessels. The on-site WWTP will be decommissioned following connection to the Bunlickey WWTP