



Ms Ewa Babiarczyk
Environmental Protection Agency,
Headquarters PO Box 3000
Johnstown Castle Estate,
County Wexford.

19th November 2014

Re: Application for Waste Licence (W082-02) Greenstar, Dock Road, Limerick

Dear Ms Babairczyk,

I refer to the Agency's Notice dated the 23rd October 2014 in accordance with Regulation 10(2)(b)(ii) of the EPA (Industrial Emissions)(Licensing) Regulations 2013, requesting the submission of a Natura Impact Statement (NIS). An original and one hardcopy of the NIS document is enclosed along with an updated Non-Technical Summary. Also enclosed are two CD ROM discs with the files in pdf searchable format.

Yours Sincerely


Jim O'Callaghan

DixonBrosnan

noise & ecology specialists

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Project				
Habitats Directive Appropriate Assessment Waste Acceptance Materials Recovery Facility, Dock Road, Limerick.				
Client Starrus Eco Holding Ltd T/A Greenstar.				
Project no	No pages	Client Reference	©DixonBrosnan 2014	
1477		-	v011113	
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Report no	Date	Edit	Prepared by	
1477	18/11/14	0 - issue to client	Carl Dixon	
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1. Introduction

Starrus Eco Holding Ltd, trading as Greenstar, has applied to the Environmental Protection Agency (EPA) for an Industrial Emissions Licence for its existing waste recovery and transfer facility in the townland of Ballykeefe, County Limerick. Accompanying the licence application was a screening assessment (*Stage 1 Screening - Proposed increase in waste acceptance materials recovery facility - Greenstar Environmental Services Ltd, April 2014*). The screening was completed due to the proximity of the site to the Lower River Shannon SAC (site code 2165) and River Shannon and River Fergus SPA (site code 4077).

Following a review off the screening report, the EPA requested a Natura Impact Statement for the following reasons:

- The existing pollution in storm water discharge from the installation to adjacent drain that ultimately discharges into above SPA and SAC, and the fact that mitigation measures, i.e. re-engineering of drainage system, will need to be put in place to prevent further discharge of the polluted storm water.
- The close proximity of the Lower River Shannon SAC (site code 2165) and River Shannon and River Fergus SPA (site code 4077).
- Uncertainty that the activity, individually or in combination with other plans or projects (not least the EPA-licensed facilities in close proximity to the site as listed below), will not have a significant effect on any European site.
 - Irish Cement Limited (Licence Reg. No. P0029-03)
 - James McMahon Limited (Licence Reg. No. P0329-01)
 - Atlas Aluminium Limited (Licence Reg. No. P0436-01)
 - Limerick City & County Council and Clare County Council (Licence Reg. No. D0013-01).

Greenstar appointed Dixon Brosnan to prepare the Natura Impact Statement to specifically address these concerns.

1.1 Methodology

According to the EU Birds Directive (2009/147/EC) and Habitats Directive (92/43/EEC), member states are required to designate areas in order to protect priority habitats and species. These designated sites are known as Natura 2000 sites. In Ireland, the Natura 2000 network of European sites comprises Special Areas of Conservation (SAC), including candidate Special Areas of Conservation (SAC), and Special Protection Areas (SPA), including proposed Special Protection Areas (pSPA).

Under Article 6(3) of the EU Habitats Directive (92/43/EEC) and Article 30 of Statutory Instrument No 94/1997 – European Communities (Natural Habitats) Regulations, 1997 as amended, any plan or project, which is not directly connected with or necessary to the management of a Natura 2000 site and has the potential to significantly impact thereon, must be subject to an Appropriate Assessment.

Article 6(3) of the Habitats Directive states:

Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.

Article 6(4) states:

If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted. Where the site concerned hosts a priority natural habitat type and/or a priority species the only considerations which may be raised are those relating to human health or public safety, to beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest.

Appropriate Assessment

It is the responsibility of the proponent of the plan or project to provide the relevant information (ecological surveys, research, analysis etc) for submission to the “competent national authority” (in this case, the Planning Authority). Having satisfied itself that the information is complete and objective, the competent authority will use this information to screen the project, to determine if an Appropriate Assessment is required and to carry out the Appropriate Assessment, if one is deemed necessary. The competent authority shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned.

The appropriate assessment process consists of a four-stage process. Each stage determines whether a further stage in the process is required. If, for example, the conclusions at the end of Stage One are that there will be no significant impacts on the Natura 2000 site, there is no requirement to proceed further. The four stages are:

- Screening to determine if an appropriate assessment is required

- Appropriate assessment
- Consideration of alternative solutions
- Imperative Reasons of Overriding Public Interest/Derogation

Stage 1. Screening

Screening is the technique applied to determine whether a particular plan would be likely to have significant effects on a Natura 2000 site and would thus warrant an Appropriate Assessment. The key indicator that will determine if an Appropriate Assessment is required is the determination of whether the development is likely to have *significant environmental effects* on a Natura 2000 site or not.

Stage 2. Appropriate Assessment

This step is required if the screening report indicates that the development is likely to have a significant impacts on a Natura 2000 site. Stage 2 assesses the impact of the plan or project on the integrity on the Natura 2000 site, either alone or in combination with other plans or projects, with respect to the site's structure, function and conservation objectives. Where there are adverse impacts, an assessment of the potential mitigation of these impacts in also required.

Stage 3 – Assessment of Alternative Solutions.

If it is concluded that, subsequent to the implementation of measures, a plan or project will have an adverse impact upon the integrity of a Natura 2000 site, it must be objectively concluded that no alternative solutions exist before the plan or project can proceed.

Stage 4 – Imperative Reasons of Overriding Public Interest/Derogation

Where no alternative solutions exist and where adverse impacts remain but imperative reasons of overriding public interest (IROPI) exist for the implementation of a plan or project, an assessment of compensatory measures that will effectively offset the damage to the Natura site 2000 will be necessary.

This assessment follows the methodology guidelines outlined in “*Assessment of plans and projects significantly affecting Natura 2000 sites, methodological guidance on the provisions of Articles 6(3) and 6(4) of the Habitats Directive 92/43/EEC*” (2001), Department of Environment, Heritage and Local Government (2009, revised February 2010) *Appropriate Assessment of Plans and Projects in Ireland* and National Parks and Wildlife Services (2010) Circular NPW 1/10 & PSSP 2/10 *Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities*. These assessment guidelines provide for a step by step process as outlined above. This appropriate assessment was based on a site inspection and the proposed changes to facility operations. This report was prepared by Carl Dixon MSc Applied Ecology and Vincent Murphy MSc Applied Ecology.

2. Description of project

2.1 Site Location

The Greenstar facility is located in the townland of Ballykeefe, off the main N69 Limerick to Tralee road on Dock Road (**Figure 2.1**). It is in the northern end of an industrially zoned area and is bounded to the south, southeast and southwest by warehousing units, oil distribution centres and truck sales and repair and Cussen Crane Hire. To the east and north is Ballinacurra Creek, where the Ballynaclough River joins the Shannon. The lands north of the Ballinacurra Creek and between it and the Shannon are undeveloped. The Limerick City Council wastewater treatment plant is located to the west of the site and separated from it by an open field. Further west is Bunlickey Lake.

2.2 Site layout

The facility is accessed off the Dock Road by a private road serving the facility and other occupiers of the industrial estate. The site is approximately 1.8ha in size, most of which is either paved or occupied by buildings.

There are two adjoining waste handling buildings (Building 1 and 2). Building 1 is currently used for sorting and compacting 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. There is palisade security fence on the north, east and west boundaries, with block work walls along the south-western boundary south of Building 1 and west of the site offices and workshop.

2.3 Site operations

There are currently 20 full time employees based at the facility, including management, administration, general operatives and maintenance staff. The facility is authorised to operate seven days per week twenty four hours per day. At present, there are two eight hour shifts operating from 06:00 – 14:00 and 14:00 to 22:00.

The facility accepts and processes non-hazardous mixed municipal solid waste and mixed and source segregated dry recyclables that are primarily collected in the Mid-West Region.

The waste processing includes sorting of the mixed dry recyclables into separate categories (paper, plastic, cardboard), which are then compacted; the baling of the source segregated dry recyclables and the baling of the mixed municipal solid waste. The baled recyclables are sent to off-site recovery facilities for further processing, while the baled mixed municipal solid waste is sent to overseas waste to energy plants.

2.4 Environmental management system

Greenstar has a detailed Environmental Management System (EMS) which is accredited to ISO 14001. This system promotes continual improvement of the EMS and will be updated to implement any new requirements of the IPPC Licence. As part of the EMS, the management and responsibility for the operation and control of all abatement/treatment systems on-site is maintained to reduce impacts on the environment. Controls are in place for waste acceptance and processing, and emergency procedures have been prepared in the unlikely event that a pollution incident occurs to minimise risk to nearby watercourses

2.5.1 Drainage

2.5.1 Surface water

Surface water run-off is generated by rainfall on the roof of the offices and workshop building, the waste handling buildings and the paved open yard areas. The run-off from the paved yards is collected and discharged to a man-made drain at the north eastern site boundary via a three chamber oil interceptor (40m³ capacity). Run-off from the roof of the main buildings discharges to manmade perimeter drain along the western boundary. The perimeter drains also receive run-off from other occupants of the industrial estate upstream of the Greenstar facility. The perimeter drains discharge to Bunlickey Lake. There is a shut-off valve at the outlet from the interceptor that can be closed in the event of an incident that has the potential to impact on surface water quality and contain the surface water within the site boundary

Emissions do not contain any substances listed in the Schedule of EPA (Industrial Emissions) (Licensing) Regulations 2013 S.I. No. 137 of 2013.

As the emission includes run-off from the paved yards where vehicles are manoeuvred and wastes are stored there is the potential for small amounts of hydrocarbons and suspended solids to be present. The Waste Licence requires monitoring at the outlet from the interceptors (FE 1A) and in the perimeter drain up (WS-9) and downstream (WS-10) of the discharge point. The parameters include pH, electrical conductivity, total suspended solids (TSS), ammonia, biochemical oxygen demand (BOD), Fats Oils and Grease (FOG), Mineral Oil, Total Organic Carbon (TOC) and dissolved metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc). Recent results are included as **Appendix 2** of this report.

2.5.2 Foul water

It is a condition of the waste licence that foul water and sewage from the site be discharged to the Council's foul sewer, following the completion of the Limerick Main Drainage Scheme, subject to the approval of the Sanitary Authority-Limerick City Council. In 2009, the City Council gave its approval in principle to the connection to the municipal wastewater treatment plant, however due to difficulties in obtaining way leaves to install the sewer line, the connection could not be completed at that time. Greenstar is currently engaged with the City and County Council

and Irish Water regarding the connection and the necessary wayleaves and it is expected that the connection will be completed sometime in Q1 of 2015. Following this, the on-site wastewater treatment plant will be decommissioned.

2.6 Proposed Development

Greenstar intends to increase the amount of waste that can be accepted to 130,000 tonnes/year. The proposed increase is to allow Greenstar compete for business in domestic and commercial waste collection market and offer waste treatment services to authorised waste collectors in the Mid-West and adjoining Regions. There will be no change to either the types of waste accepted, or the way the waste is handled, processed and stored. The only change will be an increase in the number of vehicles that bring the unprocessed waste to the site and remove the processed materials. An overview of the facility is shown below in **Figure 1**.



Figure 1 - site layout

3. Natura 2000 sites

SACs are selected for the conservation and protection of habitats listed on Annex I and species (other than birds) listed on Annex II of the Habitats Directive, and their habitats. The habitats on Annex I require special conservation measures. SPAs are selected for the conservation and protection of bird species listed on Annex I of the Birds Directive and regularly occurring migratory species, and their habitats, particularly wetlands. The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network. European and national legislation places a collective obligation on Ireland and its citizens to maintain at favourable conservation status sites designated as Special Areas of Conservation and Special Protection Areas. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. Favourable conservation status of a habitat is achieved when its natural range, and area it covers within that range, is stable or increasing, and the ecological factors that are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and the conservation status of its typical species is favourable. The favourable conservation status of a species is achieved when population data on the species concerned indicate that it is maintaining itself, and the natural range of the species is neither being reduced or likely to be reduced for the foreseeable future, and there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis. A list of designated Natura 2000 sites within 15 km of the facility is given in **Table 1**.

Table 1. Natura 2000 Sites within 15 km of the Greenstar Facility

Name & Site Code	Key Features	Distance & direction from Greenstar Site
Lower River Shannon SAC (Site Code 2165)	The site is a candidate SAC selected for lagoons and alluvial wet woodlands, both habitats listed on Annex I of the EU Habitats Directive. The site is also selected for floating river vegetation, Molinia meadows, estuaries, tidal mudflats, Atlantic salt meadows, Mediterranean salt meadows, Salicornia mudflats, sand banks, perennial vegetation of stonybanks, sea cliffs, reefs and large shallow inlets and bays all habitats listed on Annex I of the EU Habitats Directive. The site is also selected for the following species listed on Annex II of the same directive – Bottle-nosed Dolphin, Sea Lamprey, River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Atlantic Salmon and Otter. There are also a number of species present within the site that are rare and listed in the Irish Red Data Book (1985) in addition to species protected under the Flora Protection Order (1999).	400m to the north
Glenorma Wood SAC (Site Code 1013)	Glenorma Wood is a good example of a deciduous semi-natural woodland and is of considerable conservation significance due to its old oak woodlands which are listed on Annex I of the EU Habitats Directive. Three Red Data Book mammals occur in the site: Badger, Pine Marten and Hare.	11.4 km to the north east
Ratty River Cave SAC (Site Code 2316)	The cave in Ratty River Cave SAC is a natural fossil limestone cave set into the east-facing bank of Ratty River (also known as Owenogorney River). Lesser Horseshoe Bats have been using the cave beside the Ratty River as a hibernation site for some years. During the winter of 2001, 187 bats were recorded here making it a site of international importance.	14.5 km to the north east
Danes Hole Poulnalecka SAC (Site Code 0030)	The site is selected for the presence of European priority habitats comprising caves, and old oak woodlands. The site is a winter hibernation site and also a mating site of the Lesser Horseshoe Bat. A nearby summer roost for the bat and the commuting routes between the two are also included. Lesser Horseshoe Bats were counted at the cave, making the site one of international importance.	15 km to the north
Tory Hill SAC (Site Code 0439)	This site is of considerable conservation significance for the diversity of terrestrial and wetland habitats found within it, and particularly for the presence of	13 km to the south

Name & Site Code	Key Features	Distance & direction from Greenstar Site
	good examples of three habitats that are listed on Annex I of the E.U. Habitats Directive which include Orchid-rich Calcareous Grassland, Cladium Fens, and Alkaline Fens.	
Askeaton Fen Complex SAC (Site Code 002279)	This site is of conservation value because it supports two fen types each of which exhibit many sub-types. Cladium fen is listed as an Annex I priority habitat under the E.U. Habitats Directive. These wetland habitats of fen, reedbeds, open water, marsh and wet grassland are also valuable in that they supply a refuge for fauna in an otherwise intensively managed countryside.	14km to the south west
River Shannon & River Fergus (Site Code 004077)	This site is of great ornithological interest, being of international importance on account of the numbers of wintering birds it supports. It also supports internationally important numbers of three species, i.e. Dunlin, Black-tailed Godwit and Redshank. In addition, there are 16 species that have populations of national importance. For several of the bird species, it is the top site in the country. Also of note is that three of the species which occur regularly are listed on Annex I of the E.U. Birds Directive, i.e. Whooper Swan, Golden Plover and Bar-tailed Godwit. The site is most effectively censused from the air and this is carried out in most winters.	400 m to the north

3.1 Natura 2000 Sites Potentially Affected by the Project

The facility is not located in or immediately adjacent to a Natura 2000 Site. All discharged foul water/ sewage from the site will be directed to Limerick City Council's foul sewer for treatment. Stormwater run-off from the site discharges to Bunlickey Lake which is in the River Shannon & River Fergus SPA and is hydraulically connected to the River Shannon. Due to the limited size of the development, given that sewage is directed to mains sewer and given the distances involved no theoretical impact on the Glenorma Wood SAC (Site Code 1013), Ratty River Cave SAC (Site Code 2316), Danes Hole Poulnalecka SAC (Site Code 0030), Tory Hill SAC (Site Code 0439) or Askeaton Fen Complex SAC (Site Code 002279) have been identified. Thus impacts on these Natura 2000 have been screened out. Due to their proximity, there could potentially be impacts on the Lower River Shannon SAC (Site Code 2165) and River Shannon & River Fergus (Site Code 004077). The location of the site in relation to these Natura 2000 sites is shown below in **Figure 2**. Therefore this report specifically addresses potential impacts on these sites which are discussed in greater detail below. Site synopses for these sites are included in **Appendix 1** of this report.

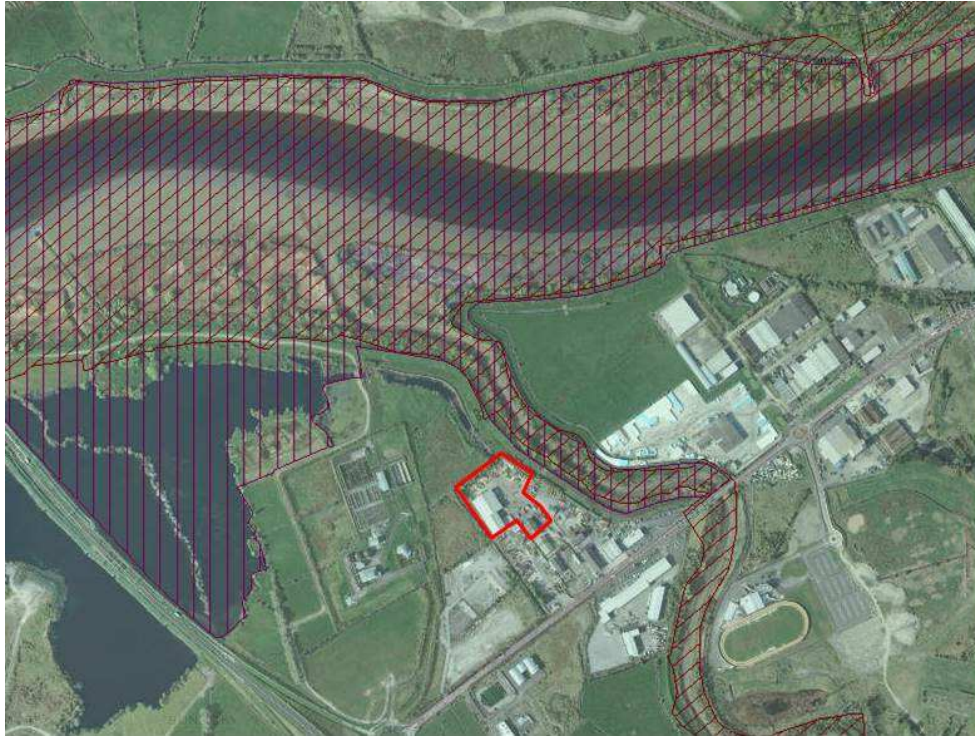


Figure 2. Site in relation to SPA (purple vertical liens) and SAC in (red slanted lines)

3.2 Lower River Shannon SAC - features of interest and conservation objectives

The Lower River Shannon cSAC supports a number of important habitats and protected species. This very large site stretches along the Shannon valley from Killaloe to Loop Head/ Kerry Head, a distance of some 120 km. The site thus encompasses the Shannon, Feale, Mulkear and Fergus Estuaries, the freshwater lower reaches of the River Shannon (between Killaloe and Limerick), the freshwater stretches of much of the Feale and Mulkear catchments and the marine area between Loop Head and Kerry Head. Specific conservation objectives for the features of interest of the Lower River Shannon cSAC are published (Lower River Shannon SAC 002165, Conservation Objectives Series NPWS August, 2012). Maps showing the distribution of qualifying habitats within the SAC are also included in this document. The features of interest and specific conservation objectives for the various qualifying habitats and species as detailed in this document are included below in **Table 2**.

Table 2 Qualifying interests and conservation objectives

Features of Interest/Objective	Conservation objectives
Freshwater Pearl Mussel <i>Margaritifera margaritifera</i>	Objective: To restore the favourable conservation condition
1096 Brook Lamprey <i>Lampetra planeri</i>	Objective: To maintain the favourable conservation condition
1110 Sandbanks which are slightly covered by sea water all the time	Objective: To maintain the favourable conservation condition
1140 Mudflats and sandflats not covered by seawater at low tide	Objective: To maintain the favourable conservation condition
1160 Large shallow inlets and bays	Objective: To maintain the favourable conservation condition
1170 Reefs	Objective: To maintain the favourable conservation condition
1410 Mediterranean salt meadows (<i>Juncetalia maritimi</i>)	Objective: To restore the favourable conservation condition
3260 Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation	Objective: To maintain the favourable conservation condition
6410 Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>)	Objective: To maintain the favourable conservation condition
91E0 *Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae)	Objective: To restore the favourable conservation condition
1150 *Coastal lagoons	Objective: To restore the favourable conservation condition
1220 Perennial vegetation of stony banks	Objective: To maintain the favourable conservation condition
1230 Vegetated sea cliffs of the Atlantic and Baltic coasts	Objective: To maintain the favourable conservation condition
1330 Atlantic salt meadows (<i>Glaucopuccinellietalia maritima</i>)	Objective: To restore the favourable conservation condition
Sea Lamprey <i>Petromyzon marinus</i>	To restore the favourable conservation condition
1099 River Lamprey <i>Lampetra fluviatilis</i>	To maintain the favourable conservation condition
Atlantic Salmon <i>Salmo salar</i> (only in fresh water)	To restore the favourable conservation condition of Salmon
1130 Estuaries	To maintain the favourable conservation condition of Estuaries
1349 Bottlenose Dolphin <i>Tursiops truncatus</i>	To maintain the favourable conservation condition
1355 Otter <i>Lutra lutra</i>	To restore the favourable conservation condition

3.3 River Shannon & River Fergus SPA

It is proposed that the River Shannon and River Fergus Estuaries Special Protection Area (SPA) will be expanded to include most of the lower Shannon including the area adjoining the Shannon LNG site. This SPA is the most important coastal wetland site in Ireland and regularly supports in excess of 50,000 wintering waterfowl (mean of 59,183 for the 4 seasons 1996-97 to 1999/00), a concentration of international importance. In addition, it also supports internationally important numbers of three species, Dunlin, Black-tailed Godwit and Redshank, with a further 16 species occurring in numbers of national importance (NPWS, 2005). The site synopsis for this Natura 2000 site is included below in **Appendix 1**. The following are listed as features of interest for the River Shannon and River Fergus Estuaries SPA:

- Cormorant (*Phalacrocorax carbo*) [A017]
- Whooper Swan (*Cygnus cygnus*) [A038]

- Light-bellied Brent Goose (*Branta bernicla hrota*) [A046]
- Shelduck (*Tadorna tadorna*) [A048]
- Wigeon (*Anas penelope*) [A050]
- Teal (*Anas crecca*) [A052]
- Pintail (*Anas acuta*) [A054]
- Shoveler (*Anas clypeata*) [A056]
- Scaup (*Aythya marila*) [A062]
- Ringed Plover (*Charadrius hiaticula*) [A137]
- Golden Plover (*Pluvialis apricaria*) [A140]
- Grey Plover (*Pluvialis squatarola*) [A141]
- Lapwing (*Vanellus vanellus*) [A142]
- Knot (*Calidris canutus*) [A143]
- Dunlin (*Calidris alpina*) [A149]
- Black-tailed Godwit (*Limosa limosa*) [A156]
- Bar-tailed Godwit (*Limosa lapponica*) [A157]
- Curlew (*Numenius arquata*) [A160]
- Redshank (*Tringa totanus*) [A162]
- Greenshank (*Tringa nebularia*) [A164]
- Black-headed Gull (*Chroicocephalus ridibundus*) [A179]
- Wetlands & Waterbirds [A999]

Specific conservation objectives for the features of interest of the River Shannon and River Fergus Estuaries SPA have been published (River Shannon and River Fergus Estuaries SPA, Conservation Objectives Series NPWS September, 2012). The specified conservation objectives are to maintain the favourable conservation condition of all the birds listed as features of interest and to maintain the favourable conservation condition of the wetland habitat in the River Shannon and River Fergus Estuaries SPA as a resource for the regularly-occurring migratory waterbirds that utilize it.

4. Site survey

A site visit was undertaken on November 8, 2014. Habitats were classified using the classification scheme outlined in the Heritage council publication *A Guide to Habitats in Ireland* (Fossit, 2000) and cross referenced with Annex 1 habitats under the Habitats Directive where relevant.

4.1 Habitats

This is an industrialised site with a very high level of disturbance. The site is dominated by concrete surfaces, and buildings (BL3 built land and artificial surfaces) used for the sorting and storage of recyclable materials. A number of vehicles are also parked and within the site. The remaining buildings are used for administrative purposes. Very few plant species were noted within the development area, with only a sparse number of the hardiest ruderals noted including ribwort plantain, daisy, stinging nettle and dandelion. In the northwest corner of the site, a fenced off area contains a Klargester unit for foul water treatment. This fenced area is developing a WS1 Scrub habitat of willow, bramble and clematis.

Outside of the site boundary to the west, north and east is a drain (FW4 Drainage ditch) and associated FS1 reed and large sedge swamp. The drainage ditches are connected to the Bunlickey Lake to the east, and do not appear to be directly connected to Ballincurra creek or the River Shannon. This lake is part of the SPA. Species recorded in the drainage ditches surrounding the site include grey willow, white willow, cracked willow, hazel, birch, bramble, ivy, clematis, common reed, rosebay willowherb, common figwort, water cress and duckweed. Special attention was given to these drainage ditch area for the presence of opposite-leaved pondweed, and triangular clubrush, which are listed under the Floral (Protection) order (1999); neither were recorded. A substantial levy, approximately 4m high, separates the drainage ditches on the western side of the site from Ballincurra creek, and the River Shannon.

4.2 Fauna

Large aggregations of birds were recorded during the site visit. It is likely that birds are attracted to this site as waste food may occasionally also be present at this site. Large numbers (100+) of rook, jackdaw, blackheaded gull and starling were noted. Other species noted include common gull, lesser blackbacked gull, hooded crow, robin and pied wagtail. A bird scarer is used on site once to twice a day (Pers. Comm Dominic Broadherst). No signs of otter, (an Annex 2 species listed as a feature of interest for the Lower River Shannon SAC), were recorded on site, or from the surrounding drainage ditches. Whilst it is possible that otters may occasionally utilise these drainage ditches, Ballincurra creek and the River Shannon will be the primary habitat for this species in this area.

5. Potential impacts

5.1 Proposed Development

The proposed increase in the annual waste throughput will not require the expansion of the site, the construction/provision of any new buildings/structures, or any alteration to the existing site layout and operations. There will be no change to the waste acceptance and operational hours and it will not require the use of any new raw materials that have the potential to cause contamination. It will not result in any new or additional abstraction from groundwater or surface water. It will not give rise to any new emissions to surface water or sewer, nor will it contribute to increased noise, dust and odour emissions or illumination. There is only one hydrocarbon storage point on site. This is used for diesel fuel storage for the vehicles on site and is securely bunded. There is an existing hydrocarbon interceptor on site, which prevents any inadvertent contamination of surface water discharges.

5.2 Direct Impacts

The Greenstar facility is not located within any designated Natura 2000 Site and therefore the proposed changes will not result in any direct habitat loss or fragmentation of either the Lower River Shannon SAC or the River Shannon and River Fergus Estuaries SPA. These Natura 2000 Sites are approximately 400m to the north and west of the Greenstar facility. The facility is extensively developed and almost entirely covered with paving and buildings, which means it does not support the species for which the Natura 2000 sites were selected. Based on the above, the project does not present any risk of a direct adverse effect on either the habitats or species for which the Natura 2000 Sites were selected.

5.3 Indirect Impacts

There is the potential for indirect impacts on the Natura 2000 Sites, as surface water run-off from the yards and roofs discharges to the Bunlickey Lake, which is part of the River Shannon & Fergus SPA and hydraulically connected to the River Shannon via sluices. However, the project will not result in any changes to either the volume or quality of the surface water run-off from the facility and therefore will have no impact of the Natural 2000 Sites.

Disturbance impacts are considered with regard to the potential for effects on the Annex II species for which the Lower River Shannon SAC is designated and the bird species listed as special conservation interests of the River Shannon and River Fergus Estuaries SPA.

The Greenstar facility is located within an industrial estate and is 2km west of Limerick Docks. There are extensive and ongoing traffic movements, artificial lighting and noise emissions associated with both areas. It must be noted that the presence of the listed species of conservation interest within the environs of Limerick City indicates they have become acclimatised to the background levels of disturbance.

The project does not require the provision of any new plant and equipment or changes to the operational hours therefore there will be no additional sources of disturbance to the listed species present in both the SAC and SPA.

5.4 Cumulative impacts

This section assesses the potential effects for Greenstar in combination with other plans and projects to potentially impact on Natura 2000 sites is assessed. Cumulative impacts refer to a series of individually modest impacts that may 'in combination' produce a significant impact. The underlying intention of this in combination provision is to take account of cumulative impacts from existing or proposed plans and projects and these will often only occur over time. It may be appropriate to consider the effects of already completed plans and projects if they have continuing effects on the site and point to a pattern of progressive loss of site integrity. Where there is a series of small, but potentially adverse impacts occurring within or adjacent to a Natura 2000 site, consideration of their cumulative impacts should be considered.

The potential for Greenstar to indirectly impact the Lower Shannon SAC or the Shannon and Fergus Estuaries SPA has been assessed. Potential cumulative impacts on the sites may arise owing to an alteration to water quality or quantity. Deterioration in water quality can occur as an indirect consequence of point source or diffuse pollution, which in turn changes the aquatic environment and reduces its capacity to support certain plants and animals. This leads to potential negative consequences for the qualifying interests that rely on the maintenance of water quality within the Natura 2000 site.

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6.1 Proposed amendment to the Greenstar Operations

The proposed increase in the amount of waste accepted will not result in any changes to either the volume or quality of the surface water run-off that therefore will not contribute to any significant cumulative impact on the Natura 2000 Sites.

The proposed changes to the site do not involve the construction of new buildings, the introduction of new plant or equipment or the changes to the operational hours, and therefore will not add to the cumulative disturbance effects on the Natura 2000 Sites.

Surface water run-off is generated by rainfall on the roof of the offices and workshop building, the waste handling buildings and the paved open yard areas discharges via an interceptor through a drainage network to into Bunlickey Lake. There is a shut off valve at the outlet from the interceptor that can be closed in the event of an incident which may potential to impact on surface water quality. Surface water emission monitoring data from the facility to date are shown in **Appendix 2**.

The monitoring data indicates that, with the exception of BOD and TSS, all of the parameters are below the proposed ELV and significantly below the EQS.

To address the BOD and TSS issue, it is proposed to divide the site into 'clean' and 'dirty' areas in terms of surface water run-off management. The 'clean' area will comprise the building roofs and the yard in the south east of the site (8,195m²), while the 'dirty' area will comprise the yard between the processing buildings and the northern and north eastern boundaries (8,499m²).

The 'dirty' area is defined by area trafficked by the heavy goods vehicles, refuse collection vehicles and articulated trucks leaving Main Building, which require a large turning area. The division of the site into 'clean' and 'dirty' areas will involve re-routing the existing drainage system. The run-off from the southern yard and building roofs will continue to be directed to the interceptors and will outfall to the drain at the existing discharge point. The run-off from the 'dirty' area will pass through a new grit trap and oil interceptor before connecting to the new foul sewer.

While the emissions to the drains are rainfall dependent, based on an annual average rainfall amount of 950mm, the estimated average daily discharge of surface water to the drain is from 18.1m³ per day.

6.2 Environmental Management System

A detailed Environmental Management System is in place to controls activities at the site and ensure compliance with the Waste Licence. Controls are in place for waste acceptance and processing, and emergency procedures

have been prepared in the unlikely event that a pollution incident occurs to minimise risk to nearby watercourses. All foul emissions from the site discharge directly to the Limerick Waste Water Treatment Plant which is licenced by the EPA (Licence Reg. No. D0013-01).

6.3 Plans and Projects

The potential in-combination effects of Greenstar operations with respect to the following:

- Water Framework Directive
- Shannon River Basin Management Plan
- Limerick Dock Water Body Status Report

6.4 Water Framework Directive

The Water Framework Directive is a European Union directive which commits European Union member states to achieve good qualitative and quantitative status of all water bodies (including marine waters up to kilometres from shore) by 2015. It is a framework in the sense that it prescribes steps to reach the common goal rather than adopting the more traditional limit value approach. The directive defines 'surface water status' as the general expression of the status of a body of surface water, determined by the poorer of its ecological status and its chemical status. Thus, to achieve 'good surface water status' both the ecological status and the chemical status of a surface water body need to be at least 'good'. Good ecological status is defined locally as being lower than a theoretical reference point of pristine conditions, i.e. in the absence of anthropogenic influence. Article 14 of the directive requires member states "to encourage the active involvement of interested parties" in the implementation of the directive.

6.5 Shannon River Basin Management Plan

The water from Bunlickey Lake discharges to the Shannon River Estuary via valves and sluices that prevent tidal inflow. 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 EPA have assigned the Upper Shannon Estuary "Good" status based on general physico-chemical elements, phytoplankton and macroalgal growths. This suggests that the nutrient loading from Limerick Waste Water Treatment Plant is not having a significant detrimental impact on water quality.

6.6. Limerick Dock Water Body Status Report

The Limerick Dock Water Body Status Reports 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. The risk assessment was prepared in 2008 and at that time the primary pressure on water quality identified in the Shannon Transitional and Coastal WMU Plan 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.

There are a number of point sources that should be taken into consideration in the evaluation of cumulative effects. These are licenced facilities as outlined below:

- Irish Cement Limited (Licence Reg. No. P0029-03)
- James McMahon Limited (Licence Reg. No. P0329-01)
- Atlas Aluminium Limited (Licence Reg. No. P0436-01)
- Limerick City & County Council and Clare County Council (Licence Reg. No. D0013-01).

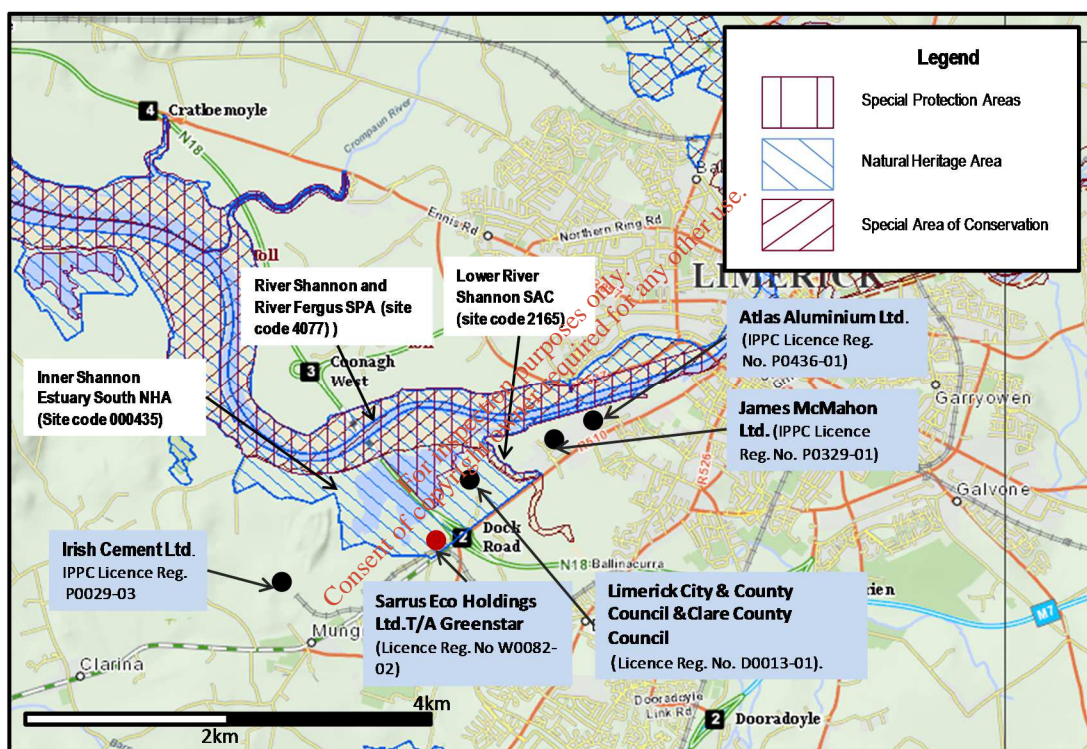


Figure 5.6.1. Designated sites and licenced discharges.

6.7 Irish Cement Limited (Licence Reg. No. P0029-03)

The process effluent from this facility discharges to the Bunlicky Clayfield Pond (Bunicky Pond) via surface water emission points labelled SW1 and SW2. The Bunlicky Pond is included within the site boundary and acts as the installation's inert landfill. The pond is not designated as a waterbody for the purposes of the Water Framework Directive. The pond discharges to the adjacent Limerick Dock (IE-SH-060-0900) - River Shannon. A review of

surface water emissions from the site in the Annual Environmental Monitoring Report for 2013 showed that they were in compliance with the licenced emission limit values.

6.8 James McMahon Limited (Licence Reg. No. P0329-01)

James McMahon Limited, Corcanree, Dock Road, Limerick is currently licenced for the treatment or protection of wood, involving the use of preservatives, with a capacity exceeding 10 tonnes per day. There are no licenced emissions of process effluent or surface water sewer from this site and as a result emissions from the facility are not considered as part of the cumulative assessment.

6.9 Atlas Aluminium Limited (Licence Reg. No. P0436-01)

Atlas Aluminium Limited, is currently licenced to produce/recovery non-ferrous metals, or other alloys including aluminium and zinc, by thermal means in processing. Foul drainage lines from the site were developed prior to the existence of a town sewer. Separate foul lines join the surface water at the front yard, and the outfall from this point is to the river Shannon via a combined drain. It is understood that following a fire in 2011 that the facility is no longer operational and as a result emissions from the facility are not considered as part of the cumulative assessment.

6.10 Limerick City & County Council and Clare County Council (Licence Reg. No. D0013-01)

A review of the Annual Environmental Report for 2013 for the Limerick Waste Water Treatment Plant, which is designed to treat waste water from Limerick City and its environs, shows that it is fully compliant with its licenced water emissions. In 2013 there were no breaches of emission limit values. The organic loadings on the Limerick Waste Water Treatment Plant treatment plant for 2013 is calculated to be 117800 PE which is 12200 less than the design PE of 130000. Therefore Limerick Waste Water Treatment Plant has handled the hydraulic and organic loading adequately and met emission limit values set out in the discharge licence.

7. Conclusions

The potential for Greenstar's operations both on its own, and in combination with other plans and projects to negatively impact the qualifying interests of the Lower Shannon SAC or the Shannon and Fergus Estuaries SPA has been assessed. It has been concluded that the proposed increase in annual waste throughput will not result in any new or additional emissions/disturbance or that could present a significant risk to the Qualifying Interests and Conservation Objectives of either the Lower Shannon SAC or the Shannon and Fergus Estuaries SPA.

Plans and policies were assessed with respect to positive/negative impacts on Qualifying Interests and Conservation Objectives for the Lower Shannon SAC and the Shannon and Fergus Estuaries SPA. The potential for in-combination effects to occur via a cumulative effect would involve water emissions from Greenstar Environmental Services in addition to other EPA licenced facilities. Discharge to Limerick City Council Waste Water Treatment Plant could impact on water quality which could indirectly compromise the integrity of the Lower Shannon SAC and the Shannon and Fergus Estuaries SPA and associated qualifying interests. The following was noted:

- Greenstar's Environmental Management System has detailed environmental control measures to prevent, in the unlikely event of an incident, any potential contamination of surface waters by diverting them to Limerick Waste Water Treatment Plant. In addition it is proposed to segregate clean yard and dirty yard areas to ensure all surface water emissions are compliant with licenced limits.
- Water quality testing undertaken by Limerick City Council Waste Water Treatment Plant (2013), and Irish Cement have shown that they are fully compliant with the emission limit values of the licences.
- The water quality of the Upper Shannon Estuary has been assigned "Good" status based on general physico-chemical elements, phytoplankton and macro-algal growths. This suggests that the Limerick Waste Water Treatment Plant is not having a significant detrimental impact on water quality.

Therefore it is concluded, based on the above information, that Greenstar Environmental Service operations, in combination with other potential sources of pollution, are not significantly impacting on water quality. Nor are any such impacts predicted in the future. Thus no adverse impacts on the integrity of designated sites have been identified.

Appendix 1 Site Synopses

SITE NAME: LOWER RIVER SHANNON SITE CODE: 002165

This very large site stretches along the Shannon valley from Killaloe to Loop Head/ Kerry Head, a distance of some 120 km. The site thus encompasses the Shannon, Feale, Mulkear and Fergus Estuaries, the freshwater lower reaches of the River Shannon (between Killaloe and Limerick), the freshwater stretches of much of the Feale and Mulkear catchments and the marine area between Loop Head and Kerry Head. The Shannon and Fergus flow through Carboniferous limestone as far as Foynes, but west of Foynes Namurian shales and flagstones predominate (except at Kerry Head, which is formed from Old Red Sandstone). The eastern sections of the Feale catchment flow through Namurian Rocks and the western stretches through Carboniferous Limestone. The Mulkear flows through Lower Palaeozoic Rocks in the upper reaches before passing through Namurian Rocks, followed by Lower Carboniferous Shales and Carboniferous Limestone. The Mulkear River itself, immediately north of Pallas Green, passes through an area of Rhyolites, Tufts and Agglomerates. Rivers within the sub-catchment of the Feale include the Galey, Smearlagh, Oolagh, Allaughaun, Owveg, Clydagh, Caher, Breanagh and Glenacarne. Rivers within the sub-catchment of the Mulkear include the Killeenagarraff, Annagh, Newport, the Dead River, the Bilboa, Glashacloonaraveela, Gortnageragh and Caherahallia.

The site is a candidate SAC selected for lagoons and alluvial wet woodlands, both habitats listed on Annex I of the E.U. Habitats Directive. The site is also selected for floating river vegetation, *Molinia* meadows, estuaries, tidal mudflats, Atlantic salt meadows, Mediterranean salt meadows, *Salicornia* mudflats, sand banks, perennial vegetation of stony banks, sea cliffs, reefs and large shallow inlets and bays all habitats listed on Annex I of the E.U. Habitats Directive. The site is also selected for the following species listed on Annex II of the same directive Bottle-nosed Dolphin, Sea Lamprey, River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Atlantic Salmon and Otter.

The Shannon and Fergus Estuaries form the largest estuarine complex in Ireland. They form a unit stretching from the upper tidal limits of the Shannon and Fergus Rivers to the mouth of the Shannon estuary (considered to be a line across the narrow strait between Kilcredaun Point and Kilconly Point). Within this main unit there are several tributaries with their own sub-estuaries? e.g. the Deel River, Mulkear River, and Maigne River. To the west of Foynes, a number of small estuaries form indentations in the predominantly hard coastline, namely Poulmasherry Bay, Ballylongford Bay, Clonderalaw Bay and the Feale or Cashen River Estuary.

Both the Fergus and inner Shannon estuaries feature vast expanses of intertidal mudflats, often fringed with saltmarsh vegetation. The smaller estuaries also feature mudflats, but have their own unique characteristics, e.g. Poulmasherry Bay is stony and unusually rich in species and biotopes. Plant species are typically scarce on the mudflats, although there are some Eel-grass beds (*Zostera* spp.) and patches of green algae (e.g. *Ulva* sp. and

Enteromorpha sp.). The main macro-invertebrate community, which has been noted from the inner Shannon and Fergus estuaries, is a *Macoma-Scrobicularia-Nereis* community.

In the transition zone between mudflats and saltmarsh, specialised colonisers of mud predominate: swards of Common Cord-grass (*Spartina anglica*) frequently occur in the upper parts of the estuaries. Less common are swards of Glasswort (*Salicornia europaea* agg.). In the innermost parts of the estuaries, the tidal channels or creeks are fringed with species such as Common Reed (*Phragmites australis*) and Club-rushes (*Scirpus maritimus*, *S. tabernaemontani* and *S. triquetrus*). In addition to the nationally rare Triangular Club-rush (*Scirpus triquetrus*), two scarce species are found in some of these creeks (e.g. Ballinacurra Creek): Lesser Bulrush (*Typha angustifolia*) and Summer Snowflake (*Leucojum aestivum*).

Saltmarsh vegetation frequently fringes the mudflats. Over twenty areas of estuarine saltmarsh have been identified within the site, the most important of which are around the Fergus Estuary and at Ringmoylan Quay. The dominant type of saltmarsh present is Atlantic salt meadow occurring over mud. Characteristic species occurring include Common Saltmarsh Grass (*Puccinellia maritima*), Sea Aster (*Aster tripolium*), Thrift (*Armeria maritima*), Sea-milkwort (*Glaux maritima*), Sea Plantain (*Plantago maritima*), Red Fescue (*Festuca rubra*), Creeping Bent (*Agrostis stolonifera*), Saltmarsh Rush (*Juncus gerardi*), Long-bracted Sedge (*Carex extensa*), Lesser Sea-spurrey (*Spergularia marina*) and Sea Arrowgrass (*Triglochin maritima*). Areas of Mediterranean salt meadows, characterised by clumps of Sea Rush (*Juncus maritimus*), occur occasionally. Two scarce species are found on saltmarshes in the vicinity of the Fergus Estuary: a type of robust Saltmarsh-grass (*Puccinellia foucaudii*), sometimes placed within the compass of Common Saltmarsh-grass (*Puccinellia maritima*) and Hard-grass (*Parapholis strigosa*).

Saltmarsh vegetation also occurs around a number of lagoons within the site. The two which have been surveyed as part of a National Inventory of Lagoons are Shannon Airport Lagoon and Cloonconeen Pool. Cloonconeen Pool (4-5 ha) is a natural sedimentary lagoon impounded by a low cobble barrier. Seawater enters by percolation through the barrier and by overwash. This lagoon represents a type which may be unique to Ireland since the substrate is composed almost entirely of peat. The adjacent shore features one of the best examples of a drowned forest in Ireland. Aquatic vegetation in the lagoon includes typical species such as Beaked Tasselweed (*Ruppia maritima*) and green algae (*Cladophora* sp.). The fauna is not diverse, but is typical of a high salinity lagoon and includes six lagoon specialists (*Hydrobia ventrosa*, *Cerastoderma glaucum*, *Lekanesphaera hookeri*, *Palaemonetes varians*, *Sigara stagnalis* and *Enochrus bicolor*). In contrast, Shannon Airport Lagoon (2 ha) is an artificial saline lake with an artificial barrier and sluiced outlet. However, it supports two Red Data Book species of Stonewort (*Chara canescens* and *Chara cf. connivens*).

Most of the site west of Kilcredaun Point/Kilconly Point is bounded by high rocky sea cliffs. The cliffs in the outer part of the site are sparsely vegetated with lichens, Red Fescue, Sea Beet (*Beta vulgaris*), Sea Campion (*Silene maritima*), Thrift and Plantains (*Plantago* spp.). A rare endemic Sea Lavender (*Limonium recurvum* subsp.

pseudotranswallinum) occurs on cliffs near Loop Head. Cliff-top vegetation usually consists of either grassland or maritime heath. The boulder clay cliffs further up the estuary tend to be more densely vegetated, with swards of Red Fescue and species such as Kidney Vetch (*Anthyllis vulneraria*) and Bird's-foot Trefoil (*Lotus corniculatus*).

The site supports an excellent example of a large shallow inlet and bay. Littoral sediment communities in the mouth of the Shannon Estuary occur in areas that are exposed to wave action and also in areas extremely sheltered from wave action. Characteristically, exposed sediment communities are composed of coarse sand and have a sparse fauna. Species richness increases as conditions become more sheltered. All shores in the site have a zone of sand hoppers at the top and below this each of the shores has different characteristic species giving a range of different shore types in the SAC.

The intertidal reefs in the Shannon Estuary are exposed or moderately exposed to wave action and subject to moderate tidal streams. Known sites are steeply sloping and show a good zonation down the shore. Well developed lichen zones and littoral reef communities offering a high species richness in the sublittoral fringe and strong populations of *Paracentrotus lividus* are found. The communities found are tolerant to sand scour and tidal streams. The infralittoral reefs range from sloping platforms with some vertical steps to ridged bedrock with gullies of sand between the ridges to ridged bedrock with boulders or a mixture of cobbles, gravel and sand. Kelp is very common to about 18m. Below this it becomes rare and the community is characterised by coralline crusts and red foliose algae.

Other coastal habitats that occur within the site include the following:

- stony beaches and bedrock shores - these shores support a typical zonation of seaweeds (*Fucus* spp., *Ascophyllum nodosum* and kelps).
- shingle beaches - the more stable areas of shingle support characteristic species such as Sea Beet, Sea Mayweed (*Matricaria maritima*), Sea Campion and Curled Dock (*Rumex crispus*).
- Sandbanks which are slightly covered by sea water at all times - there is a known occurrence of sand/gravel beds in the area from Kerry Head to Beal Head.
- sand dunes - a small area of sand dunes occurs at Beal Point. The dominant species is Marram Grass (*Ammophila arenaria*).

Flowing into the estuaries are a number of tidal rivers. Freshwater rivers have been included in the site, most notably the Feale and Mulkear catchments, the Shannon from Killaloe to Limerick (along with some of its tributaries, including a short stretch of the Kilmastulla River), the Fergus up as far as Ennis, and the Cloon River. These systems are very different in character: the Shannon being broad, generally slow-flowing and naturally eutrophic; the Fergus being smaller and alkaline; while the narrow, fast-flowing Cloon is acid in nature. The Feale and Mulkear catchments exhibit all the aspects of a river from source to mouth. Semi-natural habitats, such as wet grassland,

wet woodland and marsh occur by the rivers, however, improved grassland is most common. One grassland type of particular conservation significance, *Molinia* meadows, occurs in several parts of the site and the examples at Worldsend on the River Shannon are especially noteworthy. Here are found areas of wet meadow dominated by rushes and sedges and supporting a diverse and species-rich vegetation, including such uncommon species as Blue-eyed Grass (*Sisyrinchium bermudiana*) and Pale Sedge (*Carex pallescens*).

Floating river vegetation characterised by species of Water-crowfoot (*Ranunculus* spp.), Pondweeds (*Potamogeton* spp.) and the moss *Fontinalis antipyretica* are present throughout the major river systems within the site. The rivers contain an interesting bryoflora with *Schistidium alpicola* var. *alpicola* recorded from in-stream boulders on the Bilboa, new to county Limerick.

Alluvial woodland occurs on the banks of the Shannon and on islands in the vicinity of the University of Limerick. The woodland is up to 50m wide on the banks and somewhat wider on the largest island. The most prominent woodland type is gallery woodland where White Willow (*Salix alba*) dominates the tree layer with occasional Alder (*Alnus glutinosa*). The shrub layer consists of various willow species with sally (*Salix cinerea* ssp. *oleifolia*) and what appear to be hybrids of *S. alba* x *S. viminalis*. The herbaceous layer consists of tall perennial herbs. A fringe of Bulrush (*Typha* sp.) occurs on the riverside of the woodland. On slightly higher ground above the wet woodland and on the raised embankment remnants of mixed oak-ash-alder woodland occur. These are poorly developed and contain numerous exotic species but locally there are signs that it is invading open grassland. Alder is the principal tree species with occasional Oak (*Quercus robur*), Elm (*Ulmus glabra*, *U. procera*), Hazel (*Corylus avellana*), Hawthorn (*Crataegus monogyna*) and the shrubs Guelder-rose (*Viburnum opulus*) and willows. The ground flora is species-rich.

Woodland is infrequent within the site, however Cahiracon Wood contains a strip of old Oak woodland. Sessile Oak (*Quercus petraea*) forms the canopy, with an understorey of Hazel and Holly (*Ilex aquifolium*). Great Wood-rush (*Luzula sylvatica*) dominates the ground flora. Less common species present include Great Horsetail (*Equisetum telmateia*) and Pendulous Sedge (*Carex pendula*).

In the low hills to the south of the Slievefelim mountains, the Cahernahallia River cuts a valley through the Upper Silurian rocks. For approximately 2km south of Cappagh Bridge at Knockanavar, the valley sides are wooded. The woodland consists of Birch (*Betula* spp.), Hazel, Oak, Rowan (*Sorbus aucuparia*), some Ash (*Fraxinus excelsior*) and Willow (*Salix* spp.). Most of the valley is not grazed by stock, and as a result the trees are regenerating well. The ground flora feature prominent Greater wood-rush and Bilberry (*Vaccinium myrtillus*) with a typical range of woodland herbs. Where there is more light available, Bracken (*Pteridium aquilinum*) features.

The valley sides of the Bilboa and Gortnageragh Rivers, on higher ground north east of Cappamore, support patches of semi-natural broadleaf woodland dominated by Ash, Hazel, Oak and Birch. There is a good scrub layer

with Hawthorn, Willow, Holly and Blackthorn (*Prunus spinosa*) common. The herb layer in these woodlands is often open with a typically rich mixture of woodland herbs and ferns. Moss species diversity is high. The woodlands are ungrazed. The hazel is actively coppiced in places.

There is a small area of actively regenerating cut away raised bog at Ballyrorheen. It is situated approx. 5km north west of Cappamore Co. Limerick. The bog contains some wet areas with good moss (*Sphagnum*) cover. Species of particular interest include the Cranberry (*Vaccinium oxycoccos*) and the White Sedge (*Carex curta*) along with two other regionally rare mosses including *S. fimbriatum*. The site is being invaded by Birch (*Betula pubescens*) scrub woodland. Both commercial forestry and the spread of rhododendron has greatly reduced the overall value of the site.

A number of plant species that are Irish Red Data Book species occur within the site - several are protected under the Flora (Protection) Order, 1999:

- Triangular Club-rush (*Scirpus triquetrus*) - in Ireland this protected species is only found in the Shannon Estuary, where it borders creeks in the inner estuary.
- Opposite-leaved Pondweed (*Groenlandia densa*) - this protected pondweed is found in the Shannon where it passes through Limerick City.
- Meadow Barley (*Hordeum secalinum*) - this protected species is abundant in saltmarshes at Ringmoylan and Mantlehill.
- Hairy Violet (*Viola hirta*) - this protected violet occurs in the Askeaton/Foynes area.
- Golden Dock (*Rumex maritimus*) - noted as occurring in the River Fergus Estuary.
- Bearded Stonewort (*Chara canescens*) - a brackish water specialist found in Shannon Airport lagoon.
- Convergent Stonewort (*Chara connivens*) - presence in Shannon Airport Lagoon to be confirmed.

Overall, the Shannon and Fergus Estuaries support the largest numbers of wintering waterfowl in Ireland. The highest count in 1995-96 was 51,423 while in 1994-95 it was 62,701. Species listed on Annex I of the E.U. Birds Directive which contributed to these totals include: Great Northern Diver (3; 1994/95), Whooper Swan (201; 1995/96), Pale-bellied Brent Goose (246; 1995/96), Golden Plover (11,067; 1994/95) and Bar-tailed Godwit (476; 1995/96). In the past, three separate flocks of Greenland White-fronted Goose were regularly found but none were seen in 1993/94.

Other wintering waders and wildfowl present include Greylag Goose (216; 1995/96), Shelduck (1,060; 1995/96), Wigeon (5,976; 1995/96); Teal (2,319; 1995-96); Mallard (528; 1995/96), Pintail (45; 1995/96), Shoveler (84; 1995/96), Tufted Duck (272; 1995/96), Scaup (121; 1995/96), Ringed Plover (240; 1995/96), Grey Plover (750;

1995/96), Lapwing (24,581; 1995/96), Knot (800; 1995/96), Dunlin (20,100; 1995/96), Snipe (719, 1995/96), Black-tailed Godwit (1062; 1995/96), Curlew (1504; 1995/96), Redshank (3228; 1995/96), Greenshank (36; 1995/96) and Turnstone (107; 1995/96). A number of wintering gulls are also present, including Black-headed Gull (2,216; 1995/96), Common Gull (366; 1995/96) and Lesser Black-backed Gull (100; 1994/95). This is the most important coastal site in Ireland for a number of the waders including Lapwing, Dunlin, Snipe and Redshank. It also provides an important staging ground for species such as Black-tailed Godwit and Greenshank.

A number of species listed on Annex I of the E.U. Birds Directive breed within the site. These include Peregrine Falcon (2-3 pairs), Sandwich Tern (34 pairs on Rat Island, 1995), Common Tern (15 pairs: 2 on Sturamus Island and 13 on Rat Island, 1995), Chough (14-41 pairs, 1992) and Kingfisher. Other breeding birds of note include Kittiwake (690 pairs at Loop Head, 1987) and Guillemot (4010 individuals at Loop Head, 1987)

There is a resident population of Bottle-nosed Dolphin in the Shannon Estuary consisting of at least 56-68 animals (1996). This is the only known resident population of this E.U. Habitats Directive Annex II species in Ireland. Otter, a species also listed on Annex II of this directive, is commonly found on the site.

Five species of fish listed on Annex II of the E.U. Habitats Directive are found within the site. These are Sea Lamprey (*Petromyzon marinus*), Brook Lamprey (*Lampetra planeri*), River Lamprey (*Lampetra fluviatilis*), Twaité Shad (*Allosa fallax fallax*) and Salmon (*Salmo salar*). The three lampreys and Salmon have all been observed spawning in the lower Shannon or its tributaries. The Fergus is important in its lower reaches for spring salmon while the Mulkear catchment excels as a grilse fishery though spring fish are caught on the actual Mulkear River. The Feale is important for both types. Twaité Shad is not thought to spawn within the site. There are few other river systems in Ireland which contain all three species of Lamprey.

Two additional fish of note, listed in the Irish Red Data Book, also occur, namely Smelt (*Osmerus eperlanus*) and Pollan (*Coregonus autumnalis pollan*). Only the former has been observed spawning in the Shannon.

Freshwater Pearl-mussel (*Margaritifera margaritifera*), a species listed on Annex II of the E.U. Habitats Directive, occurs abundantly in parts of the Cloon River.

There is a wide range of landuses within the site. The most common use of the terrestrial parts is grazing by cattle and some areas have been damaged through over-grazing and poaching. Much of the land adjacent to the rivers and estuaries has been improved or reclaimed and is protected by embankments (especially along the Fergus Estuary). Further, reclamation continues to pose a threat as do flood relief works (e.g. dredging of rivers). Gravel extraction poses a major threat on the Feale.

In the past, Cord-grass (*Spartina* sp.) was planted to assist in land reclamation. This has spread widely, and may oust less vigorous colonisers of mud and may also reduce the area of mudflat available to feeding birds.

Domestic and industrial wastes are discharged into the Shannon, but water quality is generally satisfactory - except in the upper estuary, reflecting the sewage load from Limerick City. Analyses for trace metals suggest a relatively clean estuary with no influences by industrial discharges apparent. Further industrial development along the Shannon and water polluting operations are potential threats.

Fishing is a main tourist attraction on the Shannon and there are a large number of Angler Associations, some with a number of beats. Fishing stands and styles have been erected in places. The River Feale is a designated Salmonid Water under the E.U. Freshwater Fish Directive. Other uses of the site include commercial angling, oyster farming, boating (including dolphin-watching trips) and shooting. Some of these may pose threats to the birds and dolphins through disturbance. Specific threats to the dolphins include underwater acoustic disturbance, entanglement in fishing gear and collisions with fast moving craft.

This site is of great ecological interest as it contains a high number of habitats and species listed on Annexes I and II of the E.U. Habitats Directive, including the priority habitat lagoon, the only known resident population of Bottlenosed Dolphin in Ireland and all three Irish lamprey species. A good number of Red Data Book species are also present, perhaps most notably the thriving populations of Triangular Club-rush. A number of species listed on Annex I of the E.U. Birds Directive are also present, either wintering or breeding. Indeed, the Shannon and Fergus Estuaries form the largest estuarine complex in Ireland and support more wintering wildfowl and waders than any other site in the country. Most of the estuarine part of the site has been designated a Special Protection Area (SPA), under the E.U. Birds Directive, primarily to protect the large numbers of migratory birds present in winter.

6/10/2006.

SITE NAME: RIVER SHANNON AND RIVER FERGUS ESTUARIES SPA SITE CODE: 004077

The estuaries of the River Shannon and River Fergus form the largest estuarine complex in Ireland. The site comprises all of the estuarine habitat west from Limerick City and south from Ennis, extending west as far as Killadysert and Foynes on the north and south shores respectively of the River Shannon (a distance of some 25 km from east to west). Also included are several areas in the outer Shannon estuary, notably Clonderalaw Bay and Poulnasherry Bay, as well as the intertidal areas on the south shore of the Shannon between Tarbert and Beal Point.

The site has vast expanses of intertidal flats. The main macro-invertebrate community present is a *Macoma-Scrobicularia-Nereis* community which provides a rich food resource for the wintering birds. Other species occurring include Common Cockle (*Cerastoderma edule*), Lugworm (*Arenicola marina*), the polychaete *Nephtys hombergii*, the gastropod *Hydrobia ulvae* and the crustacean *Corophium volutator*.

Eelgrass (*Zostera* spp.) is present in places, along with green algae (e.g. *Ulva* spp. and *Enteromorpha* spp.). Salt marsh vegetation frequently fringes the mudflats and this provides important high tide roost areas for the wintering birds. Characteristic species occurring include Common Saltmarsh-grass (*Puccinellia maritima*), Sea Aster (*Aster tripolium*), Thrift (*Armeria maritima*), Sea-milkwort (*Glaux maritima*), Sea Plantain (*Plantago maritima*), Red Fescue (*Festuca rubra*) and Saltmarsh Rush (*Juncus gerardi*). In the innermost parts of the estuaries, the tidal channels or creeks are fringed with species such as Common Reed (*Phragmites australis*) and club-rushes (*Scirpus maritimus*, *S. lacustris* subsp. *tabernaemontani*). Also found is the nationally rare Triangular Club-rush (*Scirpus triquetus*). Elsewhere in the site the shoreline comprises stony or shingle beaches.

The site is the most important coastal wetland site in the country and regularly supports in excess of 50,000 wintering waterfowl (mean of 59,183 for the 4 seasons 1996-97 to 1999/00), a concentration easily of international importance.

The site has internationally important populations of Dunlin (14,987), Black-tailed Godwit (706) and Redshank (1,983) - all figures are average peaks for 3 of the 5 seasons in the 1995/96-1999/00 period. A further 16 species have populations of national importance, i.e. Cormorant (148), Whooper Swan (141), Greylag Goose (88), Shelduck (895), Wigeon (3,025), Teal (1,558), Pintail (40), Shoveler (56), Scaup (76), Golden Plover (4,073), Grey Plover (564), Lapwing (13,007), Knot (686), Bar-tailed Godwit (481), Curlew (1,231) and Greenshank (33). The site is among the most important in the country for several of these species, notably Dunlin (11% of national total), Grey Plover (7.5% of total), Lapwing (6.5% of total), Redshank (6% of total) and Shelduck (6.0% of total). The site is also used by Oystercatcher (363), Ringed Plover (70), Brent Goose (135), Great Crested Grebe (47), Red-breasted Merganser (14), Mallard (247), Turnstone (71), Mute Swan (54), Grey Heron (25), Black-headed Gull (1,233) and Common Gull (194).

The Shannon / Fergus system was formerly frequented by a Greenland White-fronted Goose population but this declined during the 1980s and 1990s and the birds now appear to have abandoned the area. The site provides both feeding and roosting areas for the wintering birds. Habitat quality for most of the estuarine habitats is good. Some species, particularly Whooper Swan and Greylag Goose, utilise areas outside of the site for feeding.

Apart from the wintering birds, large numbers of some species also pass through the site whilst on migration in spring and/or autumn. Regular species include Black-tailed Godwit, Whimbrel and Greenshank.

Much of the land adjacent to the rivers and estuaries has been reclaimed and improved for agriculture and is protected by embankments (especially along the River Fergus estuary). Further reclamation, especially near to the urbanised and industrial areas continues to pose a threat. The site receives pollution from several sources,

including industry and agriculture, but it is not known if this has any significant impacts on the wintering birds. Aquaculture occurs in some areas of the site – future increases in this activity could cause disturbance to the habitats and the associated birds. Common Cord-grass (*Spartina anglica*) is well-established and may threaten some of the estuarine habitats. Some disturbance occurs from boating activities.

This site is of great ornithological interest, being of international importance on account of the numbers of wintering birds it supports. It also supports internationally important numbers of three species, i.e. Dunlin, Black-tailed Godwit and Redshank.

In addition, there are 16 species that have populations of national importance. For several of the bird species, it is the top site in the country. Also of note is that three of the species which occur regularly are listed on Annex I of the E.U. Birds Directive, i.e. Whooper Swan, Golden Plover and Bar-tailed Godwit. The site is most effectively censused from the air and this is carried out in most winters.

1.4.2005

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Appendix 2 Surface Water Monitoring Results Greenstar

Table 1 Surface Water Monitoring Results Greenstar – February 2012

Parameter	Units	MH-5	WS9 - UP	FE1A Discharge	WS10-DOWN	ELV*	EQS
pH	pH units	7.55	8.28	7.76	8.21	-	
BOD	mg/l	42	1	44	2	25	
Total Suspended Solids	mg/l	37	12	86	<10	60	
Ammonia Nitrogen	mg/l	3.15	0.45	3.64	0.93	4	
Fats Oils Grease	mg/l	<0.01	<0.01	0.52	<0.01	-	-
Mineral Oils	mg/l	<0.01	<0.01	<0.01	<0.01	5	0.01
TOC	mg/l	40	6	48	15	-	-
Arsenic - dissolved	ug/l	<0.9	<0.9	<0.9	2		25
Cadmium - dissolved	ug/l	<0.03	<0.03	<0.03	<0.03	-	5
Chromium - dissolved	ug/l	0.5	<0.2	0.5	<0.2	-	30
Copper - dissolved	ug/l	10	3	<3	<3	-	30
Mercury - dissolved	ug/l	<0.5	<0.5	<0.5	<0.5	-	1
Nickel - dissolved	ug/l	14	1.2	14.1	<0.2	-	20
Lead - dissolved	ug/l	3	1.9	1.2	0.7	-	10
Zinc - dissolved	ug/l	117.8	1.7	47.5	<1.5	-	100

* ELV applies to discharges – FE1A & B only.

No flow at monitoring location

Table 2 Surface Water Monitoring Results – April 2012

Parameter	Units	WS9 - UP	FE1A Discharge	WS10-DOWN	ELV*	EQS
pH	pH units	8.16	7.79	8.24	-	
BOD	mg/l	1	37	4	25	
Total Suspended Solids	mg/l	40	12	<10	60	
Ammonia Nitrogen	mg/l	0.20	1.99	0.27	4	
Fats Oils Grease	mg/l	<0.01	<0.01	<0.01	-	-
Mineral Oils	mg/l	<0.01	<0.01	<0.01	5	0.01
TOC	mg/l	18	40	20	-	-
Arsenic - dissolved	ug/l	<2.5	<2.5	<2.5		25
Cadmium - dissolved	ug/l	<0.5	<0.5	<0.5	-	5
Chromium - dissolved	ug/l	<1.5	2.4	<1.5	-	30
Copper - dissolved	ug/l	<7	<7	<7	-	30
Mercury - dissolved	ug/l	<1	<1	<1	-	1
Nickel - dissolved	ug/l	<2	6	<2	-	20
Lead - dissolved	ug/l	<5	<5	<5	-	10
Zinc - dissolved	ug/l	8	24	5	-	100

* ELV applies to discharges – FE1A & B only.

Table 3 Surface Water Monitoring Results – 3rd July 2012

Parameter	Units	WS9 - UP	FE1A Discharge	WS10-DOWN	ELV*	EQS
pH	pH units	7.44	7.15	7.50	-	
BOD	mg/l	2	72	2	25	
Total Suspended Solids	mg/l	<2	130	2	60	
Ammonia Nitrogen	mg/l	<1	<1	<1	4	
Fats Oils Grease	mg/l	<1	17.2	<1	-	-
Mineral Oils	mg/l	<0.001	0.013	<0.001	5	0.01
TOC	mg/l	<7	33	<7	-	-
Arsenic - dissolved	mg/l	3	5	3		25
Cadmium - dissolved	mg/l	<0.2	<0.2	<0.2	-	5
Chromium - dissolved	mg/kg	<1	<1	<1	-	30
Copper - dissolved	mg/l	<0.2	<0.2	<0.2	-	30
Mercury - dissolved	mg/l	0.1	0.2	<0.01	-	1
Nickel - dissolved	mg/l	<0.2	<0.2	<0.2	-	20
Lead - dissolved	mg/l	<0.2	<0.2	<0.2	-	10
Zinc - dissolved	mg/l	<0.2	<0.2	<0.2	-	100

* ELV applies to discharges – FE1A & B only

Table 4 Surface Water Monitoring Results – 5th October 2012

Parameter	Units	WS9 - UP	FE1A Discharge	WS10-DOWN	Trigger*	ELV*	EQS
pH	pH units	7.24	6.41	6.82		-	
BOD	mg/l	7	176	89	25		
Total Suspended Solids	mg/l	9	70	51	60	60	
Ammonia Nitrogen	mg/l	0.51	0.29	0.04		4	
Fats Oils Grease	mg/l	<1	11.1	3.3		-	-
Mineral Oils	ug/l	<1	2.03	<1		5	0.01
TOC	mg/l	4	39.32	19.27		-	-
Arsenic - dissolved	ug/l	1	1	1			25
Cadmium - dissolved	ug/l	0.2	0.2	0.2		-	5
Chromium - dissolved	ug/l	<0.6	2	1		-	30
Copper - dissolved	ug/l	13	16	13		-	30
Mercury - dissolved	ug/l	0.1	0.1	0.1		-	1
Nickel - dissolved	ug/l	<2	4.4	2.4		-	20
Lead - dissolved	ug/l	<0.8	1.10	1.4		-	10
Zinc - dissolved	ug/l	11	22	13		-	100

* ELV & Trigger applies to discharges – FE1A only.

Table 5 Surface Water Monitoring Results - March 2013

Parameter	Units	WS9 - UP	FE1A Discharge	WS10-DOWN	Trigger*	ELV*	EQS
pH	pH units	7.39	6.93	7.26		-	
BOD	mg/l	11	12	29	25		
Total Suspended Solids	mg/l	13	80	60	60	60	
Ammonia Nitrogen	mg/l	0.16	2.40	1.55		4	
Fats Oils Grease	mg/l	<1	<1	<1		-	-
Mineral Oils	ug/l	<1	<1	<1		5	0.01
TOC	mg/l	7.48	35.78	14.02		-	-
Arsenic - dissolved	ug/l	0.002	0.002	0.002			25
Cadmium - dissolved	ug/l	0.7	0.6	0.6		-	5
Chromium - dissolved	ug/l	1	2	1		-	30
Copper - dissolved	ug/l	2	2	<2		-	30
Mercury - dissolved	ug/l	<0.015	<0.015	<0.015		-	1
Nickel - dissolved	ug/l	2	4.8	3.0		-	20
Lead - dissolved	ug/l	<0.8	<0.8	<0.8		-	10
Zinc - dissolved	ug/l	32	14	4		-	100

Table 6. Surface Water Monitoring Results-August 2013

Parameter	Units	WS9 - UP	FE1A Discharge	WS10-DOWN	Trigger*	ELV*	EQS
pH	pH units	7.68	7.01	7.31		-	
BOD	mg/l	<2	29	6	25		
Total Suspended Solids	mg/l	13	50	21	60	60	
Ammonia Nitrogen	mg/l	0.14	2.41	0.31		4	
Fats Oils Grease	mg/l	<1	1.59	1.17		-	-
Mineral Oils	ug/l	<1	<1	<1		5	0.01
TOC	mg/l	<5	9.87	<5		-	-
Arsenic - dissolved	ug/l	0.92	1	1.7			25
Cadmium - dissolved	ug/l	0.3	1	0.4		-	5
Chromium - dissolved	ug/l	<0.6	2	<0.6		-	30
Copper - dissolved	ug/l	4	5	4		-	30
Mercury - dissolved	ug/l	<0.013	<0.013	0.014		-	1
Nickel - dissolved	ug/l	<2	5.4	<2		-	20
Lead - dissolved	ug/l	<0.8	1	<0.8		-	10
Zinc - dissolved	ug/l	16	72	15		-	100

Table 7 Surface Water Monitoring Results -November 2013

Parameter	Units	WS9 - UP	FE1A Discharge	WS10-DOWN	Trigger*	ELV*	EQS
pH	pH units	7.36	7.00	7.45		-	
BOD	mg/l	4	14	6	25		
Total Suspended Solids	mg/l	3	13	8	60	60	
Ammonia Nitrogen	mg/l	0.62	0.62	0.48		4	
Fats Oils Grease	mg/l	<1	<1	<1		-	-
Mineral Oils	ug/l	<1	<1	<1		5	0.01
TOC	mg/l	5.29	10.9	6.51		-	-
Arsenic - dissolved	ug/l	1	1	1			25
Cadmium - dissolved	ug/l	0.2	<0.12	<0.12		-	5
Chromium - dissolved	ug/l	1	2	1		-	30
Copper - dissolved	ug/l	23	37	22		-	30
Mercury - dissolved	ug/l	<0.01	<0.01	<0.01		-	1
Nickel - dissolved	ug/l	2.5	2.2	2.1		-	20
Lead - dissolved	ug/l	<0.8	<0.8	1		-	10
Zinc - dissolved	ug/l	14	37	11		-	100

Table 8

Surface Water Monitoring Results – 18th December 2013

Parameter	Units	WS9 - UP	FE1A Discharge	WS10- DOWN	Range 2011	Trigger*	ELV*		EQS
pH	pH units	7.52	7.18	7.46				-	
BOD	mg/l	2	9	5	4-106	25			
Total Suspended Solids	mg/l	10	72	17	<1-113	60		60	
Ammonia Nitrogen	mg/l	0.82	1.39	1.04				4	
Fats Oils Grease	mg/l	<1	3.8	<1				-	-
Mineral Oils	ug/l	<0.001	<0.001	<0.001				5	0.01
TOC	mg/l	6.29	69.01	7.24				-	-
Arsenic - dissolved	ug/l	1	0.93	0.73					25
Cadmium - dissolved	ug/l	0.8	0.4	0.6				-	5
Chromium - dissolved	ug/l	1	2	1				-	30
Copper - dissolved	ug/l	28	60	27				-	30
Mercury - dissolved	ug/l	0.025	0.028	<0.013				-	1
Nickel - dissolved	ug/l	2.6	6	4.8				-	20
Lead - dissolved	ug/l	0.9	2.1	1.5				-	10
Zinc - dissolved	ug/l	15	41	31				-	100

* ELV & Trigger applies to discharges – FE1A only.

Table 9

Surface Water Monitoring Results – 25th February 2014

Parameter	Units	WS9 - UP	FE1A Discharge	WS10- DOWN	Range 2011	Trigger*		ELV*	EQS
pH	pH units	7.5	6.9	7.3				-	
BOD	mg/l	3	26	6	4-106	25			
Total Suspended Solids	mg/l	8	23	5	<1-113	60		60	
Ammonia Nitrogen	mg/l	0.22	1.07	0.02				4	
Fats Oils Grease	mg/l	<1	2.2	<1				-	-
Mineral Oils	ug/l	<0.001	<0.001	<0.001				5	0.01
TOC	mg/l	3.19	16.03	4.17				-	-
Arsenic - dissolved	ug/l	0.46	0.6	0.44					25
Cadmium - dissolved	ug/l	0.2	0.3	0.4				-	5
Chromium - dissolved	ug/l	1	1	2				-	30
Copper - dissolved	ug/l	6	4	3				-	30
Mercury - dissolved	ug/l	0.018	<0.013	<0.013				-	1
Nickel - dissolved	ug/l	<2	3.4	2.2				-	20
Lead - dissolved	ug/l	1.2	2.5	1.2				-	10
Zinc - dissolved	ug/l	23	44	14				-	100

* ELV & Trigger applies to discharges – FE1A only.

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Table 10

Surface Water Monitoring Results – 26th March 2014

Parameter	Units	WS9 - UP	FE1A Discharge	WS10-DOWN	Range 2011	Trigger*	ELV*		EQS
pH	pH units	7.46	6.64	8.09				-	
BOD	mg/l	<2	51	4	4-106	25			
Total Suspended Solids	mg/l	4	24	4	<1-113	60		60	
Ammonia Nitrogen	mg/l	0.42	0.49	0.58				4	
Fats Oils Grease	mg/l	<1	<1	<1				-	-
Mineral Oils	ug/l	<0.001	<0.001	<0.001				5	0.01
TOC	mg/l	4.95	16.24	5.25				-	-
Arsenic - dissolved	ug/l	0.73	0.59	0.71					25
Cadmium - dissolved	ug/l	0.2	0.2	0.2				-	5
Chromium - dissolved	ug/l	1	1	1				-	30
Copper - dissolved	ug/l	<5	<5	<5				-	30
Mercury - dissolved	ug/l	0.084	0.18	0.052				-	1
Nickel - dissolved	ug/l	<2	2.1	1.2				-	20
Lead - dissolved	ug/l	1.1	<0.8	<0.8				-	10
Zinc - dissolved	ug/l	9	15	7				-	100

* ELV & Trigger applies to discharges – FE1A only.

Table 11

Surface Water Monitoring Results – 17th April 2014

Parameter	Units	WS9 - UP	FE1A Discharge	WS10- DOWN	Range 2011	Trigger*	ELV*	EQS
pH	pH units	7.61	6.96	7.72			-	
BOD	mg/l	<1	25	<1	4-106	25		
Total Suspended Solids	mg/l	63	29	20	<1-113	60	60	
Ammonia Nitrogen	mg/l	0.12	5.46	0.38			-	
Fats Oils Grease	mg/l	<0.01	<0.01	<0.01			-	-
Mineral Oils	ug/l	<0001	<0.01	<0.01			5	0.01
TOC	mg/l	6	14	6			-	-
Arsenic - dissolved	ug/l	<2.5	<2.5	<2.5				25
Cadmium - dissolved	ug/l	<0.5	<0.5	<0.5			-	5
Chromium - dissolved	ug/l	<1.5	<1.5	<1.5			-	30
Copper - dissolved	ug/l	<7	<7	<7			-	30
Mercury - dissolved	ug/l	<1	<1	<1			-	1
Nickel - dissolved	ug/l	<2	<2	<2			-	20
Lead - dissolved	ug/l	<5	<5	<5			-	10
Zinc - dissolved	ug/l	<3	4	<3			-	100

* ELV & Trigger applies to discharges – FE1A only.

Table 12

Surface Water Monitoring Results – 19th May 2014

Parameter	Units	WS9 - UP	FE1A Discharge	WS10- DOWN	Range 2011	Trigger*	ELV*	EQS
pH	pH units	7.67	6.9	7.49			-	
BOD	mg/l	5	63	6	4-106	25		
Total Suspended Solids	mg/l	3	32	6	<1-113	60	60	
Ammonia Nitrogen	mg/l	0.34	0.69	0.43			4	
Fats Oils Grease	mg/l	<1	<1	<1			-	-
Mineral Oils	ug/l	<0.001	<0.001	<0.001			5	0.01
TOC	mg/l	6.92	21.7	8.03			-	-
Arsenic - dissolved	ug/l	0.7	0.59	0.7				25
Cadmium - dissolved	ug/l	0.5	0.6	0.4			-	5
Chromium - dissolved	ug/l	1	3	1			-	30
Copper - dissolved	ug/l	<5	6	<5			-	30
Mercury - dissolved	ug/l	<0.013	<0.013	<0.013			-	1
Nickel - dissolved	ug/l	2.2	5.2	2.4			-	20
Lead - dissolved	ug/l	1	2.9	<0.8			-	10
Zinc - dissolved	ug/l	14	45	11			-	100

* ELV & Trigger applies to discharges – FE1A only.

Table 13

Surface Water Monitoring Results – 27th May 2014 (EPA Visit)

Parameter	Units	FE1A Discharge	Range 2011	Trigger*	ELV*	EQS
pH	pH units	6.7			-	
BOD	mg/l	83	4-106	25		
Total Suspended Solids	mg/l	32	<1-113	60	60	
Ammonia Nitrogen	mg/l	2.02			4	
Fats Oils Grease	mg/l	<1			-	-
Mineral Oils	ug/l	<0.001			5	0.01
TOC	mg/l	28.46			-	-
Arsenic - dissolved	ug/l	0.65				25
Cadmium - dissolved	ug/l	<0.125			-	5
Chromium - dissolved	ug/l	2				30
Copper - dissolved	ug/l	<5			-	30
Mercury - dissolved	ug/l	0.014			-	1
Nickel - dissolved	ug/l	4.6			-	20
Lead - dissolved	ug/l	<0.8			-	10
Zinc - dissolved	ug/l	24			-	100

* ELV & Trigger applies to discharges – FE1A only.

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Table 14Surface Water Monitoring Results – 31st July 2014

Parameter	Units	WS9 - UP	FE1A Discharge	WS10-DOWN	Range 2011	Trigger*	ELV *	EQS
pH	pH units	7.43	7.5	7.83			-	
BOD	mg/l	4	5	3	4-106	25		
Total Suspended Solids	mg/l	4	3	4	<1-113	60	60	
Ammonia Nitrogen	mg/l	0.28	0.1	0.3			-	
Fats Oils Grease	mg/l	<1	<1	<1			-	-
Mineral Oils	ug/l	<0.001	<0.001	<0.001			5	0.01
TOC	mg/l	3.5	4.49	4.36			-	-
Arsenic - dissolved	ug/l	0.83	0.75	0.79				25
Cadmium - dissolved	ug/l	0.4	0.3	0.3			-	5
Chromium - dissolved	ug/l	<0.6	<0.6	1			-	30
Copper - dissolved	ug/l	<5	<5	<5			-	30
Mercury - dissolved	ug/l	<0.0130	<0.0130	<0.0130			-	1
Nickel - dissolved	ug/l	<2	2	2			-	20
Lead - dissolved	ug/l	<0.8	<0.8	1.2			-	10
Zinc - dissolved	ug/l	2	5	3			-	100

* ELV & Trigger applies to discharges – FE1A only.

Table 15 Surface Water Monitoring Results – 28th August 2014

Parameter	Units	WS9 - UP	FE1A Discharge	WS10-DOWN	Range 2011	Trigger*	ELV *	EQS
pH	pH units	7.24	-	8.11			-	
BOD	mg/l	13	-	12	4-106	25		
Total Suspended Solids	mg/l	10	-	9	<1-113	60	60	
Ammonia Nitrogen	mg/l	0.47	-	0.95			4	
Fats Oils Grease	mg/l	<1	-	<1			-	-
Mineral Oils	ug/l	<0.001	-	<0.001			5	0.01
TOC	mg/l	6.86	-	6.96			-	-
Arsenic - dissolved	ug/l	0.96	-	0.27				25
Cadmium - dissolved	ug/l	0.5	-	0.4			-	5
Chromium - dissolved	ug/l	1	-	1			-	30
Copper - dissolved	ug/l	8	-	5			-	30
Mercury - dissolved	ug/l	<0.023	-	0.27			-	1
Nickel - dissolved	ug/l	2.2	-	<2			-	20
Lead - dissolved	ug/l	1.2	-	0.9			-	10
Zinc - dissolved	ug/l	2	-	3			-	100

FE1A Not sampled as no surface water was discharging from site at time of sampling.

NON-TECHNICAL SUMMARY

Starrus Eco Holding Ltd trading as Greenstar, Dock Road, Limerick is applying to the Environmental Protection Agency (EPA) for a Licence for its existing Materials Recovery Facility at Dock Road, Limerick. It is intended to increase the amount of waste accepted at the facility from 90,000 tonnes annually to 130,000 tonnes. The classes and nature of the industrial emissions directive activities, in accordance with the First Schedule to the Act of 1992 as amended, are:

11.1 The recovery or disposal of waste in a facility, within the meaning of the Act of 1996, which facility is connected or associated with another activity specified in this Schedule in respect of which a licence or revised licence under Part IV is in force or in respect of which a licence under the said Part is or will be required.

11.4.(b) Recovery, or a mix of recovery and disposal, of non-hazardous waste with a capacity exceeding 75 tonnes per day involving one or more of the following activities, (other than activities to which the Urban Waste Water Treatment Regulations 2001 (S.I. No. 254 of 2001) apply):

(ii) pre-treatment of waste for incineration or co-incineration;

Greenstar had obtain planning permission from Limerick County Council for planning permission for the proposed change and a copy of the Notification to Grant Permission is included in this application. Greenstar prepared an Environmental Impact Statement (EIS) as part of the application and a copy of the EIS is included in the application

The design and method of operation at both the existing facility and proposed development are based on the requirements of the Agency's Final Draft BAT Guidance on Best Available Techniques for the Waste Sector: Materials Recovery and Transfer and 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.

The emission limit values were determined by those set in the existing Waste Licence, which comply with BAT, and an assessment of the impacts of the new emission sources, which include odours and noise.

The EC (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2006 do not apply.

The Installation

The site is located in the townland of Ballykeefe. The current Waste License area encompasses approximately 2.38 hectares (ha) and comprises two discrete parts. The first is controlled by GES and contains the facility (20,000 m²). The second (3,800m²) is controlled by CLIIB, the landowners of the entire licensed area and is not used for waste activities.

CLIIB, who were the original licensee, sold their waste business but retained control of a portion of the licence area for use as part of their crane hire business. There is a fence between the Greenstar and CLIIB controlled areas.

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 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.

Currently approximately 20 full time staff at the facility including a Facility Manager, weighbridge clerk, machine operators and general operatives. The facility obtains water from the municipal water supply system. The electricity power supply is provided by Electric Ireland.

Surface water run-off is generated by rainfall on the roof of the offices and workshop building, the waste handling buildings and the paved open yard areas. The run-off from the paved yards and maintenance building is collected and discharged to a man-made drain at the north eastern site boundary. Run-off from the roofs of Buildings 1 and 2 discharges to a manmade perimeter drain along the western boundary. It is proposed to divert run-off from the yards to the north and east of the waste buildings to a new foul sewer, which will be installed by the landlord and will connect to the Bunlickey Wastewater Treatment Plant.

The only wastewater emission is sanitary wastewater from the toilets/canteen. This is collected and treated in an on-site Klargester Biodisc wastewater treatment plant, with the final effluent discharging to an onsite percolation area. Sanitary wastewater from the neighbouring CLIIB yard is also treated in the Klargester. It is proposed to divert the sanitary wastewater to the new foul sewer that will be installed by the landlord. Subsequently the Klargester will be decommissioned. It is also proposed to restart washing vehicles and bins at the facility and discharge the wastewater to the foul sewer.

Plant & Equipment

The type and numbers of fixed and mobile plant used to handle and process the waste is shown in Table 1. The proposed increase in the amount of wastes accepted does not require the provision of any additional plant items

Table 1 Plant

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 neither refuelled nor serviced on-site.

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 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.

External 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.

Raw & Auxiliary Materials and Energy Usage

Facility operations involve the consumption of water, oil and electricity. The estimated quantities used annually at full capacity are given in Table 2

Table 2 : Resource Consumption

Resources	Quantities 2012
Diesel (green)	60,000 litres
Electricity	113,567 kWh
Hydraulic Oil	4500 litres
Engine Oil	1500 litres
Mains Water	8,200 m ³

Sources of Emissions

The actual and potential emissions from the site are:

Noise from plant and equipment used to process the wastes and the delivery/collection vehicles.

Dust from waste processing and vehicle movements on yards during dry weather.

Rainwater run-off from the yards and building roofs.

Odours from the MSW

Vehicle exhaust gases from the delivery and collection vehicles.

Treated effluent from the on-site sanitary wastewater treatment plant

Environmental Conditions

The facility 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.

The climate in the area is mild and wet, with the prevailing wind direction from the south west. The subsoil comprise 0.0-2.5m – Made Ground (gravely sand containing ash, wood, glass, metals, slates and plastics) underlain by natural 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 bedrock is Visean Undifferentiated Limestone, which is a pure bedded limestone.

The available information on the aquifer indicates that the subsoils at the site are not significantly water bearing. The bedrock is classified as Locally Important Aquifer Generally Moderately Productive (Lm). The aquifer vulnerability rating for the site is Low.

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

Rainwater run-off from the site goes to perimeter man-made drains that discharge to Bunlickey Lake. The surface water monitoring carried out in accordance with the current licence conditions confirms that the run-off from the site meets the emission limit values set in the licence.

The ambient air quality is good and the routine dust monitoring carried out in accordance with the current licence conditions confirms dust is not an issue. The noise levels in the area are typical of an area zoned for industrial use. The annual noise monitoring confirms the site is not a source of noise nuisance.

Historic activities have caused soil and groundwater contamination at the site and a baseline report has been prepared.

Nature of the Emissions and Assessment of Impact

Climate

All new developments that give rise to extra greenhouse gases (GHG) emissions are considered to have a negative effect on climate. While the increase in the amount of waste accepted will result in additional GHG emissions from the handling equipment and transport vehicles the increase will be so small as to mean the development will have an imperceptible negative impact.

Soils and Geology

The proposed changes do not involve any excavations or ground disturbance. At present sanitary wastewater is treated in an on-site wastewater treatment plant, with the treated effluent discharged to a percolation area. It is proposed to connect to the foul sewer, following which the on-site treatment plant will be decommissioned and the discharge to the percolation area will stop. This will have a positive impact on soils.

Water

The only emission to surface waters is run-off from the paved yards and building roofs. It is proposed to divert the run-off from the section of the yard that is crossed by transport vehicles and where waste is stored to the foul sewer via an oil interceptor. This will reduce the volume of surface water emissions and reduce the potential for contamination of the run-off and will have a perceptible positive impact.

The development will not have any impact on the rainfall contribution to groundwater and, as there will be no new emissions to ground, there will be no impact on groundwater.

Ecology

As the entire site consists of open paved areas, with buildings, there are no sensitive ecological habitats within the site boundaries. Bunlickey Lake, which is 500m to the west of the site and the stretch of the River Shannon, which is 400m to the north are protected sites under the EU Habitats and Birds Directives (Special Protection Area (SPA) and Special Area of Conservation (SAC)).

A Stage 2 assessment (Natura Impact Statement) of the impacts the proposed change would have on the SPA and SAC was carried out. It concluded that as the change does not require the construction of any new buildings, the use of any additional equipment that could be a cause of disturbance, will reduce the volumes of surface water emissions to the water course and will minimise the risk of contamination of the emissions to surface water, it will have no direct, indirect or cumulative, impact on either the SPA or the SAC and therefore mitigation measures are not required.

Air Quality

The existing emissions to air from the site are dust and vehicle and plant exhaust emissions. The routine dust monitoring carried out as required by the Waste Licence has established that dust emissions are not a cause of nuisance. The proposed change will not result in any new sources of dust and therefore mitigation measures are not needed.

The increase in the amount of waste accepted will result in extra vehicle movements and an associated increase in the exhaust emissions, however these will be very small in the context of the site's location in a well established industrial area. The trucks used to transport the wastes to and from the site are fitted with catalytic converters to reduce the amount of nitrous oxides in the exhaust gas.

Noise

The transport and processing of the wastes are sources of noise. However, the routine noise monitoring carried out at the facility has established that the current operations are not having any impacts on the closest noise sensitive locations. The proposed change will not result in any new sources of noise and therefore will have an imperceptible impact on noise and mitigation measures are not needed.

Proposed technology and other techniques to prevent or eliminate, or where this is not practicable, limit, reduce or abate emissions from the installation

The design and method of operation of both the existing facility and proposed development 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.

The current waste licence specifies the manner in which the facility must operate so as to ensure that pollution and/or nuisance to neighbours and the general public is prevented. They require the site management team to have the appropriate training and qualifications; identify the types of wastes and processes that can be carried out; specify

how wastes and raw materials that have the potential to cause pollution are handled and stored; the control measures that must be applied to prevent nuisance, for example dust suppression, and require appropriate emergency response procedures to be in place.

Summary of the Quantity and Nature of the Waste

The overall amount of waste accepted will increase from 90,000 tonnes to 130,000 tonnes annually. The wastes will be non-hazardous and will be generated by households, commercial and industrial operations and construction & demolition sites.

Measures to Comply with Waste Management Hierarchy

The existing facility is designed and operated to maximise the recovery of recyclables from the incoming wastes. The proposed changes are consistent with the Waste Hierarchy as the use of the MSA as a fuel gains the maximum value from the waste.

BAT

Condition 2 of the current Waste Licence requires Greenstar to develop and implement an Environmental Management System for the facility which is consistent with the requirements of both Agency's BAT Guidance Note and the BREF. GES has an accredited 14001 EMS in place.

The Licence conditions require the implementation of the control measures specified in the BREF in so far as they apply to non-hazardous solid waste processing and the prevention of soil contamination. The site location and licence conditions also incorporate the relevant control techniques referenced in the Agency's BAT Guidance 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 hour 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

The proposed changes take into consideration the requirements of Sections 5.2 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 prior to discharge to the foul sewer.

Abnormal Operating Conditions

Greenstar has prepared a Health & Safety Statement for all waste facilities that requires the completion of hazard identification and risk assessments to minimise the occurrence to accidents. It includes for staff training on actions to be taken in abnormal conditions. Greenstar had prepared and adopted an Emergency Response Procedure (ERP). The ERP identifies all potential hazards at the site that may cause damage to the environment and also specifies roles, responsibilities and actions required to deal quickly and efficiently with all foreseeable major incidents and to minimise environmental impacts. This is currently being amended to update the fire prevention measures and personnel changes.

Avoidance of the Risk of Environmental Pollution due to Closure of the Facility

Greenstar has prepared an Environmental Liability Risk Assessment (ELRA) and Decommissioning Management Plan (DMP) for the facility and these, along with a proposal for Financial Provision, have been submitted to and approved by the Agency.

Environmental Monitoring:

Environmental monitoring is carried out in accordance with the licence conditions. The monitoring includes noise, dust, surface water, groundwater and odours.

Measures to Comply with an Environmental Quality Standard

The emission limit values proposed in the application and those that will be set by the EPA in the new licence are and will be based on achieving compliance with the relevant EQS.

Measures to comply with Council Directive 80/68/EEC and 2006/118/EC in relation to the protection of groundwater.

After the decommissioning of the on-site wastewater treatment plant, there will be no discharge to ground. The site is designed to prevent accidental emissions to ground.

The Main Alternatives to the Proposed Technology, Techniques and Measures

Alternative Sites

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 will not require the provision of any new or additional emission control and mitigation measures, other than the diversion of surface water run-off to the foul sewer, which was requested by Limerick County Council. 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 emissions from transport vehicles and transport costs. Therefore, continuing to use the Ballykeeffe 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.

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