EAST GALWAY RESIDUAL LANDFILL

ENVIRONMENTAL IMPACT STATEMENT

VOLUME I – NON TECHNICAL SUMMARY

REVISED OCTOBER 2003

greenstar
setting the standard

Non-Technical Summary of the Environmental Impact Statement for the East Galway Residual Landfill, County Galway

Introduction

Since March 31st 2003, the applicant, Celtic Waste Ltd., now operates under a new company name of Greenstar Recycling Holdings Ltd. and will trade under the title *greenstar*. The change of company name and rebranding does not impact on or affect in any way this application.

greenstar intends to develop a residual landfill in East Galway to serve primarily the South Connaught Region. It is proposed to accept waste at the facility for a period of 10 years. The proposed development will fully meet the need for a landfill facility in South Galway, as set out in the Waste Management Plan for the Connaught Region (1999-2004).

Article 6 of the Landfill Directive (1999/31/EC) indicates that only waste that has been subject to treatment will be landfilled. The fraction remaining following this treatment is termed 'residual waste'.

The proposed facility will accept residual municipal non-hazardous waste, including residual waste arising from the operation of permitted and licensed waste recovery facilities.

The facility will accept 100,000 tonnes of residual municipal waste per annum. In addition the facility will accept 27,320 tonnes per annum of inert waste, sourced from material recovery facilities, for recovery purposes only (i.e. for redevelopment, restoration or construction purposes at the landfill facility). The waste acceptance procedures proposed for the site will be in accordance with Council Decision 2003/33/EC, which establishes criteria and procedures for the acceptance of waste at landfill, pursuant of Article 16 of, and Annex II to, Directive 1999/31/EC (Landfill Directive).

The proposed facility will comply with the Planning Permission granted by Galway County Council/An Bord Pleanála and will also be operated within the conditions of any Waste Licence granted by the Environmental Protection Agency (EPA).

The site (see Figure 1) is located approximately 2.5 kilometres (km) southwest of Kilconnell and 4.5 km northwest of Cappataggle, in the townlands of Killagh More, Ballybaun (E.D. Killaan) and Ballintober (E.D. Killaan), County Galway.

An Environmental Impact Statement (EIS) for the proposed development has been prepared by *greenstar*. The EIS contains a description of the existing environment, information on the scale and nature of the proposed development, an impact assessment of the proposed development and mitigation measures to prevent or reduce the impact on the receiving environment.

The EIS will accompany the Planning Application to Galway County Council, the authority for planning matters related to the proposed development. The EIS will also accompany a Waste Licence Application to the EPA, the regulatory authority for environmental matters related to this proposed development.

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This document is a non-technical summary of the main EIS document.

Existing Environment

The site, as shown on Figure 1 (Site Location Map), is situated within the townlands of Killagh More, Ballybaun (E.D. Killaan) and Ballintober (E.D. Killaan), approximately 2.5km southwest of Kilconnell and 4.5km northwest of Cappataggle, County Galway.

Figure 1 also shows the site location relative to a number of adjacent villages and towns including Kilconnell, New Inn, Cappataggle and Aughrim. The location of the site relative to the R348 (the Ballinasloe to Athenry Road) and the N6 (the Dublin to Galway Road) is also shown on Figure 1. The site is located within a segment of land, bounded to the north by the R348 road. Local county roads occur immediately adjacent to the east (L7442) and south (L7439) of the site.

The agricultural lands within and surrounding the proposed facility are used for low intensity farming, with lands used for the grazing of cattle and sheep. The agricultural productivity of the land is considered poor, due to the natural soil conditions. There is evidence of extraction of gravelly clay within the site boundary to the south of the proposed landfill footprint. Small scale peat cutting occurs to the north of the proposed facility. Industrial activity in this area is dominated by the Mid-Western Farmers Co-op (Kilconnell village) and Garvey's farm building manufacturer (New Inn). Commercial forestry plantations are noted to the east and north of the proposed facility.

The immediate area of the proposed landfill is sparsely populated, with only five residential dwellings falling within or close to a 500 metre radius of the landfill footprint (i.e. the area to be infilled with waste), with the closest dwelling to the landfill footprint recorded 480m to the south. There are also four farm buildings and six derelict houses/ruins within the 500m radius of the landfill footprint. A further thirteen residential dwellings falling within or close to a 1,000m radius of the landfill footprint.

The proposed haul route to the facility, for waste vehicles, is via the Dublin to Galway Road (N6), turning off at Cappataggle Crossroads. After travelling through Cappataggle and

Killagh Beg Cross Roads the traffic turns left on to the Ballinasloe to Athenry regional road (the R348) at the intersection of the county road to the west of Kilconnell Village. Vehicles will then turn left off the regional road (R348) and into the site from the north along a new high integrity road to be constructed as part of the development.

Results of analyses of dust samples, taken as part of the baseline study, show that background levels within the site are below the EPA's guidelines. It is proposed that further sampling will be carried out prior to construction of the facility and will continue during operation of the facility.

A gas survey was undertaken to establish the existing concentrations of methane (CH_4) and carbon dioxide (CO_2) in the ambient atmosphere, within and immediately adjacent to the proposed landfill footprint. The results of the survey indicate that the concentration of methane and carbon dioxide are below detection limit, which is typical of a rural environment.

Noise measurements were taken at the site boundaries close to the nearest residences. These show that the total noise environment is typical of a rural environment with ambient noise levels due primarily to the road traffic flow on the adjoining road networks and agricultural machinery.

Local meteorological data show that this part of Galway has an annual rainfall of the order of 1,091mm with the monthly average ranging from 66mm in summer months to 117mm in winter months. The closest synoptic weather station with wind measurement equipment and in operation for at least 30 years is the Birr synoptic station, which shows that the prevailing winds are from the south and southwest, with lesser wind flows from the north and east.

Reference to the soils map indicates that the principal dominant soil within the site comprises gley soil with associated grey brown Podzolics. The parent subsoil material from which this soil material is derived is considered to be from a limestone glacial till. The dominant soil types noted during investigations within the boundaries of the proposed site were podzols in the elevated free draining areas and organic rich peat soil in the low lying areas.

A mapping project recently published by Teagasc indicates that the dominant subsoil in this area is classified as limestone till. The site investigation programme indicates that the subsoil material comprises low permeability ($1x10^{-8}$m/sec to $1x10^{-9}$m/sec) gravelly clay. In low lying areas, where peat deposits dominate, occasional fine silt and clays were recorded at the base of the peat. The material recorded from borehole drilling concurs with the trial pit findings, with peat, boulder clay and silty clay recorded across the site. The findings of the geophysical survey indicate that the unconsolidated material comprises a clay dominant material. All surveying techniques employed did not find evidence of any significant thickness of high permeability sand and gravel material.

The site is underlain by Basinal Limestones, which are described as predominantly dark, laminated, argillaceous calcisiltites and calcareous shales, with some limestone turbidites. Correspondence from the GSI indicates that the aquifer potential of the Basinal Limestone Unit in County Galway is provisionally classified as a Locally Important Aquifer, which is moderately productive only in local zones (Aquifer Code: Ll). The geophysical survey did not detect any geological anomalies in the bedrock indicative of faulting or major fissures. The groundwater levels measured on the 23rd of April 2002 show that the groundwater level within the site varies from a maximum of approximately 118m OD to the south to a minimum of approximately 109m OD to the north, in the area of the blanket peat deposit. Within the site the groundwater flow direction is from the south to the north/northwest.

The extensive site investigations and laboratory testing carried out indicate that the geological and hydrogeological conditions of the site are acceptable for the development of a landfill in accordance with the national guidelines, namely the EPA Landfill Site Selection Manual and the Groundwater Protection Scheme document (EPA/ DoELG/GSI, 1999).

An extensive network of drainage ditches traverse the site. There are two streams within the site, one enters the site on the south western corner and flows in a south to north direction and the other enters the site at the northeast corner and continues along the northern site boundary. These streams converge approximately 1km north of the proposed facility entrance and are tributary streams of the River Raford. The River Raford is itself a tributary of Dunkellin River, which comprises a total catchment area of approximately 35km². The catchment divide boundaries of the River Suck and the River Kilcrow lie to the east of the proposed site.

Information obtained from the Western Regional Fisheries Board indicates that the River Raford is designated as a *Salmonid* status fresh water body, being of such quality as to support game fish. Invertebrate samples taken from streams on and adjacent to the site as part of baseline studies for the EIS were given a Q rating of 3 (slightly polluted) based on EPA biological criteria, indicating moderate water quality. An electric fishing survey was carried out as part of the baseline studies. The fish survey concluded that the biological quality of the water has not changed significantly between 1986 and 2002, however the streams draining the proposed site are of no importance in terms of salmonid spawning and nursery habitat.

The site itself measures 60.8ha in area, with topographic elevation varying between 110m and 126mOD. The lands contain two slightly lower-lying boggy areas, which run from east to west. The area beyond to the north is characterised by pockets of deciduous woodland and pasture, the woodland and localised topography forming a screen to views from the north/ R348. These blocks of deciduous woodland, containing mature beech and ash are an important visual and ecological feature of the landscape. The middle area of the site is largely rough undulating pasture. There is a small hill at 126mOD within this section, from which views over the wider landscape are gained. The area to the south is largely wet grassland and pasture. A field drain runs along parts of the western site boundary.

The current Galway County Council County Development Plan (1997-2002) is the statutory plan detailing the development objectives of the Authority. In considering a 3km radius area surrounding the site, and within the estimated zone of visual influence for the proposed development there are no proposed Natural Heritage Areas (pNHAs) nor proposed candidate Special Areas of Conservation (pSACs). There are no listed views within this area. The next nearest site of nature conservation is Callow Lough, a proposed Natural Heritage Area (pNHA), which is located approximately 4.5km north of the site.

Five occupied properties lie within 500m of the site boundary: one to the north and four to the south. Because of the locally undulating topography and existing pockets of woodland and forestry plantations in the area many views of the site lands are obscured. Key open views are from county roads bordering the site to the east and from properties to the north and south of the site.

Blocks of deciduous woodland are found in the north of the site. The tree mixture includes hazel, beech, oak, birch ash, sycamore, alder and holly. It is proposed to preserve, improve and augment this area of deciduous woodland in the north of the site. There is also a coniferous plantation comprised of sitka spruce located in the east of the site.

Badger (Meles meles) and fox (Vulpes vulpes) prints were observed to the north west of the site in the cut away bog. An old badger sett was discovered in the broadleaf woodland to the north of the site. However this has been unoccupied for some time. Otter (Lutra lutra) spraints were found along the western stream at the north of the site.

Two bat surveys have been undertaken within the site, in April 2002 and in June 2003, to investigate the area for bat activity, habitat locations and flightpaths. A low level of bat activity was recorded within the site during the two bat surveys undertaken within the site. With respect to bat foraging habitats, the deciduous woodland, which *greenstar* propose to enhance, is the most likely suitable habitat for bats during the summer months, both as a hunting ground and as a roosting area.

In total, 23 No. common species of bird were observed on-site that are typical of lowland agricultural landscapes.

A single recorded archaeological site, identified as an enclosure on the Ordnance Survey maps and the Sites and Monuments Record, is located in the southern half of the area of the proposed development. Two vernacular house sites were also noted. A number of archaeological monuments, which survive in the surrounding townlands, have also been identified in the course of baseline studies. It should be stressed that none of these monuments will be directly affected by the proposed development. In accordance with industry standards, the developer will prepare an archaeological mitigation strategy for the approval of Duchas The Heritage Service (or other statutory body) prior to construction of the facility.

The site is located within rural East Galway, a traditional farming area where population densities are low outside of the towns of Ballinasloe and Loughrea. In the area of the proposed landfill the average population density (1996 census) is 12 persons per km², which is less than half the national rural average. The population of the local area has gradually fallen over the last 20 years. In 1996 there was a population of 1,580 living in 472 households, with an average household size of 3.35. If the decline since 1981 continues, i.e. a trend line projection, the population of the area will fall to under 1,500 by 2006.

The size of the resident workforce is also falling. While agriculture remains the largest employer, with 186 workers in 1996, the sector is in long-term decline. There was a 35% decrease in the number of men working in farming between 1986 and 1996. The 1996 census shows a relatively diversified economic base, with substantial numbers of workers employed in manufacturing and in professional services as well as in agriculture. To an increasing degree, the income of local households is probably dependent on household members commuting to work in nearby towns. The landfill site does not lie within one of the areas of County Galway, which has a significant tourism economy. The new Dublin-Galway gas pipeline traverses the site to the south of the landfill footprint, but the construction and operation of the landfill will not impact on this pipeline.

Description of Proposed Landfill Facility

greenstar proposes to develop the residual landfill site to serve South Connaught, capable of accepting approximately 1 million tonnes of waste over a 10 year period.

In total, the landfill footprint (i.e. the area within which waste will be placed) comprises 14.8 hectares (36.6 acres) in area (Figure 2). The overall area of the *greenstar* property comprises 60.8 hectares (150.3 acres). Hence only some 25 percent of the lands will be used for waste disposal. It is proposed that the landfill will be constructed in three phases as shown on Figure 2. Any material excavated from this area will be utilised on site for the construction of the landfill. A construction material borrow area, with a footprint covering approximately 5.7 hectares, will also be developed within the site. Following the removal of construction material, the borrow area will be reinstated to a level not below 116 metres above Ordnance Datum (m OD). The remainder of the site will form a buffer zone from adjacent lands and roads.

It is planned to construct the landfill in three distinct phases, encompassing fully lined cells, which will serve to isolate the waste body from the surrounding environment. The lining system proposed, a combination of a geomembrane liner and a geological barrier, will totally retain all leachate within the waste body.

It is proposed to found the landfill on glacial subsoil material, which will result in the excavation of material from within the landfill footprint. It is proposed that prior to construction of the liner system, the floor of each phase will be graded in accordance with the

proposed formation levels. This excavated material from each phase will be used in the construction of the landfill embankments and for cover and capping material. The formation level of the landfill will be constructed at an elevation so that the maximum head of leachate (1m above geomembrane liner) is at, or close to, the level of the watertable and thus the hydraulic head between the leachate level and the watertable is eliminated. This proposal to locate the liner system below the watertable is fully consistent with the Landfill Directive and is allowed for in the EPA Design Manual, 2002 (Section 5.2.3).

On average the landfill will be 10-14m deep and the final peak elevation, post settlement, of the landfill will be approximately 125 m OD. The site, including the material borrow area, will be managed and landscaped to reflect the topographical contours of the surrounding landscape and returned to agricultural usage.

A leachate collection system will be installed at the site, above the liner system. Leachate is a liquid that is produced from rainwater percolating through the waste body. Percolating water absorbs suspended and soluble materials that originate from, or are products of, the degradation of the waste. All leachate generated within the waste body will be collected in the collection system and pumped to a holding tank for export off-site. *greenstar* has secured letters of agreement in principle from a number of operators of approved municipal wastewater treatment plants to accept the leachate from the proposed facility.

When each of the landfill phases is filled, a final cover will be constructed on the waste body. In order to limit the risk of damage to the final cap, due to waste settlement, a temporary cover will be installed for a period of at least 2 years. During this period the settlement of the waste body will be measured on a regular basis. Progressive landscaping measures will be undertaken following the final capping to return the land to agricultural usage as quickly as possible.

A horizontal geosynthetic gas drainage/equalising layer will also be placed underneath the final cap. Vertical gas extraction wells will be installed which will allow for the extraction of the gas from the waste body. Landfill gas (LFG) is the end product of the microbiological degradation of organic material produced under anaerobic conditions, for example in the waste body of a landfill site, and consists mainly of the components methane (approximately 60%) and carbon dioxide (approximately 40%). The landfill gas generated within the waste body will be collected and safely vented or flared during the operational phase of the landfill and for some years post closure. Any landfill gas flare will comply with EPA and EU standards in terms of combustion temperature, retention times, emission levels etc. The landfill gas will be utilised to generate electrical energy, if the quantities of gas generated within the waste body are sufficient.

Environmental monitoring stations, in accordance with EPA requirements, will be established at the site and monitoring will be undertaken at regular periods during the operation of the facility. This monitoring will be continued post-closure of the facility. The primary aims of

this environmental monitoring programme are to quantify the quality of the environment in the vicinity of the landfill site and identify any adverse impacts from the development of the landfill. With specific reference to groundwater quality, *greenstar* have proposed trigger levels which will act as intervention levels where corrective action will be taken. Emission Limit Values (ELV) will be set by the EPA for many of the parameters to be monitored. Any exceedence of emission limit values will be judged by the EPA to be a non-compliance of the Waste Licence.

Potential nuisances such as odours, dust, noise, litter, vermin, etc. will be addressed with the implementation of the operational plan whereby landfilling will be carried out in a controlled manner, minimising the possibility of these nuisances. The results of the environmental monitoring will be issued on an annual basis to regulatory bodies and other interested parties.

The facility is designed and will be constructed, operated, monitored and restored in accordance with European Council Directive 1999/31/EC (Landfill Directive), the EPA Landfill Manuals and licence conditions issued by the EPA and planning conditions issued by Galway County Council. 'Best Available Techniques' (BAT) will be used in all aspects of the design, construction, operation and management of the site.

The site infrastructure to be constructed at the site will include two weighbridges, one wheel-wash, site security arrangements, bunded waste inspection and quarantine areas, site accommodation, site roads, surface and foul water drainage etc.

It is proposed to construct the surface water treatment infrastructure, comprising the grit trap, the oil interceptor and the surface water retention lagoon, to the north of the landfill footprint.

A material borrow area will also be developed within the confines of the site for provision of construction material. This material will be utilised for the construction of the formation layer, the landfill embankments, the final capping layer and temporary capping layers. The footprint of the clay borrow area will comprise approximately 5.7 hectares. The potential resources available within the borrow area have been calculated to comprise approximately 41,300m³. It is proposed to haul all material from the borrow area to the landfill footprint via internal haul roads. The land within the borrow area footprint will be reinstated to a level not below 116m OD following completion of material extraction. The excavated material will be screened within worked areas of the landfill footprint and used in the construction of the facility. The material excavated from within the landfill footprint (232,200m^3) will also be used in the construction of the facility.

Some temporary stockpiles of topsoil and peat will also be retained for intermediate cover and augmentation of temporary capping if required. These temporary stockpiles will be covered with industrial tarpaulins to prevent the potential of dust migration. Temporary surface water control measures, comprising placement of sediment traps, will be implemented within the clay borrow area which will prevent any uncontrolled run-off to the adjoining surface water

bodies.

The proposed landfill site will operate on a daily basis from Monday to Saturday each week. The site will operate from 8.00am to 6.30pm, Monday to Friday and from 8.00am to 2.30pm on Saturdays. Waste will only be accepted between the hours of 8.00am to 5.45pm Monday to Friday and from 8.00am to 1.45pm on Saturdays, to allow time for the daily cover of the waste. The site will not operate on Sundays or Bank Holidays.

Waste acceptance procedures will adhere to the Council Decision 2003/33/EC, which establishes criteria and procedures for the acceptance of waste at landfill, pursuant to Article 16 of, and Annex II to, Directive 1999/31/EC (Landfill Directive) and will comply with the EPA's Draft Landfill Manual on Waste Acceptance (1998). Only waste classified as suitable for acceptance at a non-hazardous landfill, in accordance with Council Decision 2003/33/EC, will be accepted at the proposed facility. Processed inert waste, from permitted facilities, will also be accepted at the landfill for use as a substitute for engineering material (e.g. road works).

The operation of the proposed landfill will be undertaken under licence issued by the EPA. The conditions of the licence will include measures to minimise or prevent nuisance to the public occurring as a result of the operation of the facility. A complaints register detailing any complaint received from the general public in respect of the operation of the facility will be maintained at the site. Nuisance control measures to address potential odours, litter, vermin, scavenging birds, etc. will be put in place at the site. The personnel employed at the site will be suitably experienced and qualified to fill the role for which they are employed.

The waste will be transported to the site in covered vehicles resulting in limited impact on the residents of dwellings in terms of dust and windblown litter. Wheel wash facilities will be provided on-site to minimise the potential for mud and soil being carried onto the public road. Site operatives will also undertake regular road cleansing and litter picking. The sourcing of construction material within the property boundary will significantly reduce traffic on the public road network. The material borrow area will not generate additional traffic in the vicinity of the site as both the borrow area and the landfill footprint are confined within the site boundary.

Contingency plans will be put in place and any accidents and other emergencies will be handled according to these procedures. All site operatives and other relevant employees of *greenstar* will be trained in emergency response procedures and in fire prevention and control. Contact numbers for emergency services will also be prominently posted on-site.

Potential Impacts and Proposed Mitigation Measures.

The proposed landfill facility, including the material borrow area, will be designed, constructed and operated in accordance with best industry practice and therefore potential impacts on the environment will be minimised.

In addition, the facility will be operated under the conditions of a Waste Licence from the EPA, which will set stringent standards by which *greenstar* must comply. There are also a number of mitigation measures for the facility, which will limit potential impacts and ensure that the facility can be operated without causing nuisance to the local residents and local communities.

The existing traffic conditions on the road network in the vicinity of the proposed development site have been assessed and the relative level of impact of the proposed development quantified. Travel patterns will not be disrupted by the proposed facility, however vehicle numbers will increase. Where appropriate, road improvement measures to address the management of both the existing traffic and development traffic on the local road network have been put forward for consideration by the Local Authority. The mitigation measures to improve the road at the entrance will reduce the impact of the facility. Road improvement proposals have been submitted to provide junction improvements at Cappataggle Crossroads. These measures will also improve road safety for all road users. Traffic analysis also shows that the traffic generated by the proposed facility will have an insignificant impact on the capacity of the junctions on the local roads network.

Mitigating measures proposed include upgrading of the existing site entrance and adjacent section of the Ballinasloe to Athenry regional road (R348). The road will be realigned in order to improve the junction sightlines in both directions at the proposed entrance point. These works will affect only lands in the ownership of *greenstar*. This work will be undertaken in full agreement and consultation with Galway County Council. A high standard of road infrastructure will also be developed from the site entrance to the reception area to prevent vehicles queuing onto the regional road. Information and warning signs will also be placed on the R348 at the eastern and western approaches to the site entrance.

Recommendations have also been made as to minor geometric revisions to a local junction on the proposed route to the site from the N6 for consideration by the local authority. Over the entire length of the L3416 and the R348 between the landfill site entrance and Cappataggle Crossroads 12 No. areas are identified where modest remedial measures are required. Details of the remedial measures have been submitted for consideration. Based on the measured road widths, the improvement measure proposed at the 12 No. locations along the route can be undertaken within the existing highway boundaries. All proposed improvement/access proposals are compliant with the NRA: Design Manual for Roads and Bridges.

The noise emission from the proposed landfill facility, including the material borrow area, will be kept well within that required by the EPA. The higher noise levels will occur during

construction of the facility but these levels will occur over a limited period. The noise emissions associated with road traffic will increase the existing noise levels along the roadway by less than 2 dB(A) and accordingly will result in a negligible to marginal noise impact.

Historically, poorly operated, un-engineered landfill sites generated odours, which extended beyond the boundary of the site and led to complaints from nearby residents. This was primarily due to the lack of proper covering of the waste, capping system and gas collection system. The proposed daily, weekly and temporary covering of the waste combined with the final capping and gas collection and treatment system should ensure that the potential odour impact will be negligible.

The nearest dwelling to the landfill footprint is approximately 480m to the southeast of the landfill footprint. Given the gas control measures proposed by *greenstar*, together with a) the considerable distance to the houses, b) the saturated ground conditions and c) the relatively restricted pathways for flow of landfill gas, the risk potential of gas migration to these houses is considered low. Proposed landfill gas control measures include the installation of the horizontal landfill gas drainage layer and the vertical landfill gas extraction system in the waste cells.

In addition to the landfill gas collection and treatment system, a network of landfill gas monitoring wells will be installed around the landfill footprint, which is designed to detect gas migrating through potential pathways. It is not considered that the proposed development will have a significant impact on the local or global climate.

The extraction of material from within the landfill footprint and the borrow area is a temporary construction related activity and will have a negligible effect on the ambient environment. The borrow area is within the proposed site. Mitigation measures such as the grassing of exposed areas, the covering of topsoil stockpiles, spraying with water during periods of extended dry weather etc., will also reduce potential dust impacts from the clay borrow area.

The proposed landfilling operation will be restricted to the north and northeast portion of the property, as shown on Figure 2. Due to the nature of the proposed development, the geological environment will be impacted by the activities associated with the landfilling operation. This impact will be limited to the excavation and levelling of mineral soil and glacial subsoil within the area of the proposed landfill facility and borrow pits. This will result in a moderate impact on the soil/subsoil environment and no direct impact on the bedrock environment.

All excavation required for the formation of the landfill base platform and site infrastructure will be undertaken in unconsolidated material. Suitable material for the construction of the facility will be sourced on-site from within the landfill footprint and the material borrow area.

There will be no significant impact on the geological environment in the undisturbed area of the property outside of the landfill footprint and borrow area.

The design of the proposed landfill has taken account of the groundwater protection response matrix. A double protection lining system is proposed to maximise the protection offered. Periodic sampling of the groundwater in the boreholes adjacent to the proposed facility will be undertaken to demonstrate that the quality of groundwater is not being affected by the landfill operation. Trigger levels have been proposed for all monitoring boreholes. The trigger levels will act as intervention levels when corrective actions will be deemed necessary.

The landfill design has taken account of the hydrogeological setting of the proposed site. The bedrock underlying the site is classified as a Locally Important Aquifer, which is moderately productive only in localised zones. With the excavation and filling of the clay till within the footprint the natural groundwater vulnerability will be rated as extreme. The construction of the landfill formation level at a level so that the maximum head of leachate (1m above level of HDPE liner) is at, or close to, the level of the watertable reduces the risk to the surface water and groundwater environment. In this situation there is no hydraulic head between the leachate and the watertable to induce the leachate to pass through the liner system. Therefore the risk of leachate leakage from the landfill is essentially eliminated.

All surface water runoff from site roads will be diverted to the retention lagoon, via a grit trap and an oil interceptor, to allow settlement of suspended solids, prior to discharge to the Ballintober Stream. A surface water swale will also be constructed around the landfill footprint for the collection of clean surface water runoff, which will also be diverted to the surface water retention lagoon.

Regular sampling of the surface water environment will be undertaken upstream and downstream of the landfill to ensure that on-site activities, including those at the borrow area, do not cause an adverse impact on the natural water quality. This information will be compared to the water quality data already existing to determine any cumulative impacts or negative trends.

All water falling on exposed soil surfaces is likely to contain clay and silt particles. Therefore, temporary surface water control measures, such as sediment traps, will be installed to allow for settlement of fines. Minor changes in the shape of the shallow water table in the vicinity of the pits are likely to result from the excavation. The impact of these changes will be localised and are not considered significant.

In summary, there will be no uncontrolled discharge from the facility to the surface water environment. Discharge of surface water to the Ballintober Stream will be subject to the conditions of any Waste Licence as issued by the EPA. Given the above mitigation measures and the high landfill design standards employed, the surface water environment will not be significantly impacted by either the landfill operations or the excavations at the borrow area.

Even though the proposed landfill site is not in a visually designated area, some site elements, in particular the broadleaf woodland block to the northwest of the proposed landfill footprint are important assets in the landscape. This broadleaf woodland will be retained, improved and managed as part of the overall development to ensure its longevity. It is likely that the proposed landfill site would be perceived to have a negative medium term impact on the visual and landscape character of the surrounding area. Negative impacts would be reduced by the implementation of a planting programme to facilitate screening of the facility.

It is considered that the greatest levels of visual impact arising from proposed development will be on views from the county road to the eastern site boundary, and on a small number of properties located to the north and south of the site. The remaining views within this estimated zone of visual influence will experience low to moderate visual impact. All attempts will be made to integrate the development into the site, in particular by establishment of effective tree/shrub screens to site boundaries to reduce visual impact on surrounding receptors.

Mitigation measures adopted and recommended to reduce the negative visual impacts of the proposed development include the following:

- Restricting the landfill footprint to minimise removal of deciduous woodland within the northwestern site area;
- Appropriate modelling of the landfill profile during both landfill and capping operations, to create a final landform which blends with the existing topography;
- Where possible, retention of topography, hedgerows and tree belts within the site boundary, and their long term management;
- Provision of space within the site boundary for establishment of further tree/scrub blocks
- Grouping of buildings and plant in a compact form. Associated with this a comprehensive landscape treatment of the site entrance and internal areas;
- Use of building/plant/boundary element materials and colours in keeping with the background setting;
- Mass tree/scrub planting belts consisting of tree and shrub species found locally. Appropriate maintenance of all new planting;
- Provision of additional tree and shrub planting at key areas e.g. site entrances; and
- Perimeter materials, e.g. fencing, to blend in with local materials and not be out of place in what is a rural setting.

In addition a phased implementation of the restoration scheme will be undertaken. A restoration plan has been prepared for the proposed development. Initial boundary planting works will be established at the commencement of the landfill.

The retention of the existing stands of trees around the proposed borrow area, especially to the south of the area, and minimal interference with the existing landscape outside of the boundary, in conjunction with new planting, will prove valuable in mitigating the visual

impact of the proposed development at the borrow area. The proposed land take will also provide an adequate buffer around the borrow area in which *greenstar* will be able to manage this site screening.

There is no expected impact, negative or positive upon any Designated Areas of Conservation as a result of the proposed development.

The proposed site contains a reasonable diversity of mainly native tree species in hedgerows and treelines and therefore has a high local ecological value. However, with the exception of the wooded areas, the habitats found within the site are well represented in the nearby environment. Hedge cover will not be removed or cut between the 1st of March and the 31st of August, as per the Wildlife (Amended) Act 2000

Within the proposed development area, including the landfill footprint and the borrow area, a substantial amount of habitats will be removed. It is recognised that although these habitats are well represented in the local area, all wildlife habitats are under threat from development. Mitigation measures therefore would include protecting and enhancing those habitats remaining and providing alternative habitats wherever possible.

The block of broad-leaved trees which occurs to the northwest of the site and comprises the dominant stand of trees will not be impacted by the development and will offer screening of on-site activities from the northwest and west. It is proposed to erect stock proof fencing at the woodland perimeter to allow natural regeneration of tree species to occur in this area. Whip planting will be undertaken at the periphery of the woodland to encourage growth at the margins.

Two other small clusters of broadleaf woodland blocks occur to the north of the site. Under the proposed development, these areas of woodland will be removed. To compensate for the loss of woodland at the site (approximately 20%), 3 deciduous trees will be planted for every deciduous tree felled. This planting will be incorporated into the final landfill development plans. Planting will only be undertaken in areas considered suitable for woodland establishment. When construction work is completed, a further tree survey will be carried out to identify any trees in need of maintenance.

Although limited bat activity has been observed on-site, there is potential for bat populations to be present on-site, and several pro-active measures have been identified to offset roost/habitat loss for the local bat populations. In particular the large block of broadleaf woodland, is a most suitable habitat, which could be used by bats during the summer months both as a hunting ground and as a roosting area. The broadleaved woodland will be retained and enhanced where possible. The proposed surface water retention lagoon may also provide a suitable feeding ground for bats at the site. The site will be resurveyed for bat activity prior to construction of the facility.

The proposed development will not impinge on any known listed building, archaeological monuments or features. An archaeological pre-testing survey has been undertaken, at the recommendations of Galway County Council and Duchas as part of the planning application. The pre-testing survey was concerned with archaeological testing of a possible enclosure and a possible field system within the confines of the proposed landfill footprint. The survey found that the enclosure was most likely to be a relatively modern construction, dating to the first half of the 20th Century. Pre-development testing of the possible field system revealed no features of archaeological significance and this feature was most likely the remnants of peat exploitation rather than an archaeological feature.

Due to the scale of the operation and the possible existence of subsurface archaeological features it is proposed that all ground disturbances, both for the landfill and material borrow area, be monitored by an archaeologist, working under licence from Dúchas The Heritage Service and The National Museum of Ireland. No other mitigation measures are considered necessary or are proposed.

Modern landfilling practices including the immediate compaction of waste as it is deposited on the landfill site, maintaining the active tipping area as small as is practicable and the daily covering of the compacted waste considerably reduces the risks of fires, windblown litter, vermin and scavenging birds on landfill sites. Other nuisance control measures include regular road cleansing and litter picking. The landfill will be developed in distinct phases and cells, which will be progressively landscaped and restored. The borrow area will also be developed and restored on a phased basis which will be contingent on the staged requirements for material for the construction and capping of the landfill.

With the mitigation measures outlined above and outlined in more detail in the main EIS in relation to environmental protection, visual intrusion, noise, air quality, and traffic, the likely effects of the proposed facility on the local residents and material assets are expected to be relatively insignificant.

In addition, while there is potential for the above impacts to interact and result in a cumulative impact, it is unlikely that any of these cumulative impacts will result in significant environmental degradation.