OFFICE OF LICENSING & GUIDANCE

INSPECTORS REPORT ON A LICENCE APPLICATION

To:	Directors	
From:	Dr. IAN MARNANE	**- LICENSING UNIT**
Date:	JUNE 18 2007	
RE:	APPLICATION FOR A WASTE LICENCE FROM FINGAL COUNTY COUNCIL, LICENCE REGISTER W0231-01	

Application Details	
Type of facility:	Engineered Landfill
Class(es) of Activity (**P** = principal activity):	3rd Schedule: 4, 5(P), 6, 7, 11, 13 4th Schedule: 3, 4, 9, 11, 13
Quantity of waste managed per annum:	500,000 tonnes initially with estimated drop to 300,000 tonnes following proposed commencement of operation of waste to energy facilities in the region.
Classes of Waste:	Non-hazardous household and commercial waste, industrial non-hazardous solids, construction and demolition waste, sludges, household waste for recovery at the public recycling facility. Bottom ash from non-hazardous waste to energy treatment plants for initial storage to allow CO_2 stabilisation prior to reuse offsite.
Location of facility:	Nevitt, Lusk, Co. Dublin
Licence application received:	05/07/2006
Third Party submissions:	91
EIS Required:	Yes
Article 14 Notices sent:	11/10/2006, 16/11/2006, 23/03/2007
Article 14 compliance date:	18/05/2007
Site Inspection:	04/08/2006, 06/10/2006, 31/05/2007

1. Facility

The application from Fingal County Council is for the development of a new engineered landfill facility and public recycling facility. The site is currently used as farming land, with 8 residential properties within the total land area proposed for the development. Part of the site has also been used historically for the disposal of waste, and is reported to consist mainly of construction and demolition waste, though other materials reported as part of the application also include ash/cinders, organic material, newspaper and crockery.

The proposed disposal area covers an area of approximately 57 hectares, with an additional site area of 153 hectares proposed to be used as an area for screening/landscaping, for the provision of a new county road and for site infrastructure (e.g. offices, leachate treatment, gas treatment). A buffer distance in excess of 250 metres is present between the landfill footprint and the nearest residence.

The principal activity at the site will be the disposal of non-hazardous waste into engineered lined cells. Up to 500,000 tonnes of waste will be accepted per annum initially, with a proposal to reduce the annual intake when waste to energy facilities begin operating in the Region. The public recycling facility will accept up to 8,800 tonnes of waste per annum, including up to 5,000 tonnes of bagged household waste. Other items to be accepted will include textiles, glass, aluminium and steel cans, wood, metal, plastic, oil, batteries, WEEE, paints, green waste and household C & D waste.

Other activities at the site will include temporary storage of bottom ash from non-hazardous waste to energy plants (prior to reuse offsite), primary treatment of leachate, flaring of landfill gas and combustion of landfill gas to generate electricity. Primary-treated leachate will be discharged to public sewer for treatment at a WWTP operated by Fingal County Council, or alternatively taken in closed tankers to a Fingal County Council treatment plant with sufficient capacity.

In addition to the 500,000 tonnes of waste accepted per annum, additional capacity will be required during the initial operating period (expected to be within the first year) to allow disposal of the existing historical waste body which is currently landfilled in the south-eastern corner of the site. Much of this is reported to be inert construction and demolition waste and may be used in road construction within the main landfill area.

The design capacity of the landfill is 9,400,000 tonnes with an estimated operational lifetime of up to 30 years. 20 – 25 cells will be developed with a reported average cell capacity of 400,000 tonnes.

2. Operational Description

The landfill area will be an engineered non-hazardous waste landfill. Approximately 11 construction phases are proposed with 20 – 25 cells being developed. The lining is specified as per the requirements of the landfill directive (Council Directive 1999/31/EC). A drainage layer will also be installed below the liner system to allow for dewatering during construction and initial filling of the cells (and after completion of the cells, as required). Daily cover will be provided at the working face to minimise impact from aspects such as vermin, litter and odour release.

Operational and waste acceptance hours are detailed below:

Area	**Waste Acceptance Hours**	**Operational Hours**
Landfill	08:00 – 16:30 Mon – Sat No waste acceptance on Sunday	07:30 – 20:00 Mon – Fri 07:30 – 18:30 Sat 08:00 – 16:30 Sun/Public Holidays
Public Recycling Facility	08:00 – 16:30 Mon – Fri 08:00 – 16:00 Sat & Sun	07:30 – 18:30 Daily 08:00 – 16:30 Public Holidays

A leachate collection system will be installed, including a leachate storage lagoon, and leachate will receive primary treatment (Sequencing Batch Reactor system) prior to discharge to the local authority sewer system for treatment at the proposed Portrane wastewater treatment plant, or at another treatment plant operated by Fingal County Council in the event that operation of the Portrane facility has not commenced. A leachate recirculation system will also be installed at the facility. Dewatered sludge from the leachate treatment plant will be disposed of on-site.

A landfill gas collection system will be installed to manage landfill gas generated at the site. Landfill gas flaring and electricity generation from combustion in a landfill gas engine will be employed as part of the management of landfill gas.

Surface water runoff from the main site roads and from capped areas of the landfill will be diverted to the surface water attenuation facility prior to release to a local surface water system. Groundwater collected from the drainage layer beneath the main liner will also be directed to the attenuation system. Emissions from this attenuation facility will be continuously monitored (flow, dissolved oxygen, electrical conductivity, suspended solids) with trigger levels to be agreed with the Agency for diversion of the release. Surface water from hardstanding areas of the site (e.g. around the administration building and other areas such as the quarantine area and wheel wash) will be separately collected and discharged to the leachate collection system.

Material collected at the public recycling facility will be sent off-site for recovery/treatment/disposal. This includes a quantity of bagged household waste which will be accepted at the facility. Some of the construction and demolition waste collected at the public recycling facility will be disposed of within the lined cells or used in construction at the facility.

3. Use of Resources

Resource use is based on information gathered by the applicant from Baleally landfill site, and reported as follows:

- Fuel
    - Diesel – 313,320 litres
- Electricity
    - 115,050 kWh
- Water
    - No information provided on water usage.

Efficient use of resources is required as part of the recommended licence requirements. In addition, the applicant has been requested to provide a support fuel for the landfill gas flare to ensure effective treatment of landfill gas.

4. Emissions

4.1 Air

The main emissions to air from the site are likely to consist of the following:

- Landfill gas emissions (directly from the waste body);
- Dust emissions from storage of ash and other materials such as soil as well as dust emissions from the working face of the landfill;
- Combustion gas emissions from the landfill gas flare and landfill gas engine;
- Dust from vehicle movements on unpaved roads at the site;
- Odour from general waste activities.

A landfill gas collection system will be installed at the site to collect landfill gas generated from decomposition of waste. The collection efficiency of the system is reported by the applicant at 80 – 90 %. The RD requires that energy generation be employed at the earliest opportunity. Where energy generation is not possible flaring must be employed, with landfill gas being flared in an enclosed flare with a minimum combustion temperature of 1,000^{o}C and a retention time of 0.3 seconds (this is considered BAT as this is the requirement for gas flaring as detailed in TA Luft 2002). Due to the

expected lower percentage of organic material in waste being sent to landfill (this is a requirement of the Landfill Directive, which requires Member States to implement a National Strategy for reduction of biodegradable municipal waste going to landfill) it is expected that a situation may arise where the extracted gas cannot independently support combustion. In order to ensure the extracted landfill gas is effectively treated the applicant has been requested to provide support fuel (e.g. natural gas) to ensure combustion can be maintained. This measure will also reduce odours and their off-site impact.

Dispersion modelling of emissions from the flare unit has been completed as part of the EIS. The results indicate no significant impact at off-site receptors based on comparison with statutory limits for NO_X, SO_2, particulate matter, benzene and CO. The proposed lining system, gas collection system and gas flaring/utilisation system are considered to be BAT for this facility. Emission limits for the landfill gas flare and landfill gas engines are specified in Schedule B, and are also considered BAT for this facility.

Modelling of emissions from the landfill gas engine(s) is required under Condition 6.10 in the RD in order to determine the most suitable location for the engine(s) prior to installation.

Modelling of odour emissions has been completed based on odour emissions from the following areas:

- Active face of landfill;
- Tipping of waste;
- Active cell;
- Temporary capped cell;
- Permanent capped cell;
- Leachate storage tank;
- Landfill flare/gas utilisation engines.

The model results indicate that odour emissions will not impact the nearest sensitive receptors. The RD includes a number of conditions required to minimise odour emissions, including:

- Waste received at the landfill must undergo prior treatment, in line with the requirements of the landfill directive and waste hierarchy;
- Specification of a maximum area for the working face;
- Daily cover required to control odour from the working face;
- Collection and flaring of landfill gas;
- Provision of a support fuel for the flare to allow ongoing combustion of gas in the event that the landfill gas alone cannot sustain combustion;
- Treatment of air emissions from the leachate treatment system.

Fugitive emissions may be generated from the landfill gas collection system and the leachate collection system. Condition 6.24 requires a programme be put in place for the identification and reduction of fugitive emissions. Inspection of overground pipes carrying untreated/treated leachate is also required to identify any leaks.

The applicant has requested that storage of incinerator bottom ash be allowed at dedicated cells within the site. The material is proposed to be stored to allow CO_2 stabilisation prior to proposed reuse off-site in construction of roads. Prior to acceptance of bottom ash the RD requires the licensee to submit details of the locations of the proposed temporary storage cells and a management procedure to prevent the occurrence of significant dust nuisance.

Ambient monitoring of dust deposition is required at the site boundary, with limits included in Schedule B (limits specified as per TA Luft). A number of techniques are detailed in Section 3.4.5.1 of the EIS for dust suppression during construction and operation phases of the landfill. These include dampening of unsurfaced roads and soil stockpiles, vehicle speed restrictions and the provision of wheel washes. Condition 5.5 requires that site operations do not result in a dust nuisance impact at off-site locations. The RD also requires dampening of site roads, ash storage area (landfill cell(s)) and soil stockpiles during dry weather conditions.

4.2 Emissions to Sewer

The only release to sewer at the site will be from the primary leachate treatment system. The applicant has indicated that the pre-treatment method at the site will be a sequencing batch reactor process. Discharge limits for treated leachate emissions from the site to the sewer system are specified in Schedule B, as stipulated by Fingal County Council. Additional conditions requested by the Council in their response to the Section 52 notice issued by the Agency are also included in the RD. This includes a requirement for continuous monitoring of methane gas levels in the sewer.

The applicant has indicated that sufficient capacity is available at the planned new wastewater treatment plant at Portrane. The treated leachate will be pumped into a dedicated sewer line and will join the main sewer system to the west of Lusk town. In the event that the Portrane facility is not operational or a sewer connection is not available the Council has confirmed that capacity is available at the Swords or Malahide treatment works on a temporary basis, until the sewer connection and/or treatment plant is in place. Treated leachate will be tankered to the treatment plants. Condition 5.4 of the RD requires the applicant to demonstrate the availability of suitable treatment capacity prior to initial receipt of waste at the site. The Portrane treatment plant has a proposed 60,000 population equivalent capacity, with post-treatment discharge into the Irish Sea.

'Domestic' effluent from kitchen/canteen and toilets/bathrooms in the administration building will be directed to the leachate treatment system.

4.3 Emissions to Surface Waters

The only proposed emissions to surface water at the site will be from the storm water attenuation pond and associated wetlands which will be constructed as part of the development of the site, and is discussed in Section 4.4 below.

Surface water from hardstanding areas of the site (e.g. around the administration building and other areas such as the quarantine area and wheel wash) will be collected and discharged to the leachate collection system. This is discussed further in Section 4.4 below.

There will be no process emissions (e.g. leachate) to surface waters.

Additional conditions in relation to surface water protection have been included in the RD based on the submission received from the Eastern Regional Fisheries Board.

Flooding Potential

A flood risk assessment was carried out as part of the EIA. The InfoworksRS model was employed to predict flood levels.

Flooding is predicted to take place in the southeast corner of the proposed licensed area, outside the area of the actual landfill footprint. The modelling indicates that flooding occurs in this area for 1 in 30 year floods (the shortest return period modelled) with the extent of flooding not increasing significantly for 1 in 200 year return period. The extent of the area of flooding is not predicted to extend into the area of the proposed landfill footprint, with the closest area of predicted flooding being greater than 200 metres from the landfill footprint. The extent of flooding was modelled with and without the proposed landfill in place, with only a small difference being noted in the extent of estimated flooding.

The EIS indicates that silt build-up at the existing culverts at the Nevitt Road Bridge (at the M1 Motorway), along with a currently installed monitoring weir, may result in flooding of this area and recommends that the weir is removed and the culvert is cleaned to reduce the risk of flooding in this area. The EIS also specifies compensatory measures which would allow fish to pass upstream of the culvert and to improve the habitat of approximately 1.5 km of manmade channels adjacent to the M1 motorway.

4.4 Storm Water Runoff

Receiving Waters

The receiving water for discharge from the attenuation pond is the Corduff River system, also known as Ballough Stream. The Corduff is not a designated Salmonid River as defined under the European Communities (Quality of Salmonid Waters) Regulations 1988 (SI No. 293 of 1988). A river habitat assessment completed as part of the EIS indicated good quality salmonid habitats within the proposed landfill area and also downstream of the proposed site. Studies carried out as part of the EIA and data from the Eastern Regional Fisheries Board indicate significant populations of brown trout in sections of the Corduff River. A submission from the Eastern Regional Fisheries Board also confirms that the Corduff system supports significant local populations of salmonid species.

There are four streams crossing the proposed site, which form part of the Corduff River Catchment. The development of the landfill will result in the loss of approximately 1 km of watercourse. The EIS indicates that the habitat lost does not constitute suitable habitat for salmonid fish. Compensatory measures are proposed in the EIS which would improve the salmonid habitat quality in other section of the Corduff system, and allow upstream movement of salmonid species through a culvert under the M1 motorway which is currently considered to be impassable for these species.

EPA monitoring has been carried out at two locations downstream of the site (in the Corduff River) with the most recent data from 2001 reporting a Q-rating of Q3 – 4 at both sites, indicating slightly polluted conditions. Previous monitoring completed at the same site between 1988 and 2001 indicated a consistent Q-rating of Q3, hence the 2001 results suggest a slight improvement.

Monitoring and assessment of biological quality carried out as part of the EIA (samples collected in 2005) indicate a Q-rating in the streams running through the site and in the Corduff River of Q2-Q3 indicating moderately polluted conditions, with a possible toxic influence noted at one location approximately 4 km downstream of the site.

The Rogerstown Estuary, approximately 6 km from the site, into which the Corduff Rivers flows, is a candidate Special Area of Conservation.

Discharges to Surface Water

Runoff from hardstanding areas (administration area/waste quarantine area/wheel wash) will be collected in a dedicated system and diverted to the leachate collection system for treatment and discharge to the local authority sewer system. All rainfall within the landfill footprint will be collected and transferred to the leachate collection and treatment system.

Runoff from the main site road and from capped areas of the landfill will be collected and diverted to the surface water management system. The surface water management system will also receive water from the groundwater drainage layer beneath the main landfill liner. The surface water management system will consist of a sedimentation forebay, an attenuation pond, Class I petrol/oil interceptor, vortex type flow control system and continuous emissions monitoring with automatic diversion to the leachate collection system. The surface water management system has been designed for a 100-year flood event and also includes allowance for a 10 % increase in rainfall volumes associated with global warming.

A submission from the Eastern Regional Fisheries Board (ERFB) recommended specific measures to protect the receiving waters, including:

- Development of a Sustainable Drainage System (SuDS);

- Online monitoring of emissions and alarm-enabled mechanisms to protect receiving waters;
- Class I petrol/oil interceptor, silt and grit trapping and hydro-brake controls;
- Maintenance of a minimum 10 metre riparian corridor along all streams and rivers;
- Maintenance of the on-site attenuation structures should not result in the release of contaminated water to the surface water network;
- Adherence to the ERFB 'Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites'.

These requirements have been taken into account in developing the RD conditions. Measures are required to be taken during both the construction and operational phases to protect the receiving waters from elevated suspended solids loading and other potential pollutants.

Continuous monitoring of emissions from the attenuation system to the Corduff River and the setting of trigger levels for closure/diversion of the release is required in the RD. Separate non-continuous monitoring of the emissions from the drainage layer underneath the main landfill liner is also required in the RD.

Bunding is required for all tanks and drum storage areas.

4.5 Emissions to ground/groundwater:

There are no proposed emissions to groundwater at the site. A series of groundwater monitoring wells have been specified in the RD with regular monitoring being required to identify any pollutant releases to groundwater due to operations at the site.

The applicant has committed to retaining at least 10 metres of in-situ low permeability subsoils below the landfill footprint after excavation. This would result in a vulnerability rating of 'Low' according to the National vulnerability mapping guidelines (DELG, EPA, GSI, 1999). The site boundary and landfill footprint are reported to extend across the Lucan, Naul and Loughshinny bedrock formations. These have been classified by the GSI as 'locally important bedrock aquifers which are generally moderately productive (Lm)'. Combining this aquifer classification and vulnerability for the landfill footprint results in a classification under the 'Response Matrix for Landfills' of R1: 'Acceptable subject to guidance in the EPA Landfill Design Manual or conditions of a waste licence'.

Analysis of groundwater from eleven shallow bedrock monitoring wells drilled as part of the site investigations was carried out as part of the EIS. Total coliforms were detected in 10 of the wells, while faecal coliforms were detected in five of the wells. Concentrations of ammoniacal nitrogen above the EPA Interim Guideline Values were detected in four wells, while ortho-phosphate levels above the EPA Interim Guideline Values were detected in five of the wells.

A historic landfill was discovered during site investigations in the southeast of the proposed licensed area. It is reported that the area where landfilling had taken place was historically used as a sand/gravel quarry. The quantity of waste in place is estimated at 120,000 tonnes and is reported to have been placed between 1994 and 2000. Trial pits and boreholes were dug in this area with a maximum depth of waste reported at 5.1 metres. Investigations carried out as part of the EIS report that the majority of material in place is construction and demolition waste, with other material identified including ash, wood, plastic, carpet, decaying organic matter and newspaper. There is evidence of minor contamination in groundwater samples collected from a shallow bedrock monitoring well drilled within the waste body. Elevated conductivity, calcium, magnesium, potassium, chloride, sulphate, ammoniacal nitrogen, cadmium, manganese, nickel, total coliforms and faecal coliforms (in excess of the EPA interim guideline values) were reported. The applicant has requested that the waste be left in situ, and capped (topsoil and subsoil to a minimum 0.5 metre thickness). While the applicant has carried out a qualitative risk assessment which reports no likely significant impact from leaving the waste body in-situ, it is considered that placement of the waste into the licensed landfill area is the most appropriate means of managing this waste in the long term and hence transfer of the waste into the engineered landfill area has been specified within the RD. Construction and demolition waste recovered from the existing landfill may be used on site as a sub-base for the construction of internal roads or other construction purposes, following confirmation of the inert nature of the material. Other wastes can either be deposited within the engineered landfill or transferred off-site (any hazardous fractions). The RD requires submission, within twelve months of the date of grant of the licence, of a detailed programme for the excavation and remediation of the historical landfill area at the site, and disposal of the waste into an engineered lined cell.

Bog of the Ring Drinking Water Abstraction

The Bog of the Ring groundwater abstraction scheme is currently operated by Fingal County Council and has been in operation as a potable water supply scheme since July 2003. The abstraction rate is currently in the region of 4,000 m^3/day. The nearest of the four production wells for the abstraction scheme is located approximately 2.5 km to the north of the northern landfill boundary.

The Bog of the Ring wetlands is a proposed Natural Heritage Area (pNHA). A report published on behalf of Fingal County Council in 2006 determined that the abstraction is not having a significant impact on the ecological status of the area. The report also stated that the maximum sustainable yield from the Bog of the Ring aquifer is 4,000 m^3/day ± 15 % (i.e. approximately the current abstraction rate). This supplies approximately 50 % of the water requirements of Balbriggan and approximately 5 % of the total requirements for the Fingal County Council area.

The GSI determined the Zone of Contribution (ZOC) for the abstraction scheme in their 2005 Bog of the Ring Groundwater Source Protection Zones

Report. One of the main objectives of this investigation by the GSI was to 'delineate source protection zones for the four Bog of the Ring public supply wells'. This indicates that the landfill area is outside the ZOC, even in the event that the abstraction rate was increased to 5,000 m^3/day. Based on this and on the groundwater flow contours provided by the applicant (and also on contours submitted as part of a third party submission and prepared by Mott McDonald consultants) it is considered that any potential emission from the landfill would not result in contamination of water abstracted from the Bog of the Ring scheme. The applicant has submitted groundwater contour plots for an extended period covering all seasons, with the plots indicating no flow from the landfill towards the Bog of the Ring.

There are also significant thicknesses of gravel beneath the clay overburden in the southern part of the landfill footprint, with thinner areas of gravel in the northern half. Significant thicknesses of gravel are also noted in the Bog of the Ring abstraction area. The flow direction in the gravel layer is considered to be the same as that in the underlying bedrock layer, hence no flow from the landfill towards the Bog of the Ring is expected due to the presence of the gravels.

In a response to a request for information from the EPA the GSI also indicated that a potential area for development of further groundwater abstraction lies to the east of the motorway along the north-south geological fault line. At similar abstraction rates to the Bog of the Ring Scheme it is considered that the ZOC for this area would encompass the landfill area, hence the potential for development of such a scheme is likely to be impacted by the development of the landfill. However, it is considered that any potential leakage from the landfill will not have a significant impact of the quality of the groundwater (leachate collection system would have to fail, synthetic liner would have to fail, engineered mineral liner would have to fail, underdrainage layer would have to fail, in-situ clay would have to fail). It is also noted that the development of the landfill would not preclude the development of wells further to the south or east which would be unlikely to include the landfill within their Zone of Contribution.

Fingal County Council has indicated that it is not proposed to develop any additional groundwater abstraction schemes as plans are already in place to increase the capacity of the Leixlip treatment plant from which the majority of water for Fingal is currently sourced (approximately 84,000 m^3/day supplied to Fingal).

Other Groundwater Usage

The applicant carried out a well survey in the area of the site. Well data was also received as part of a number of third party submissions.

It is evident that this area of North County Dublin is a significant centre for the horticultural industry (mainly growing and processing of vegetables) and groundwater is used at a number of facilities for purposes including irrigation and for vegetable washing. In particular, there are three facilities located in the vicinity of the site (within 2 km) where groundwater is used for vegetable

processing or irrigation purposes on a commercial basis. These facilities have been highlighted in a number of submissions as being at risk from potential leakage from the landfill:

- Kennedy, located approximately 800 metres to the east of the edge of the landfill footprint. Water is used here for irrigation purposes. The yield (reported by the drilling company) is approximately 9,000 litres per hour;
- Moore, located approximately 1.8 km to the east of the landfill footprint. This is reported to be used for vegetable processing purposes. The yield (reported by the drilling company) is approximately 45,000 litres per hour;
- Kerrigan, located approximately 900 metres from the southern edge of the landfill footprint. This is reported to be used for irrigation and vegetable processing purposes, with a yield (reported by the drilling company) of 45,000 litres per hour.

Groundwater flow contours from the EIS and from additional supporting data received from the applicant suggest that groundwater flow from the areas of the Kennedy and Moore wells is towards the west or southwest, flowing towards the fault line running approximately north-south parallel to the M1 Motorway. The contours indicate that any potential leakage from the landfill site would also flow towards this fault and then along the fault line, i.e. there would be no flow towards either the Kennedy or Moore wells.

The Kerrigan well is located approximately 500 metres to the west of the reported route of the north-south fault line and approximately 900 metres to the south of the southern edge of the landfill footprint. Groundwater flow contours for the area also indicate that this well is not likely to be impacted by any potential emissions from the landfill.

As part of additional application information supplied in January 2007 the applicant estimated a theoretical leakage rate from the landfill, due to possible imperfections in the lining, at 100 litres per day. The groundwater flow across the site through the bedrock is estimated at 1,504,000 litres per day, resulting in a dilution factor in excess of 15,000. This does not take account of any attenuation in the natural clay beneath the site or the potential for an inward hydraulic gradient to exist due to groundwater in the surrounding clay overburden. Therefore, it is considered that the landfill will not have a significant impact on the quality of the groundwater downgradient of the site.

There are also a number of domestic wells in the vicinity of the proposed landfill however the majority of these are reported (in the EIS) to be decommissioned and no longer in use as a mains water supply is now available to most houses. Sampling of water from several of these wells was completed, with identification of faecal coliforms in two of the wells. No significant impact on local wells is anticipated.

4.6 Wastes Generated:

As indicated in Section 4.5, an existing body of waste, estimated at 120,000 tonnes has been identified within the proposed site boundary. The RD conditions require that this material is removed and placed within the lined cells. Any hazardous wastes identified within this waste body which cannot be accepted in the lined cells should be transported off-site for final disposal at an appropriate facility. Inert waste from the existing waste body may be used for construction purposes.

Any unacceptable waste received at the facility must either be removed from the site immediately or temporarily stored in the quarantine area prior to disposal off-site at an appropriate facility.

Waste sludge from the on-site wastewater treatment plant will be landfill at the site and the RD requires procedures to be put in place for management of waste sludges at the site.

Temporary storage of waste will be carried out at the public recycling facility.

4.7 Noise:

The site is located adjacent to the M1 Motorway, with the eastern boundary of the site adjoining the motorway. The EIS identified the main background noise sources at the local sensitive receptors as local traffic movements. Higher noise levels were identified at noise monitoring locations N1 and N2 due to a larger proportion of HGV traffic along the adjacent road. An EPA licensed inert waste landfill (Murphy Concrete, Reg. No. W0129-01) operates in the area of the site. A summary of the baseline noise measurements, made on 3rd August 2005 are presented in Table 4.1 below.

Table 4.1: Summary of baseline noise measurements

Location	Time	L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	LA_{90}
N1	10:44	59.8	85.6	48.7	59.5	52
N1	14:22	60.1	85.5	48.2	60	52
N2	11:45	56.7	74.6	38.8	59.5	45
N2	15:03	57.3	75.9	35.5	60	42
N3	13:00	54.9	65.3	40.5	58.5	46.5
N3	16:02	54.8	77.2	42.1	55	45.5
N4	13:40	52.9	74.2	36.1	55.5	44
N4	15:30	52.7	81.4	31.6	53.5	36

Note: The monitoring locations are marked on Figure 3.6.1 of Volume 2 of the EIS

Estimation of worst-case noise impact from the operational and construction phase of the site indicates no likely significant impact. Review of the noise section of the EIS indicates the greatest impact on local sensitive receptors will be from traffic on the proposed new County Road along the western landfill boundary.

Potential sources of noise related to the proposed site include site operations during the construction phases and operational phases. The main potential noise emissions during both construction and operation are reported to be

related to mobile plant and traffic. Other potential noise sources include building services plant (e.g. pumps, fans, air conditioning).

As part of the development of the site it is proposed to construct berms around the site (some within the site boundary and some external) which will act to attenuate noise emissions from the site and also from the proposed new county road (see Figure 2.8 of the EIS for layout of berms).

In addition the RD conditions require that all equipment used on site is properly maintained. This includes proper maintenance of all plant used at the site, which will further aid in minimising noise impact.

The RD requires noise monitoring on a quarterly basis. Noise measurements must be carried out at local sensitive receptors.

The RD sets limits for day-time and night-time noise levels at the nearest sensitive receptors of 55 dB(A) and 45 dB(A), respectively. Noise emissions shall not have a clearly audible tonal or impulsive component at the nearest sensitive receptors. Quarterly noise monitoring is stipulated in RD.

4.8 Nuisance:

There are a number of conditions in the RD aimed at controlling nuisances at the proposed landfill. Condition 5.5 requires that nuisances associated with the activity do not result in an impairment of, or an interference with amenities or the environment at the facility or beyond the facility boundary or any other legitimate uses of the environment beyond the facility boundary. Also, this condition requires that any method used to control or prevent any such impairment/interference shall not cause environmental pollution (e.g. the use of pesticides or insecticides).

Condition 6.5.2 requires that all litter control infrastructure is inspected on a daily basis, with at least a temporary repair being made by the end of the day.

Condition 6.5.3 requires that all loose litter or other waste, placed on or in the vicinity of the facility, other than in accordance with the requirements of the RD, shall be removed, subject to the agreement of the landowners, immediately and in any event by 10.00am of the next working day after such waste is discovered.

A litter patrol of the site and surrounding area will be carried out on a daily basis with recovery of any wind-blown litter. All vehicles removing and delivering waste must also be covered.

5. Restoration

Condition 10 of the RD stipulates measures for closure, restoration and aftercare of the site. In particular, prior to the acceptance of waste at the site, a fully detailed and costed plan for the closure, restoration and long-term aftercare of the site or part thereof is required to be submitted for the approval

of the Agency. The licensee must demonstrate adequate financial provisions for the proposed restoration and aftercare plans.

Condition 6.35 also requires a programme to be submitted to the Agency detailing the proposed measures for excavation, remediation and restoration of the existing waste body at the site.

6. Cultural Heritage, Habitats & Protected Species

The site itself is not included within an NHA, SAC or SPA area. The nearest designated areas are as follows:

- The Bog of the Ring is a designated NHA (Natural Heritage Area) and is located approximately 2 km to the north of the site.
- Rogerstown Estuary (approximately 6 km southeast of the site) is a designated Special Area of Conservation, Natural Heritage Area and Special Protected Area.

Other designated areas within an approximate 10 kilometre radius are detailed below:

Name	**Designations**
Malahide Estuary	NHA, SAC
Knock Lake	NHA
Portraine Shore	NHA
Skerries Island	NHA, SPA
Cromwell's Bush Fen	NHA
Loughshinny Coast	NHA
Rockabill	SPA
Broadmeadow/Swords Estuary	SPA

It is not considered that any of these areas will be significantly impacted by the operation of the landfill facility in line with the conditions specified in the RD.

The EIS reports that no birds were identified at the site which are listed in Annex I of the Birds Directive (79/409/EEC). All bats identified at the site area are protected under the Wildlife Acts 1976 and 2000. Measures are detailed in the EIS for the identification of bat roosts prior to construction/demolition works so that mitigation measures can be put in place. It is also proposed to construct an artificial badger sett to replace a sett which will be removed as part of the proposed site development.

A number of archaeologically significant sites were identified within the proposed site boundary and some sites will be permanently removed as a consequence of the development of the landfill. It is noted that the applicant received correspondence from the Department of the Environment, Heritage and Local Government concurring with the archaeological mitigation measures proposed in the EIS and also stipulating further measures for the protection of sites which will remain in place after completion of the development.

It is considered that the conditions specified in the RD will prevent any significant impact (due to facility operations) on the remaining archaeological sites.

7. Waste Management Plan

The Waste Management Plan for the Dublin Region was developed jointly by Dublin City Council, South Dublin County Council, Fingal County Council and Dun Laoghaire-Rathdown County Council. The first Regional Waste Management Plan became effective in 2001 and a revised plan (for 2005 – 2010) was issued in November 2005. Both the first regional waste management plan and the revised plan included provision for the proposed landfill.

8. Environmental Impact Statement

I have examined and assessed the EIS and am satisfied that it complies with the EIA and Waste Licensing Regulations.

9. Best Available Techniques (BAT)

I have examined and assessed the application documentation and I am satisfied that the site, technologies and techniques specified in the application and as confirmed, modified or specified in the attached Recommended Decision comply with the requirements of BAT. I consider the technologies and techniques as described in this report; the application; and in the RD; the most effective in achieving a high level of protection of the environment having regard to the way the facility is located, designed, built, managed, maintained, operated and decommissioned.

10. Compliance with Directives/Regulations

Air Quality Framework Directive – 1996/62/EC

Assessment of the licence application documents and additional information requested from the applicant indicates that the operation of the site will have no significant impact on air quality, and will not result in a breach of the statutory air quality limits specified in the daughter directives to the AQFD.

Landfill Directive – 1999/31/EC

The RD conditions have been specified in line with the Landfill Directive and with the principles of Best Available Techniques (BAT) as discussed throughout this report.

Groundwater Directive – 80/68/EEC (to be replaced by 2006/118/EC)

The Groundwater Directive provides for the control of releases of List I and List II substances to groundwater. The direct discharge of List I substances is prohibited. In the case of a landfill it may be considered that a direct

discharge could occur (in the event of a leak in the landfill liner) where the groundwater table is above the level of the base of the landfill and hence in direct contact with the liner. However, in such cases the surrounding groundwater would result in an inward hydraulic gradient preventing any significant release to groundwater. In support of this the RD requires a maximum leachate head of 1 metre be maintained above the base of the landfill, to prevent an outward gradient developing.

In addition, the Directive does not apply to discharges which are found by the competent authority of the Member State concerned to contain substances in lists I or II in a quantity and concentration so small as to obviate any present or future danger of deterioration in the quality of the receiving groundwater. As has previously been discussed in this report, it is considered that any potential release of leachate from the landfill to groundwater will not result in significant deterioration in the quality of the receiving groundwater.

Directive 80/68/EEC will be repealed on 21 December 2013 as specified in the Water Framework Directive. Directive 2006/118/EC has thus been put in place to ensure ongoing protection of groundwater. This directive supports the goals of the Water Framework Directive and sets standards for certain pollutants in groundwater and requires member states to specify threshold values for a range of other pollution indicators. Directive 2006/118/EC also includes pertinent aspects of Directive 80/68/EEC to allow for the continued protection of groundwater after the repeal of Directive 80/68/EEC.

Water Framework Directive – 2000/60/EC

The WFD covers inland surface waters, estuarine and coastal waters and groundwater. The fundamental objective of the Water Framework Directive aims at maintaining “high status” of waters where it exists, preventing any deterioration in the existing status of waters and achieving at least “good status” in relation to all waters by 2015.

The conditions included in the RD have been developed to prevent any significant impact on water quality, and in particular surface water and groundwater quality. Substantial monitoring of water quality is also required to detect any impact takes place, and to allow mitigation measures to be put in place as soon as possible to restore water quality where an incident at the facility has lead to an impact on water quality.

IPPC Directive 96/61/EC

The activity falls within the scope of the IPPC Directive. The IPPC Directive requires that the competent authority take account of the general principles set out in Article 3 when determining the conditions of a permit. The Recommended Decision (RD) takes account of the requirements of the Directive. In particular, Condition 7 Resource Use and Energy Efficiency provides conditions dealing with water, energy and raw materials use,

reduction and efficiency on site, while Condition 10 provides for measures to be taken in the event of definitive cessation of the activity.

11. Proposed Decision

The RD as drafted includes a range of conditions which have been developed to afford protection to the surrounding environment. The main potential issue at landfill facilities are typically associated with groundwater quality impact and odour nuisance. The landfill lining has been specified in line with the requirements of the Landfill Directive. Leachate generated within the landfill must be collected and treated prior to discharge. Monitoring of groundwater quality in the vicinity of the site is also required. Control of odorous emissions includes a requirement for the pre-treatment of waste, extraction and combustion of landfill gas, treatment of vapours generated in the leachate treatment plant, requirement for daily cover of waste, pre-treatment of sludges and limitation of the size of the working face. With the reduction in the quantity of biodegradable waste being sent to landfill the methane content of the extracted gas is often insufficient to support combustion, thus the RD also requires that the landfill gas flare incorporate a support fuel to allow combustion of low quality landfill gas.

I am satisfied that the conditions as set out in the RD will adequately address all emissions from the facility and will ensure that the carrying on of the activities in accordance with the conditions will not cause environmental pollution.

12. Submissions

There were 91 submission made in relation to this application. A list of those who made submissions is included in Appendix 1.

Due to the quantity of submissions received the issues have been dealt with thematically below, with reference made to specific submissions where necessary to provide an overview of the concerns raised.

Some submissions dealt with issues which are outside the general remit of the Agency with regard to waste licensing. These include issues such as visual impact, bird strike/aviation issues, general planning authority issues, issues related to compulsory purchase orders and off-site traffic impact.

In addition, some of the issues included in submissions have been dealt with as part of the response to the three Article 14 Notices as issued by the Agency, e.g. the exclusion of certain boreholes from groundwater contour plots or the issue of the EIS statement that the landfill was not underlain by gravel. Other issues have been discussed in detail in the preceding sections of this report. These issues have therefore not been dealt with specifically below, with the responses below focussing on the main identified concerns.

1. Air Quality

1.1 Odour – Odorous emissions will impact on local receptors (e.g. residences, school).

Response: A number of submissions raise concerns in relation to odour impact on nearby receptors.

There is potential for generation of odours at a landfill facility, where large quantities of waste are handled on a daily basis, with a fraction of this waste being putrescible waste. It is considered that the most effective means of preventing an off-site odour nuisance is through good day-to-day management and operational practices.

The RD includes a number of specific conditions designed to minimise odour emissions and therefore prevent off-site odour impact, these include:

- Requirement for pre-treatment of wastes prior to acceptance at the site;
- Active gas extraction and flaring/utilisation;
- Provision of support fuel at the flare to ensure effective combustion of the extracted gas;
- Extraction and treatment of headspace vapour from the leachate holding tank;
- Development of a comprehensive odour management procedure, including provision of operator training and procedures for dealing with particularly odorous wastes;
- Requirement for pre-treatment of sludges (e.g. lime stabilisation) prior to acceptance at the site. Mixing of the sludge with lime results in heat generation and increased pH which acts to kill pathogens and bacteria in the sludge and minimise odour generation.
- Limiting the landfilling operations to a single working face and limiting the area of the working face. The working face must also be covered as soon as is practicable;
- Preparation of an odour management procedure;
- Waste acceptance procedures and daily cover of waste at the working face.

The RD also requires inspection of groundwater, leachate tanks and emissions to water for odour on a regular basis.

Off-site gas migration in the soil should be prevented through a combination of active gas extraction and the installation of an impermeable liner. In addition, to monitor the effectiveness of the liner a number of gas monitoring well are required to be monitored on a regular basis.

1.2 Emissions to Air from the Site Will Adversely Impact Human Health

Response: Submissions raise concerns in relation to emission of dust and other pollutants to air (e.g. flare emissions, gas engine emissions, landfill gas from the landfill body). As part of the RD, conditions are imposed which place limit values on emissions to air from the facility. These have been developed to protect human health.

It is recognized that gases generated at landfill sites can be dangerous to human health if left untreated. Therefore the RD conditions require that a gas collection system is installed to collect waste gases generated within the landfill body. These waste gases can then be treated in a landfill gas flare to

minimise harmful emissions to air, or preferably the energy content of the waste gas can be employed in an engine to generate electricity which can then be supplied into the national grid. In order to control the emissions from flares and landfill gas engines a number of additional conditions are imposed, including:

- Specified volumetric flow and pollutant concentration limits. Compliance with these limits is verified/checked through monitoring requirements;
- Appropriate maintenance of the equipment is required on a regular basis;
- A minimum operating temperature for the landfill gas flare is specified to ensure complete combustion of the landfill gas;
- Support fuel is required for the landfill gas flare in the event that the composition of the gas extracted from the landfill will not sustain combustion;
- The emission limits specified in the RD for flares/gas engines are considered to be in line with the requirements of BAT.

In relation to storage of incinerator bottom ash, the RD requires submission of a proposal to the Agency for the location and management procedures for the ash. In addition, the RD allows only the acceptance of bottom ash, rather than the finer (and dustier) fractions of 'fly ash'. Dispersion modelling of dust emissions from ash storage does not indicate any significant off-site impact. Dampening of the ash storage areas is required in periods of dry weather. In addition, the RD requires monitoring of dust deposition rates at the site boundary and compliance with limits as specified in the RD.

Dust suppression measures for site roads are also required to be put in place in dry weather conditions, and a wheel wash must be installed and properly maintained. In addition all site vehicles and equipment must be properly maintained.

2. Ecological Issues – Development of the landfill will adversely impact local wildlife and ecosystems and result in a loss of habitat.

Response: The development of the landfill will result in the loss of some local habitat as buildings will be demolished, trees will be felled, hedgerows will be cleared and crops will no longer be planted in the area of the landfill. Remedial measures proposed in the EIS have been designed to allow a recovery with respect to any initial decline in species numbers as a result of the landfill development.

In relation to flora, the EIS states that no special features of flora were found within the development area, thus the impact of the development on flora is reported not to be significant.

In relation to the ongoing operation of the site, the RD conditions have been specified to prevent any impact on the environment outside the site boundary. Emissions to air are limited and emissions to water must be controlled to

prevent erosion. Noise emissions from the site are also limited and no operations will take place during night-time hours (except for the short period between 07:30 and 08:00).

In relation to potential impact on local watercourses, the landfill development will result in the loss of approximately 1 km of watercourse, which is reported not to be suitable for salmonid fish. However, it is noted that that the EIS proposes improvements to an existing culvert which is currently considered to be impassable for upstream fish movement. This will make a section of stream (approx. 1.5 km) available for salmonid species, which is currently considered to be inaccessible.

In relation to the operation of the site, conditions in relation to control of leachate and control of storm water release to local watercourses have been put in place to prevent contamination and erosion of the river. Continuous monitoring of emissions to water is required and leachate from the landfill is separately collected and treated on site prior to discharge off-site for further treatment. The surface water management system has been designed for a 100-year flood event and also includes allowance for a 10 % increase in rainfall volumes associated with global warming. The Eastern Regional Fisheries Board has made a submission detailing measures which should be put in place to protect local watercourses. These requirements have been incorporated into the RD.

3. Groundwater

3.1 Bog of the Ring Abstraction Scheme. A number of submissions discuss the potential for the contamination of the Bog of the Ring abstraction scheme due to releases of leachate from the landfill. It is also submitted that the position of the groundwater divide/southern boundary of the Bog of the Ring Zone of Contribution has not been adequately established.

Response: Contour plots of groundwater flow in the bedrock indicate that groundwater flow at the landfill will not be in the direction of the Bog of the Ring abstraction wells. Groundwater passing under the landfill footprint will travel towards the north-south fault to the east of the landfill and will follow the direction of the fault line in a general southerly direction. A report submitted as part of Submission No. 11 suggests that a number of 'aquifers' flow from south to north under the landfill and directly into the Bog of the Ring, however there is no hydrogeological evidence to support this interpretation. Submission No. 33 also presents (on page 10 of the submission) a plot suggesting a bedrock groundwater flow direction from the centre of the landfill towards the Bog of the Ring, however this interpretation is based on identifying hydraulic gradients between discrete bedrock monitoring wells and does not take account of the overall flow directions based on interpretation of the combined bedrock well data. The bedrock groundwater contour plots submitted by the applicant cover a prolonged period of time and all four seasons, and even under low rainfall conditions there is no evidence of any significant variations in the groundwater flows.

It is noted that the extent of the Zone of Contribution (ZOC) for the Bog of the Ring abstraction (as detailed in the GSI Bog of the Ring Groundwater Source Protection Zones Report) will move to the south (towards the landfill) for abstraction rates in excess of 3,500 m^3/day (the rate for which the ZOC is delineated in the GSI report). However the GSI report indicates that even for abstraction rates (from the existing wells) of 5,000 m^3/day, the southern boundary of the ZOC will move approximately 40 metres to the south, and will therefore remain outside the landfill footprint. The 2006 study completed by Tobin Engineering on the sustainable abstraction rate for the existing wellfield indicates a sustainable abstraction rate of 4,000 m^3/day ± 15 %. The GSI report indicates that for this abstraction rate the ZOC will not include the landfill footprint, but will extend to within approximately 200 metres of the north-eastern landfill footprint boundary. Based on review of the GSI report it is considered that the extent of the Zone of Contribution has been assessed in a conservative manner and that the potential for extension of the southern boundary of the ZOC to encompass the landfill is not likely to be hydrogeologically plausible. As an additional precaution the RD requires the licensee to monitor bedrock groundwater levels on a quarterly basis and provide an annual report to the Agency, including updated bedrock groundwater contours.

The Hydrogeological Assessment Report on the Bog of the Ring completed by Tobin Consulting Engineers includes a plot of the Cone of Depression for the Bog of the Ring wellfield at the current abstraction rates (~ 4,000 m^3/day). The southern boundary of the Cone of Influence is plotted in the report at approximately 1.5 kilometres to the north of the northern landfill footprint boundary. It should be noted that the cone of depression is a different parameter to the zone of contribution however this data also supports the overall conclusion that any potential emissions from the landfill is not likely to have any significant impact on the Bog of the Ring abstraction scheme.

The issue of potentially developing additional wells to increase the abstraction rate is discussed separately under Point 5 below.

A number of submissions also raise concerns in relation to the gravel overlying the bedrock acting as a separate flow-path towards the Bog of the Ring, with any potential contaminants released from the landfill being transported northwards through the gravel. Review of groundwater level data for gravel monitoring wells does not indicate that the gravel acts as a separate aquifer or flow path. Water level data for gravel monitoring wells and adjacent bedrock monitoring wells indicates practically identical water levels suggesting that the gravel layer acts as additional storage for the bedrock aquifer. It is considered that the groundwater flow in the gravel is likely to be the same as that reported based on data from the bedrock monitoring wells.

3.2 A quantitative risk assessment of leachate leakage from the proposed landfill has not been completed.

Response: Given the classification of the landfill area under the 'Response Matrix for Landfills' in the 'Groundwater Protection Schemes' Guidance published by the EPA, GSI and DoEHLG, and the stringent monitoring and

control measures included in the RD it is not considered that a detailed quantitative risk assessment is required for the proposed development. Calculations submitted by the applicant also indicate a large dilution effect in the event of leachate escaping through the HDPE liner, the underlying 1 metre depth of low permeability clay, and the 10 metre depth of low permeability natural clay underlying the landfill footprint.

4. Groundwater – Horticulture Industry

4.1 Zone of Contribution for Moore and Kerrigan wells include part of proposed landfill footprint – Submission No. 63 provides a plot of the Source Protection Zones for two private wells in the horticulture industry, Thomas Moore and Thomas Kerrigan, respectively.

Response: In relation to Thomas Moore's well, as pointed out by the applicant in their response to the Agency request for information of November 16th, the regional direction of groundwater flow in the area of Thomas Moore's well is from the northeast, suggesting that the Zone of Contribution for the well is highly unlikely to include the landfill footprint.

For Thomas Kerrigan's well the applicant points out that the Zone of Contribution is plotted based on a yield of 1,962 m^3/day, this figure being a yield estimate from the drilling company which originally drilled the borehole. It is also reported that Mr Kerrigan does not use this quantity of water on a daily basis and it is not known whether this yield, from this single borehole, is sustainable. Given this information, and the detailed bedrock contour plots including the area of Kerrigan's well supplied by the applicant in response to the Agency request for information of November 16th, it is considered that the Zone of contribution for Kerrigan's well is also not likely to include the landfill footprint.

It is considered that the Zone of Contribution for any other horticultural well will not intersect the landfill footprint. Furthermore, the applicant has calculated a dilution factor for leakages entering the aquifer of 15,000. This factor does not take account of any natural attenuation which may occur in the clay underlying the landfill footprint.

Based on the information provided and the operation of the landfill in line with the requirements of the RD conditions, it is considered that the operation of the landfill will have no impact on the surrounding horticultural industry.

4.2 Contamination of Groundwater will Severely Damage, if not destroy, the horticultural industry in north county Dublin, which is reported to supply 50 % of the vegetables produced in Ireland and is reportedly worth several hundreds of millions of Euro to the economy.

Response: The conditions of the RD require the landfill to be constructed and operated to strict standards in order to minimise any emissions to groundwater and prevent adverse effects on the environment, including contamination of groundwater. A number of relevant conditions are discussed below.

It is accepted that some leakage from the landfill is possible, as landfills typically cannot be considered fully watertight, however the RD requires strict quality assurance measures to be implemented and includes:

- Submission of a detailed 'Specified Engineering Works' proposal to the Agency at least two months prior to the proposed commencement of any of the major engineering works associated with the site. The details of the proposed works must be approved by the Agency before any works can commence.
- Once the works have been completed a Construction Quality Assurance Validation Report must be completed by the licensee, which must include quality assurance validation of the liner system, including a leak location survey.

The lining system specified in the RD is as required under the EU landfill directive (Directive 1999/31/EC) for landfills accepting non-hazardous waste. This is considered to be Best Available Technique (BAT) for this aspect of the development. In addition, a capping layer will be put in place on completed cells to minimise the ingress of rainwater into the cells and thus the potential for generation of leachate in the base of the cells.

Collection and treatment of leachate generated within the landfill cells is required within the RD (as required by the Landfill Directive). This leachate will receive initial treatment on site prior to further off-site treatment before final discharge. Treated leachate emissions are controlled through the imposition of volumetric flow and contaminant concentration limits in the RD schedules. The RD conditions limit the maximum depth of leachate in the base of the cell to 1 metre above the base of the cells lining, hence the quantity of leachate in a cell at any time will be relatively small compared to the overall cell volume.

Given the reported groundwater flows beneath the site, the applicant has calculated that any leachate emission which may to occur will be rapidly diluted and will not result in any significant impact on groundwater and in particular on local private horticultural wells and the Bog of the Ring abstraction system.

5. Groundwater – Potential for Development of Additional Groundwater Abstraction. Information from the applicant, the GSI and a number of third parties suggest the potential for development of an additional groundwater abstraction scheme, particularly in the area to the east of the landfill along the north-south fault line. Submissions also suggest that the potential of the area for development of additional abstraction was not adequately addressed. It is also suggested that a possible fault running through the landfill footprint may also be a location for development of an abstraction well. It is proposed that development of an additional abstraction scheme in the area to the east of the site could potentially result in a similar sustainable yield to that attained from the Bog of the Ring wellfield, i.e. in the order of 4,000 m^3/day. Due to the proximity of the landfill to this fault zone it is considered likely that the Zone of Contribution for a new wellfield

along the fault zone would include the area of the landfill and as such it is proposed that the development of the landfill would effectively prevent the development of this additional groundwater resource.

Response: The applicant had been requested to carry out an evaluation to determine whether the zone of contribution for a proposed additional wellfield along the fault line would include all or part of the landfill footprint, and to determine the potential yield from such an additional wellfield. In response the applicant provided satisfactory information on the expected extent of the zone of influence and the potential yield from a hypothetical wellfield. The applicants assessment indicated that development of wells to the east of the landfill would most likely result in the zone of influence of the wellfield extending through the landfill.

It is considered that the development of a landfill at the Nevitt site may effectively prevent the development of an additional abstraction system directly to the east of the site as detailed above, purely based on the precautionary principle. However, in terms of the actual environmental impact on this resource, it is considered that the conditions specified in the RD will prevent any likely significant impact on the groundwater in this area. The applicant also indicates, in the additional information submitted in May 2007, that it may be possible to develop a viable wellfield further to the south of the landfill, for which the landfill would be outside the zone of influence.

A number of submissions also suggest that the aquifer, currently classified as locally important, should in fact be reclassified as regionally important. This is outside the remit of the EPA, however it is noted that the GSI has indicated it does not intend to reclassify the aquifer based on information received to date.

A point is also raised that the development of the landfill 'will restrict the development of that part of the Loughshinny aquifer located in this region of Fingal and is therefore contrary to sustainable development and spatial planning'. The consideration of this issue is not directly within the remit of the Agency as regards licensing of waste management facilities. However, it is considered that the development of the landfill will have no significant impact on current users of groundwater and also that there is still potential for development of additional groundwater abstraction systems in the area.

6. Surface Water

6.1 Submission from Eastern Regional Fisheries Board

Submission No. 13, from the Eastern Regional Fisheries Board, highlights the need for prevention of contamination of local watercourses due to emissions from the landfill.

Specific points raised in the submission include:

- Comprehensive approach for achieving stream protection during construction and operation;

- Implementation of a SuDS drainage system to protect the receiving waters;
- Maintenance of attenuation structures should not result in the release of contaminants to surface water.
- Online monitoring and telemetry should be put in place to protect receiving waters;
- Class I petrol/oil interceptors, silt and grit trapping and hydro-brake controls should be in place on surface water discharges;
- The discharge to surface waters must not impact on the passage of salmonids;
- The applicant must take into account the guidance in the 'Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites';
- In-stream works can only be completed during the months May to September;
- All in-stream and riparian works must be approved by the ERFB prior to implementation, and must be informed at least 3 weeks prior to the commencement of the works;
- A leave-strip of at least 10 metres must be maintained along local watercourses;
- Comprehensive monitoring of surface waters is required;
- The applicant should comply with all relevant legislation including the Local Government (Water Pollution) Act 1977 (as amended) and the Fisheries (Consolidation) Act 1959 (as amended).

Where not already dealt with in the RD the above recommendations have been taken into account in the RD.

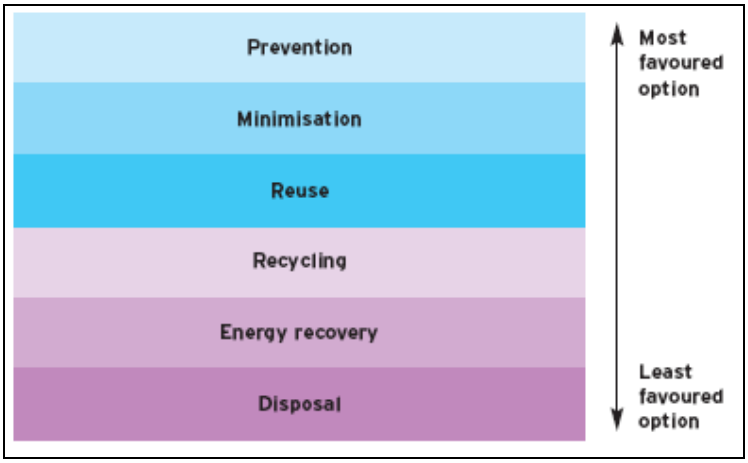
6.2 Pollution of Local Water Course will Result from the Development and Operation of the Landfill

Response: It is considered that the measures required as part of the RD and as detailed in the EIS will prevent any significant contamination entering the local watercourses. The emission point from the surface water attenuation system to the local watercourse will be monitored continuously, with diversion of the surface water emission required in the event that agreed trigger levels are reached. Surface water runoff from the hardstanding at the 'administrative area' will be diverted to the leachate collection system.

7. Need for the Landfill and Compliance with Legislation/National Policy, and Inconsistency with the Principle of Sustainable Development.

Response: The strategic planning need for the proposed landfill has yet to be decided by the planning authority.

Legislation does require that as part of the consideration of a waste licence application, national waste management policies and objectives are taken into account and in this case the 'Waste Hierarchy' is considered a central aspect of National Waste Policy and an important contributing factor to the principle of sustainable development. The waste hierarchy is illustrated below:



Submission No. 69 suggests that licensing the landfill would contravene Section 52(2)(b) and 52(2)(e) of the EPA Act 1992, which state:

> *In carrying out it functions the Agency shall-*
>
> *(b) have regard to the need for a high standard of environmental protection and the need to promote sustainable and environmentally sound development, processes or operations,*
> *(e) ensure, in so far as is practicable, that a proper balance is achieved between the need to protect the environment (and the cost of such protection) and the need for infrastructural, economic and social progress and development.*

In order to promote the principle of the waste hierarchy and sustainable development, a condition has been included in the RD which requires the applicant to utilise, if possible, more favoured management options (e.g. energy recovery, recycling, composting) where external capacity is available. This includes off-site pre-treatment of waste using methods such as segregation at source (to include segregation of biodegradable organic fractions), Mechanical Biological Treatment (MBT), anaerobic digestion, and energy recovery.

In relation to the issue of the cost of landfilling being lower than other management methods as specified in the waste hierarchy (e.g. energy recovery) and thus inhibiting the development of other waste management methods, it is considered that the issue of imposing additional levies on the landfill of waste is outside the remit of the Agency. However, it is considered that the requirement to divert waste to more favourable management options will assist in promoting the development of suitable facilities.

Condition 11.4 requires that the licensee shall as part of their Environmental Management Programme prepare a report examining waste recovery options which shall be submitted to the Agency for its agreement in the Annual Environmental Report. This report shall address methods to contribute to the achievement of the recovery targets stated in regional, national and European Union waste policies.

The RD also requires, in line with the requirements of the Landfill Directive, that residual wastes only be accepted at the landfill for disposal. This should contribute to the reduction in the quantity of waste sent to the landfill and in particular those fractions of the waste which can be recovered/recycled.

In addition, Condition 1 of the RD makes clear that the licence conditions shall not be construed as negating the licensee's statutory obligations or requirements under any other enactments or regulations.

The percentage of organic waste being sent to landfill is reducing as members of the public become more involved in home composting and as local authorities provide facilities for the segregated collection and treatment of organic fractions of household waste. The reduction of Biodegradable Municipal Waste (BMW) sent to landfill is also a requirement of the landfill directive and while the reduction targets specified in the directive are not directly applicable to any individual landfill facility, it is expected that the overall increase in segregation and separate treatment of organic wastes will result in a reduction in the percentage of BMW directed to all landfills, including the proposed Fingal facility.

8. Impact of Accidents (Fires/Explosions/release of leachate/release of landfill gas/escape of waste) – Not Adequately Addressed in EIS or Licence Application

Response: Accident Prevention and Emergency Response are discussed in Section J of the licence application.

The RD requires that, prior to commencement of the activity, a documented accident prevention procedure is put in place which will address the hazards on-site, particularly in relation to the prevention of accidents with a possible impact on the environment. This procedure shall be reviewed annually and updated as necessary. Similarly, in the event that an incident does occur, the site is required to have an Emergency Response Procedure in place.

The technologies and techniques to be employed at the facility are well understood and commonly employed in Ireland, while the potential risk posed are also well understood. Therefore, the main concern of the Agency is that provision for the prevention and control of abnormal operations (accidents) are in place and are regularly reviewed, as required by the RD.

The potential occurrence of catastrophic events is considered to be unlikely. In the unusual event that a fire within the landfill body caused damage to the liner the licensee shall be required to repair any damage. Condition 3.25 requires the completion of a risk assessment to determine if the facility should have a firewater retention facility to contain contaminated fire-water.

The number of landfill fires reported to the Agency on an annual basis is negligible, and are typically close to the surface, with the number of deep-seated fires being lower again.

The presence of an active gas extraction system should prevent the build-up of significant quantities of gas within the waste body and therefore control the risk of landfill gas explosions.

9. Stability of Landfill During Construction and Operation. A number of issues were raised in relation to potential for slope failures and dewatering requirements not being adequately addressed.

Response: The issue of landfill stability was highlighted in a number of submissions.

The RD requires the completion of a stability assessment of the side slopes of the facility annually. The results of this assessment shall be reported as part of the AER.

One submission also quoted a number of examples of publicised landfill slope failures however it is considered that some of these are not comparable to the situation in Ireland. For example, in one case waste was simply dropped over the edge of a valley to form a 70 metre high hill of waste. In other cases no leachate collection had been put in place or the landfill had been put in place on the side of significant slope (much more significant than the slope at the proposed Fingal facility), with a significant height difference between the toe and the crest of the landfill.

In practice, the occurrence of stability failure during the operational phase of a landfill is not common, with research in the UK indicating that the majority of identified failures actually occur prior to the placement of waste and can be easily remedied, with no catastrophic failures reported.

In the event of a slope failure occurring during the operational phase of the Fingal facility the licensee will be required to put corrective measures in place in line with the conditions specified in the RD.

In relation to the potential for basal heave, the licensee will be required to carry out basal heave calculations as part of the detailed landfill design. Information on these calculations shall be submitted to the Agency as part of the Specified Engineering Works reports (see Schedule D of the RD). Guidance in this area suggests a factor of safety of 1.5 in basal heave calculations is generally considered to be adequate.

Given the presence of 10 metres of clay below the landfill base, the potential for settlement, resulting in liner failure, is not considered to be significant.

The RD requires the installation a drainage layer beneath the main lining system so that shallow perched groundwater can be pumped from the drainage layer as required. The licensee has proposed that this pumping will need to take place during construction and initial filling of the cells. However, the Agency may require ongoing removal of water from this layer based on further assessment during the operation of the landfill.

10. Health Impact – Health Impact Not Adequately Addressed in EIS/Application. The operation of the landfill will have a detrimental health impact on the local population, including pupils at Hedgestown School.

Response: The conditions and limits specified in the RD have been determined in line with the requirements and objectives of the Landfill Directive, and in line with the requirements of 'Best Available Techniques'.

Article 1(1) of the Landfill Directive states:

> *....the aim of this Directive is, by way of stringent operational and technical requirements on the waste and landfills, to provide for measures, procedures and guidance to prevent or reduce as far as possible negative effects on the environment, in particular the pollution of surface water, groundwater, soil and air, and on the global environment, including the greenhouse effect, as well as any resulting risk to human health, from landfilling of waste, during the whole life-cycle of the landfill.*

The protection of human health in relation to the operation of waste facilities is assured through the use of standards. A limit based (also known as performance based) standards approach to regulation is, internationally, a common approach to environmental protection employed by legislators and regulators. Compliance with the standards (i.e. limits) specified in the RD will allow protection of human health in the local population.

It is noted that The Health Research Board (2003) concluded that at present there is insufficient evidence to demonstrate a clear link between cancer and exposure to a landfill (Executive Summary pp 5).

11. Off-Site Traffic Impact – Concern has been expressed that increased traffic flow in the area will have a number of detrimental impacts, including increased noise and air emissions, adverse impact on the rural nature of the local area and increased fatalities on the local roads.

Response: In this instance, the issue of off-site traffic impact is considered to be a matter for the planning authority. In order to avoid duplication, this issue is therefore not addressed here.

12. Miscellaneous

12.1 Submission No. 1 from a solicitor on behalf of their client, Mr. Larry Hagan, indicates that the EIS is defective as it does not include reference to their clients existence and their house is not included on maps which details the location of local residences.

Response: This matter was addressed by the applicant who submitted an additional EIS section in September 2006 dealing specifically with the impacts on Mr. Larry Hagan's property.

12.2 Submission No. 2 asks 'where is the strategic environmental assessment from Fingal County Council'.

Response: Directive 2001/42/EC on the Assessment of the Effects of Certain Plans and Programmes on the Environment (transposed into Irish Law through S.I. No. 436 of 2004) requires that an Environmental Assessment is carried out for plans and programmes which are completed for a numbers of different activity sectors (including waste). It is not a requirement to complete an SEA for an individual development such as the proposed landfill but rather for an overall plan or programme.

The requirement to carry out an environmental assessment under the regulations applies to a plan or programme, or modification to a plan or programme, the first formal preparatory act of which occurs on or after 21 July 2004. In addition, where the first formal preparatory act occurs before 21 July 2004 and the plan or programme, or modification to a plan or programme, is unlikely to be adopted before 20 July 2006, an environmental assessment shall be carried out of the plan or programme, or modification to a plan or programme, in accordance with the requirements of the regulations.

Therefore, in the event that the first preparatory act of a plan or programme is commenced prior to July 21 2004, and the plan or programme is adopted before 20 July 2006, then an SEA is not required for that plan or programme.

12.3 General Issues relating to Planning Application and Land Zoning

Response: Such issues must be dealt with by the competent authority dealing with the planning application, which in this case is An Bord Pleanala.

12.4 Council has not remediated existing waste body identified at the site. The risk assessment for the existing waste body is inadequate.

Response: The requirements to excavate the existing waste body and place in the lined landfill cells is included in the RD. A programme detailing the proposed scope of work for excavation, remediation and restoration of the site must be submitted to the Agency for approval.

12.5 The use of a Public Private Partnership to Operate the site weakens the control of Fingal County Council (who would hold the licence) over the site.

Response: Condition 2.1 of the RD requires that the facility management are suitably qualified and experienced and that personnel performing specified tasks are also suitably qualified. Enforcement of the licence conditions will be carried out by the Agency in the same manner as for other sites, with no particular allowance/consideration to the operation of the site as a PPP.

12.6 A number of submissions have requested an oral hearing.

Response: The Waste Management Act provides for an oral hearing to be requested at the objection phase, which covers a period of 28 days following issue of a Proposed Decision (draft licence). Every person who makes a

submission in relation to an application is notified of the Agency's proposed decision on the application. Subsequently, any person may make an objection, accompanied by the appropriate fee, to a proposed decision by the EPA on an application, within 28 days of the notification of the proposed decision. A person making a valid objection may also request an oral hearing (fee required).

12.7 Fingal County Council should develop a groundwater supply at the site area to diversify the water supply source for the Fingal area.

Response: The most appropriate strategy for water supply for Fingal is not an issue that can be directly considered as part of the granting of a waste licence.

12.8 Submission 88 states that the EIS failed to address the issue of microbial contamination of groundwater due to potential releases of leachate from the landfill into the underlying soil.

Response: Firstly, the engineered landfill proposed for the site will minimise the potential for leachate release to the underlying soil and groundwater, hence the potential for release of large quantities of leachate to groundwater is not considered to be significant. In addition, due to the requirements for 10 metres of clay to remain in place below the site, it is considered that microbial pathogens will not be able to enter the underlying groundwater.

The submission refers to the fact that microbial contamination will be introduced to the landfill in nappies included in domestic waste, in wastewater treatment plant sludge and in household and commercial food waste (in particular from abattoirs). Prior to receipt of any sludge at the site it must be pre-treated using lime stabilisation or an equivalent technology. Lime stabilisation reduces the content of pathogens/bacteria/viruses in the sludge.

The quantity of animal related waste from abattoirs sent to landfill is practically non-existent, as any materials not suitable for human consumption are reused (e.g. animal hides), rendered (e.g. to produce meat and bone meal) or are sent for land spreading on farm land.

Used nappies account for approximately 4 % of municipal waste in Ireland. While it is likely that some microbial contamination may be present in the nappies it is considered that the risk posed from this source is not significant, given the level of groundwater protection which will be in place at the landfill.

The landfill directive also specifies target for reduction in the quantities of Biodegradable Municipal Waste (BMW) going to landfill, hence the quantities of household and commercial food waste going to landfill are expected to reduce in line with the requirements of the landfill directive.

Overall the risk of contamination of groundwater with pathogens/bacteria contained in landfill leachate leakage is considered to be insignificant, particularly when compared to that associated with other practices such as poorly managed landspreading of slurry.

12.9 Potential for Development of Tourism Damaged by Landfill

Response: A number of submissions indicate that the archaeological features of the site area could be developed as a tourist attraction.

It is noted that the archaeological investigations reveal a number of archaeological complexes, individual sites and archaeological features. The development of the landfill and associated infrastructure will result is the permanent loss of several of the individual sites and archaeological features, however it is noted that the two significant archaeological complexes (Site A and J as detailed in the EIS) are proposed to be preserved in situ (i.e. not excavated). Site J is outside the proposed licence boundary while Site A is within the proposed licence boundary. Site A, J and N are also recommended for inclusion in the Record of Monuments and Places which will offer the sites additional protection.

Failte Ireland, as a statutory consultee, was notified of the licence application and invited to make a submission to the Agency. No submission was received from Failte Ireland. While the issue of tourism is not directly within the remit of the licensing process, the licence must, however, prevent emissions from the site having any significant impact on archaeological features such as the complexes mentioned above (e.g. erosion due to water emissions from the landfill). It is considered that the conditions specified in the RD will prevent any significant impact on the remaining archaeological features.

12.10 Construction of the Base of the Landfill Below the Water Table is in Contravention of the Groundwater Directive as this will Allow Direct Release of List I and List II Substances into the Groundwater.

Response: In the situation where the water table is above the base of the landfill, the water surrounding the base will result in an inward pressure which will act in opposition to any potential release from holes which may develop in the landfill liner. This will effectively prevent the direct discharge of List I substances. If the leachate level in the landfill was allowed to increase it is possible that the leachate head would increase above the level of the surrounding water table, and thus overcome the inward pressure from the water table. In order to control this satisfactorily, the RD requires that the head of leachate within the landfill be maintained at less than 1 metre above the landfill basal liner.

In addition, the directive does not apply to discharges which are found by the competent authority of the Member State concerned to contain substances in lists I or II in a quantity and concentration so small as to obviate any present or future danger of deterioration in the quality of the receiving groundwater. As has previously been discussed in this report, it is considered that any potential release of leachate from the landfill to groundwater will not result in deterioration in the quality of the receiving groundwater.

12.11 Local people, currently living on the proposed landfill site, will be forced to move out of their homes, while other homes in the area will be devalued.

Dissipation of Rural Community and Loss of Community Spirit will occur and local access will be impacted through road closures.

Response: It is acknowledged that the requirement to move local residents from their houses may be considered a significant impact, however these issues are considered to be outside the remit of the Agency.

12.12 *Site operations will have a significant impact on noise levels experienced at local residences and other sensitive receptors (e.g. school).*

Response: The RD limits the operational hours of the site and also prescribes that noise emissions from the site shall not give rise to noise levels at local sensitive receptors in excess of specific day-time and night-time limits. Monitoring is required to assess compliance with the RD requirements. In addition maintenance of all site equipment is required which should prevent noise generation in excess of those specified in the EIS for the various equipment employed at the site. Berms will also be put in place which will further reduce off-site noise levels. In addition, the licensee has committed (in the EIS) to imposing speed limits on internal roads which will act to further minimise noise and also reduce dust generation.

12.13 *Vermin, birds, flies or other fauna attracted to the site will result in the spread of disease to off-site receptors. Also, a submission suggests that rats which are poisoned will die in local water courses and this will result in pollution of the watercourse. The issue of the dangers associated with bird strikes of aircraft approaching and taking off from Dublin airport has also been raised.*

Response: A condition in the RD requires that nuisances such as those detailed above associated with the activity do not result in an impairment of, or an interference with amenities or the environment at the facility or beyond the facility boundary or any other legitimate uses of the environment beyond the facility boundary. Also, this condition requires that any method used by the licensee to control or prevent any such impairment/interference shall not cause environmental pollution (e.g. the use of pesticides or insecticides).

The issue of the danger of bird strikes is considered to be a matter for the Planning Authority. However, the RD specifically requires that measures be taken to prevent birds gathering at the site.

In addition, the ongoing reduction in organic waste to landfill will reduce the availability of food and thus the attraction to scavenging birds.

12.14 *The Local Community had received assurances from Fingal County Council that a landfill would not be developed in the area, given that the Baleally Landfill site is also located in the Lusk area.*

Response: This issue is outside the remit of the Agency.

12.15 *Truck movements and site operations will result in local increases in litter due to spillages from trucks and from windblown litter from the site. Spillages of oil/diesel may also occur from these trucks.*

Response: The RD requires that all trucks delivering waste to the site or removing waste and materials from the site are covered. In addition the RD requires that a daily litter patrol is carried out to identify any off-site litter impact.

The RD requires spillage containment equipment to be maintained at the site to be employed in the event of a spill, such as from a truck or other vehicle operating at the site.

The RD also requires measures to be put in place to prevent spills from storage tanks, lagoons, treatment plants, etc.

12.16 The Board of Management of Hedgestown National School made a submission raising a number of concerns in relation to the school children.

Response: A number of the issues raised by the Board of Management are within the remit of the planning authority rather than the Waste licensing process. These include:

- Positioning of landfill access and exit points
- Removal of part of the school catchment area
- Loss of pupils due to loss of housing on landfill site
- Communications between applicant and locals

Issues within the remit of the Agency licensing process (noise, odour) have been addressed elsewhere in this report.

15. Charges

The annual charge is calculated at €26,840.

16. Recommendation

I have considered all the documentation submitted in relation to this application and recommend that the Agency grant a licence subject to the conditions set out in the attached RD and for the reasons as drafted.

Signed

_____

Dr. Ian Marnane

Procedural Note

In the event that no objections are received to the Proposed Decision on the application, a licence will be granted in accordance with Section 43(1) of the Waste Management Acts 1996-2005.

Figures

Figure 1: Example of bedrock contour flow. Proposed landfill to south, Bog of Ring abstraction area to north

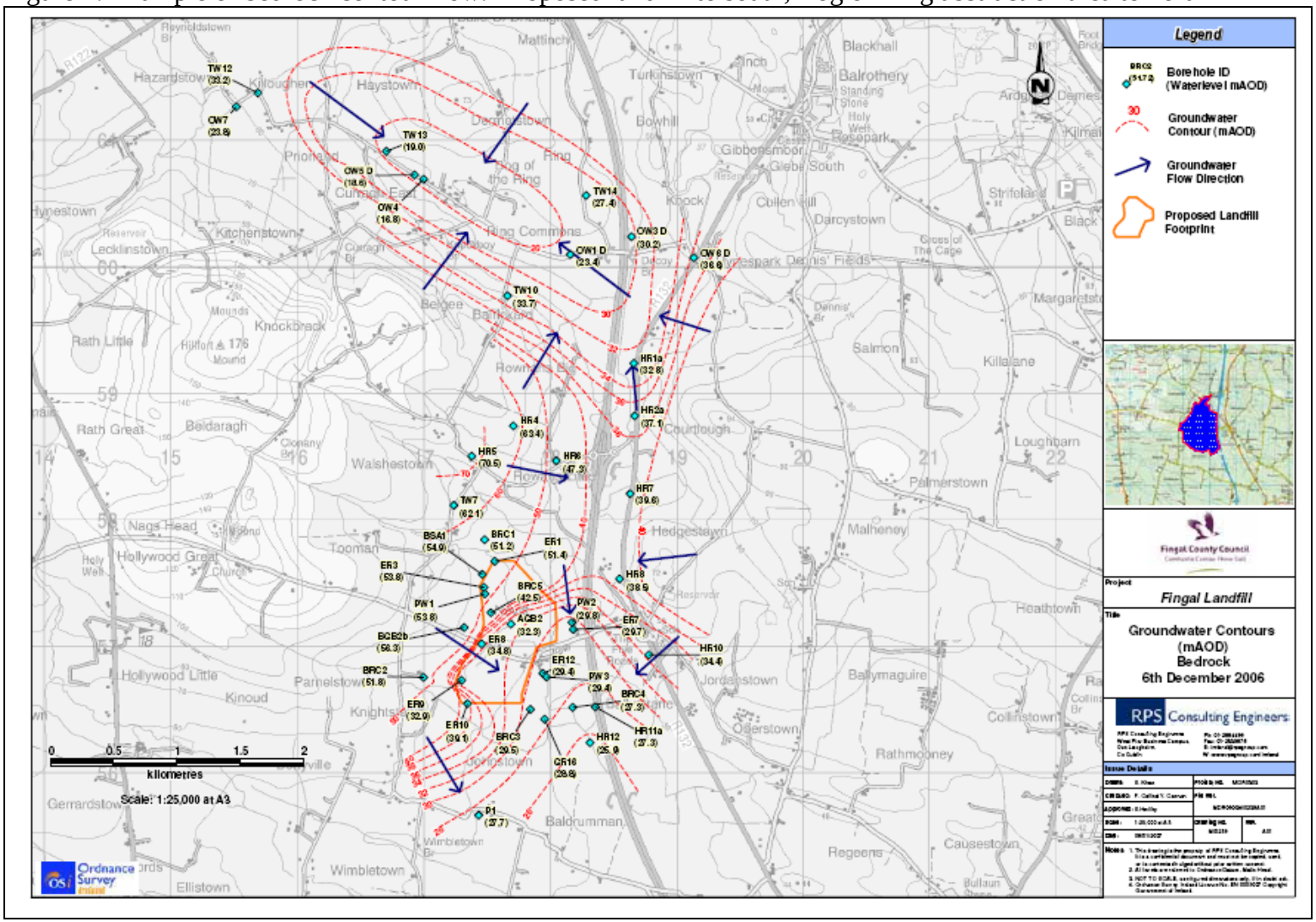
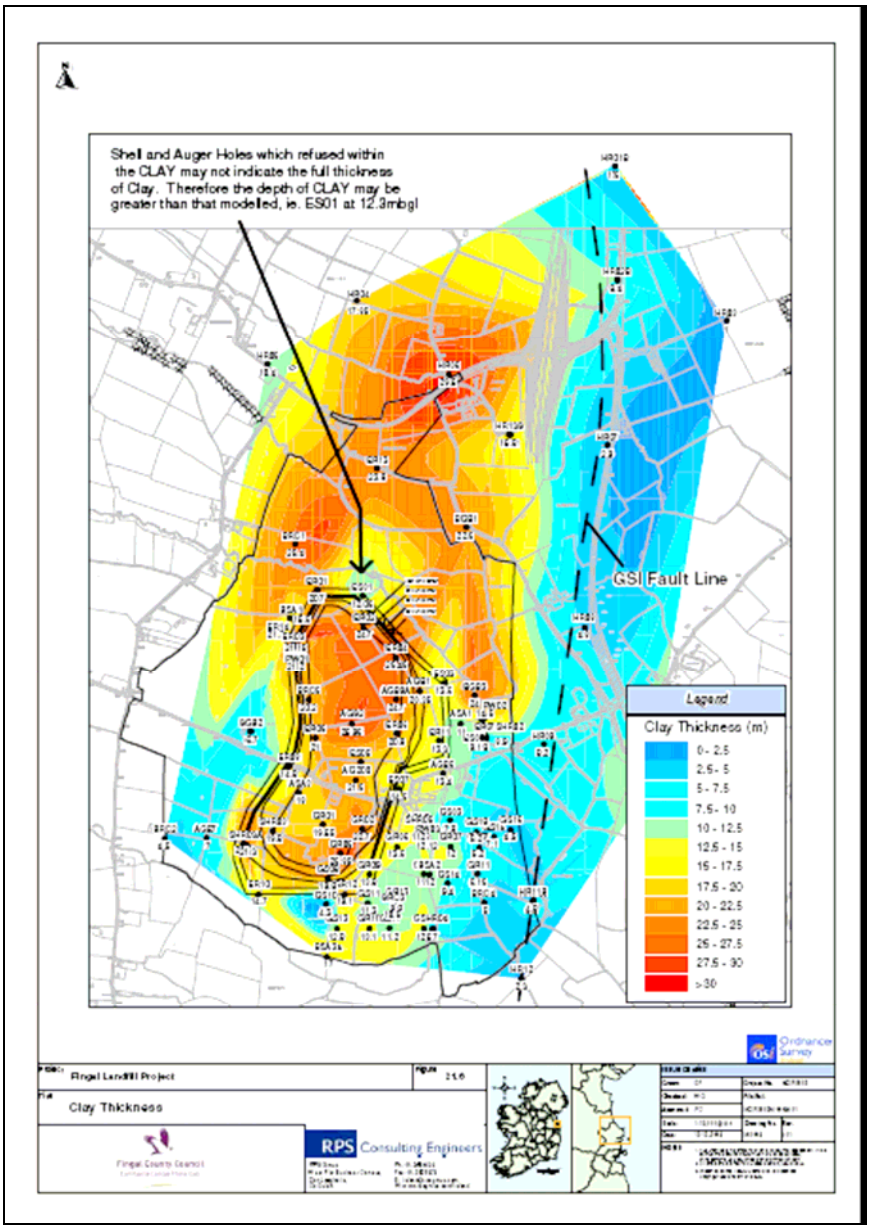


Figure 2: Clay thickness contour plot



Appendix 1 – List of Submissions

No.	Name	No.	Name	No.	Name
1	Lawlor, O'Reilly and Company Solicitors on behalf of Mr. Larry Hagan	32	Patrick Boyle, Declan White	63	WYG on behalf of NLAG
2	Mr. D. Geoghegan	33	Declan White	64	Damian Christie
3	Andrew Gaffney	34	Nevitt Lusk Action Group. Report completed by Mott McDonald	65	Brendan Ryan & Sean Ryan TD
4	Mrs. Vicky McGauley	35	Joseph McNally	66	Jackie Keaney - Confederation of European Waste to Energy Plants
5	Paddy and Elaine Devoy	36	James and Bernadette Gunning	67	Declan White
6	Winifred Jones	37	Patrick Boyle	68	L. Ryan
7	Elizabeth Gough	38	John McGuinness	69	Indaver Ireland – Claire Shellshear
8	Peter Gough	39	Withdrawn, replaced by 42	70	NLAG
9	Joseph Jones	40	Patrick Christie	71	Declan White
10	Declan White	41	Philomena Christie	72	Mary Upton TD
11	Mr. Trevor Sargent T.D.	42	WYG Report on behalf of Nevitt Lusk Action Group	73	Declan White
12	Margaret Kavanagh	43	Patricia Christie	74	Patrick Boyle
13	Eastern Regional Fisheries Board	44	John Christie	75	Edward Kirk, Hedgestown School
14	Clair Downey	45	Letter from GSI	76	Kevin Cullen
15	Robert O'Hara and Philomena O'Hara	46	Dan Christie	77	Patrick Boyle
16	Trevor Sargent T.D.	47	Paula Christie	78	Kevin Cullen

17	Brigid Lenehan	48	Kevin Cullen	79	Shay Lunney on behalf of NLAG
18	John Lenehan	49	Patrick Boyle, Declan White	80	Kevin Cullen
19	Angela Morrin	50	Gemma Larkin	81	From applicant
20	William Morrin	51	Dermot Sheridan	82	Kevin Cullen
21	Patrick Boyle, Declan White	52	Dr. James Reilly	83	Patrick Boyle
22	Withdrawn	53	Tony Larkin	84	Gemma Larkin
23	Richard, Pauline, Lora, Richard, Jane and Fiona Morrin	54	Councillor Daithi Doolan	85	John Shortt on behalf of NLAG
24	Aidan Reid	55	Thomas A. Larkin	86	Kevin Cullen
25	Patrick Boyle	56	Michael Hoey, Country Crest Ltd	87	Gemma Larkin
26	Kevin Cullen	57	Martin and Miriam Moore	88	Dr. Anthony Staines
27	Patrick Boyle, Declan White	58	Thomas Moore, Super Dawn Fresh Vegetables Ltd.	89	John Shortt
28	Kevin Cullen	59	Declan White, Nevitt Lusk Action Group	90	Shay Lunney/Nevitt Lusk Action Group
29	Patrick Boyle, Declan White	60	Mary Byrne	91	Kevin Cullen
30	David Rogers on behalf of Irish farmers Association	61	Kevin Cullen		
31	Sarah Harmon	62	Mary Upton TD		