| INTERNAL MEMORANDUM | |
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| **To:** | The Board of the Agency |
| **From:** | Patrick Byrne (Oral Hearing Chairman) |
| **Date:** | 21ST AUGUST 2008 |
| **RE:** | Report on Oral Hearing with regard to a Waste Licence Application by Fingal County Council Register No. W0231-01. |

I am to refer to your letter to me dated the 12th February 2008 notifying me of my appointment as Chairman and requesting that I conduct an oral hearing of objections made to the proposed decision of the Agency with regard to a Waste licence application by Fingal County Council for a facility at Nevitt, Lusk, Co. Dublin, Register No. W0231-01.

In accordance with the provisions of Section 44 of the Waste Management Acts 1996 to 2008, I attach my report and recommendations for your consideration. This report represents an assessment of the written objections received in relation to the proposed decision and the written and verbal submissions presented at the oral hearing. Mr Kealan Reynolds and Mr Bruce Misstear, as per their letters of appointment from the Agency, assisted me during the course of the oral hearing and preparation of this report.

I can confirm that I considered and assessed the matters raised in the written objections and submissions on objection received in relation to the proposed decision, and all written and verbal submissions presented at the oral hearing.

Signed

Patrick Byrne
Chairman

# Report on the Objections and Oral Hearing on the Proposed Decision of a Waste Licence Application For

Fingal County Council
Nevitt
Lusk
Co. Dublin

Register No. W0231-01

Main Report

July 2008

Report by: Patrick Byrne
Assisted by: Kealan Reynolds & Bruce Misstear

# Acknowledgements

Kealan Reynolds, Bruce Misstear and myself would like to acknowledge and thank all the administrative staff of the Licensing Unit who organised the oral hearing, disseminated all the necessary information and carried out all the other tasks associated with the running of the oral hearing and preparation of this report.

I would like to note my sincere appreciation for the assistance provided by Mr Kealan Reynolds (EPA) and Mr Bruce Misstear (TCD) who acted as Assistant Chairmen at the oral hearing and assisted in the preparation of this report.

Finally I would like to thank the Applicant, Objection Parties and the local residents who attended and participated in the oral hearing, for their courtesy and contributions.

# Table of Contents

# Chapter 1 Introduction

## *1.1 Introduction*

Fingal County Council applied, in accordance with the Waste Management (Licensing) Regulations 2004 to 2008, to the Environmental Protection Agency (EPA) on the 5th July 2006 for a Waste Licence for the development of a new engineered landfill facility and public recycling facility at Nevitt, Lusk, Co. Dublin. The principal activity proposed is the disposal of non-hazardous waste which will be placed in lined engineered cells. The design capacity of the proposed development is 9.4 million tonnes of waste. The waste licence application also includes remediation of an existing landfill within the site boundary of the proposed facility.

There were 108 valid submissions received by the EPA in relation to the waste licence application. The Agency issued a Proposed Decision (PD) on the 20th September 2007. The EPA subsequently received nine valid objections. Six of the objections included valid requests for an oral hearing.

The valid objections were received from the following individuals/parties:

- Mr Deaglan De Faoite, Baile Na Ridire, Lusk. Co. Dublin;
- Mr John and Mrs Mary White, John White Agricultural Contractor, Nevitt, Lusk, Co Dublin;
- Ms Margaret Heavey, Greenstar Ltd., Unit 6 Ballyogan Business Park, Ballyogan Road, Sandyford, Dublin 18;
- Mr Martin Kiely, Fingal County Council, PO Box 174, County Hall, Swords, Fingal, Co Dublin;
- Mr Shay Lunney and others, Nevitt, Lusk Action Group, Little Acre Cottage, Walshestown, County Dublin;
- Ms Jackie Keaney, Confederation of European Waste to Energy Plants (CEWEP) Ireland, PO Box 10285, Dublin 1;
- Mr Kevin T. Cullen, Sliding Rock, Blackglen Road, Sandyford, Dublin 18;
- Mr Ian McGrandles, TIROS Resources Limited, Armitage House, 10 Hatch Street Lower, Dublin 2; and
- Mr Trevor Sargent TD, Agriculture House, Kildare Street, Dublin 2

The EPA received three submissions on the objections. The full text of the above objections and submissions on objections are presented in Appendix B of this report.

The Board of the EPA, following appraisal of the nature of the objections and requests for an oral hearing at a meeting of the Board of the EPA on the 13th November 2007, decided that an oral hearing of objections would be held. The Applicant and Objection Parties were notified of the decision to hold an oral hearing by letter on the 16th November 2007.

The Board of the Agency on the 29th January 2008 appointed Mr. Patrick Byrne to chair the oral hearing, and Mr. Kealan Reynolds and Mr. Bruce Misstear to act as assistants to the chair.

Mr Byrne, Mr Reynolds and Mr Misstear visited the site of the proposed facility and surrounding areas, including The Bog of the Ring, on the 20th February 2008.

## *1.2 Oral Hearing*

The oral hearing was held in The Bracken Court Hotel, Bridge Street, Balbriggan, Co. Dublin. The oral hearing commenced at approximately 10:30 on the 3rd March 2008 and concluded on the 13th March 2008 (3rd – 7th and 10th – 13th March inclusively).

The Chairperson, Mr Byrne, and the assistants to the Chairperson, Mr Reynolds and Mr Misstear, read their letters of appointment into the record. Copies of the letters of appointment are included in Appendix C of this report. The Chairperson then proceeded to read a statement outlining the procedures to be followed during the oral hearing, the parties involved and the proposed order of presentations. Mr Doyle assisted in the preparation of the order of the presentations.

Appendix D provides a list of the individuals who made presentations during the course of the oral hearing including cross references to the Digitake recording. Appendix F includes a summary record of the oral hearing, the complete recording of the oral hearing is available as recorded by 'Digitake'. The written presentations and witness statements provided to the oral hearing are included in Appendix E

During the course of the oral hearing there were a number of requests for the oral hearing to be adjourned. Mr O'Donnell for Nevitt Lusk Action Group (NLAG) made a preliminary objection in which he requested that the EPA oral hearing be adjourned until An Bord Pleanala (ABP) had made a decision in relation to the proposed facility. Mr O'Donnell noted that the proposal was presently before ABP. It was Mr O'Donnell's submission that the oral hearing should be adjourned until ABP determine if it should proceed and to do otherwise would be prejudicial to his clients. His second submission was that even if ABP approved the proposed facility it will inevitably be subject to modifications and conditions as to how the proposed facility will be designed, operate and function. In these circumstances they could not be clear as to the nature of the development they are to consider because it is dependent on a third party (ABP) who was not present at the EPA oral hearing. Therefore he stated that matters dealt with in the EPA oral hearing may in fact not be included in the development and what we are invited to do is to speculate about the likely design. According to Mr O'Donnell, that renders the exercise entirely fruitless, inappropriate and in his submission the oral hearing would be premature until a decision is made by ABP. A number of other Objection Parties supported Mr O'Donnell's request for the oral hearing to be adjourned.

Ms Larkin, for NLAG, asked the Chairperson to require representatives from the Geological Survey of Ireland (GSI) to attend the oral hearing. The Waste Management (Licensing) Regulations 2004 to 2008do not provide for the person appointed to conduct an oral hearing to require the attendance of parties such as the GSI. However, the Chairperson contacted the GSI and invited them to attend the oral hearing. They duly accepted the opportunity to attend and answered questions posed by the Chair and parties to the hearing.

The scope of the oral hearing was raised by a number of parties: in particular, Mr Ahern, for CEWEP Ireland, raised the issue of the need for the development, and environmental aspects associated with traffic. Mr Flanagan, for the Applicant, objected to these questions. The Chairperson allowed the issues to be included in witness statements and questions raised in cross examination in the context of the requirements of the Waste Management Acts 1996 to 2008.

Mr Mulcahy, for Greenstar Ltd., stated that he considered that the Agency should not be assessing the objections to a decision that has already been made by the Agency and all objections should be considered by a differently constituted Board.

The completeness of the Environmental Impact Statement (EIS) was raised by a number of Objection Parties. It was also claimed that the EIS under consideration by An Bord Pleanala was different than the EIS available to the EPA in relation to the consideration of the existing landfill on-site. Mr O'Donnell, for NLAG, queried if the Board of the EPA would complete an EIA for the proposed facility prior to making a final decision on the waste licence application. Mr O'Donnell also questioned the legal standing of the proposed determination (PD), which was issued by the EPA, and claimed that the Applicant was wrong to consider that the oral hearing should focus on the PD. The Chair clarified the role of the Chair and Assistants to the Chair and stated that they would consider any evidence presented in relation to the waste licence application.

Mr Hammerstein, MEP, brought to the attention of the oral hearing correspondence from Dr Mary Kelly, Director General of the EPA, to the Petitions Committee in relation to the proposed facility. A number of Objection Parties questioned the basis of the letter, and statements within the letter. The Chairperson made available to all participants at the oral hearing the correspondence between the EPA and the Petitions Committee (Document No. 6 of Appendix E).

## *1.3 An Bord Pleanala*

The proposed facility requires a waste licence from the EPA and also approval from An Bord Pleanala. The Applicant lodged an application to An Bord Pleanala for approval on the 2nd May 2006 (Case reference: PL06F.EL2051), and an oral hearing was held by An Bord Pleanala in October 2006. Following completion of the An Bord Pleanala oral hearing, a letter to the Applicant from the Department of Environment Heritage and Local Government dated the 27th November 2006 relating to archaeological recommendations, was forwarded to An Bord Pleanala by the Applicant. The EPA was also sent a copy of this letter by the Applicant.

An Bord Pleanala circulated the letter from the Department of Environment Heritage and Local Government to all statutory bodies and the parties to the An Bord Pleanala oral hearing. They invited submissions or observations to be received by the 4th January 2007 in relation to this letter. An Bord Pleanala in a letter dated the 19th January 2007 notified all parties that due to the volume of submissions made in respect of the case and the complexity of the matters raised therein the completion of the inspector's report would be delayed.

No decision has been made by An Bord Pleanala in relation to the proposed facility to date.

The requests to have the EPA oral hearing adjourned were refused. The EPA oral hearing is in respect of a waste licence application and is a separate process to the assessment being undertaken by An Bord Pleanala. While approval is required from both the EPA and An Bord Pleanala for the proposed facility to be developed/operated either body can complete its assessment process and issue a decision prior to the other. There is no requirement under the Waste Management Acts 1996 to 2008 or the Planning and Development Acts 2000 to 2006 for such a development to have An Bord Pleanala approval prior to the EPA making its decision in relation to a waste licence application.

## *1.4 Compulsory Purchase Process and Property*

A number of Objection Parties raised their dissatisfaction with the compulsory purchase process and the property devaluation associated with the proposed facility. While we acknowledge the distress caused by the compulsory purchase process it is not within the remit of the oral hearing report to comment or adjudicate on the process. The compulsory purchase process rests with An Bord Pleanala (Case reference: PL06F.CH2269). The issue of property devaluation likewise is not within the remit of the EPA oral hearing.

In the event that a waste licence is granted for the proposed facility to proceed we recommend that the licensee shall establish and maintain a community liaison committee to enable communication between the licensee and representatives of the local residents, farmers and businesses.

## *1.5 Scope of this Report*

This report has been completed in accordance with the requirements of the Waste Management Acts 1996 to 2008 and Waste Management (Licensing) Regulations 2004 to 2008.

The Waste Licence application and additional information submitted by the Applicant, Environmental Impact Statement, submissions (including DVDs and videos), objections and submissions on objections and all presentations and submissions made at the oral hearing (including DVDs and models) were considered in preparation of this report.

The written evidence of the following individuals were read into the record on their behalf, as they were not present: Mrs Lynch's statement was read into the record by Mr O'Sullivan, Dr Warner's statement was read into the record by Mr Boyle, and Dr. Quayle's statement was read into the record by Ms McGlennon.

# Chapter 2 Review of Evidence

This section of the report deals with the issues raised during the oral hearing and the specific conditions which were objected to in the written objections, submissions on objections and presentations to the oral hearing. The issues are discussed below by topic and have been collated under headings insofar as possible. The hydrogeological aspects of the proposed facility were discussed at considerable length during the oral hearing and therefore they are covered in particular detail in the relevant section of the report below (Section 2.3 Hydrogeology). All objections raised by the Objection Parties, submissions on objections, written presentations presented to the oral hearing and oral evidence have been considered and incorporated into the assessment, even if not specifically mentioned below.

## *2.1 Waste Policy and Related Issues*

### 2.1.1 Waste Policy and Hierarchy

Several Objection Parties argued that the EPA shall consider waste policy in making a decision in relation to the proposed facility. Various waste policy documents were referred to during the course of the oral hearing. The Applicant identified that they considered that the proposed facility was in accordance with the Waste Management Plan for the Dublin Region 2005-2010.

**Comment**
Section 40(2)(b)(iv) of the Waste Management Act 1996 to 2008 requires the EPA in considering an application for a waste licence to have regard to:
'the policies and objectives of the Minister or the Government in relation to waste management for the time being extant'.

Relevant national policy documents, in relation to waste management generally and the proposed facility specifically, which the EPA must have regard of include 'Changing our Ways', 1998, 'Delivering Change', 2002, 'Waste Management – Taking Stock and Moving Forward', 2004, and the 'National Strategy on Biodegradable Waste', 2006.

National Policy must of course be considered in the context of European Union Directives and their implementation. Of relevance are Directive 2006/12/EEC on waste which replaced the original Framework Directive on Waste, Council Directive 1999/31/EEC on the Landfill of Waste, Directive 2000/60/EC establishing a framework for Community action in the field of water policy, Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment, etc.

The European Commission policy on waste management is based on three guiding principles, these being i) waste prevention, ii) recycling and reuse of waste and iii) improving final waste disposal and monitoring. The policy provides a hierarchy for the management of waste and this hierarchy is summarised as follows:

- Waste should be prevented or reduced at source as far as possible;
- Where waste cannot be prevented, waste materials or products should be reused directly, or refurbished then reused;
- Waste materials should then be recycled or reprocessed into a form that allows them to be reclaimed as a secondary raw material;
- Where useful secondary materials cannot be reclaimed, the energy content of waste should be recovered and used as a substitute for non-renewable energy resources;
- Only if waste cannot be prevented, reclaimed or recovered, should it be disposed of into the environment by landfilling, and this should only be undertaken in a controlled manner.

The National and European approach to waste management is based on an 'integrated waste management' approach, and on the internationally adopted hierarchy of options which places greatest emphasis on waste prevention, followed by minimisation, re-use, recycling, energy recovery and, finally, the environmentally sustainable disposal of residual waste. The National Policy Document 'Delivering Change' notes 'the vast bulk of waste arising in Ireland is landfilled. However, landfill should be a last resort after all other options have been exhausted. Only material that cannot be prevented, re-used, recycled, or otherwise treated should be landfilled.' The National Policy documents provide performance targets for the separation, recycling and biological treatment of waste arising and set a framework for the development of regional waste management plans.

The Waste Management Plan for the Dublin Region 2005-2010 sets out the policy for the management of waste within the Dublin Region and the main goals of the plan reflect those that are set out in National Policy. The proposed facility is part of the Waste Management Plan for the Dublin Region 2005-2010 and is part of the integrated waste management system for the region.

The planning and provision of waste treatment facilities beyond the boundary of the proposed facility are beyond the remit of this waste licence application and this report.

### 2.1.2 Need for the Facility

A number of Objection Parties questioned the need and scale of the proposed facility. In response, the Applicant identified that the proposed facility was in accordance with the Waste Management Plan for the Dublin Region 2005-2010. In particular the Applicant referred to the stated policy in the Waste Management Plan under the heading of 'Policy on Self Reliance' which states that:
'The Dublin Region will aim to become self-reliant in terms of waste management infrastructure: waste generated in Dublin should be managed in Dublin as far as possible. The Local Authorities will aim to provide (either directly or in partnership with the private sector) an integrated network of facilities to cater for household and commercial waste they collect and manage. An integrated and adequate network of facilities is also required to deal with industrial waste and C&D wastes.'

Mr Ahern, CEWEP Ireland, stated in his evidence that there is substantial landfill capacity in the counties surrounding Dublin (including Wicklow, Kildare and the

North East Region) which could accept the municipal, commercial and industrial waste generated in the Dublin Region. Mr Ahern presented an update of the landfill capacity available in the counties surrounding Dublin; this updated situation was based on EPA waste licence approvals and An Bord Pleanala approvals of landfill and incineration facilities since the time when the EIS was prepared by the Applicant. Mr Ahern claimed that the Applicant should have updated the landfill availability table in the EIS as new capacity became available. The Applicant insisted that while additional landfill may have been approved in the counties surrounding Dublin there was an aim expressed in the Waste Management Plan for the Dublin Region 2005-2010 for the region to be self reliant. The Applicant acknowledged that the plan does state 'Where infrastructure deficits arise in the Dublin Region, facilities in other Regions with spare capacity should be employed until this deficit is corrected and if required in accordance with this Plan.'

**Comment**
The 'Dublin Region' referred to in the Waste Management Plan for the Dublin Region 2005-2010 comprises Dublin City Council, Dun Laoghaire Rathdown County Council, Fingal County Council and South Dublin County Council. The first Regional Waste Management Plan was made in 1998 (subsequently re-adopted in 2001), and the first formal Review of the Plan took place during 2004-2005 and resulted in the current plan.

The assessment of the *need* aspects of any project against national, regional or local plans is essentially a matter for the planning authorities or An Bord Pleanala as the case may be. That said, Section 40(4)(cc) of the Waste Management Acts 1996 to 2008 requires that the Agency shall not grant a waste licence to an activity unless it is satisfied that:
'the activity concerned is consistent with the objectives of the relevant waste plan or the hazardous waste management plan, as the case may be, and will not prejudice measures taken or to be taken by the relevant local authority or authorities for the purpose of the implementation of any such plan.'

We acknowledge that there have been changes in the availability of landfill and waste disposal capacity in the area surrounding the Dublin region, as identified by Mr Ahern in his evidence. We are satisfied that the development of a landfill within the Dublin Region is identified in the current Waste Management Plan for the Dublin Region 2005-2010 as a means of the region being 'self reliant' (Section 18.10 Policy on Self Reliance). In addition we believe that the proposed facility will not prejudice measures taken or to be taken by the relevant local authority or authorities for the purpose of the implementation of the waste management plan for the Dublin region.

### 2.1.3 Annual Intake

Mr Ahern, CEWEP Ireland, questioned the justification for the annual intake figures proposed by the Applicant and raised a number of concerns regarding the scale of the annual intake figures and the fact that the operator, who may not be the Local Authority (the proposed facility may be operated as a public private partnership), would aim to accept waste up to the permitted annual tonnages. Mr Ahern identified the potential negative impact of excess landfill capacity on alternative recycling or recovery activities as a result of the reduced cost of landfilling as a disposal option. It was also noted that the Minister for the Environment Heritage and Local Government

identified that in the future, if adequate recycling and recovery measures were implemented, only 400,000 tonnes of residual waste would have to be sent for disposal.

Mr Ahern asked the applicant to clarify if the 300,000 tonnes per annum, after commencement of the proposed 'waste to energy' facility, included the acceptance of bottom ash for temporary storage on-site, estimated by Mr Ahern to be 100,000 to 150,000 tonnes per annum. The Applicant stated, based on the PD, that they did not consider that the bottom ash accepted at the proposed facility for temporary storage was included in the annual waste acceptance quantity of 300,000 tonnes as the bottom ash was not to be accepted for disposal. Mr Ahern also questioned if bottom ash from the proposed 'waste to energy' facility could be delivered to the proposed facility on the basis of the conditions included in the An Bord Pleanala decision in relation to the proposed 'waste to energy' facility at Poolbeg which specifies that the bottom ash shall be exported via Dublin Port.

**Comment**
The waste licence application proposed a maximum annual intake of 500,000 tonnes per annum for the initial number of years of waste acceptance until such time as the proposed 'waste to energy' facility becomes operational. Following commencement of the 'waste to energy' facility the annual intake shall decrease to 300,000 tonnes per annum. The maximum annual intake included in the PD was 500,000 tonnes per annum.

The above points in relation to annual intake stray somewhat into the remit of An Bord Pleanala, which is a matter that has still to be decided upon. There are, however, a number of points brought forward through evidence presented at the EPA oral hearing.

The applicant has interpreted the reduced annual tonnage (300,000 tonnes per annum after the proposed 'waste to energy' facility is operational) does not include bottom ash, which they have sought approval to accept for temporary storage. The proposal, put forward by the Applicant, was for the bottom ash to be stored on-site prior to subsequent removal and recovery. Therefore the bottom ash was not proposed to be landfilled for disposal. The proposed 'waste to energy' facility at Poolbeg has been approved by an Bord Pleanala for treatment of 600,000 tonnes per annum; a decision on the waste licence application for the waste to energy plant has not been issued to date.

The Waste Management Plan for the Dublin Region 2005-2010 identifies that the quantity of waste sent to landfill in 2003 was 756,970 tonnes. The most recently published National Waste Report 2006 (EPA 2007), records a national increase of 16% in waste generation since 2003; therefore, it is reasonable to consider that the quantity of waste sent for landfill in the Dublin Region in 2006 has increased to c.878,000 in line with the national trend. Assuming that 600,000 tonnes are sent to the proposed 'waste to energy' facility, it should not be necessary to landfill greater than 300,000 tonnes per annum following commencement of the proposed 'waste to energy' facility in the Dublin Region.

The National Waste Report 2006 (EPA 2007) notes (in its Executive Summary) in relation to landfill capacity that new capacity may be driving gate fees down and an increase in the landfill levy, allied with other policy interventions, may be appropriate to ensure that relatively low gate fees do not undermine the ongoing progress in recycling. The low gate fees are also identified as a factor which may be undermining the economics of biostabilising organic fines from mechanical treatment of waste and the roll-out of source segregation and collection schemes for biodegradable waste. We acknowledge that gate fees may be influenced by available landfill capacity, however the cost of entry to landfill can be addressed by amendment of the 'landfill levy' in accordance with the Waste Management Acts 1996 to 2008.

Mr Ahern referred to the An Bord Pleanala approval of the Poolbeg Waste to Energy facility. The An Bord Pleanala Inspector's Report on the oral hearing into the waste to energy facility states that 'the evidence submitted at the oral hearing indicates that the bottom ash would be stored internally in the building where provision would be made for the storage of one month's production. The bottom ash would be taken to the port area, as indicated in Mr. Norgaard's evidence at the oral hearing for export for recovery and reuse.' The inspector went on to note his reservations about the long term sustainability of the export of residues such as bottom ash; however, the inspector notes that 'in the event of an alternative bottom ash recovery/disposal system being proposed in the future the implications of that would have to be assessed through the appropriate procedures.'

Condition 13 of the An Bord Pleanala Grant of Approval states :
All mitigating measures proposed and recommended in the environmental impact statement and which are set out in summary in Chapter 21 of the environmental impact statement shall be implemented as part of the development.

Chapter 21 Summary of Mitigation Measures and Residual Impacts (EIS for Poolbeg Waste to Energy Facility) states 'Residue and Ash Removal on Local Road Network: The proposed locations for the removal of Bottom Ash and FGT [Flue Gas Treatment] residue have been selected to minimise disruption to the local road network and provide safe and efficient exportation of the residue by boat.' The An Bord Pleanala grant of approval in relation to the proposed Poolbeg 'Waste to Energy' facility does not provide for the transport of the bottom ash to this proposed facility.

In the event that a waste licence is granted for this proposed facility to proceed we recommend that:

- The annual intake of waste be reduced to a maximum of 300,000 tonnes following the commencement of a Waste to Energy facility in the Dublin region; and
- Bottom ash shall not be accepted at the facility for temporary storage.

### 2.1.4 Waste Treatment

The Applicant requested that the wording of Condition 8.1.1 be amended and that Condition 8.1.2 is deleted. The Applicant considers that the requirement of Condition 8.1.2 to rank the Mechanical Biological Treatment (MBT) of waste ahead of energy recovery is not in keeping with the Waste Management Plan for the Dublin Region. The Applicant requested that MBT and energy recovery should be put on a level footing in terms of the pre-treatment options for waste accepted at the facility. The

Applicant suggests that any licence granted should only require that waste accepted at the facility be subjected to pre-treatment.

The NLAG and CEWEP in their witness statements and objections identified that the pretreatment of waste to be accepted at the proposed facility is not discussed in the waste licence application. They note that the nature and location of pre-treatment facilities are not identified. The Objection Parties identified that the removal of organic waste from the incoming waste is a legal requirement under the Landfill Directive and would also reduce the problems associated with the landfilling of organic waste.

**Comment**
Condition 8.1.1 and 8.1.2 in association with the definition of 'residual waste' of the PD as issued seek to require all wastes accepted at the proposed facility, other than those exempted under points (i) and (ii) of Condition 8.1.1 to have been subjected to pre-treatment. The requirements of the conditions seek to contribute towards the objectives of the Landfill Directive. In particular the conditions seek to achieve the diversion of biodegradable waste away from landfill as required by Article 5 of the Landfill Directive.

The diversion of biodegradable waste from landfill is a key requirement of national policy and of EU Legislation and given that the diversion targets provided in the Landfill Directive are based on 1995 waste data and considering the increase in waste generation in Ireland since 1995, the need to divert significant quantities of biodegradable waste from landfill is essential.

The National Strategy on Biodegradable Waste (2006) identified the ways and means by which biodegradable waste can be diverted from landfill and a keystone of the strategy is the segregation and separate collection and treatment of biodegradable waste.

The Waste Management Plan for the Dublin Region 2005-2010 sets out the policy for the management of waste within the Dublin Region and the main goals of the plan reflect those that are set out in National Policy. In terms of diverting biodegradable waste from landfill the policy discusses the potential role of Mechanical Biological Treatment (MBT) of waste and it is considered in the plan that whilst MBT may provide for the diversion of biodegradable waste from landfill it may also result in poor quality stabilised biowaste compared to the better quality material that would result from source-segregated, and separately collected and treated, biodegradable waste. The plan states: 'thermal treatment (with energy recovery) of residual waste i.e. after recycling and composting of source separated organic waste, is the continued policy of the Dublin Region. This policy will deliver a highly integrated system that is optimised in terms of environmental and economic factors'. The proposed facility, if granted a waste licence, would have an operational life beyond the period covered by the current Waste Management Plan and therefore we consider that any licence granted must provide an appropriate level of flexibility to accommodate changes in future waste management plans.

The Applicant outlined that they do not propose waste treatment at the proposed facility. However, they identified that there are currently two biological treatment

facilities to be constructed in the Dublin Region (Ballogan and Kilshane Cross) for the acceptance of source-segregated biodegradable waste and the Poolbeg Waste to Energy facility has been granted An Bord Pleanala approval.

The proposed facility would be one of the largest landfills in Ireland and therefore it is considered critical that as much biodegradable waste as practicable is diverted from the facility by means of pre-treatment prior to delivery of the waste to the facility. The diversion of biodegradable waste from the proposed facility is in line with the European, National and Regional Policy and would also have benefits in reducing the quantity of leachate, landfill gas and odour generated at the facility.

In the event that a waste licence is granted for the proposed facility to proceed we recommend that the conditions of the licence require:

- Only residual waste shall be accepted at the facility, provision shall be maintained for exempt waste to be accepted without pre-treatment (as provided for in Condition 8.1.1 of the PD issued);
- Condition 8.1.2 shall be amended to require the licensee to identify to the satisfaction of the Agency, prior to the acceptance of residual waste at the facility, that the residual waste has been subjected to pre-treatment, such as:
  - (i) source-segregation to include, in particular, segregation of recyclables and separate segregation of the biodegradable organic fractions (three-bin system or equivalent);
  - (ii) Mechanical Biological Treatment (MBT); or
  - (iii) energy recovery.
- The licensee shall record the pre-treatment received by all waste accepted at the facility, the record shall be maintained on-site at all times and the licensee shall summarise the record for inclusion in the AER.
- The licensee shall monitor the waste accepted at the facility to establish the biodegradable content of the waste accepted. Amend Schedule C.4 (Waste Monitoring) to include monitoring of incoming residual waste.
- The licensee shall establish based on incoming residual waste monitoring the maximum acceptable 'respiratory index' for the incoming residual waste.
- The licensee shall be permitted to accept stabilised waste arising from the composting of the biodegradable fraction of municipal waste, to which fraction sewage sludge may have been added.

### 2.1.5 Acceptance of Bottom Ash

The Objection Parties identified that they had concerns in relation to the Applicant's proposal to temporarily store bottom ash from the proposed Poolbeg Waste to Energy facility at this proposed landfill facility. The concerns related to dust emissions from the deposition, storage and removal of the bottom ash, the potential for possible dust emissions to cause negative health implications for the local community and potential negative implications for the horticultural industry. The Objection Parties also submitted that the Applicant had not considered the traffic implications of transporting the bottom ash to and from the proposed facility.

**Comment**
The Applicant has sought permission as part of the waste licence application to temporarily store bottom ash at the proposed facility. As identified above under Section 2.1.3 (Annual Intake) bottom ash from the proposed Poolbeg Waste to Energy facility is not authorised, under the terms of the An Bord Pleanala approval, to send bottom ash to this proposed facility for disposal/recovery.

The Applicant addressed, in response to the EPA request for further information, the potential dust emissions from the temporary storage of bottom ash on-site. The Applicant's assessment indicates that dust emissions will not cause nuisance or an environmental impact beyond the boundary of the proposed facility. We consider that the Applicant has not adequately addressed the circumstances under which bottom ash would be accepted for temporary storage, the period of bottom ash storage, maximum quantities to be stored, movement and handling of bottom ash on-site and the further uses of the bottom ash.

In the event that a waste licence is granted for the proposed facility to proceed we recommend that bottom ash shall not be accepted for temporary storage. It is recommended that there should be no restriction on accepting non-hazardous bottom ash for disposal.

### 2.1.6 Acceptance of Sludge

The NLAG expressed concerns regarding the acceptance of waste sludges at the proposed facility. They submitted that procedures are required to manage sludges accepted at the proposed facility and that these procedures should have been provided as part of the waste licence application.

**Comment**
There are a number of conditions included in the PD issued which would control the acceptance of sludges at the proposed facility. The PD specifies that only non-hazardous wastes shall be accepted at the facility and that no liquid wastes shall be accepted. The acceptance of non-hazardous treated sludges at the proposed facility would not be considered to contravene National or European legislation. The conditions included in the PD require that any treated sludges accepted at the proposed facility are appropriately handled and deposited.

In the event that a waste licence is granted for the proposed facility to proceed we recommend that sludges accepted at the proposed facility shall be subjected to pre-treatment (e.g. lime stabilisation) and that the licensee shall establish a programme for the reduction of biodegradable waste sludges accepted at the proposed facility.

## *2.2 Relevant Legislation*

### 2.2.1 Landfill Directive

Mr Hammerstein (MEP) and a number of Objection Parties identified that the requirements of the Landfill Directive must be fully complied with and that the Landfill Directive requires that the proposed facility can only be authorised if it does not pose a serious environmental risk. In particular it was identified that the Landfill Directive requires that the location of the landfill must take into consideration the geological and hydrogeological conditions of the area.

In response, the Applicant stated that the proposed facility is designed in accordance with the requirements of the Landfill Directive and in particular they identified that the proposed facility meets, or goes beyond, the specified requirements of Annex 1 of the Landfill Directive.

A number of the Objection Parties raised concerns that the development of the proposed facility may reduce Ireland's ability to meet the requirements of the Landfill Directive in relation to diversion of biodegradable waste from landfill (Article 5 of the Directive). It was argued that increased landfill capacity has been identified as reducing landfill gate fees and thereby reducing the economics of waste recycling. While it was acknowledged by Mr Ahern, CEWEP Ireland, that the PD and specifically Condition 8.1.2 do try to restrict the type of waste which can be accepted at the proposed facility, he considered the condition to be unenforceable. Mr Ahern also stated that he was unable to provide a more suitable alternative condition.

**Comment**

The objective of the Landfill Directive (Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste) is outlined in Article 1 of the Directive and states that:

'1. With a view to meeting the requirements of Directive 75/442/EC, and in particular articles 3 and 4 thereof, the aim of this directive is, by way of stringent operational and technical requirements on the waste and landfills, to provide for measures, procedures or 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 green house effect, as well as any resulting risk to human health from landfilling of waste, during the whole lifecycle of the landfill.

2. In respect of the technical characteristics of landfills, this Directive, contains for those landfills to which Directive 96/61/EC is applicable the relevant technical requirements in order to elaborate in concrete terms the general requirements of that Directive. The relevant requirements of Directive 96/61/EC shall be deemed to be fulfilled if the requirements of this Directive are fulfilled.'

Various aspects of the proposed facility are considered in detail below. The consideration of each of the aspects associated with the proposed facility form part of the consideration of the proposed facility for compliance with the Landfill Directive.

Article 5 of the Landfill Directive (Council Directive 1999/31/EC) requires member states to reduce the quantity of biodegradable municipal waste going to landfill (biodegradable waste is defined in the Landfill Directive as 'any waste that is capable of undergoing anaerobic or aerobic decomposition such as food and garden waste, and paper and paperboard'). Ireland has availed of a four-year derogation for the first two phases of the diversion-from-landfill targets. By 2010 (deferred from 2006), Ireland is restricted to landfilling no more than 75% of the equivalent total weight of biodegradable municipal waste produced in 1995, the baseline year. This target is further reduced to 50% of the 1995 baseline by 2013 (deferred from 2009) and 35% by 2016. The first target, for the year 2010 requires that the landfilling of biodegradable municipal waste must be reduced by over 450,000 tonnes by the start

of 2010. The Comptroller and Auditor General[1] noted in his annual report for 2005 that 'there is a significant risk that Ireland will fail to meet the targets set down in the Landfill Directive.' He also highlighted the 'possibility of EU financial penalties arising from any such failure.'

The EPA and Minister for the Environment Heritage and Local Government have acknowledged that measures need to be taken at a national level for Ireland to achieve the requirements of the Landfill Directive. The EPA highlighted their concern and the urgency with which diversion of biodegradable waste from landfill needs to be encouraged in the National Waste Report 2006. The report identifies that low gate fees at landfills may be resulting in marginally economical waste recycling not been undertaken; however, it is suggested that an increase in the landfill levy may be a possible means of increasing the cost of landfill. The EPA has published a discussion paper entitled Hitting the Targets for Biodegradable Municipal Waste: Ten Options for Change (2008); this discussion document identifies potential means of achieving the Landfill Directive Targets. The Minister for the Environment Heritage and Local Government in a press release dated the 1st February 2008 acknowledged 'Ireland faces a formidable challenge in meeting a series of European Union targets for the diversion of biodegradable municipal waste from landfill, starting in 2010**.** We need some new thinking to break some old habits and this report[2] from the EPA makes a very welcome contribution to finding solutions to the obstacles in our path'.

The potential for the proposed facility to reduce Ireland's ability to meet the requirement of Article 5 of the Landfill Directive is discussed above under Section 2.1.3 (Annual Intake). The conclusion above was that while the proposed facility may result in greater landfill capacity there were other policy measures which may be taken to increase the cost of landfill, for example revision of the landfill levy.

We consider that the inclusion of Conditions 8.1.1 and 8.1.2 (as amended), the definition of residual waste as included in the PD issued and the recommendations proposed above do restrict the waste accepted at the proposed facility to only residual waste. The Landfill Directive provides a definition of what is considered to be treatment: 'Treatment means of physical, thermal, chemical or biological processes, including sorting, that change the characteristics of the waste in order to reduce its volume or hazardous nature, facilitate its handling or enhance recovery.' This definition is very broad and it is considered more enforceable to amend the conditions as recommended above under Section 2.1.4 (Waste Treatment) in the event that a waste licence is granted for the proposed facility.

### 2.2.2 Groundwater Directive/Water Framework Directive

The Objection Parties identified that the proposed facility must be considered in the context of the requirements of the Water Framework Directive. In particular they noted that the Water Framework Directive aims to 'prevent further deterioration' and therefore the Objection Parties claimed that the loss of leachate from the proposed facility, would result in a deterioration of the groundwater.

[1] www.audgen.gov.ie
[2] Hitting the Targets for Biodegradable Municipal Waste: Ten Options for Change (EPA 2008)

**Comment**
Directive 80/68/EEC on the protection of groundwater against pollution caused by certain dangerous substances, defines 'groundwater' to mean 'all water which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil' and 'direct discharge' 'means the introduction into groundwater of substances in lists I or II without percolation through the ground or subsoil.' Article 3 states that 'Member States shall take the necessary steps to: (a) prevent the introduction into groundwater of substances in list I and (b) limit the introduction into groundwater of substances in list II so as to avoid pollution of this water by these substances. Article 2 states that this Directive shall 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.' Article 11 requires authorizations referred to in article 4 and 5 to be reviewed at least every four years; this requirement does not apply to the proposed facility as there is not a direct discharge to groundwater.

The Water Framework Directive (Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy) relates to all water bodies (inland surface waters, transitional waters, coastal waters and groundwater) and aims to create a framework to prevent further deterioration and protect and enhance the status of aquatic ecosystems. Article 1 of the Directive identifies the purpose of the Directive. Article 22(2) identifies that Directive 80/68/EEC shall be repealed with effect from 13 years after the date of entry into force of this Directive 2000/60/EC.

The potential emissions to water from the proposed facility are leachate from the waste body, surface water run-off from hardstanding areas, capped areas of the site and drainage from excavations. Impacts of the proposed facility are considered in greater detail in Section 2.3 (Hydrogeology) and Section 2.4 (Surface Water/Leachate Management/Geo-technical Issues).

In accordance with the Water Framework Directive Ireland has classified all water bodies in terms of their current level of risk. The Lusk-Bog of the Ring (groundwater body) is the only one of the three daughter groundwater bodies of the Lusk groundwater body that is included in risk category '1b – probably at significant risk' from potential over-abstraction. The area is classified as '1a – at significant risk' under the River Water Bodies Assessment Summary.[3]

Article 6 of the Water Framework Directive requires each Member State to establish a 'register or registers of all areas lying within each river basin district which have been designated as requiring special protection under specific Community legislation for the protection of their surface water and groundwater or for the conservation of habitats and species directly depending on water.' In Ireland, the Environmental Protection Agency (EPA) has compiled this Register on a national basis.

[3] Based on Summary Report on Characterisation and Analysis of Ireland's River Basins, www.wfdireland.ie

The Office of Environmental Assessment, within the EPA, prepared Ireland's submission in accordance with Article 5 of the Directive[4]. Within The Register of Protected Areas the following is stated 'Areas designated for the abstraction of water intended for human consumption: In Ireland, waters intended for human consumption are protected under the Drinking Water Regulations (S.I. 439/2000). The actual protected areas for drinking waters are not outlined within the Regulations, as a result, the protected area for drinking waters is represented by the water body from which the water is abstracted and the associated drinking water abstraction point. The entire water body is to be used to represent the protected area (groundwater body, lake or river).'

### 2.2.3 Waste Management Acts 1996 to 2008

The Applicant and Objection Parties identified a number of sections within the Waste Management Acts 1996 to 2008 which they considered significant and of relevance in the consideration of the waste licence application. It was identified that section 40(4)(bb) specifies that the Agency shall not grant a waste licence unless the activity will comply with Council Directive 1999/31/EC on the landfill of waste (Landfill Directive). It was identified that the definition of environmental pollution includes following 'create a risk to waters, the atmosphere, land, soil, plants or animals, create a nuisance through noise, odours or litter'.

**Comment**

The consideration and assessment of the waste licence application, submitted by the Applicant, shall be undertaken in accordance with the requirements of the Waste Management Acts 1996 to 2008. Our recommendations as presented in this report are based on our consideration of all the information presented as part of the waste licence application process (including the waste licence application, additional information provided by the Applicant, submissions received, objections and submissions on objections received) and the information presented during the course of the oral hearing.

The definition of environmental pollution is considered in this report in the context of the definition in the Waste Management Acts 1996 to 2008, and includes 'risk'; the various aspects are considered in more detail under the relevant sections of this report.

### 2.2.4 Waste Management (Licensing) Regulations 2004 to 2008

The Objection Parties identified that the EPA had requested under Article 14(2)(b)(ii) that the Applicant undertake a numerical modelling study (using Modflow or other similar industry accepted code). The Applicant acknowledged that they did not complete or provide such a model but they considered that they had provided adequate information.

**Comment**

The inspector in assessing the waste licence application requested further information from the applicant under Article 14(2)(b)(ii) of the Waste Management (Licensing)

[4] Submission in accordance with Article 5 of Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy, and in accordance with EC-DG Environment D.2 document "Reporting Sheets for 2005 Reporting" dated 19 November 2004. www.epa.ie

Regulations 2004 to 2008. The inspector requested, in a letter issued under Article 14(2)(b)(ii) dated the 16th November 2006, a numerical modelling study to determine '(a) the impact on the groundwater flows at the proposed landfill area of the additional abstraction wells along the indicated area of land and (b) the combined zone of contribution for the existing Bog of the Ring abstraction system and the theoretical new abstraction wells.' The Applicant provided information in response to the specific request for a numerical model, in a submission dated January 2007, but did not provide the model as requested. The inspector having assessed the waste licence application and the further information provided by the Applicant was satisfied that the waste licence application complied with the requirements of Article 12 and Article 13(1) of the Waste Management (Licensing) Regulations 2004 to 2008. Compliance was confirmed in writing in a letter to the Applicant dated the 4th July 2007.

The hydrogeological aspects of the proposed facility are considered in detail in Section 2.3 (Hydrogeology) below.

### 2.2.5 Environmental Protection Agency Acts 1992 to 2007

A number of Objection Parties and the Applicant identified the functions of the EPA and what the EPA shall do in carrying out its functions as specified under Section 52 of the EPA Acts 1992 to 2007. In particular the Objection Parties identified that the EPA shall keep itself informed of the policies and objectives of public authorities, and 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. In relation to sustainability the Objection Parties claimed there was a conflict between the development of a landfill and the use of groundwater as a resource in the future.

**Comment**

Waste policy is discussed in greater under Section 2.1 (Waste Policy and Related Issues), and it is considered that in preparing this report, including recommendations, the requirements of the EPA Acts 1992 to 2007, and specifically Section 52 of the EPA Acts 1992 to 2007, have been taken into account.

The oral hearing allowed for an in-depth assessment of the arguments put forward by the Applicant and Objection Parties. It has allowed the consideration of the proposed facility in greater detail than available when the EPA issued the PD, It is considered that the aim of the process is to have regard to the need for a high standard of environmental protection while at the same time promoting sustainable and environmentally sound development, processes and operations. The consideration of the proposed facility and other resources in the area are discussed in detail under the various headings which follow.

The sustainability of proposed facility is considered in the following sections in the context of the proposed facility's impact on the environment.

### 2.2.6 Environmental Impact Assessment Directive

A number of Objection Parties claimed that the Environmental Impact Statement (EIS) which was assessed by An Bord Pleanala at their oral hearing in October 2006 has been modified since then by means of Article 14 responses to the EPA and, in particular, it was claimed that the non-technical summary has been changed. The

Applicant responded that the additional information provided in response to requests from the EPA were clarifications rather than modifications to the proposed facility.

Greenstar Ltd. identified that the excavation of the existing landfill, which is discussed in more detail in Section 2.9 (Historical Landfill) of this report, had not been assessed fully in the EIS. The Applicant noted the references to the existing landfill within the EIS and claimed that the excavation of the waste was identified as an alternative means of remediation. The applicant also claimed that the mitigation measures associated with developing the proposed landfill would also apply to the excavation of the existing landfill.

A number of the Objection Parties, and Mr Hammerstein (MEP), stated that there is no evidence that an Environmental Impact Assessment (EIA) had been carried out on the proposed facility and may therefore not be in compliance with the EIA Directive (Council Directive of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment (85/337/EEC)).

NLAG noted that transposition of the EIA Directive into National legislation is the subject of legal challenge. It was also queried why the EPA and An Bord Pleanala could not hold a joint oral hearing to consider all the information, as this would be a more appropriate method of ensuring that all issues are addressed by the correct regulatory authority.

**Comment**
The Applicant prepared an EIS for the proposed facility as required under the Planning and Development Acts 2000 to 2006. The EIS was submitted in support of the application for approval submitted to An Bord Pleanala and also submitted in support of the waste licence application submitted to the EPA. The EPA inspector, in his report to the Board confirmed that the EIS complied with the requirements of the EIA and Waste Management (Licensing) Regulations. The EPA shall have regard to the EIS as submitted with the waste licence application and any amendments or clarifications provided during the waste licence assessment including the oral hearing.

The EPA published EIS guidelines[5] note that an EIA process should remain focused on issues that: are environmentally based; are likely to occur; and have significant and adverse effects. An EIS is not intended to be an exhaustive assessment of every possible sub-issue or aspect under the headings or topics identified in the EIA Regulations[6] and as reproduced on page 3 of the EPA Guidance on Information to be Contained in EIS (air, water, landscape, human beings, climate, etc): rather, a developer should identify, with justification, the key aspects/impacts (significant likely adverse impacts) of a particular development, and address these in the EIS. The EPA EIS guidance supports this view when it notes that the level of detail, of assessment, of the topics may differ depending on the likelihood of impacts.

[5] Guidelines on the information to be contained in Environmental Impact Statements. IR EPA, 2002.

[6] SI 93 of 1999. Second Schedule.

EIA is not a document *per se*, nor a single recorded act, rather, it is a process: the primary purpose of which is to ensure that projects which are likely to have significant effects on the environment are subject to an assessment of their likely impacts. The EIS document is a subset of that process. The EPA Guidance on Information to be Contained in EIS observes that EIA is a process that feeds into, scrutinises and improves a project. EIA, from a regulator's perspective, commences at scoping meetings and continues through assessment of applications and submissions, draft decision making, determination of objections, to final decision. The EIA process also includes implementation of the proposed facility and monitoring. Certification of the EIS is one element, albeit an important one, of this process. So although not presented in one document, the EIA process is in fact registered in numerous documents reflecting the stages of the project (records of scoping meetings, EPA correspondence, Third Party correspondence, application documentation, draft decisions, EPA reports on assessment of application or objections, records of EPA Board decisions, etc.,). This report too will form part of the record of the EIA process for the proposed facility.

While this report is not the forum to consider the legalities of the National transposition of the EIA Directive it is noted that under Article 1 of the Directive it states 'The competent authority or authorities shall be that or those which the Member States designate as responsible for performing the duties arising from this Directive', implying that more than one competent authority may assess a proposed development for compliance with the Directive.

### 2.2.7 Strategic Environmental Assessment Directive

The Objection Parties and Mr Hammerstein (MEP) considered that a Strategic Environmental Assessment which would include an assessment of the proposed landfill facility, the proposed Waste to Energy facility and all other waste infrastructure in the region, should have been prepared rather than, or in addition to, an EIA for this proposed facility.

**Comment**
The Planning And Development (Strategic Environmental Assessment) Regulations 2004, (S.I. 436 of 2004), came into effect on the 21st July 2004. The regulation applies to plans and programmes such as waste managements plans. An SEA is not required for an individual development such as this proposed facility.

### 2.2.8 Access to Information on the Environment

Mr Hammerstein (MEP) identified that he had concerns in relation to compliance with the Directive on Public Access to Environmental Information. NLAG also voiced concerns that information was not provided to them.

**Comment**
Directive 2003/4/EC on Public Access to Environmental Information, was introduced into National legislation by S.I. 133 of 2007 and provides, subject to certain exceptions, that information relating to the environment held by, or for, a public authority must be made available on request to any person. The waste licence application process is designed to be as open as possible to all interested parties. The licence application, all supporting information submitted by the applicant, all submissions from interested parties, all correspondence in relation to the proposed

facility between the Agency and individuals and bodies (including the applicant, interested parties etc.), are available in the following forms:

- A hard copy of all the above is available at the EPA Headquarters; and
- Electronic versions of all the above are available on the EPA website (www.epa.ie).

Therefore we believe everything put before the Agency has been made available to interested parties. The EPA cannot control or make available documents beyond those provided to the EPA.

### 2.2.9 Precautionary Principle

The precautionary principle was raised by a number of Objection Parties during their witness statements and also by Mr Hammerstein, MEP. The Objection Parties identified that the precautionary principle should be applied in the assessment of the proposed facility and in the assessment of possible impacts of the proposed facility on the groundwater resource under the site and in the surrounding area. Mr Hammerstein stated that the precautionary principle outlines that one cannot wait for complete scientific certainty to act or cease to act; he also noted that the precautionary principle is the object of much debate.

**Comment**

The EU Commission, in 2000, produced communication on the application of the precautionary principle[7]. This publication was later complemented by a report from the European Environment Agency (EEA) on the subject[8]. The principle is more a governance philosophy rather than a clearly and unambiguously articulated principle. There is no one definition of it in EU legal texts, and similar governance principles are found in a number of international treaties and protocols (Stockholm Convention, Montreal Protocol, etc.,). Article 174 (Environment) of the EC Treaty contains the main EU formal reference to – but no definition of - the principle. The EEA document (op. cit.) concludes that '*the precautionary principle is an overarching framework of thinking that governs the use of foresight in situations characterised by uncertainty and ignorance and where there are potentially large costs to both regulatory action and inaction*': and observes that '*society's growing commitment to the precautionary principle is essentially a response to a growing tension between two aspects of science: its growing innovative powers were increasingly outrunning its capacity to anticipate the consequences'.*

The precautionary principle is mainly seen as a way to deal with a lack of scientific certainty. Uncertainty is often expressed as a form of risk and this is why Risk Management is core to the application of the precautionary principle.

The EU communication on the Precautionary Principle (op. cit.) identified two distinct aspects of the principle: (i) the political decision to act or not to act (including the triggers for same), and; (ii) how to act (i.e. the measures).

[7] Communication from the Commission on the precautionary principle. EU Commission COM(2000)1, 2-Feb-2000.

[8] Late lessons from early warnings: the precautionary principle 1986-2000. EEA Environmental Issue Report #22, 2001.

The principle was enshrined at the 1992 Rio Conference on the Environment and Development. The Rio Declaration states 'in order to protect the environment, the precautionary approach shall be widely applied by States according to their capability. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation'.

The precautionary principle is reflected in National legislation too; in particular we refer to Section 52(2)(c) of the EPA Acts 1992 to 2007: this section deals with the guiding principles for the functioning of the EPA, in particular the Board.

In Europe the precautionary principle has been considered in the development of legislation, including the Landfill Directive, IPPC Directive etc, and in the development of BAT Reference Documents prepared by the IPPC Bureau. The aspect of groundwater and the risk to the groundwater resource is discussed in more detail later in this report, Section 2.3 (Hydrogeology).

## *2.3 Hydrogeology*

The hydrogeological aspects of the proposed decision on the waste licence application are considered below under the following headings:

- Geology
- Groundwater vulnerability
- Aquifer classification
- Protection of existing groundwater sources
- Conceptual model and risk assessment
- Future groundwater development potential

### 2.3.1 Geology

The geology of the proposed facility site consists of glacial till with sands and gravels, either as lenses within the till, or as more extensive horizon(s) overlying Carboniferous limestone bedrock. There was considerable discussion at the oral hearing about the geology and especially about the extent of sands and gravels within the superficial deposits, the elevation of the bedrock surface ('rockhead elevation'), the extent of faulting in the bedrock and the interpretation of the site geology as illustrated in the Applicant's geological cross-sections. These issues are summarised in turn below.

*Superficial geology*

The glacial till is described in the EIS as firm light brown sandy gravelly CLAY (circa 2.5 m thick) overlying stiff to very stiff grey to black sandy gravelly CLAY (Volume 5, Appendix H). The sand and gravel, according to the EIS, ranges from 'absent to 10 m' across the study area, whilst 'significant gravel deposits were present beneath the glacial till to the north of the study area (13 m at [borehole] HR1a) and to the east (17 m at HR9)', outside the landfill footprint.

In response to cross examination of its witnesses during the oral hearing, the Applicant produced a new map of gravel thickness (oral hearing Document No. 11; this and other oral hearing documents are included in Appendix E to this report), the map in the Article 14 submission of December 2006 (Fig. 21.2) having omitted to indicate that not all boreholes had penetrated the full thickness of the gravel, and that this had not been taken account of by the computer software contouring program. The revised map includes the footnote that 'Not all boreholes will have reached the base of the GRAVEL due to refusal'. One of the Objection Parties, Mr Cullen, indicated that about a third of the data points on this map did not penetrate the full thickness of the gravel aquifer at those drilling locations (Document No. 22). There was also discussion on the accuracy of some of the individual borehole data points of gravel thickness as plotted on the map.

Mr Cullen had prepared his own map on the *lateral extent* of the gravel (in September 2006, and circulated as Document No. 7A during this oral hearing). This map shows continuous gravels stretching from the landfill footprint northwards to the Bog of the Ring wellfield. Mr Cullen also produced a map of gravel *thickness* (Document No. 22, Fig. 4). There was some discussion about the full extent of the gravel implied by this map: Mr Flanagan, for the Applicant, argued that the map indicates that there is less than 1 $km^2$ of gravel having a saturated thickness of more than 5 m below the landfill footprint, whereas Mr Cullen indicated that there is more than 1 $km^2$ with such gravel thickness in the map area.

Mr Boyle, on behalf of NLAG, also considered the extent of the gravel, and how this might influence the Zone of Contribution (ZOC) to the Bog of the Ring wellfield to the north of the landfill footprint, and horticultural wells to the south (see discussion on *Protection of existing groundwater sources* in Section 2.3.4 below).

*Rockhead Elevation*

The EIS indicates the typical thickness of overburden to be between 15 and 25 m, with the deepest clay (below the proposed landfill footprint) to be 27.25 m (Volume 5, Appendix H). These depth ranges are apparently based on borehole data since it is also stated that 'In the proposed landfill footprint, exploratory boreholes indicate deep clay running from north to south extending to depths of 20 m to 27 m. However, geophysics indicated clay in this area to greater depths'. The EIS also states that the depth to bedrock in general 'ranged from 5 m to 34 m below ground level within the study area'.

As with the thickness of gravels map referred to above, there was also considerable discussion during the oral hearing about the Applicant's bedrock geology and rockhead elevation map (Fig. 21.5 in the Article 14 submission of December 2006). Issues discussed included the omission of borehole data points on this map and the fact that the map did not apparently take account of evidence on depth to bedrock from the geophysical surveys. The Applicant produced a new map during the oral hearing (Document No. 11), which included the borehole data points. There was discussion on the accuracy of some individual borehole data points as plotted on the map.

In his evidence Mr Cullen summarised the changes that have been made by the Applicant to the map of the bedrock surface (rockhead elevation) as well as to the

thickness of gravel map and the geological cross-sections since the time of the preparation of the EIS. Regarding the map of bedrock surface, Mr Cullen argued that the failure to use geophysical data is a particular omission, and renders the map 'of limited value'. Mr Cullen argued further that the Applicant's map 'masks the extent and importance of the deep and continuous bedrock trough' which runs approximately north-south beneath the site and, by so doing 'diminishes the extent of the gravel aquifer'. Mr Cullen provided an alternative map (Fig. 3 in Document No. 22) showing such a north-south trough, bounded (approximately) by two faults (the eastern one corresponding, approximately, to the fault shown on the regional geological map; the western one inferred from the results of the drilling and geophysical investigations).

*Bedrock Geology / Faulting*
The bedrock geology is illustrated in Fig. 4 in Volume 5, Appendix H of the EIS, and is an excerpt from the Geological Survey of Ireland (GSI) regional geology map. This shows the proposed landfill footprint to be underlain by the Carboniferous (Lower Dinantian) Lucan (Calp), Naul and Loughshinny Formations.

During the oral hearing, there was a discussion surrounding a letter from Dr A Sleeman of GSI (letter of 19th December 2006 to the Agency) which raised the possibility, based on his examination of the borehole logs from the site investigations, that the whole footprint could be underlain by the Loughshinny Formation (the possible implications of this are considered in Section 2.3.3 *Aquifer classification* below). However, Dr Sleeman did add that 'In general, however, the logs are not detailed enough in description to distinguish between the Lucan, Naul and Loughshinny formations which are all quite similar and closely related in terms of deposition'.

The extent of faulting was also discussed. The regional geological map shows a major north-south fault to the east of the landfill footprint. As noted above (under *Rockhead elevation*), a map prepared by Mr Cullen (Fig. 3 in his submission) proposes a second north-south fault running through the landfill footprint. Mr Cullen interprets the area between the two faults as a fault zone. As pointed out by both Mr Cullen and Mr Boyle (the latter on behalf of the Nevitt Lusk Action Group), some of the geophysical profiles (2-D resistivity arrays and seismic refraction profiles) in the EIS (Volume 5, Geophysical Investigations) display some evidence of faulting.

*Geological Cross-sections*
Geological cross-sections were provided by the Applicant in Volume 5, Appendix H of the EIS (Sections A-A$^{l}$ and B-B$^{l}$) and in the Article 14 submission of January 2007 (Sections A-A$^{l}$ and B-B$^{l}$). With regard to these cross-sections (which predate the revised rockhead elevation and gravel thickness maps produced at the oral hearing), Mr Cullen argued that there is little correlation between Section B-B$^{l}$ and the bedrock and gravel maps: for example, the trough is deeper and more extensive than shown on the section. Mr Cullen produced his own alternative geological cross-sections (Fig. 5 and Fig. 6 in Document No. 22). The Fig. 5 cross-section (B-B$^{l}$: west-east) of Mr Cullen's submission shows the site to be entirely underlain by Loughshinny Formation. It also shows the geology to be strongly influenced by the inferred fault-bounded trough, which is also reflected by a steep change in the piezometric surface

depicted along the western margin of this trough. The north-south section (Fig. 6) shows the 'gravel aquifer' to be nearly continuous.

**Comment**
The revised geological maps provided by the Applicant and the alternative maps, geological sections and interpretations provided by the Objection Parties (especially by Mr Cullen) are relevant to the aquifer classification and site conceptual model and are therefore considered further under the discussion of those issues below.

### 2.3.2 Groundwater Vulnerability

In the national Groundwater Protection Scheme (GPS) in Ireland, groundwater vulnerability is classified mainly according to the *thickness* and *permeability* of the subsoil (Department of Environment and Local Government, Environmental Protection Agency and Geological Survey of Ireland, 1999 – Groundwater Protection Schemes). Where the subsoil comprises at least 10 m of low permeability material the groundwater vulnerability is classified as 'low' in the GPS, as pointed out in the Applicant's EIS.

In the area of the proposed facility, as noted in the discussion on *Geology* above, the subsoil typically comprises 15-25 m of glacial till (mainly sandy gravelly CLAY) with gravels. The Applicant has stated that at least 10 m of clay will remain after construction of landfill. The Applicant has not produced a map showing the final anticipated clay thickness contours after construction (Mr O'Toole confirmed at the oral hearing that there was no such map) – Fig 21.6 of the December 2006 Article 14 submission shows *existing* clay thickness contours - but there are three cross sections on Fig 8.1 of the same submission that do show the final anticipated thickness of boulder clay. The Article 14 submission of May 2007 adds that 'As phases of the landfill develop additional site investigation will be employed as necessary to determine clay cover is maintained at 10 m'.

Regarding subsoil permeability, Volume 5, Appendix H of the EIS refers to 'Substantial thicknesses of low permeability ($1x10^{-8}$ m/s - $1 \times 10^{-7}$ m/s) clay'. The actual field and laboratory permeability test results are summarised in Table 4.5 of Appendix I (Soils) of Volume 5. Field values (from variable head tests) ranged from $1.35 \times 10^{-9}$ m/s to $5.3 \times 10^{-6}$ m/s, whereas laboratory (triaxial cell tests) ranged from $3.8 \times 10^{-11}$ to $1.05 \times 10^{-8}$ m/s). Table 5.1 in the same appendix summarises the permeability and inferred groundwater vulnerability across the landfill footprint. The GSI 2003 draft 'Guidelines for Assessing and Mapping of Groundwater Vulnerability to Contamination' were used (together with the Soil Mechanics (1979) criteria in Table 4.6) in assigning a permeability rating at each sample site, with the following quote from the GSI document included in a footnote to the table 'The boundary between moderate and low permeability materials is practically measured in the range between $10^{-8}$ m/s and $10^{-7}$ m/s, if measured using field based falling head tests'.

There was very little discussion at the oral hearing about possible preferential flowpaths within the tills. Dr Ashley, on behalf of the NLAG, provided a copy of a paper (Document No. 14) that describes how the microstructure of tills is a more important controlling factor on their porosity than their particle size distribution analyses, but that paper does not investigate permeability relationships.

Another issue that can influence the classification of groundwater vulnerability is the type and amount of recharge. In the EIS (Volume 5, Appendix H), the Applicant refers to a table produced in a 2004 report by the Working Group on Groundwater which indicates that, for a low permeability subsoil and low groundwater vulnerability setting, the recharge coefficient (RC – which is the proportion of effective rainfall that leads to groundwater recharge) might be expected to be between 5 and 15% of effective rainfall, implying a recharge for the landfill area of 18 to 54 mm/year (for an effective rainfall of 358 mm/year). The EIS also indicates that where the clayey subsoils are thick at this site, no response to rainfall was observed in groundwater hydrographs, whereas a response to rainfall was observed where the aquifer is overlain by thin subsoils.

The GSI estimated recharge to be 57 mm/year over most parts of the Bog of the Ring aquifer (north of the proposed facility), where there is a substantial covering of till. As noted in the discussion of *Protection of existing groundwater sources* in Section 2.3.4 below, the full range of recharge values used by TES Consultants in their estimation of the zone of influence of the Bog of the Ring wellfield area was 57 mm/year (which was applied to 75% of the zone of influence) to 322 mm/year (25% of that area), and these values were also used by the Applicant in their Article 14 submission of May 2007 when delineating hypothetical zones of influence for hypothetical wellfields located east or south of the landfill footprint (see discussion on *Protection of existing groundwater sources* below for explanation of zone of influence).

**Comment**
The Applicant has placed great emphasis on the retention of a minimum clay thickness of 10 m when the landfill is constructed. Whilst a map showing the final anticipated contours of clay thickness would have been of assistance, the Applicant did provide three cross sections with such information, and has indicated that additional site investigations would be employed as necessary to determine that the clay cover would be maintained at 10 m as phases of the landfill develop. If the landfill is allowed to proceed, it is recommended that a licence condition should be included to ensure that sufficient testing is carried out to prove the 10 m of clay beneath the landfill footprint.

Regarding the permeability characteristics of the subsoils at the site, the field permeability test values of between $1.35 \times 10^{-9}$ m/s and $5.3 \times 10^{-6}$ m/s suggest that the majority of the till material is likely to be of low permeability, although some materials may be of moderate permeability (the GSI draft 'Guidelines for Assessment and Mapping of Groundwater Vulnerability to Contamination' state that 'The lower permeability of these [moderate permeability] materials is ~0.001 m/day or ~$10^{-8}$ m/s' (Fitzsimons et al., 2003). Any sandy lenses within the till, plus the more extensive sand and gravel layer occurring between the till and bedrock, are likely to have permeabilities in the moderate to high ranges (the boundary between these two categories is typically taken as around $10^{-4}$ m/s). Experience elsewhere in Ireland suggests that preferential flow paths within the tills, if present, are likely to occur mainly within the upper few metres, and so preferential flowpaths are unlikely to be a significant issue at this site where the tills are relatively thick (and where at least 10 m of clay would be retained below the proposed landfill).

The GSI draft groundwater vulnerability mapping guidelines also point out that 'Moderate permeability subsoil materials are silty and sandy glacial tills that are generally quite free draining except in low lying areas and/or area of groundwater discharge' whereas 'Low permeability subsoil materials are clayey tills, peats and lacustrine clays that allow less than 20% recharge acceptance regardless of thickness or saturation conditions'. The term recharge acceptance here is used in the same sense as recharge coefficient referred to below. The guidelines indicate that recharge acceptance in low permeability materials is generally less than 30% of potential recharge on a sub-catchment scale and generally less than 15% on a field assessment scale, and that 'This latter scale is more appropriate to vulnerability assessments'. The GSI estimation of recharge for those parts of the Bog of the Ring aquifer covered by substantial till deposits – 57 mm/year from a total effective rainfall of 358 mm/year - is equivalent to a recharge coefficient of approximately 15%, which is consistent with a low permeability rating for the subsoil according to these criteria.

The GSI procedures for classifying vulnerability also take account of indirect indicators such as drainage density (a high density of artificial or natural drainage is indicative of low groundwater vulnerability and *vice versa*) and vegetation type (certain plant species are found more commonly under 'wet' or 'dry' soil conditions, rushes being an example of the former). No detailed evidence was provided on surface drainage density or vegetation characteristics as indicators of groundwater vulnerability category at the site, so it is not possible to comment further on this issue here.

Overall, the information from the geology, thickness and permeability of the subsoils, together with the inferred recharge characteristics for the nearby Bog of the Ring area, are consistent with a low vulnerability rating for the proposed facility site.

### 2.3.3 Aquifer Classification

The Carboniferous Limestone aquifer at this site is classified by the GSI as a locally important aquifer that is generally moderately productive ('Lm'). The aquifer is part of an 800 $km^2$ area classed as Lm aquifer in North County Dublin. Ms Hunter Williams of the GSI pointed out in her oral evidence that this assessment was based on over 70 well productivity data points.

In the EIS (Volume 5, Appendix H), the Applicant notes that the Loughshinny, Naul and Lucan Formations are all classified as Lm within the study area, but that the Lucan Formation is less productive to the south of a structural divide located to the south of the proposed landfill footprint, where it is classed as a locally important bedrock aquifer which is moderately productive only in local zones (Ll). All the limestone aquifer units are characterised by fracture flow. Transmissivity estimates from pumping tests carried out by the Applicant ranged from 12 to 86 $m^2/d$. As noted in the Applicant's Article 14 submission of January 2007 the maximum depth of the response zone for the pumping tests was 35 m (depth within the bedrock). Mr Mulcahy for Greenstar queried whether a transmissivity figure based on this depth was appropriate and argued that, whereas the Applicant had claimed to have sufficient information on the site hydrogeology (to make it unnecessary to construct a numerical groundwater model – see discussion in Section 2.3.5 below on *Conceptual model and risk assessment*) the Applicant had also said that they would require deeper wells to establish transmissivity. Mr Cullen enquired of the Applicant's witnesses what

implications deeper boreholes (as well as the presence of the gravel layer) would have on the Applicant's estimate of groundwater throughflow beneath the site (1,500 $m^3$/d).

There was discussion at the oral hearing about whether the aquifer classification should be upgraded to regionally important – GSI witnesses confirmed there are no plans to do this – and whether the gravels underlying the till constituted an aquifer in their own right. Again, GSI confirmed that the gravels are not classified as a separate aquifer, and mentioned that they provide storage to the bedrock aquifer. In this respect, the GSI modelling report for the Bog of the Ring wellfield of March 2005 (Document No. 9) refers to 5-15 m of gravels underneath the Bog and that these gravels 'are likely a more or less continuous layer. The saturated gravels are considered to contribute extra transmissivity to the groundwater system and also to provide extra groundwater storage'. Regarding the hydraulic connectivity of the gravels and bedrock in the landfill study area, the Applicant noted that, at a number of locations across the study area, groundwater levels are the same as in the bedrock, whilst in the east of the study area (borehole SR2) there are slight vertical upward hydraulic gradients between the bedrock and the gravel at this location (Article 14 submission of May 2007).

There was also discussion about the implications of Dr Sleeman's letter of 19th December 2006 to the Agency, which raised the possibility that the entire landfill footprint could be underlain by the Loughshinny Formation. Although Mr Cullen indicated that the Loughshinny Formation in particular has been shown to be an important aquifer in North County Dublin, Dr Sleeman ended his letter by saying 'the level of detail in the logs supplied does not make it possible to give any definitive answer to your question concerning changes to our [geology] map, but my comments above offer an alternative interpretation of the detail consistent with your site investigation information. It makes no practical difference to the overall picture of the geology or its influence on groundwater. Any minor lithological differences between the different geological formations, as far as the groundwater behaviour is concerned, are likely to be negligible; the groundwater behaviour is far more likely to be affected by faulting, and fracturing of the rocks by joints'. The interpretation of the bedrock geology in the landfill area is also addressed in a subsequent letter from Ms Hunter Williams of the GSI to the Agency (4th April 2007) which states 'as the impure limestones (Loughshinny, Naul and Lucan Formations) behave in a hydrogeologically similar manner, this distinction is not critical in the assessment of groundwater flow in the area south of the Bog of the Ring. What is more important is the depth to which significant fracturing and fissuring occurs'.

**Comment**

From the evidence provided, notably by the Geological Survey of Ireland (GSI), it is clear that there are no plans at present to change the classification of the aquifer from its current rating of a locally important aquifer that is generally moderately productive. Although the evidence provided at the oral hearing on the extent of the gravels suggests that these deposits may play an important role in adding to the storage and transmissivity of the underlying bedrock aquifer, it was again confirmed by the GSI that there are no plans to classify the gravel in this area as a separate aquifer (similarly, the gravel deposits present at the Bog of the Ring are not classified as a separate aquifer).

Regarding details of the bedrock geology and hydrogeology, we note the opinion of the GSI that the stratigraphic classification of the bedrock formations (between Loughshinny, Naul and Lucan Formations) is not a critical issue and it is the presence and depth of faulting that is more likely to be important with regard to aquifer characteristics.

### 2.3.4 Protection of Existing Groundwater Sources

It may be helpful to introduce this section by defining the terms *zone of influence* (ZOI) and *zone of contribution* (ZOC), since these underpin much of the discussion below. According to the US Environmental Protection Agency, the ZOI is the 'area of drawdown or the cone of depression around a well created by pumping', whilst the ZOC is the 'portion of an aquifer in which all recharge and groundwater flows towards a pumping well' (US EPA 'Handbook: Ground Water and Wellhead Protection', 1994). In Ireland, the ZOC is known as the source catchment area or the *Outer Protection Area*, whilst an area within the ZOC that is defined by the 100-day time of travel (TOT) from any point below the water table to the source is known as the *Inner Protection Area* (DoELG *et al*., 1999 Groundwater Protection Schemes). The boundaries of the ZOC are defined by groundwater divides and other aquifer boundaries. Note that the ZOI will only rarely equal the ZOC, for example where the water table is flat, which seldom occurs in practice. The extent of the ZOC is strongly influenced by the estimated recharge rate required to sustain a particular groundwater abstraction.

The existing groundwater abstractions in the area can be considered under two subheadings: the Bog of the Ring public water supply wellfield located to the north of the proposed facility, and the private wells, many of which are used in the horticultural industry, mainly located to the east and south of the proposed facility. Future groundwater sources are considered later in this document (Section 2.3.6) under the heading *Future groundwater development potential*.

*Bog of the Ring Wellfield*

Evidence provided on behalf of Applicant states 'The direction of groundwater flow within the locally important aquifer beneath the landfill footprint is towards the south-east away from the Bog of the Ring public water abstraction scheme' (Document No. 4); and again 'Water level monitoring data sets collected from June 2005 to November 2007 have consistently demonstrated that groundwater flow below the proposed landfill site is in a south-easterly direction towards Rogerstown Estuary and away from the Bog of the Ring through all seasons'.

Detailed information on the Bog of the Ring wellfield is included in the report prepared by TES Consultants (October 2006, reissued in January 2007), a copy of which was circulated at the oral hearing. This report includes (in an appendix) a groundwater modelling report by the GSI dated March 2005, a copy of which was also distributed at the oral hearing (Document No. 9).

The GSI modelling report indicates that 'The southwest [model] boundary is a NO FLOW boundary. It is defined mainly by surface water catchment boundaries, with which groundwater divides are considered to respond…… Along the southernmost part of this boundary, the groundwater divide is in a low-relief area. The location of the groundwater divide is presumed to coincide with the surface water catchment

divide. It is defined on this basis and with few data, and therefore its exact location is uncertain'. In their letter to the EPA dated 24th October 2006, the GSI provided further information on the data used to delineate this divide and reiterated their report's recommendation that there should be field data collection to verify the location of the groundwater divide.

The location of the divide is indicated by the GSI modelling study to move southwards due to pumping: 'The modelling suggests that the groundwater divide may move approximately 200 m southwestwards in the area of Rowans Little and Hedgestown…. when the abstraction rate is 3500 $m^3$/d' (the current abstraction rate; see Map 5 of that document). A further modelling scenario (for an abstraction of 5,000 $m^3$/d) indicated the boundary of the ZOC to move 40 m southwards in the Rowans Little and Hedgestown area, whilst an additional well 250 m south of PW1 (yielding 500 $m^3$/d, with 3,500 $m^3$/d from existing wells) would cause the boundary to migrate approximately 80 m southwards in the Rowans Little and Hedgestown area. The GSI report goes on to say that the 'predicted boundaries cannot be taken as definitive; neither the available data nor the conceptual model on which the numerical model is based nor the model grid allow precise delineation of the ZOC boundaries'. In their (Ms Hunter Williams) letter to the Agency dated 4th April 2007, the GSI add 'there appear to be insufficient monitoring points in the area between Rowans Little, Courtlough and Hedgestown/The Five Roads to ascertain with a high degree of confidence (a) the location of the groundwater divide and, particularly, (b) its lateral migration as a function of seasonal variations in recharge.'

As noted below, TES in their Bog of the Ring report suggest that the recharge value used by GSI (a value of 57 mm/year was used by the GSI for much of the modelled area) is an underestimate. They suggest, for an abstraction rate of 4,080 $m^3$/d (the treatment works capacity), that the cone of depression (or ZOI) should be calculated assuming 25% of the contributory area is recharged at a rate of 322 mm/year (the GSI upper value, representing 90% of the effective rainfall of 358 mm/year) and 75% of the area at a rate of 57 mm/year. The resultant area of the ZOI for this abstraction rate is 12 $km^3$ (Fig. 3 of the TES report). (The southern limit of this ZOI is about 800 m north of Rowans Little). The TES report, in the re-issued version of January 2007, does not of itself estimate the ZOC, but quotes the area of the ZOC from the GSI report (Map 5) as 17.5 $km^2$. The report concludes that 'there is no significant scope for increasing abstraction from the Bog of the Ring Aquifer' and 'Increasing abstraction from the scheme has the potential to over-exploit the aquifer, whereby there is insufficient recharge to the aquifer to meet the abstraction'.

A number of the submissions from the Objection Parties indicated that there is uncertainty over the position of the groundwater divide between the landfill footprint and the Bog of the Ring wellfield and speculated on the implications of, *inter alia*, the extent of the gravel; the north-south fault line which runs to the east of the footprint; the slope of the bedrock surface; the surface topography (e.g. Document No.27 and Document No. 43). Taking the gravel as an example, Mr Boyle argued that 'all indications at present then are that it would be capable of delivering water through the gravels to the Bog of the Ring' and 'The EIS and the Applicant's replies to the EPA have failed to address the issue of the possible contribution of these gravels below the landfill to the Bog of the Ring Zone of Contribution…' (Document No. 43). Mr Boyle also queried whether the groundwater divide would differ between the gravel

and underlying bedrock. Regarding the implications of the north-south fault, Mr Flanagan for the Applicant pointed out that an east-west fault is the dominant influence on the Bog of the Ring wellfield: a copy of a 1994 report by KT Cullen & Co. on the Bog of the Ring wellfield was circulated as Document No. 36 at the oral hearing, the report concluding that 'the aquifer associated with the original trial wells is related to the structural deformation associated with the fault. This fault runs in an east-west direction…'.

*Horticultural Wells*

Several Objection Parties provided evidence that water used in the horticultural industry must be of drinking water quality (e.g. Documents No. 8, 13, 18, 19, 20, 27, 32, 34, 39, 40, 43, 50, 52) – and must be perceived to be pristine too (e.g. Document No. 28 and evidence provided by Mr Bergin in relation to his Document No. 19).

Information on private wells is included in the Applicant's EIS (Volume 5, Appendix H, Appendix A8). This contains limited information on around 15 wells in the area, although many of the other households visited during the well survey were recorded as 'No answer, left card'. The appendix contains a map showing the locations of 10 wells in the vicinity of the proposed facility, six of which were sampled for water quality by the Applicant.

Further information on private wells was provided in submissions by the Nevitt Lusk Action Group (NLAG) e.g. Document No. 27 submitted by Mr White refers to '140 wells (the majority of which have industrial status) in the Fingal aquifer'. Submission No. 39 talks about the inadequacy of the Applicant's reporting on private wells: 'With the same map as our guide and just one phone call to the drilling company who carried out most of the drilling work in the area, the NLAG had the records of 92 wells….. The group later gathered information on a further 40 wells on the map.'

Details (by way of driller's logs, borehole geology logs, pumping test records, etc) are sketchy on borehole construction and, in particular, on sustainable yields from these wells. Document No. 43 includes some information on Mr John Thorn's, Mr Thomas Kerrigan's and Mr Thomas Moore's wells. Regarding Mr Kerrigan's well, it was indicated that the driller's estimate of yield was 1,900 $m^3$/d and pump capacity approximately 600 $m^3$/d; however, according to the Applicant, whereas the maximum summer abstraction for irrigation is 612 $m^3$/d, the pumping rate in winter (for vegetable washing) is reported to be much lower, at 6.5 $m^3$/d (Article 14 response of January 2007) (The Applicant's EIS indicated that this well is 115 m deep and has a '15 gallons/hour output' (about 2 $m^3$/d)). According to Mr Boyle, Mr John Thorn's well, which lies to the east-northeast of the proposed facility, has an estimated yield of 750 $m^3$/d. For both Kerrigan's and Thorn's wells, Mr Boyle suggested that the gravels beneath the landfill footprint could influence the ZOC for these wells. In the case of Kerrigan's well, Mr Boyle speculated that a fault line could connect the aquifer beneath the landfill footprint and the well. In oral evidence, Mr Thomas Moore indicated that his well was sunk about 40 years ago, and is about 40 m deep; it has UV water treatment. Document No. 27 (Mr White) refers to Moore's well as having a yield of 750 $m^3$/d. The Applicant's well survey indicates the well to be 25 m deep and that 'It produces approximately 10,000 gallons/day' (approximately 45 $m^3$/d).

Mr Bergin gave evidence about his own well (Document No. 19, but the well details are not included in the written submission): this was drilled in 1999, is 130 m deep and has a 9 inch (225 mm) diameter; the main water inflow occurs at around 90-100 m depth. The well is reportedly capable of yielding up to 25,000 gph (2,700 $m^3$/d); it was pumped for 6 months without stopping (April to September 2006, with the 25,000 gph capacity pump set at around 85 m depth); the static water level is around 4 m below ground level whilst the pumping water level is reportedly at approximately 15 m bgl. The well is located at Roscall, about 3.5 km south of the proposed facility; it apparently lies on the intersection of north-south and east-west faults. It also supplies several neighbouring farms via a gravity feed into three local streams (the Turvey, Ballboghill and Corduff rivers). This well was not included in the survey of wells in the EIS.

ZOCs have not been defined around these horticultural wells and no evidence was provided at the oral hearing, although Mr Declan White for NLAG did refer to a 2006 submission by White Young Green concerning the possible extent of the ZOCs of private wells beneath the landfill footprint (Document No. 27). White Young Green, in their written submission to the Agency dated 23rd November 2006, estimated the extent of the ZOCs for Kerrigan's and Moore's wells, based on limited data, and showed the ZOCs to intersect the landfill footprint area. They then recommended that the 'EIS delineate the source protection areas for the wells considered to be at risk of becoming contaminated from the proposed landfill'. In their Article 14 response of January 2007, the Applicant responded to this third party submission by stating that the measured directions of groundwater flow had not been taken into account for Moore's well and, in the case of Kerrigan's well, the actual discharge rate rather than the driller's estimate of yield should have been used. At the oral hearing, Mr Herlihy for the Applicant indicated that Kerrigan's, Moore's and Thorn's wells were not down gradient of the proposed landfill. Mr Boyle suggested the gravels could extend from beneath the landfill to Kerrigan's well. Mr White also commented on the possible impacts of faulting on flow directions and ZOCs to the horticultural wells.

**Comment**

Considering first the implications of the proposed development with respect to the Bog of the Ring wellfield, the evidence available indicates that the groundwater divide lies north of the proposed development and that the zone of contribution of the wellfield does not extend beneath the proposed landfill footprint. The exact position of the groundwater divide is not certain (it appears to lie approximately 500 m north of the proposed landfill footprint) and additional monitoring boreholes would be required to establish this position with greater accuracy. We consider it unlikely that the position of the divide would differ between the bedrock aquifer and the overlying gravel layer: for example, the Applicant's May 2007 submission suggests the heads are generally similar and therefore the two formations are likely to be in hydraulic continuity.

From the evidence provided by the Applicant, an increase in abstraction from the Bog of the Ring wellfield is unlikely, so any movement of the groundwater divide in the future would be more likely to occur as a response to variations in recharge. In particular, it is possible that the wellfield ZOC and hence the divide could move further southwards if there were a prolonged drought (and existing levels of abstraction were maintained); although the exact extent of such movement is not

known, it seems unlikely that the divide would move sufficiently far south so as to encompass the proposed landfill footprint within the wellfield ZOC. Nevertheless, in the event that the landfill is permitted to proceed, it is recommended that additional monitoring boreholes should be installed in the vicinity of the groundwater divide to establish its position with greater accuracy and to monitor any changes in its position over time. Groundwater quality should also be monitored in this area.

Turning to the private (mainly horticultural) wells, it can be inferred from the groundwater level contour maps provided by the Applicant that Moore's well and Thorn's well are highly unlikely to be hydraulically down gradient of the landfill footprint. With respect to Kerrigan's well, the groundwater level map for 6th December 2006, contained in the Applicant's Article 14 submission of January 2007, includes Kerrigan's well (earlier maps did not) and, as such, the water level contours extend further south than those on previous maps. Although the contouring suggests that Kerrigan's well is not down gradient of the proposed landfill footprint, we consider that there is insufficient groundwater level data available south of the landfill footprint to be able to assess, with confidence, flow directions in the vicinity of Kerrigan's well and wells further to the south.

### 2.3.5 Conceptual Model and Risk Assessment

The Applicant's conceptual model is described in Section 3.6 of Volume 5, Appendix H of the EIS, whilst a qualitative risk assessment is included in Section 5 of the same volume. The conceptual model is illustrated in Fig. 9 within Section 3.6. At the oral hearing there was considerable criticism from Objection Parties, including Mr Cullen and Dr Ashley (the latter on behalf of NLAG), that this figure was simplistic and inadequate as a conceptual model, in that it does not, for example, indicate the extent of the gravels occurring between the till and bedrock (it shows only gravel lenses), nor does it indicate the extent of fracturing or faulting of the bedrock aquifer. The Applicant responded by saying that these and other issues are discussed in the accompanying text, and that it is both the text and diagram together that should be regarded as the conceptual model. Mr Mulcahy, for Greenstar, also argued that the conceptual model is inadequate as it does not include the historic landfill (a separate risk assessment/conceptual site model for the historic landfill was included as Attachment H.1 in the Applicant's Waste Licence application). Mr Mulcahy enquired if the groundwater quality (including elevated ammoniacal nitrogen levels) at borehole GS18 is likely to have been affected by leachate from this historic landfill. Mr Doak for the Applicant responded by saying that this contamination could be from agricultural or other sources. Dr Ashley subsequently stated in evidence that the presence of some ammonia and faecal coliforms in groundwater samples suggested that pathways to groundwater already exist.

Dr Ashley indicated that he would have expected a far more complex conceptual model to be developed after the site investigations; such a detailed conceptual model should have included: rainfall, recharge, how groundwater moves, interactions between gravels and bedrock, extent of gravels, and a water balance for the system. In his view, a computer model would be needed to address all of these factors. He noted that the LandSim model, which is widely used within the UK, would not be suitable because the proposed landfill is below the water table. (Fig. 9 shows the proposed leachate level to be below both the 'perched water table' in the superficial deposits and below the piezometric surface of the bedrock aquifer). The qualitative

risk assessment notes that 'Across most of the site, this head difference will provide a positive hydraulic gradient from the surrounding subsoil inwards to the landfill cell, therefore contaminant migration to the subsoil via advection and dispersion is not possible. The only method by which contaminants may migrate to the subsoil is via diffusion which will be very slow and which will also have to bypass the engineered lining'.

Mr Cullen argued that the conceptual site model provided by the Applicant underestimates the magnitude of the groundwater resource by failing to record e.g. the extent of the fault-controlled bedrock trough beneath the landfill footprint; the extent of the 'gravel aquifer'; the high degree of faulting recorded by the geophysics; and the change in piezometric surface along the southwestern edge of the footprint. Mr Cullen provided an alternative conceptual model (Fig. 2 in Document No. 22) which shows, *inter alia*, a gravel layer beneath the footprint, fault zones and a postulated ZOC (and 100-day TOT) to a hypothetical wellfield located east of the landfill.

In their qualitative risk assessment, the Applicant describes how the combination of low vulnerability and locally important aquifer at the site indicates an R1 response according to the Groundwater Protection Scheme. This was also reiterated in evidence provided on behalf of the Applicant at the oral hearing (Document No. 4), and in the closing statement by Mr Flanagan on behalf of the Applicant which concluded 'The GSI have affirmed the Resource Protection Matrix [response rating] R1 for the proposed development' (Document No. 54). It was noted at the oral hearing by a Geological Survey of Ireland (GSI) witness - and previously in a letter from the GSI to the Agency dated 24th October 2006 - that the groundwater protection responses are only intended for outline planning and screening of potential development sites, and that the risk assessment (and risk response) at any site will be based on the detailed site investigations carried out at that site.

The qualitative risk assessment in the EIS follows the source-pathway-receptor model. The source is the leachate, and the general characteristics of landfill leachate are described. The discussion of pathways covers the migration mechanisms for leachate (advection, dispersion and diffusion), the proposed engineered barrier (including the proposed composite liner), the natural geological barrier (more than 10 m of clay retained at the base of the landfill) and contaminant transport in the bedrock aquifer (dilution and dispersion). The section on receptors concludes that the Bog of the Ring water supply scheme is not a receptor ('there is no pathway between the groundwater at the proposed landfill site and the Bog of the Ring Water Supply Scheme') and, in respect of private wells, that there are 'no groundwater users down gradient of the proposed landfill'. The EIS also concludes that there is 'negligible risk of pollution' to the groundwater dependent ecosystems located 6 km and 10 km down gradient of the study area, and that this 'also applies to down gradient surface water receptors'.

As the name suggests, the qualitative risk assessment summarised above is entirely qualitative. However, the Applicant in Article 14 responses provided some additional, quantitative data. The submission of January 2007 provides an estimate of the likely leachate leakage rate from the landfill (estimated as 0.1 $m^3$/d or 100 l/d). The same section also considers the likely groundwater flow rate beneath the landfill (1504 $m^3$/d) and hence calculates the dilution factor (15,000).

Several of the Objection Parties at the oral hearing referred to the fact that the Agency had requested a numerical modelling study to be undertaken by the Applicant, but that the Applicant had not done so. The purpose of the Inspector's request was for such a model 'to determine (a) the impact on the groundwater flows at the proposed landfill area of the additional abstraction wells along indicated area of land [south of Decoy Bridge along a zone roughly parallel to the M1], and (b) the combined zone of contribution for the existing Bog of the Ring abstraction system and the theoretical new abstraction wells'. In not constructing a groundwater model, the Applicant responded by stating that 'it is not Fingal County Council's plan to further develop groundwater resources in the area' (Article 14 submission dated January 2007). At the oral hearing Mr Herlihy for the Applicant stated that sufficient site information was available without requiring a model.

Regarding the pollution risk from the proposed landfill, Mr Cullen agreed, in cross examination by Mr Flanagan, that no direct discharge to groundwater would occur because of the presence of low permeability clay. Again, in response to a question from Mr O'Sullivan (for the NLAG), Mr Cullen indicated that a properly engineered landfill would not lead to significant deterioration of groundwater quality beneath the site. The closing statement provided on behalf of the Applicant states 'The characteristics of the site mean that there will not be any risk to the groundwater as suggested. This position is endorsed by the evidence of Mr Kevin Cullen, in cross examination' (Document No. 54).

**Comment**

The Applicant has provided a conceptual model for the site and a risk assessment that is mainly qualitative rather than quantitative. Considering first the conceptual model, the revised geological maps provided by the Applicant (rockhead elevation; gravel thickness) and the alternative maps, cross sections and interpretations provided by the Objection Parties (especially by Mr Cullen), enable some refinement of the site conceptual model but do not, in our opinion, radically alter that model as described in Section 3.6 of Volume 5, Appendix H of the EIS. In making this comment, we are taking the conceptual model to encompass the text of Section 3.6 as well as the Fig. 9 therein, noting that the latter, in our view, is a rather simplistic illustration of the model. The gravel is certainly more extensive than shown in Fig. 9 but, as noted in the discussion of *Aquifer classification* above, it is not considered so extensive for the GSI to classify this layer as a separate aquifer. With respect to faults, and their likely extent in the vicinity of the landfill, it is worth pointing out here that the EPA 2006 document 'Landfill Manuals: Manual on Site Selection (Draft for Consultation)' states that 'In locating areas suitable for landfill, it is difficult to avoid being on, or close to geological 'faults'. Even though the majority of faults increase the permeability of the bedrock in the fault zone it would normally not be appropriate to rule out or downgrade a site because of the presence of faults' and that 'It is recommended that there should be no general prohibition of landfill siting on areas with geological faults'.

Turning now to the risk assessment, the risk assessment in the EIS is entirely qualitative, and the only quantitative component is included in the Article 14 submission in which leakage losses through a composite landfill liner were calculated, together with the estimated dilution factor should this leakage reach the groundwater. The Applicant has not, *inter alia*, made estimates of the concentrations of key

components of leachate (such as List I and List II substances as given in the EU Groundwater Directive) in any leakage that might reach particular receptors such as the aquifer beneath the landfill footprint, the aquifer at the edge of the site boundary or a potential receptor such as a nearby private well; Kerrigan's well, for example, even though it may not lie directly down hydraulic gradient of the landfill, might have been a suitable conservative choice as a receptor to investigate the implications of any release of leachate into groundwater and how key constituents might be diluted or attenuated prior to reaching that well. Nor has the Applicant tried to quantify, for the case where there is an inward hydraulic gradient to the landfill (as predicted for most of the site), the escape of contaminants though a composite liner by diffusion. In this respect, the Environment Agency of England and Wales 2004 report 'Contaminant fluxes from hydraulic containment landfills: a review' contains a detailed literature review and gives methodologies for estimating leakage by diffusion of pollutants from hydraulically contained landfills.

There was considerable discussion at the oral hearing about the need or otherwise for the Applicant to provide a groundwater model, although it should be remembered that the request from the Agency was for a model to assess water movement in the site area rather than investigate contaminant transport. The EPA's 'Landfill Manuals: Investigations for Landfills' (1995) states that the interpretative report should 'provide groundwater maps and an assessment indicating known aquifers, catchment boundaries, flow directions, abstraction rates, groundwater contours, and water quality data. A model may be used at design stage to predict the effects of the project on groundwater and form part of the risk assessment for the project.' A model is therefore an option, but not obligatory according to those guidelines. As an example of (more recent) guidance elsewhere, the Environment Agency of England and Wales report 'Hydrogeological Risk Assessments for Landfills' (2003) describes 'simple' and 'complex' risk assessment. Simple assessments 'should be carried out for landfills when the previous risk screening is insufficient to make an informed decision on the risks posed by the site'. (Table 3.1 in that report suggests that risk screening may be adequate for scenarios where the waste is inert, or where non-hazardous wastes are being considered for low permeability strata such as 'non-aquifer'). Simple risk assessments will generally be applicable 'in less sensitive locations where the risk screening and prioritisation have not identified any receptors that would be particularly susceptible to the consequences of leachate pollution. Where there is uncertainty regarding any of the source, pathway and receptor terms, undefined groundwater patterns including the potential for fissure/conduit flow or long-term liner integrity, and a robust decision cannot be made using conservative inputs, methods and assumptions, then a complex risk assessment should be carried out'. It is clear in the report that even a simple risk assessment should be quantitative: 'Simple risk assessments should consist of simple quantitative calculations, typically analytical solutions solved in a deterministic fashion using conservative input parameters, assumptions and methods.' A complex risk assessment would involve quantitative assessments using stochastic techniques, and more site characterisation data.

In assessing risk, the Applicant has relied to a large extent on the groundwater protection matrix in which the combination of low vulnerability (as indicated by the presence of 10 m of low permeability clay) and locally important aquifer designation indicates an R1 ('Acceptable') response. However, as pointed out by the GSI, this

groundwater protection matrix is only intended as a planning tool, and does not of itself replace the need for a site risk assessment following the detailed site investigations. In our view a quantitative risk assessment is necessary for such a large development as this in order to evaluate fully the contamination risks. Whilst we feel it is unlikely that a landfill at this proposed location will lead to a deterioration in groundwater quality, based on the information available we cannot conclude with confidence that no pollution will occur. More specifically, we cannot conclude with confidence that the discharge to groundwater of List I or List II substances (as per the Groundwater Directive) would be in a quantity and concentration so small as to obviate any present or future danger of deterioration in the quality of the receiving groundwater.

### 2.3.6 Future Groundwater Development Potential

There was considerable debate at the oral hearing about the impact of a landfill, should it proceed, on future groundwater exploitation in the area. In the Applicant's Article 14 submission of May 2007, ZOIs were delineated approximately for two wellfield locations, one on the fault line extending south of Decoy Bridge, to the east of the landfill footprint, and the second further south, around Annsbrook and Corduff where 'potential groundwater development could be possible here assuming that the fault zone continues further south'. In both cases, the ZOIs were delineated for hypothetical abstraction rates of 2,000 and 4,000 $m^3/d$, and the recharge rates used to estimate the ZOIs were the same as those used by TES in their Bog of the Ring study. Fig. 2 in that Article 14 submission shows the ZOI for the hypothetical wellfield east of the landfill to overlap with the ZOI delineated by TES for the Bog of the Ring wellfield, and also to include the landfill footprint. Fig. 3 shows the ZOI for the alternative hypothetical wellfield located further to the south, and this ZOI does not extend either to the landfill footprint or to the Bog of the Ring ZOI. (This is the interpolated ZOI for the wellfield, not the ZOC). In concluding this analysis of hypothetical wellfields, the submission reiterates that Fingal County Council does not propose an additional groundwater abstraction scheme for the area 'due to the sustainability and cost implications of such a supply'. At the oral hearing, Mr Spain on behalf of the Applicant confirmed that Fingal County Council is not proposing to increase groundwater abstraction in the area.

Mr Cullen, in his submission at the oral hearing, argued that a numerical modelling study, if one had been carried out, would have shown that the proposed landfill would fall within 'the 100-day TOT Zone of the groundwater source located south of Decoy Bridge and identified by the GSI'. Furthermore, the landfill would fall within 'the ZOC and potentially the 100-day TOT Zone associated with the source of groundwater identified by the Applicant (but as yet unproven) to the south of the landfill'. In Fig. 7 of his submission, Mr Cullen illustrates a possible ZOC for the hypothetical wellfield south of the landfill indicated by the Applicant in their submission of May 2007. The ZOC, as shown on the drawing, extends northwards to the groundwater divide and thus encompass the landfill footprint (this ZOC is inferred, as it is not based on actual water level data). Mr Cullen also pointed out that 'at least 2 if not 3 of the Applicant's proposed pumping wells in the alternative wellfield are [to] be located in that part of the Lucan Formation which is much less productive than the Loughshinny and Lucan Formations found at Nevitt'. In cross examination by Mr Boyle, Mr Cullen noted that the impact of these hypothetical wells on Mr Bergin's wells would need to be considered.

Mr Cullen referred to the proposed landfill as 'sterilising a significant groundwater resource', that this would 'hardly qualify as protection a groundwater body', and he also argued that the aquifer properties to the south are possibly less productive. Mr Cullen quoted Section 2.2 of the 2006 EPA 'Landfill Manuals: Manual on Site Selection (Draft for Consultation)' concerning sustainable development: this can be achieved by, *inter alia*, 'avoidance of areas of significant natural resource quality in terms of usable groundwater….'; and Mr Cullen went on to state that the proposed landfill development does not comply with this guidance. Mr Cullen pointed out that well yields from 1,000 to 4,000 $m^3$/d have been obtained from the Loughshinny Formation elsewhere and referred to a well at Trim capable of yielding 4,000 $m^3$/d. (In response to queries from Mr Misstear, Mr Cullen confirmed that this borehole is in the Loughshinny formation; that the yield estimate was based on an extended pumping test; and that no estimate of recharge and hence of sustainable yield has been made).

The NLAG in their closing statement also referred to the potential for 'sterilising a significant portion of the aquifer' were the landfill to proceed (Document No. 52). Mr White presented a physical model showing the Fingal aquifer to be part of a larger aquifer extending from Offaly to Fingal via Kildare and Meath (Document No. 27 includes a photo of this model).

Mr Cullen argued that there is a significant groundwater resource beneath the landfill footprint and also within the wider study area, and that the investigations carried out by the Applicant 'did not, nor were they intended, according to the Applicant, to establish the full extent of the groundwater resources beneath the Nevitt area.' Mr Cullen also pointed out that 'The Applicant did not carry out the requested numerical modelling exercise and the absence of the numerical model has prevented any assessment or determination by the Agency of the full potential of the groundwater resources at the Nevitt site'. Mr Cullen explained, in oral evidence, that he had written to the Agency on 1st and 31st March 2007 saying that this modelling should be done. In his closing statement, Mr Cullen stated 'The unexplained failure by the Agency to secure the modelling and the information which it had requested is of significant concern' Document No. 49).

Mr Mulcahy, for Greenstar, in his closing statement, also argued that the Council 'have not carried out the investigations at the site necessary to determine the extent of the water resource potentially affected by the development' and 'It is clear from evidence adduced at this hearing that the model would have informed the Agency of the manner in which the hydrogeology below this proposed landfill works, and of the extent of the resources thereunder'. The same document also discusses the purpose of the Groundwater Protection Matrices, that these are intended as 'merely a planning tool' and contends that 'The matrices would be rendered a nonsense if no value judgment is made as to whether in any given case a known resource may be more worthy of protection than a known source' (Document No. 53).

It was also Mr Cullen's view (Document No. 22) that a similar significant groundwater resource will not be readily available elsewhere in the Fingal area, as the groundwater potential of the Nevitt site relies on the high degree of faulting in the

limestone bedrock, plus the overlying gravel deposits, and such conditions have not been identified elsewhere.

The influence of groundwater recharge on the potential for additional groundwater abstractions in the area has been addressed in some of the documents circulated prior to and during the oral hearing. For example, the GSI, in their letter to the Agency dated 4th April 2007, state that 'In terms of resource potential of the aquifer to the south of the Bog of the Ring, whilst high transmissivities are certainly one component of a potentially significant groundwater resource, sufficient recharge to the aquifer is also required to balance-out abstractions whilst also maintaining existing groundwater flow to natural systems (e.g. rivers and other ecosystems)'.

The TES report 'Groundwater monitoring of the Bog of the Ring: Final hydrogeological assessment' of October 2006, but reissued in January 2007, also makes the same point as the GSI, that a limiting factor on sustained supplies from the Bog of the Ring wellfield is low potential for the aquifer to receive recharge, although TES go on to say that 'the recharge rate [used by the GSI in their modelling exercise] is considered conservative… The water level monitoring programme has shown response to rainfall events, suggesting that recharge may be higher than used in the model…. It is suggested that with a slightly higher recharge rate incorporated into the model, which would be justified based on the water level monitoring programme, an abstraction rate of 4,000 $m^3$/d [the current operating capacity of the treatment works] would be readily achievable'. Nevertheless, and as noted above, the report concludes that 'there is no significant scope for increasing abstraction from the Bog of the Ring Aquifer' and 'Increasing abstraction from the scheme has the potential to over-exploit the aquifer, whereby there is insufficient recharge to the aquifer to meet the abstraction'. Again, 'Based on existing studies of the Bog of the Ring Aquifer, the estimated sustainable yield from this aquifer is approximately 4,000 $m^3$/d (+/- 15%)'. Furthermore, the report points out 'The initial pump testing of the production boreholes indicated that the aquifer was highly productive…… However, following 3 years of almost continuous abstraction, the hydraulic characteristics have decreased significantly. It is concluded that the initial pump tests resulted in an over-estimation of the productivity of the aquifer.'

Under requirements set down by the European Union Water Framework Directive, the country is divided into a series of River Basin Districts and its aquifers are categorised into a series of *groundwater bodies*. The quantitative and qualitative status of each groundwater body have been defined as part of an initial characterisation of River Basin Districts. According to the EIS (Volume 5, Appendix H), the Eastern River Basin District project has delineated two groundwater bodies underlying the landfill study area: the Lusk-Bog of the Ring and the Hynestown, with the majority of the study area being underlain by the former which reportedly extends over an area of 86 $km^2$. The Lusk-Bog of the Ring is the only one of the three daughter groundwater bodies of the Lusk groundwater body that is included in risk category '1b – probably at significant risk' from potential over-abstraction.

In respect of the argument by Mr Cullen that the Applicant had not given due regard to the sustainable development of groundwater in the vicinity of the proposed development, the closing statement on behalf of the Applicant states 'It is abundantly clear that it is the policy of Fingal County Council as the relevant water authority not

to engage in the development of any further public water supply in the area', (Document No. 54).

Mr Misstear asked Mr Cullen if, in his opinion, there are potentially existing sources of pollution that could inhibit groundwater development in the area. Mr Cullen suggested that the good quality of existing groundwater sources (horticultural wells) in the area indicates a low pollution risk.

**Comment**
It is clear from the evidence available that there is little scope for increasing the abstraction significantly from the existing Bog of the Ring wellfield located north of the proposed facility site. As noted above (in Section 2.3.4 *Protection of existing groundwater sources*) we consider it unlikely that the ZOC of the Bog of the Ring wellfield will extend sufficiently far south in the future so as to encompass the proposed landfill site (but groundwater level monitoring would be required to confirm this in the event that the landfill development proceeds).

From the information available, it is likely that there are potentially exploitable groundwater resources in the vicinity of the proposed facility, notably to the east (on the fault line extending south from Decoy Bridge) and possibly also to the south. Additional investigations would be required both to quantify the resource and to assess the extent of the ZOCs of any future wellfields (such investigations would require the collection of additional field data on aquifer properties and groundwater levels to the east and south of the proposed facility, plus the construction of a numerical groundwater model to help predict the effects of potential abstractions). However, even in the absence of this additional information, we consider that the construction of a landfill would inhibit future groundwater development to the east and also possibly to the south of the proposed site, in that, in line with the precautionary principle, a responsible water supply provider is unlikely to locate a new wellfield where there would be a large landfill site within its potential zone of contribution (ZOC). As noted in evidence discussed above, the EPA's draft manual on landfill site selection refers to how sustainable development can be achieved by, *inter alia*, 'avoidance of areas of significant natural resource quality in terms of usable groundwater….'. That EPA document also goes on to state that 'Hydrogeological investigations should include assessment of the type and distribution of aquifers. The importance of the groundwater distribution, thickness and depth of the aquifers together with the permeability or transmissivity of the aquifers also need consideration. The importance of the groundwater resource should be established including protection zones, beneficial uses and the interaction between groundwater and surface water sources.' It seems clear, therefore, that the term 'usable groundwater' should be considered in relation to the importance of the groundwater resource and hence the aquifer classification, in this case a locally important aquifer.

The Applicant has made it clear that Fingal County Council is not proposing to develop new wellfields in the area. Nevertheless, the impacts of a landfill on other potential users of groundwater should also be considered; for example, the development of new horticultural wells. Again, following the precautionary principle, we would not regard it as good practice to install new industrial or private wells where there is a large landfill site within their ZOCs, even if the risk of groundwater pollution is small. In our opinion, therefore, the landfill, if it is to proceed, could

inhibit some future groundwater development in the area. There is insufficient information available to determine the extent of the aquifer area that might be 'sterilised' by a landfill development.

## *2.4 Surface Water/Leachate Management/Geotechnical Issues*

### 2.4.1 Emissions to Surface Water

A number of Objection Parties highlighted the risk of discharges to the surface water system around the proposed facility. The risks identified included: (i) the risk of leachate escaping from the waste cells, entering the drainage system under the waste cells and then passing to the on-site surface water management system and finally entering the surface water system; (ii) the risk of contamination entering the surface water system affecting the horticultural sector which extracts water for irrigation from rivers in the area; and (iii) the quantity and impact of the discharge of water associated with the drainage of groundwater encountered during site excavations.

**Comment**

The Applicant identified in their waste licence application that they would construct a surface water management (attenuation) system on-site through which all uncontaminated surface water arising on-site would pass prior to entering the Corduff River. The surface water management system is primarily an attenuation and settlement pond(s) which will control the rate of discharge to the existing surface water system (Corduff River) around the proposed facility and also reduce suspended solids in the discharge. The discharge rate from the surface water management system will be controlled by a 'hydro-brake'. In addition, surface water run-off from areas of the facility where the surface water run-off may become contaminated with oil or petrol shall pass through an oil interceptor prior to discharge to the surface water management system. Surface water run-off from areas where the surface water may become contaminated with waste or pollutants shall be directed to the on-site waste water treatment plant (leachate and waste water treatment plant) and the treated effluent shall be discharged to sewer or tankered to an agreed waste water treatment plant or re-circulated to capped waste cells.

The Applicant acknowledges that leachate may escape from the engineered lined cells. Therefore, the installation of a drainage blanket under the entire facility may result in the leachate, which may leak from the lined cells, entering the drainage blanket and then passing to the surface water management system and/or being distributed under the landfill footprint. It is considered more appropriate that drainage only be installed in those areas where it is required, such as where groundwater is encountered during site excavations.

The PD issued includes a requirement for the water from the drainage blanket to be monitored for the same parameters and at the same frequency as the groundwater (Schedule C.6 Ambient Monitoring, Groundwater Monitoring). If any contamination is identified in the drainage water it shall be directed to the on-site waste water treatment plant rather than the surface water management system.

There is no authorised discharge of effluent or leachate to the surface water system (Corduff River) and there are monitoring requirements included in the PD issued to

identify any contamination in the discharge to the Corduff River. If contamination is identified the licensee shall take remedial measures. Therefore, it is considered that the proposed facility is not likely to cause an environmental risk to the surface water system or to the horticultural industry down stream of the proposed facility (which uses water from the Corduff River for irrigation purposes).

The PD as issued under Condition 3.4.1 requires that: 'Three months in advance of the commencement of site development, the licensee shall submit to the Agency for its agreement a construction schedule, sequence and timescale (Construction Plan) incorporating the requirements of this licence and to give effect to the commitments in the application documentation.' Therefore, the sequence of construction and development on-site requires the agreement of the EPA prior to development commencing.

In the event that a waste licence is granted for the proposed facility to proceed we recommend that the following conditions/schedules be included/amended:

- Amend Condition 3.7.2 to require the installation of a drainage layer only where necessary.
- The licensee shall install the surface water management system as part of the 'Initial Development Works' identified in Condition 3.4 of the PD issued.
- The licensee shall install the waste water treatment plant prior to the commencement of acceptance of waste at the proposed facility.
- Monitoring of the discharge from the drainage layer(s) installed is provided for under Schedule C.6 (Ambient Monitoring, Groundwater Monitoring) and shall take place prior to entry to the surface water management system.
- The drainage system shall be diverted to the on-site waste water treatment plant if monitoring results indicate contamination in the drainage water.

### 2.4.2 Leachate Management

The proposed discharge of leachate from the proposed facility to the Local Authority sewer in Lusk was questioned by Mr O'Donnell, for NLAG: in particular, he asked if an analysis of the practicality or feasibility of pumping leachate to sewer had been included in the EIS. Mr O'Donnell also questioned the proposal to re-circulate leachate.

The Applicant identified that a proposed route for the pipeline, and associated wayleaves, had not been established to date. The Applicant clarified that they propose to pipe treated leachate to a Local Authority sewer at Lusk from where it will be piped to the proposed Portrane Waste Water Treatment Plant. In relation to re-circulation of leachate, the Applicant confirmed that they had proposed to re-circulate leachate but that they would require approval from the EPA under the terms of the PD issued before they could commence such activity

Mr Boyle, for NLAG, claimed that the proposed waste water treatment plant at Portrane was subject to significant opposition and questioned whether it would be developed. Mr Daly, Fingal County Council, for the Applicant, stated that the proposed Portrane waste water treatment plant referred to in the waste licence application and EIS is not the regional treatment plant but is a waste water treatment plant which had been granted approval by An Bord Pleanala for a 65,000 p.e. (population equivalent) capacity plant and the proposed plant included provision for

acceptance of leachate from the proposed facility. Mr Boyle expressed concern about the risks associated with tankering leachate to other Local Authority WWTPs as is proposed by the Applicant.

Ms Averill, Central Laboratories, and witness for the Applicant, stated that she had calculated emission limit values in response to a request received by Fingal County Council from the EPA under Section 52 of the Waste Management Acts 1996 to 2008. The emission limit values related to the acceptance of pre-treated leachate from the proposed facility at the proposed Portrane Waste Water Treatment Plant. Ms Averill identified that the emission limit values included in the Section 52 response had been based on daily mean concentrations, whereas the PD issued by the EPA specified the same emission limit values as maximum values. On the basis of the emission limit values being maximum values she proposed that the emission limit values for zinc and chloride, in particular, should be increased. Mr Mulcahy, for Greenstar, questioned the scale of increases requested. Ms Averill justified the increased emission limits on the basis that the pipeline from the landfill to Lusk would have no storm water overflows. Ms Averill clarified that she had only considered the appropriate limits for acceptance of leachate by sewer to the proposed Portrane WWTP.

**Comment**
In their waste licence application, the Applicant proposed that leachate arising on-site would be (i) treated on-site prior to discharge to sewer or tankered to a Local Authority waste water treatment plant; or (ii) re-circulated back to capped waste cells. The site is not currently connected to a sewer, therefore a new sewer will have to be installed between the proposed facility and Lusk. The waste licence application does not include the proposed sewer connection and the Applicant confirmed that a route has not been established. The sewer required would be c.3.5 – 4 kilometres.

The Applicant identified that the treated leachate to be piped to Lusk would enter the existing sewer system and be transferred to the proposed WWTP at Portrane. The Applicant's evidence states that this facility has received approval from An Bord Pleanala, includes provision for acceptance of leachate, and has a proposed treatment capacity of 65,000 p.e. (population equivalent). The Water Services Investment Programme 2007-2009, Department of Environment Heritage and Local Government identifies 'Portrane Donabate/Rush/Lusk Sewerage Scheme' as a scheme to start in 2009 and is allocated €62.4million.

The Applicant requested permission, in their waste licence application, to tanker pre-treated leachate to waste water treatment plants operated by Fingal Co. Co. The use of tankers is proposed as a temporary measure. We consider it unfeasible and undesirable to tanker leachate from the proposed facility for any significant period of time. Provision for tankering of leachate provides flexibility for the Applicant and an alternative if there were to be any temporary interruption to the sewer pipeline. The PD issued includes provision for the tankering of pre-treated leachate to WWTPs subject to the licensee demonstrating capacity at the receiving waste water treatment plants to the satisfaction of the Agency.

Leachate re-circulation is identified in Section 5.5.1 of the EPA Manuals Landfill 'Operational Practices' (1997) and Section 7.5 of EPA Manuals 'Landfill Site Design' (2000). Leachate recirculation offers benefits which include that it will 'assist in the

bio degradation process and hence shorten the period required for stabilisation of a landfill in the short to medium term.' It is identified that there are a number of prerequisites for an effective leachate recirculation system including appropriate lining and leachate collection system, and leachate level monitoring. The PD as issued includes provision for the recirculation of leachate subject to cells having been lined to the satisfaction of the Agency and the final capping having been installed.

The emission limits proposed in the Section 52 response from Fingal County Council are based on the samples being daily composite samples (daily mean concentrations) whereas the PD specified the emission limits as maximums based on grab samples. The leachate arising on-site will be balanced in the leachate lagoon prior to treatment on-site after which the leachate shall be pumped off-site for further treatment. Composite sampling of effluent discharges is common practice for waste water treatment plant discharges to sewer or receiving waters and would be considered appropriate for this proposal.

In the event that a waste licence is granted for the proposed facility to proceed we recommend that the following conditions/schedules be included/amended:

- The licensee shall provide a sewer pipeline to the Lusk sewer prior to the acceptance of waste at the facility;
- The licensee shall demonstrate to the satisfaction of the Agency that there is adequate capacity available at the Portrane waste water treatment plant for the acceptance of leachate from the proposed facility prior to acceptance of waste at the facility (Condition 5.4 of PD as issued); and
- The licensee shall sample by composite sampler the treated leachate prior to discharge. The emission limit values and monitoring frequency originally submitted by Fingal Co. Co. in response to the Section 52 notice shall be included in the schedule.

### 2.4.3 Geotechnical Issues

Mr Boyle, for NLAG, raised concerns in relation to the stability of the excavations necessary to accommodate the proposed facility (slope stability), stability of the waste when landfilled, and risks associated with blow-out and base heave particularly following installation of the liner and prior to placement of the waste. Mr Boyle questioned the Applicant in relation to their assessment of these risks and also raised them within his own witness statement. The Applicant indicated that they had considered the risks identified by Mr Boyle and did not expect them to pose any significant difficulty; dewatering of groundwater was identified as one mitigation measure. The Applicant noted that calculations in relation to slope stability would be undertaken during the construction of the facility. Mr Orsmond, for the Applicant, identified general situations when base heave or blow out can occur but stated that he did not consider such circumstances likely to occur at this site due to greater than 10 metres of clay remaining after excavation; also, any groundwater encountered would be drained from the proposed site.

**Comment**

The stability of the waste and its foundation are essential to the performance of a landfill containment systems particularly the liner system. An assessment of slope stability should be conducted during each phase of the construction, filling and

capping of a landfill to ensure that the liner and capping will not be compromised. The following critical issues relating to stability and settlement are identified in the BAT Guidance Notes for the Waste Sector Landfill Activities (EPA, Draft April 2003): liner failure during the construction and operational phases; settlement or slippage of waste during the operational phase; and settlement during the post operational phase.

Stability is identified under Annex I of the Landfill Directive, which states that 'the emplacement of waste on the site shall take place in such a way as to ensure stability of the mass of the waste and associated structures, particularly in respect of avoidance of slippages. Where an artificial barrier is established it must be ascertained that the geological substratum, considering the morphology of the landfill, is sufficiently stable to prevent settlement that may cause damage to the barrier.'

Significant site investigations have been undertaken by the Applicant: these investigations do not identify a geological situation which would result in stability difficulties. Calculations into the stability of excavations and side slopes can only accurately be carried out when the construction of the facility is underway. The EPA draft BAT Note (April 2003) states that 'an assessment of slope stability and settlement should be conducted to ensure that during each phase of work the integrity of the liner and capping will not be compromised.' The draft BAT Note goes on to identify that during the infilling and construction of the landform, its stability should be monitored by the establishment of an appropriate programme of monitoring. In light of the monitoring results, the design assumptions should then be re-considered and modified, if appropriate. The Applicant shall provide the necessary stability calculations and mitigation measures as part of the Specified Engineering Works (SEW) prior to installation of the lining system and acceptance of waste. The SEWs shall be agreed with the Agency. Condition 6.14 of the PD requires the licensee to carry out stability assessment of the waste body and side slopes on an annual basis.

In the event that a waste licence is granted for the proposed facility to proceed, we are satisfied that stability calculations in relation to the cell engineering and stability can be provided under the conditions of the licence, and any modifications to the design shall be agreed with the Agency.

While base heave and blow out are risks associated with construction of engineered lined cells the Applicant proposes to install a drainage blanket, where necessary, to remove groundwater water. Our consideration of the requirement for a drainage blanket under the entire landfill footprint is considered under Section 2.4.1 (Emissions to Surface Water). In the event that a waste licence is granted for the proposed facility to proceed we consider that the requirements of Schedule D (Specified Engineering Works) will provide an appropriate means of monitoring for and mitigating against these risks.

## *2.5 Potential Odour, Nuisance and Health Impacts*

### 2.5.1 Landfill Gas and Odour Emissions

The possibility of odours arising from the proposed facility and causing a nuisance in the vicinity was raised in a number of the objections and during the oral hearing. Witnesses at the oral hearing including Mr Hammerstein, Dr Staines, Ms Long and a

number of witnesses for NLAG stated that it was their opinion and experiences, where applicable, that odours generated from landfills do carry beyond the facility boundary and would do so in this case if the proposed facility was developed.

The Applicant claimed that based on the odour dispersion model, submitted as part of the EIS and waste licence application, odours would not extend beyond the site boundary. The Applicant also identified measures to be employed at the proposed facility which would minimise odour emissions.

Mr Chadwick, for the Applicant, was asked if odours from the proposed facility would extend beyond the facility boundary and, in particular, would odours be detected at the proposed new national school site, which will replace the Hedgestown National School.

The validity of the odour modelling carried out by the Applicant was questioned in the objection received from Mr McGrandles. He queried the accuracy of the odour modelling process, the 1.5 European Odour Units per cubic meter ($OU_E/m^3$) criteria, whether the odour emission rates used in the model were worse case scenarios and he also suggested that the odour modelling may have underestimated the potential odour impact around the proposed facility. The objection received from Mr Lunney identified the potential for gas leaks and associated odour emissions from landfill gas collection systems and referred to a report prepared by Odour Monitoring Ireland regarding the operation of the landfill gas extraction system at Inagh Landfill, Co. Clare.

**Comment**
The EPA receives a considerable number of complaints from members of the public with regard to odour emissions from existing landfills in Ireland. Odour Monitoring Ireland conducted assessments of landfill gas management infrastructure at a number of modern engineered landfills in Ireland during 2007/8 on behalf of the EPA. Landfill gas leakage was noted on all sites that were assessed and whilst some leakage of landfill gas would always be inevitable, there are common issues that require improvement. Such improvements include the provision of adequate vacuum pressure on the landfill gas extraction system, daily preventative maintenance, provision of on-site management and expertise, proper planning of waste placement and phasing of cell development, filling and capping, and the minimisation of engineering works that may give rise to landfill gas emissions (e.g. excavation of waste, temporary closure of extraction system, etc).

A series of scenarios were presented in the odour dispersion model, prepared by the Applicant. The modelling suggested that even during worse case scenarios odours emanating from the proposed facility would not give rise to nuisance odours outside the site boundary. The modelling presented two scenarios as odour plume dispersal at the $98^{th}$ percentile for an odour concentration of $\geq$1.5 and 3.0 OuE $m^3$ (Figure 3.4.2 and Figure 3.4.3, Volume 2, EIS). This modelling exercise is considered by the Applicant to represent the worst case scenario. However, it is considered that the modelling may underestimate the potential impact of odours from the proposed facility in the event that diversion of the target quantities of biodegradable waste from the proposed landfill are not achieved.

The odour model assumes effective operation of landfill gas collection and mitigation systems. However it is considered that landfill gas collection systems, if not managed appropriately, cannot guarantee continuous operation. There are a number of variable factors such as waste acceptance rates, ambient temperature, atmospheric pressure and rainfall that can impede the effective capture of landfill gas within a gas collection system. In order to mitigate against the generation of nuisance odours and the impairment of the environment beyond the facility boundary the reduction of biodegradable waste in the incoming waste stream is necessary and specific conditions regarding the on-site management of landfill gas are recommended. Recommendations in relation to reducing the percentage of biodegradable waste accepted at the proposed facility are discussed above in Section 2.1.4 (Waste Treatment) and Section 2.2.1 (Landfill Directive). Reductions in the percentage of biodegradable waste accepted at the proposed facility will reduce the generation of landfill gas and associated odours

In the event that a waste licence is granted for the proposed facility, we recommend that conditions requiring the following are included:

- Waste accepted shall only be residual waste, the reduced quantity of biodegradable fraction will reduce landfill gas generation.
- The licensee shall provide and maintain vertical and horizontal landfill gas extraction systems at the facility. The horizontal systems shall be installed at lifts no greater than 5 metres, and shall be used during cell filling to, in as far as practicable, provide a negative pressure within the waste body.
- The landfill gas management infrastructure monitoring programme shall include regular monitoring of pipeline integrity and vacuum pressures along the extraction system.
- The licensee shall submit for agreement a detailed plan for the provision of: sacrificial gas extraction systems; phased capping of the waste body; and an interim capping systems at inter-cell boundaries.
- The licensee shall have an independent assessment of the on-site landfill gas management system undertaken at least bi-annually following commencement of waste acceptance. The assessment shall include examination and testing of the landfill gas extraction and collection system and measurement of surface VOC emissions across the facility.

### 2.5.2 Dust Emissions

The control and potential impact of dust emissions arising from the proposed facility was raised both as written objections and during discussion at the oral hearing. The concerns expressed referred to potential dust emissions from: site construction; waste handling/disposal; the handling and temporary storage of bottom ash; and the excavation and processing of waste from the historic landfill. The Applicant identified that all activities on-site will be controlled and managed in accordance with the mitigation measures included in the EIS and waste licence application.

The potential impact that dust emissions may have on the local horticultural industry was a concern expressed by witnesses for NLAG and other Objection Parties. This issue is addresses below under Section 2.7 (Horticultural Industry).

**Comment**
It is considered that the conditions included in the PD as issued will control dust emissions from the proposed facility. The mitigation measures to be undertaken to control dust emissions include spraying/wetting of the facility roads during dry periods, and appropriate handling procedures being in place for the acceptance and handling of all waste materials.

In addition, the PD requires a dust-monitoring programme to be undertaken by the licensee and the dust emissions will be subject to dust deposition limits specified in the PD. The PD also requires that any dust emissions associated with the proposed facility shall not give rise to nuisance or impair the local environment.

### 2.5.3 Birds

Capt Howard, for the NLAG, identified an increased risk of bird strikes on aircraft associated with the proposed facility. Objection Parties also raised concerns regarding the problems associated with increased populations of scavenging birds and the damage such birds can cause to local agriculture, such as ripping wrapped bales of silage, dirtying livestock water supplies and carrying debris off-site.

The Applicant noted that the Irish Aviation Authority had not identified the proposed facility as a risk to aircraft. The Applicant also noted that they proposed various mitigation measures to control bird populations at the proposed facility.

**Comment**
There are conditions in the PD that provide for the control of bird populations at the proposed facility. Increased bird populations at landfills are a result of birds scavenging food from the active tipping area and other areas of exposed waste. We consider that compliant operation of the facility in terms of minimising the size of the working face, daily and intermediate covering of waste and the deployment of an integrated bird-scaring programme will ensure that the bird population at the proposed facility are controlled. It is noted that the Agency did not receive any submissions or objections from the Dublin Airport Authority or the Irish Aviation Authority in relation to risks associated with the proposed facility.

### 2.5.4 Fire

Mr Boyle, for the NLAG, expressed concerns with regard to the risk of fire at the proposed facility and in particular the risk of the basal lining system melting if a fire were to break out within the waste body. It was submitted by Mr Boyle that deep-seated fires in landfills can remain alight for long periods of time and it is near impossible to quench a fire at a landfill once it starts.

**Comment**
We consider that the prevention of fire at modern engineered landfills can be controlled by proper waste acceptance procedures and waste handling, and the appropriate compaction of waste. The PD as issued includes a number of conditions with regard to the control of fires and major emergencies.

Fires at Irish landfills are rare and in the case where a fire does occur, the on-site Emergency Response Procedures will set out the actions and measures to be taken to

manage such an incident. The PD as issued requires that an accident prevention policy is implemented at the proposed facility and in terms of fire prevention, this should - in association with on-site waste acceptance procedures - ensure that all wastes are inspected at the working face prior to placement and compaction. The appropriate compaction of the waste also ensures that there is limited oxygen available in the waste body to sustain a fire. It should also be noted that the vast majority of waste to be accepted at the proposed facility will have gone through a waste transfer/processing facility prior to delivery to the proposed facility, therefore wastes liable to give rise to fire (hot ashes, etc) will be either removed or appropriately treated prior to arrival at the proposed facility.

### 2.5.5 Health

A number of witnesses for the NLAG raised concerns in relation to potential health impacts for the local residents associated with the proposed facility. Dr Staines, for NLAG, in his witness statement was critical of the health aspects of the EIS and also stated that in his opinion a Health Impact Assessment should be completed as part of the EIS for the proposed facility.

**Comment**

We consider that health is an aspect included in the development of emission limit values, best available practice and legislative requirements including the Landfill Directive, Groundwater Directive etc. Therefore consideration of the emissions from the proposed facility includes an assessment of the impact of the proposed facility on human health.

'Health Impact Assessment' is described in the Institute of Public Health of Ireland and Department of Health and Children Guidance (2003) as a combination of procedures, methods and tools by which a policy, programme or project may be judged as to its potential effects on a population, and the distribution of those effects within the population and it is designed to inform and influence decision making and to reduce health inequalities. The Guidance outlines that a health impact assessment may be done at either of the following three stages of a project (i) Prospective (development stage), (ii) Concurrent (during implementation), and (iii) Retrospective (after implementation). The Guidance identifies that there is considerable overlap between HIA and other policy assessments, in particular Environmental Impact Assessment. But HIA has a broader outlook on health and uses qualitative as well as quantitative evidence whereas EIA tends to concentrate on health hazards such as pollution and disease and safety issues.

The Health Research Board report on Health and Environmental Effects of Landfilling and Incineration of Waste – a Literature Review (2003), makes no specific recommendation that a health impact assessment for individual incineration or landfill projects should be carried out. The report notes that all new landfills must conform to the requirements of the Directive on the landfill of waste.

Although we do not see it as within our remit to require a health impact assessment, we do acknowledge the merit of such an assessment and the Applicant should seek to have a health impact assessment completed. In the event that a waste licence is granted for the proposed facility to proceed we consider that there is time for a health

impact assessment to be completed on behalf of the Department of Health, Health Service Executive or other relevant body.

## 2.6 Archaeology

Mr Boyle for NLAG posed a number of questions for Ms Courtney, for the Applicant, in relation to the significance of the archaeological features discovered and the investigations undertaken. Mr Mulcahy for Greenstar Limited identified that the archaeological feature in the south eastern area of the proposed facility site adjoins and may extend under the existing landfill. Ms Courtney noted that the area under the existing landfill had been disturbed ground (quarry).

**Comment**
Protection and conservation of archaeological features is in the control of the Department of Environment, Heritage and Local Government. The Department of Environment, Heritage and Local Government are a statutory body to the waste licensing process and have been copied details of the waste licence application. The Department of Environment, Heritage and Local Government provided a letter to the Applicant, dated 27th November 2006, which was subsequently forwarded to the EPA and An Bord Pleanala. The letter, available on the public file, includes the following in relation to the proposed facility:

'We concur with the mitigation proposals forwarded in the EIS. Given the significance and potential significance of the sites to be avoided by the development we make the following additional recommendation: Should planning permission be granted for the development it is recommended that conservation and management plans be completed for each of the sites that are to be avoided by the development. Such plans should be submitted to this department for agreement in advance of the commencement of construction work for the landfill site.
**Reason:** To ensure the continued preservation (either in situ or by record) of places, caves, sites, features or other objects of archaeological interest.'

In the event that a waste licence is granted for the proposed facility to proceed we recommend that Condition 11.3 shall be amended to require that the licensee - prior to any construction, including remediation, taking place on site - shall submit for agreement conservation and management plans to the Department of Environment, Heritage and Local Government for agreement.

## 2.7 Horticultural Industry

A number of Objection Parties, particularly the witnesses on behalf of NLAG and Mr Sargent TD, identified the scale and significance of the horticultural industry in the area of the proposed facility and North County Dublin. They raised their concerns for the future of the horticultural industry if the proposed facility was developed on the basis of the risk to groundwater which is considered essential to the industry for irrigation and washing activities, risk to surface water used extensively for irrigation, risk of contaminants, including dust being carried in the air, and the risk of negative perception associated with growing crops in the vicinity of the proposed facility. It was highlighted by a number of witnesses that there are many 'high-risk' edible crops being grown and processed in the area and that dust emissions containing bacterial particles from the facility could have an adverse impact on the local horticulture industry.

**Comment**
The risk of contaminants entering the surface water and groundwater are discussed in greater detail above (Section 2.3 (Hydrogeology) and Section 2.4 (Surface Water/Leachate Management/Geo-technical Issues)).

The risk associated with contaminants being transported in air, including dust and bacteria, from the proposed facility to horticultural crops is considered to be significantly ameliorated by the buffer around the proposed landfill footprint and dust mitigation measures proposed.

The issue of negative perception is difficult to evaluate as a negative perception may be generated even where the risk is low. It is notable that the Ballealy landfill is also located in North County Dublin and horticultural crops are grown in the surrounding area. No evidence was provided that the horticultural industry has been negatively affected by perceptions associated with Ballealy.

## *2.8 Enforcement*

A number of witnesses for the Objection Parties raised questions over the ability of the EPA to ensure that the licensee would comply with the requirements of any waste licence granted. Ms Long, for NLAG, provided an overview of the situation at another engineered landfill licensed by the EPA where she submitted that the EPA had not satisfactorily ensured that the conditions of the waste licence were complied with.

**Comment**
The EPA is the statutory body charged with licensing, monitoring and the enforcement of specified facilities such as the landfill proposed by Fingal County Council. The Office of Environmental Enforcement (OEE) has been established within the EPA to undertake the enforcement of licences granted. The licensee is required to contribute towards the cost of enforcement and monitoring undertaken by the EPA, which is in accordance with the Waste Management Acts 1996 to 2008 and the 'polluter pays principle'. The EPA, and more specifically the OEE, carry out an extensive programme of site inspections and audits, while the EPA also undertakes monitoring of emissions. The frequency and intensity of enforcement is based on the environmental risk and compliance achieved by the licensee.

The OEE has an enforcement policy which applies to all licensees. The main aspects of the enforcement policy are:

- Proportionality in the application of environmental law and in securing compliance;
- Consistency of approach;
- Transparency about how the OEE operates;
- Targeting of enforcement action; and
- Implementation of the 'polluter pays' principle.

In the event that a waste licence is granted for the proposed facility to proceed the OEE will enforce the conditions of the waste licence issued.

## *2.9 Existing Landfill*

### 2.9.1 Government Policy (WIR 04/05)

A number of Objection Parties identified that the Minister of the Environment, Heritage and Local Government had a Circular (WIR04/05) issued in exercise of the powers conferred on him by Section 60 of the Waste Management Acts 1996 to 2008 and they claimed that the existing landfill must be remediated in accordance with the circular. Therefore the Objection Parties made the point that the EPA in considering the waste licence application must take full account of the direction provided in the circular.

Greenstar identified that the PD under Condition 1 proposes an eight year period as the specified period for Section 49(1) of the Waste Management Acts 1996 to 2008, and they highlighted that the existing landfill may therefore not be remediated for a number of years. They also highlighted that such a delay is not in keeping with the requirements of the Ministerial Direction (WIR 04/05).

The Objection Parties also noted that the direction was to encourage an intensification of enforcement action against illegal operators and claimed that the Local Authority had not fulfilled its role.

**Comment**

The Agency is obliged under Section 60(2) of the Waste Management Acts 1996 to 2008 to have regard to any directions provided by the Minister in accordance with Section 60 of the Act. It is noted in the direction referred to by the Objection Parties that the EPA would elaborate on removing illegally deposited waste or leaving it in place in developing their code[9], this code was issued in April 2007 after the Applicant had made their licence application and completed their risk assessment.

The Ministerial Direction states that when illegal waste activity is discovered the Local Authority or Agency shall ensure that it is recovered or disposed of in the shortest practicable time without endangering the environment or human health. The investigations undertaken at the existing landfill did not identify pollution endangering the environment or human health. There was contamination identified in the groundwater sample taken from within the landfill but significant contamination was not identified down gradient. The PD as issued sought to have the existing landfill remediated by means of excavation, remediation and restoration.

The Ministerial Direction states that: 'Certain sites should at all times be remediated such as:

- lands proximate to existing or planned residential development or educational facilities, in which case remediation shall require the removal, in the shortest practicable time, of all waste except only where it is shown that an alternative solution provides greater protection to the environment and the health of the local population;
- wetlands,
- Natural Heritage Areas, Candidate Special Areas of Conservation or Special Protection Areas;

[9] EPA 2007 Code of Practice Environmental Risk Assessment for Unregulated Waste Disposal Sites

- places of special interest such as high amenity areas.'

It is not considered that the subject site falls within the above categories. It is acknowledged that the existing Hedgestown National School is c. 600 metres east of the existing landfill and if relocated to the proposed site, identified by Mr Boyle, would be c. 400 metres from the existing landfill; however, it is not considered that this situation represent 'proximate to', as the M1 motorway passes between the existing landfill and the school (existing and proposed locations).

The PD issued did not specify a timeframe for the remediation of the existing landfill, the PD required a programme to be submitted for agreement within twelve months of the date of grant of the licence. In the event that a waste licence is granted for the proposed facility to proceed it is recommended that the a programme, including timeframe for commencement and completion of the works, shall be submitted for agreement within six months of the date of grant of the licence.

The holder of the waste within the existing landfill, based on the evidence presented, is Fingal County Council and if a waste licence is not granted for the proposed facility they would have responsibilities under the Local Government (Water Pollution) Act 1977. The EPA, Office of Environmental Enforcement (Local Authority), may take enforcement action to ensure the Local Authority are taking necessary measures to avoid environmental pollution. We note that the Applicant has included the existing landfill within the boundary of the proposed facility and has accepted that they will remediate it as specified in the PD issued.

Condition 1.8 of the PD specifies an eight year period for the purposes of Section 49(1) of the Waste Management Acts 1996 to 2008 on the basis of the nature of the activity and the arrangements necessary to be made in connection with the carrying on of the activity. A period of three years is the timeframe specified in Section 49(1) and begins on the date on which the licence is granted, however Section 49(2)(a) provides for the Agency to specify a period of greater than three years from the date of grant of a licence and it is considered reasonable to provide for a period greater than 3 years given the scale of the proposed development, the likelihood of appeals and delays prior to the commencement of the activity. We consider it is reasonable to maintain an eight year period for the purposes of Section 49(1) as there are likely to be appeals and delays in the event that a waste licence is granted for the proposed facility.

The Ministerial Direction highlights that sanctions should be taken in relation to illegal holders of waste and it is stated that 'the regulatory authorities shall pursue illegal holders of waste looking to the maximum potential sanctions available in law. In that regard, prosecutions should be taken in all cases using the powers available under the Waste Management Act, as amended, or other relevant legislation to maximise the deterrent factor.' The Local Authority and EPA should consider the need for enforcement actions in light of the final decision in relation to the waste licence application.

In the event that a waste licence is granted for the proposed facility to proceed the licence shall include conditions in relation to the appropriate disposal of non inert waste and hazardous waste. The licence shall specify that a programme for excavation, remediation and restoration shall be submitted within six months of the date of grant of the licence and works shall commence with twelve months of the date

of grant of the licence. The programme shall include a timeframe for completion of excavation, remediation and restoration to be agreed with the Agency.

### 2.9.2 Quantity of Waste

Mr Mulcahy, for Greenstar, questioned the Applicant's witnesses in relation to the scale of the existing landfill and the methods used to establish the scale of the landfill. Mr Burke and Ms Heavey for Greenstar in their witness statements provided alternative calculations of the scale (depth and area) of the waste body, an alternative conversion factor (from cubic metres to tonnes) and deficiencies with the Applicants investigation of the scale of the landfill. Mr Burke identified that the depth of the waste had not been established. Ms Heavey stated that the existing landfill may be one of the largest illegal landfills yet discovered in Ireland.

The Applicant claimed that an average depth of 4 metres was appropriate based on the trial pits and boreholes installed on-site, and therefore 160,000 cubic metres of waste was a reasonable estimate.

**Comment**

The evidence presented by Greenstar raises questions over the accuracy of the Applicant's calculation of the quantity of waste in the existing landfill. The depth of waste has not been definitively established and may be greater than the average of 4 metres used by the Applicant. Every increase in the existing landfill depth by 1 metre results in an extra 40,000 cubic metres of waste. The area of the existing landfill may be greater than that identified by the Applicant, however additional investigations will be required during excavation to establish the actual boundary. The quantity of material calculated by the Applicant was 160,000 cubic metres whereas Greenstar's evidence estimates that there may be up to 240,000 cubic metres. The Applicant accepted that the conversion factor used for converting cubic metres to tonnes in the application was incorrect. Therefore the quantity of waste in tonnes may be between 288,000 – 432,000 tonnes (based on a conversion factor of 1.8 tonnes per cubic metre) rather than 120,000 tonnes as originally calculated by the Applicant.

We consider that it is likely that the quantity of waste within the existing landfill may exceed the number of cubic metres identified by the Applicant, and that the exact volume and tonnage will not be known until the waste has been excavated.

### 2.9.3 Classification of Waste

Cross examination of the Applicant's witnesses focused on whether they had established the source of the waste, the procedures they followed, and what analysis of the waste and leachate was undertaken. Mr Burke for Greenstar in his witness statement identified that he considered it incorrect to refer to the waste as 'inert C & D waste'. Mr Burke argued that the Applicant did not undertake the following: adequate distribution or intensity of site investigations; on-site olfactory assessment; on-site screening of the soil with a portable Volatile Organic Concentration monitor to detect any elevated soil vapours; representative soil sampling from made ground or underlying natural subsoil; or analysis for leachate or gas. He claimed that there was insufficient information presented for the Applicant to claim that the waste is inert and will not produce any eluate or gaseous vapour.

Mr Burke identified contamination in the groundwater sample taken by the Applicant from within the waste body (GS18) and that a number of parameters including ammoniacal nitrogen, chloride, sodium, potassium, boron, cadmium and electrical conductivity are elevated compared to the EPA Interim Guideline Values for Groundwater[10] and the Drinking Water Standards (S.I. 439 of 2000). It was noted by the Objection Parties that the precautionary principle should have been applied when classifying the waste.

**Comment**
The Applicant classified the waste in the existing landfill based on the excavation of material from the trial holes (15 number). The classification was based on the visual assessment of the waste. The Applicant describes the waste in the EIS and waste licence application as 'Construction and Demolition (C & D) waste', 'primarily consists of C & D waste', 'mainly C & D' and 'construction items', 'inert waste' etc. The Applicant provided the following list of wastes encountered during the investigations: bricks, wood, ash/cinders, plastic, metal, concrete, mortar, reinforced concrete, wire, string, rubber piping, gas canister, plastic piping, tin cans, carpet, decaying organic matter (at one location), newspaper (at one location), and crockery.

The classification of the waste as 'inert C & D waste', or variants thereof, by the Applicant failed to acknowledge that there were materials within the waste body which could undergo physical, chemical or biological transformations. The groundwater analysis presented by the Applicant for three boreholes (upgradient (ER7), within (GS18) and downgradient (HR12) of the existing landfill) is only based on a single sample from each borehole. The analysis indicates contamination in GS18 which is not shown to be present at the same concentration in the other two boreholes. The concentration of contaminants measured in borehole GS18 may not be equivalent to leachate from a municipal waste; however, it is considered to be at least consistent with presence of leachate from the waste in the existing landfill and may therefore indicate the presence of such leachate.

Inert and construction and demolition waste are not interchangeable descriptions of waste. The following are definitions of each as provided in the EPA Code of Practice Environmental Risk Assessment for Unregulated Waste Disposal Sites[11]:

'Inert waste means waste that does not undergo any significant physical, chemical and biological transformations. Inert waste will not dissolve, burn or otherwise physically or chemically react, biodegrade or adversely affect other matter with which it comes into contact in a way likely to give rise to environmental pollution or harm human health'.

'Construction and Demolition waste means all wastes which arise from construction, renovation and demolition activities and all wastes mentioned in Chapter 17 of the European Waste Catalogue List. It includes surplus and damaged products and materials arising at construction work or used temporarily during on-site activities and dredge spoil.'

[10] Towards Setting Guideline Values for the Protection of Groundwater in Ireland - Interim Report
[11] EPA 2007 Code of Practice Environmental Risk Assessment for Unregulated Waste Disposal Sites

While we accept that a significant quantity of the waste material in the existing landfill may be inert waste there are other wastes present which are not inert. The waste material at the existing landfill, based on the current site investigations, would be more consistent with construction and demolition waste.

The Applicant did not establish the source or the age of the waste deposited in the existing landfill however some anecdotal evidence was provided which suggested that the waste was mainly construction and demolition waste landfilled during the years 1994 and 2000, approximately. In the EPA 'Code of Practice Environmental Risk Assessment for Unregulated Waste Disposal Sites' 'source' is referred to as 'hazard or pressure', in the 'Source – Pathway – Receptor conceptual model for environmental management.

### 2.9.4 Current Status

Mr Mulcahy for Greenstar made the point that the existing landfill was an 'illegal landfill' as it had operated outside the control of a waste permit or licence.

Mr Daly, Fingal Co. Co., stated that the landfill had been granted authorisation by the Local Authority but the operator had continued to accept waste after the expiry of the authorisation. Mr Daly also confirmed that the Local Authority could not provide a copy of the authorisation as it had been mislaid. The dates provided to the hearing during which the landfill had operated were approximately 1994 until 2000.

Mr Moore, for NLAG, who is a local resident stated in his witness statement that he had complained to Fingal County Council about the landfill and in particular odours associated with its operation. Mr Moore did not identify when he had made his complaint to Fingal County Council.

**Comment**

The existing landfill had been referred to in the EIS and waste licence application as 'contaminated land' and 'an unauthorised landfill'. The EPA inspector in his report and in the PD referred to the landfill as a 'historical landfill' and this was the term used by the Applicant throughout the oral hearing.

Based on the information presented in the EIS and at the oral hearing it would seem that the existing landfill:

- was operated between 1994 and 2000, and
- the facility had been granted authorisation under the European Communities (Waste) Regulations 1979[12] although it continued to operated beyond the expiry of the authorisation and beyond the capacities permitted (this is based on Mr Daly's evidence, as no documentary proof of an authorisation was provided).

While the existing landfill operation may, based on the evidence of Mr Daly at the oral hearing, have been authorised by Fingal County Council in accordance with European Communities Waste Regulations 1979, the landfill was operated beyond the terms of the authorisation, had operated after the introduction of the Waste

[12] S.I. 390 of 1979

Management (Licensing) Regulations 1997 and had accepted waste other than inert waste. As noted above, under Section 2.9.1 (Government Policy (WIR 04/05)), if a waste licence is not granted for the proposed facility Fingal County Council, as the holder of the waste, would have responsibilities under Local Government (Water Pollution) Act 1977 and shall not cause or permit any polluting matter to enter waters.

### 2.9.5 Archaeological Issues

A number of Objection Party witnesses pointed out that there is an archaeological site adjacent to and possibly under the existing landfill. They also identified that there is a risk of disturbing the archaeological site during remediation of the existing landfill and the Applicant had not considered this risk. The Applicant noted that the existing landfill was within an area that had previously been disturbed for quarrying and infill activities.

**Comment**

Archaeological aspects of the overall development are considered in Section 2.6 (Archaeology). The Applicant redesigned the proposed landfill footprint to avoid disturbing the archeological site adjacent to the existing landfill. It is accepted that the remediation, as required by the PD, would involve excavation and processing of the waste in the existing landfill. Much of the subject area has already been subjected to excavation for quarry activities and deposition of waste. Any disturbance or excavation of parent soils/subsoil under the existing waste shall only take place under the supervision of an appropriately qualified Archaeologist and subject to the agreement of the Department of Environment, Heritage and Local Government.

In the event that a waste licence is granted for the proposed facility to proceed the licensee shall undertake all activities associated with the landfill remediation to avoid the archaeological site as identified. Excavation into undisturbed soils or subsoil shall only be undertaken subject to Department of the Environment, Heritage and Local Government approval and shall be supervised by an appropriately qualified Archaeologist.

### 2.9.6 Comparison of Existing Landfill to Illegal/Unauthorised Landfills

Ms Heavey, for Greenstar Ltd., provided details of the licence conditions which were imposed by the EPA when licensing the Roadstone Dublin Limited remediation of their site at Blessington, Co. Wicklow (Reg. No. W0213-01). She identified the range and scope of the conditions which were imposed by the EPA and highlighted that similar conditions have not be imposed in the PD for the proposed facility. Ms Heavey also provided details of the complexity and scale of the remediation undertaken at the Roadstone facility, based on the experience gained by Greenstar Ltd. who were contracted by Roadstone to undertake the remediation works.

The Applicant claimed that all the conditions, emission limit values, monitoring required by the PD are applicable to the whole site and therefore apply to the remediation of the existing landfill as well as to the proposed new engineered landfill. The Applicant also referred to Condition 6.35 (Excavation of Historical Waste Area) which requires the Applicant to submit to the Agency for approval a programme for the excavation, remediation and restoration of the historical landfill area of the site.

**Comment**
The PD and any waste licence which may be issued, applies to the whole site including the existing landfill. Condition 1.3 of the PD states 'The facility shall be controlled, operated, and maintained and emissions shall take place as set out in this licence'. Therefore the conditions of the PD do apply to the activities to be undertaken at the existing landfill. It should be noted that unlike a number of other unauthorised landfills that have been remediated or are licensed to be remediated under EPA issued waste licences, only limited quantities of municipal and industrial waste have been identified in the trial pits excavated on this site and no clinical waste has been identified.

The example of the landfill remediation and licence requirements provided by Greenstar Ltd. is not considered directly comparable to the existing landfill. Each waste licence application is considered on its own merits, however the experiences gained are noteworthy and may assist the EPA in decision-making. A number of waste licences that have been issued by the EPA to date for remediation of unauthorised landfills, required non inert waste to be removed, while inert soil and stone could be retained on-site following screening and testing to restore the subject area. It has been a requirement of such licences that hazardous waste uncovered as part of the excavation process shall be separated and sent off site for disposal at appropriate facilities. The remediation of the existing landfill should not be dependent on the development of the proposed landfill: therefore, waste excavated may be landfilled on-site in the proposed landfill or sent off-site for disposal/recovery.

In the event that a waste licence is granted for the proposed facility to proceed the licence shall require that:

- All excavated waste shall be screened, sorted and classified prior to disposal/recovery.
- Residual wastes shall be deposited within an engineered cell in the proposed landfill or sent off site for disposal/recovery at an appropriate facility to be agreed with the Agency.
- Inert material may be retained on-site for restoration of the existing landfill area or used as raw materials in the development of the proposed facility or sent off site for recovery at an appropriate facility to be agreed with the Agency.
- Hazardous waste uncovered during excavation or processing of the waste shall be sent off-site for recovery/disposal at appropriate facilities to be agreed with the Agency; and
- Condition 6.35 shall be amended; the programme to be submitted shall include the following: a detailed plan of works to be undertaken; a timeframe for completion of excavation, remediation and restoration; details of plant and machinery to be used; mitigation measures in addition to those specified in the waste licence application for all emissions including noise, dust, water etc shall be provided; proposals for classification and characterisation of the waste excavated; proposals for recovery and treatment of the waste excavated; and identification of appropriate disposal/recovery facilities for receipt of the waste.

### 2.9.7 Risk Assessment

The risk assessment submitted under Section H.1 of the waste licence application was critically assessed by Objection Parties during cross examination and also in their own witness statements.

Mr Burke, for Greenstar, in his evidence identified that the risk assessment was prepared prior to the EPA issued Code of Practice 'Environmental Risk Assessment for Unregulated Waste Disposal Sites' (April 2007); however, he noted that BS 10175 Investigation of Potentially Contaminated Sites Code of Practice[13] was available. The Applicant confirmed that the British Standard was used as guidance in the risk assessment. Mr Burke stated that best practice dictates that a phased approach should be adopted to site investigations and the risk assessment should involve three tiers. He identified areas where these approaches were not followed and he concluded that a comprehensive site investigation and risk assessment must be carried out prior to the EPA determining what type of activity should be licensed.

The Applicant accepted that an additional assessment of the remediation programme for the existing landfill would be completed under the terms of any licence granted, but argued that the risk assessment already provided was appropriate.

**Comment**

While it is acknowledged that the 2007 EPA Code of Practice Environmental Risk Assessment for Unregulated Waste Disposal Sites was not available at the time of the Applicants assessment of the existing landfill, many of the principles contained within it are drawn from other codes of practice such as British Standard 10175 of 2001 'Investigation of Potentially Contaminated Sites - Code of Practice'. The risk assessment provided by the Applicant is considered to be a qualitative risk assessment and while the Agency inspector did not accept the recommendation to leave the waste in-situ he was satisfied that adequate information was presented to include a requirement to remediate the site. The Board of the Agency in considering the waste licence application issued the PD on the basis of the information provided in the risk assessment.

It is considered that sufficient uncertainties remain after the risk assessment such that it is not appropriate to leave the waste in-situ, based on the potential risks from leachate, limited analysis of the waste and leachate, the waste materials uncovered during the trial pitting exercise which indicate that the waste is not all inert, the scale of the landfill and also having consideration of the Ministerial Order (WIR04/05).

In the event that a waste licence is granted for the proposed facility to proceed the licence shall require the licensee to remediate by excavation and waste processing the existing landfill. In the event that a waste licence is not granted for the proposed facility the holder of the waste, Fingal County Council, shall undertake a quantitative risk assessment of the existing landfill and based on the results of such an assessment shall remediate the existing landfill.

[13] British Standard 10175 Investigation of Potentially Contaminated Sites Code of Practice, 2001

### 2.9.8 Environmental Aspects of Remediation

Ms Heavey and Mr Burke, for Greenstar Ltd., identified that the excavation and remediation of the existing landfill could result in environmental emissions including dust, noise etc. and that such emissions were not considered by the Applicant. Ms Heavey, by way of example, described the remediation undertaken at Roadstone, Blessington (W0213-01). Mr Burke stated that in his opinion the EPA did not have adequate information to assess the existing landfill when deciding what conditions and emission limits to include in the PD. The risk of emissions to groundwater during remediation was identified and it was argued that the remediation may pose a risk to the local residents and users of the civic amenity site.

The Applicant noted that their application was based on leaving the waste in-situ or removing it, if so required. They claimed that they had considered the emissions from the entirety of the proposed facility and Mr Flanagan during the oral hearing stated that the proposed development included the excavation of up to 5 million cubic metres of material to construct the cells, landscaping etc. and that such activity had been considered in terms of air, noise, surface water, groundwater and archaeological impacts.

The Applicant acknowledged that particular pieces of remediation plant, such as trommels, were not included in the impact assessments, as the recommendation from their risk assessment was that the waste material was to be left in-situ. The Applicant claimed, however, that the environmental emission assessments are conservative and based on the maximum predicted number of pieces of machinery and plant, associated with the proposed landfill being operational.

**Comment**

The Applicant based their application on leaving the existing waste in-situ. In Section 2.5.2.3 (Construction and Demolition Waste) of their EIS, the Applicant states 'In the alternative, this material will be removed and landfilled within the proposed engineered landfill.' Following issue of the PD they accept the requirement to excavate, remediate and restore the existing landfill. The PD required the Applicant to submit for approval: 'within twelve months of the date of grant of the licence, a detailed programme for the excavation, remediation and restoration of the historical landfill area at the site, and disposal of the waste into an engineered lined cell(s), including a schedule for completion of the programme.'

The environmental emissions associated with excavation, remediation and restoration were not specifically described in the waste licence application. However, the application relates primarily to a proposed landfill that requires significant engineering and earth moving activities, which are not considered to be dissimilar to those involved in the removal of the existing waste body. In Section 3.18.7.1 of Volume 2 EIS Main Report, it is stated that 'It is envisaged that an Earthworks balance will be achieved on site with all excavated material (approximately 3 million $m^3$) reused in embankment construction or as capping / landscaping material thus negating the potential impact of importing material.' Therefore we consider that while the environmental aspects associated with the excavation, remediation and restoration of the existing waste were not specifically explored by the Applicant the conditions and limits specified in the PD are appropriate to control and monitor the potential emissions. Emissions from the excavation, remediation and restoration,

including dust, noise, etc, can be mitigated by means similar to those proposed for the proposed landfill development. The risk of emissions causing nuisance for local residents and users of the civic amenity site associated with the remediation of the existing landfill are expected to be minor and also short term. We note that there is the possibility that there may be leachate within the waste body.

In the event that a waste licence is granted for the proposed facility to proceed the licence shall include a condition requiring any leachate encountered in the existing waste to be collected in a suitable storage tank and sent off-site for treatment or treatment on-site if the waste water treatment plant has been commissioned. Leachate shall not be discharged to the surface water management system or directly to river. Surface water run-off shall be directed to the surface water management system.

# Chapter 3 Consideration of Specific Licence Conditions

The written objections submitted by the Applicant and Objection Parties, after the EPA issued the PD, referred to specific conditions in the PD. During the hearing some of these objections were elaborated on further. For clarity the conditions objected to are discussed below in the order in which they appear in the PD.

## *3.1 Condition 2.2.2.8*

The Applicant objected to the requirement to establish and maintain a 'maintenance programme' within six months of the date of grant of this licence on the basis that An Bord Pleanala have not yet made a decision on the proposed development.

**Comment**
It is considered appropriate that a 'maintenance programme' should be established and thereafter maintained 'six months prior to the acceptance of waste at the facility or six months prior to the commencement of remediation of the existing landfill, whichever is the earlier'.

## *3.2 Condition 2.2.2.9*

The Applicant objected to the requirement to establish and maintain a 'a programme to ensure there is adequate control of processes under all modes of operation' within six months of the date of grant of this licence on the basis that An Bord Pleanala have not yet made a decision on the proposed development.

**Comment**
It is considered appropriate that 'control of processes' should be established and thereafter maintained 'six months prior to the acceptance of waste at the facility or six months prior to the commencement of remediation of the existing landfill, whichever is the earlier'.

## *3.3 Condition 3.7.1(ii)*

The Applicant objected to the requirement to provide details on the proposed geotextile and the respective cylinder test as part of the specified engineering works. The Applicant claims that the requirement is not possible since this would require all specific materials used in the works to be determined at this early stage in the site development. The Applicant identifies that construction of the facility will take approximately twelve months and cell lining may not commence until ten months into the development. Therefore the Applicant requests that the testing be provided as part of the CQA report.

**Comment**
The difficulty providing the cylinder test as part of the Specified Engineering Works is acknowledged and it is considered more appropriate for such information to be

provided as the development works are progressing. Condition 3.6 of the PD outlines the requirements in relation to Specified Engineering Works (SEW) and in particular identifies that they shall be submitted to the Agency for agreement at least two months in advance of the intended date of commencement of any such works. Therefore it is considered reasonable that the cylinder testing should be provided for agreement prior to the commencement of cell lining. Submission of such testing prior to the installation of the cell liner is considered more appropriate than provision of the cylinder test as part of the construction quality assurance (CQA) validation report.

## *3.4 Condition 3.7.1(iii)*

The Applicant objected to a number of the specifications included in the condition. In particular the Applicant requests:

- That the term 'pre-washed' be deleted since the degree of pre-washing is not quantifiable and may be subjective. The Applicant suggests that insertion of a stone sample grading curve with a limit on the % of finer material in the sample, for example 0-5% passing the 10mm British Standard Sieve Size;
- That the term 'uncrushed' be deleted since the sample may be essentially uncrushed after it is placed in the cell, the stone may crush down while waste is being deposited or compacted and it may be more appropriate to insert a minimum soaked 10% fines value of approximately 100kN;
- That the term 'rounded' be deleted and the passing cylinder test and the 10% fines value suffices for the stone's suitability for use in the blanket. The Applicant requests that if rounded is to be maintained then sub-rounded should be added also; and
- That the stone size specification of 16-32mm be deleted and replaced with a grading that reflects BS Sieve Sizes (mm) as used in the NRA Specification for Road Works and would be standard at Irish quarries. The Applicant suggests that the range of stone allowed should be between 10-40mm with an allowance for below 10mm (recommended 5% plus 2% for crushing post placement).

**Comment**

The EPA Landfill Manuals Landfill Site Design (2000) states that the drainage media should be rounded, pre-washed non calcareous stone (less than 10% $CaCO_3$) unless site specific tests prove otherwise, particle size to be compatible with the proposed geomembrane, and drainage blanket to have documented durability and mechanical strength commensurate with the proposed loading. We consider that the requirement for pre-washed stone is not necessary where a percentage of fines are included. Provision should be included to provide for the use of rounded and sub-rounded stone. The stone specification should be amended to reflect NRA Specifications for Road Works. The licensee shall undertake cylinder tests, to prove the suitability of the drainage stone placed over the geotextile layer and any changes to the drainage layer specified shall be agreed in advance with the Agency based on site specific tests.

## *3.5 Condition 3.7.2*

The Applicant identifies that the condition is defining a pumped system where a gravity system may possible be more appropriate. Any groundwater flows are likely

to be small in volume during construction and post construction. Higher volumes of groundwater during construction, if present, are likely to come from groundwater seepages that may develop once the cells have been excavated. Under these circumstances the preferred solution is to create a piped drainage system to intercept and direct these groundwater seepages to a traditional herringbone subsurface drainage network. If groundwater flows are found to be significant during construction or are predicted to pose a threat to the underside of the lining system post construction, then consideration of a drainage layer may be appropriate. The Applicant proposes an alternative wording for the condition.

During the course of the hearing the Applicant and other objection parties identified the drainage blanket required by this condition of the PD. The Objection Parties questioned how the drainage blanket could be provided whilst, following filling of the cells, the water level in the surrounding soils could be allowed increase above the level of the liner.

**Comment**
Based on the Applicant's objection and the information and clarification gleaned from the oral hearing we are satisfied that the condition should be amended. The inclusion of a drainage blanket under the entire site is not necessary and would most likely cause engineering difficulties.

## *3.6 Condition 3.13.2*

The Applicant requested that only water from the waste vehicle wheelwash be directed to the leachate treatment system and that the water from the construction vehicle wheelwash be diverted to the surface water management system. The leachate treatment system will not be available until completion of the construction works. The construction phase will remain separate from the waste acceptance and landfilling areas and there will be no requirement to treat wheel wash from the construction vehicles at the leachate treatment plant.

**Comment**
The PD as drafted requires two wheel cleaners to be provided, with one of these wheel cleaners for use by construction vehicles only. The wheelwash for the construction traffic should be one of the initial pieces of infrastructure to be installed at the facility, whereas the wheelwash for the waste vehicles will not be required until waste acceptance commences. In addition the leachate treatment system will only be installed and commissioned when waste acceptance commences. The wheelwash for the construction traffic is required to avoid the vehicles carrying mud and dirt onto the public road; the main contaminant in the waste water from the construction vehicle wheelwash will be suspended solids. It is considered appropriate that the water from the construction vehicle wheel wash be diverted to the surface water management system rather than the leachate treatment plant, this would also match the sequence of infrastructure installed on-site. The surface water management system should be one of the first pieces of infrastructure installed prior to the commencement of other infrastructure works which may generate a surface water run-off. The wheel wash for the waste vehicles is considered to represent a slightly greater risk of containing contaminants other than suspended solids, and so the washings should be diverted to the leachate treatment plant.

## 3.7 Condition 3.14.1

The Applicant requested that 'or as may be varied by a licence condition' be amended to read 'unless otherwise agreed with the Agency'.

**Comment**
The condition requires the Applicant to provide and maintain the leachate management infrastructure as described in the application unless a condition of the licence specifically requires otherwise. The change proposed by the Applicant would provide for alternatives to be agreed with the Agency. As adequate provisions for agreeing alterations are provided in other conditions relating to leachate management infrastructure, it is considered unnecessary to amend the condition.

## 3.8 Condition 3.15.1

The Applicant requested that 'or as may be varied by a licence condition' be amended to read 'unless otherwise agreed with the Agency'.

**Comment**
The condition requires the Applicant to provide and maintain the landfill gas management infrastructure as described in the application unless a condition of the licence specifically requires otherwise. The change proposed by the Applicant would provide for an alternative to be agreed with the Agency. As adequate provision for agreeing alternatives agreed are provided in other conditions relating to landfill gas infrastructure, it is considered unnecessary to amend the condition.

## 3.9 Condition 3.15.3

The Applicant requested that the Agency should consider that the generation of electricity from landfill gas may not be practicable in the future if waste streams change and separation of waste at source diverts organic material from going to landfill. The condition may conflict with future restoration and aftercare models that may, for example, require development of an aerobic bioreactor, the by-product of which is carbon dioxide and not methane. The Applicant provides alternative wording for the condition.

**Comment**
It is considered appropriate that landfill gas collected shall as soon as practicable be employed for generation of energy/electricity. It is also considered appropriate that the Applicant should report on the feasibility of landfill gas utilisation annually. The Applicant's identification of alternative gas treatment systems in the future should be accommodated, subject to the written agreement of the Agency.

## 3.10 Condition 3.24

The Applicant requested that the condition be amended so that only surface water from hardstanding areas within the waste acceptance areas and associated car parks should pass through an oil separator and then to the surface water management

system. Where vehicles do not travel or park and there is no risk of petrol or oil contamination there should be no requirement for an oil interceptor. The surface water from the capped areas of the landfill will be discharged directly to the surface water management system. The requirement for a silt trap is met with the installation of a fully managed surface water attenuation system. For clarity it is requested that the wording 'storm water discharges' be amended to 'surface water run-off'.

**Comment**
It considered appropriate that only surface water run-off that is likely to be contaminated by oil or petrol be directed to an oil interceptor. Therefore areas where vehicles do not travel, including capped areas of the landfill, should be directed to the surface water management system without the water having to pass through an interceptor. The surface water management system in the application is designed to achieve sedimentation; therefore, it is considered that there is no requirement to install a silt trap prior to the surface water management system. It is accepted that the term 'surface water run-off' is an appropriate description as it includes surface water from any rain event. Condition 3.24 requires the installation of a 'full retention separator', we consider that a 'by-pass separator' is appropriate for this facility as the risk of a large spillage and heavy rainfall occurring at the same time is low.

## *3.11 Condition 3.25.1*

The Applicant objected to the requirement to submit the firewater retention assessment within six months of the date of grant of this licence on the basis that An Bord Pleanala have not yet made a decision on the proposed development.

**Comment:**
It is considered appropriate that the firewater retention assessment should be submitted to the Agency 'six months prior to the acceptance of waste at the facility or six months prior to the commencement of remediation of the existing landfill, whichever is the earlier'.

## *3.12 Condition 3.27*

The Applicant requested that the Agency amend the condition and alternative wording is provided. The alternative wording requires an assessment to determine the risk, impact and appropriate measures to mitigate the risk of leaks from flanges and valves of all overground pipes used to transport material other than water. In the event that a catchment system is required, details shall be incorporated into a schedule of objectives and targets.

**Comment**
It is not considered that the condition requires the licensee to examine the provision of a catchment system, the examination shall include a risk assessment. Following completion of the examination the licensee shall incorporate the provision of a catchment system within the schedule of objectives and targets, Condition 2.2.2.2, for the reduction in fugitive emissions. We consider that no change to the condition is necessary.

## 3.13 Condition 3.28

The Applicant requests that the Agency amend the condition by changing 'adequately' to 'reasonably'. Mr O'Toole withdrew the objection on behalf of the Applicant during the oral hearing.

## 3.14 Condition 6.2.2

The Applicant requested that the Agency consider amending the wording of the condition so that alternatives to a pumping systems may be considered by the Agency. The existing condition refers to 'the level of leachate in the pump sumps' whereas the proposal from the Applicant refers to 'level of leachate in the cell leachate collection system'.

**Comment**
The condition also refers to Schedule C.2.3 (Leachate Monitoring), Note 2 of the schedule which states 'Leachate Levels to be monitored at all leachate monitoring points in the cells'. It is considered that Condition 6.2.2 requires such monitoring of leachate. It is considered that the aim of the condition is to require monitoring of the level of leachate at the monitoring points in the cells. By monitoring the leachate level the licensee can demonstrate that the leachate head is not increasing to greater than 1 metre above the base of the landfill liner.

## 3.15 Condition 6.25

The Applicant requested that the Agency consider adding 'unless otherwise agreed with the Agency' to the end of the condition in order to allow advances and variants in landfill engineering to be considered without the requirement for a licence review.

**Comment**
Recirculation of leachate is currently considered as BAT subject to conditions - the requirement for the cells to be finally capped before leachate recirculation can be commenced is one of these conditions. There are no details provided by the Applicant of what the likely changes in best practice may be and therefore it is considered inappropriate to provide for future developments that are not specified and may be some years before development or acceptance as BAT. It is considered that the licence will require review during the lifetime of the proposed facility and therefore the Applicant may request changes in line with engineering best practice for landfills at that stage. Therefore no change to the condition is recommended.

## 3.16 Condition 6.4.4

The Applicant identifies that for current municipal waste streams with a high organic content low methane concentrations will be generated during Phase I and II during initial filling and subsequent to Phase IV in the restoration and aftercare period. The Applicant identifies that if the organic content reduces as a result of waste being pre-treated prior to disposal then this may also be a significant problem during the transition phase if the landfill is degrading under anaerobic conditions. Therefore the condition requires that a supplementary fuel may need to be used to operate enclosed flares under the low methane concentrations for many years. The Applicant claims

that it makes little sense environmentally to use large amounts of fossil fuel to manage odourous compounds. The Applicant requests the flexibility to use inline carbon filters between blower and burner with a propane supplemented ignition source and a manual override on the flare to facilitate flaring at 14%v/v. This would allow control of odours and oxidation of $CH_4$ above 14%, albeit not at 1000$^oC$ for 0.3 seconds. Under the proposed treatment system, compliance with Condition 6.4.3 would not be possible (minimum temperature and residence time). The Applicant suggests alternative wording for the condition.

**Comment**
Destruction of methane by means of gas flares has two significant positive benefits: reduced odour and reduced emission of methane to the atmosphere. Significant measures must be taken at the proposed facility to minimise and treat the odourous gases arising. The potential impacts of such odourous gases were highlighted at the oral hearing and while the evidence of the Applicant was that the odour emissions from the activity will not impact on locations outside the site boundary, it is considered necessary that all practical measures should be taken to minimise odour emissions. Whilst it is acknowledged that the supplementation of methane combustion with natural gas is a use of a natural resources, this is considered necessary for odour abatement. The Applicant's proposal to use carbon filters between the blower and burner was not proposed in the licence application and the details provided in the objection do not include details of controls, operational practices or the odour reduction achieved by such methods.

The condition as included in the PD allows that alternative appropriate techniques may be employed with the written prior approval of the Agency. Condition 6.4.3, which specifies the minimum temperature and residence times for flares, is a standard condition in relation to the operation of such systems, however, we consider Condition 6.4.3 should amended to provide for alternative appropriate techniques are agreed with the Agency, under Condition 6.4.4, which cannot operate to the residence time and/or temperature. The Landfill Directive requires that landfill gas shall be collected from all landfills receiving biodegradable waste and the landfill gas must be treated and used. If the landfill gas cannot be used to produce energy, it must be flared. The collection, treatment and use of landfill gas shall be carried on in a manner which minimises damage to or deterioration of the environment and risk to human health. The Applicant has not provided an assessment which demonstrates compliance with the requirement of the Landfill Directive in their objection to the PD. Therefore no change to the condition is recommended.

## *3.17 Condition 6.6.1*

The Applicant identifies that when the majority of leachate treatment technologies including sequence batch reactors, or aeration systems are working correctly, no odours are present. When covers are added the temperatures may be raised, particularly during the summer months and these high temperature conditions may impact upon microbial breakdown of leachate. It is requested that the Agency consider allowing for covers to be installed on the sequence batch reactor tanks to allow for odour management provision but with a caveat that would allow the operators to open the covers to the atmosphere if high temperature conditions are

generated and the treatment system cannot operate effectively unless temperature is reduced. This would only be permitted if odour were not an issue.

**Comment**
While it is acknowledged that the temperature may increase within the sequence batch reactor when covers are installed, the control of odour emissions is a significant concern. Covers are installed on waste water treatment plants in a number of sensitive locations where odour may represent a nuisance and to allow the covers to be opened to the atmosphere during warm weather could compromise the odour management system. The rate of active extraction of air from the head space, above the treatment system, may need to be increased during warm weather to control the temperature; such a feature, or alternative, should be installed if considered necessary. It is considered preferable to increase the extraction rate to the odour abatement system than to release untreated and potentially odourous air to the atmosphere. Therefore it is recommended that the condition not be amended.

## *3.18 Condition 6.6.5*

The Applicant objected to the requirement to submit an odour management procedure within twelve months of the date of grant of this licence on the basis that An Bord Pleanala have not yet made a decision on the proposed development.

**Comment:**
It is considered appropriate that the odour management procedure should be submitted to the Agency 'six months prior to the acceptance of waste at the facility or six months prior to the commencement of remediation of the existing landfill, whichever is the earlier'. The odour management procedure should also be amended as necessary, and at least annually.

## *3.19 Condition 6.13.1*

The Applicant identifies that the PD allows for the disposal of 500,000 tonnes of waste per annum and the PD requires the working face to be no more than 2.5 metres in height after compaction and no more than 25 metres wide and have a slope of no greater than 1 in 3. The Applicant requests that the condition be revised to allow for a larger working face to accommodate the volume of waste intake and to consider that a horizontal gas management system may be utilised.

**Comment**
While the size of the working face would appear to be small for the scale of waste intake per day (c. 2000 tonnes per day) it is considered desirable that the working face should be as small as possible to minimise odour emissions. The Applicant does not suggest an alternative size for the working face in their objection, rather that it would be agreed with the Agency prior to waste acceptance at the facility. The Applicant identified in their waste licence application that the operational area would be kept to a minimum size and would typically be a maximum of 25m wide and 50m long (and 2.5m high). This equates to an area of 1,250m$^2$. The Applicant during the oral hearing identified that the odour assessment assumed an active face of 2650m$^2$.

In the event that a waste licence is granted for the proposed facility to proceed it is recommended that the condition be amended to include a maximum length of 50 metres.

Condition 6.13.4 includes reference to 'working face, or faces'; however, Condition 6.13.1 specifies that there shall be only one working face and hence it is recommended that Condition 6.13.4 be amended.

The Applicant in the objection identifies that a horizontal gas management system may be installed; however, at the oral hearing, Mr Chadwick for the Applicant, identified that such a system would be installed to abate odour emissions. Therefore it is recommended that a condition specifically requiring a horizontal gas management system at horizontal lifts of no greater than 5 metres be included.

## *3.20 Condition 6.15.3*

The Applicant objected to the requirement to submit a proposal for the location of four additional boreholes for agreement within six months of the date of grant of this licence on the basis that An Bord Pleanala have not yet made a decision on the proposed development.

**Comment:**
It is considered that a proposal for the location of four additional boreholes would be more appropriate 'six months prior to the acceptance of waste at the facility or six months prior to the commencement of remediation of the existing landfill, whichever is the earlier'.

## *3.21 Condition 6.31*

The Applicant objected to the requirement to develop and establish a Data Management System within six months of the date of grant of this licence on the basis that An Bord Pleanala have not yet made a decision on the proposed development.

**Comment:**
It is considered appropriate that a Data Management System should be developed and established 'six months prior to the acceptance of waste at the facility or six months prior to the commencement of remediation of the existing landfill, whichever is the earlier'.

## *3.22 Condition 6.34*

The Applicant in their objection to the PD requested that the condition requiring the licensee to maintain 10 metres vertical thickness of clay beneath the landfill footprint after excavation include the wording 'unless otherwise agreed with the Agency'. The Applicant during presentation of their evidence at the oral hearing withdrew their objection to this condition.

## 3.23 Condition 6.35.1

The Applicant objects to the requirement to submit a programme for excavation, remediation and restoration of the historical landfill within twelve months of the date of grant of the licence on the basis that An Bord Pleanala have not yet made a decision on the proposed development.

**Comment**
This condition is discussed in greater detail in Section 2.9 (Historical Landfill), and recommended amendments are proposed to the condition including the timeframe for submission of the programme for excavation, remediation and restoration.

## 3.24 Condition 8.1.2

The Applicant requested that Condition 8.1.2 be deleted on the basis that Mechanical and Biological treatment (MBT) does not form part of the Dublin Waste Management Plan 2005 and that thermal treatment (Energy Recovery) and MBT should be placed on an equal footing and do not take priority over each other. The Applicant claims that it contravenes National and European Policy to give preference to MBT over Energy Recovery. The Applicant includes in their objection details of the Dublin Waste Management Strategy and its development and targets. The Applicant suggests that Condition 8.1.2. should be deleted and Condition 8.1.1. amended to read 'Only residual wastes, which have been subject to pre-treatment, shall be accepted for disposal at the landfill facility'.

**Comment**
The condition was raised as a subject of witness statements and cross examination during the oral hearing and is discussed in more detail, including recommendations for amendment, under Section 2.1.4 (Waste Treatment) of this report.

## 3.25 Schedule B

The Applicant notes that Fingal County Council provided discharge limits for the acceptance of leachate to their own foul sewers. The Applicant identifies that there will be pre-treatment of leachate on-site before discharge to sewer for further treatment at one of the local waste water treatment plants. The Applicant points out that the threshold limits for a number of parameters in Schedule B.3 are considerably lower than the concentrations commonly found in typical leachate. Therefore, treatment of the leachate at the landfill to meet these limits would be extremely difficult to achieve. The maximum discharge per day from the facility is $200m^3$ which is small in comparison with the flows treated at the off-site waste water treatment plants. To achieve the limits specified in the PD would require some form of metal stripping. The Applicant requests that if the limits are to remain as in the PD, the monitoring (specified in Schedule C.3.2) should be reduced from monthly to annually. The Applicant provided additional information at the oral hearing in relation to the limit values for zinc and chloride and the sampling method which the Applicant considered to be appropriate.

**Comment**
The points in relation to zinc and chloride emission limit value and appropriate sampling were elaborated on in evidence during the course of the oral hearing and are discussed above under Section 2.4.2 (Leachate Management).

The emission limits specified in the PD are the same emission limits provided by Fingal County Council in their response dated the 7th February 2007 and received by the Agency on the 15th February 2007. The Agency is required under Section 52 of the Waste Management Acts 1996 to 2008 to include limits as specified by the Local Authority (sewer operator), or conditions more strict than those specified. The request to reduce the monitoring frequency from monthly to annually is not justified by the Applicant. There is provision in the PD (Condition 6.23) for the monitoring frequency to be changed with the agreement of the Agency based on monitoring results. However, the monitoring frequency and methods specified in the PD do not accurately reflect what the Local Authority in the Section 52 response requested. In the event that a waste licence is granted for the proposed facility to proceed it is recommended the emission limit values specified in the PD, Schedule B.3 (Emissions to Sewer) should not be amended. Schedule C.3.2 (Monitoring of Emissions to Sewer) of the PD should be amended to include monitoring (frequency and methods) as specified by Fingal County Council in their Section 52 response.

## *3.26 Schedule C*

The Applicant identifies that Schedule C.6 (Ambient Monitoring Groundwater Monitoring) requires monitoring of six identified groundwater wells and four additional locations as required by Condition 6.15. The Applicant identifies that two of the identified boreholes, HR12 and HR1a, are outside the licensed boundary and not in the ownership of the Local Authority. The Applicant states that while every effort will be made to continue the monitoring of these locations, their continued availability is outside the control of the Local Authority and therefore they request that these boreholes be removed from Schedule C.6 of the licence.

**Comment**
The two groundwater monitoring points were included by the Applicant in their licence application and therefore considered by the inspector to be available for monitoring. It is acknowledged that the Applicant may not be in a position to maintain access to these two points; however, rather than excluding them from the licence it is recommended that they be included but with an option for the two monitoring points to be replaced with other suitable monitoring locations subject to the agreement of the Agency.

In the event that a waste licence is granted for the proposed facility to proceed it is recommended that the heading of Schedule C.6 (Ambient Monitoring) be amended to provide for alternative groundwater monitoring points replace HR12 and HR1a subject to Agency agreement

## *3.27 Schedule D*

The Applicant requested that the Agency amend the requirements of the first item listed under Schedule D Specified Engineering Works (SEW). The wording in the PD

is as follows: 'Development of the facility including preparatory works and lining and stability calculations.' The Applicant proposes alternative wording which divides the first SEW into three requirements, which read as follows:

- Development of the initial facility including details of the facility infrastructure and cell construction
- Development of all subsequent cell constructions
- Development of all significant infrastructural developments.

The Applicant requests that there should not be a requirement to provide stability calculations at the SEW stage since these can be dependent on specific materials used in the construction of the cells which will not be definitively selected at the stage when the SEW is submitted.

**Comment**

The SEW should relate to engineering works which can be completed within a reasonable timeframe and which can be considered to be one area of work. The first item in Schedule D is very general and could be interpreted to relate to engineering work which could take a number of years to complete and may be more appropriately submitted as a number of SEWs during the development of the facility. It is therefore recommended that the first SEW included in the PD should be constructed as a number of SEWs. The first SEW should relate to preparatory works, the second should be the installation of the liner system and associated engineering works including drainage, if necessary, and there should be a requirement that each further cell development should require another SEW.

The requirement for stability calculations as part of the SEW is addressed above in relation to Condition 3.7.1(ii).

# Chapter 4 Conclusions and Recommendations

## *4.1 Main Conclusions and Recommendations*

The evidence presented to the oral hearing is reviewed in detail in Chapter 2 (Review of Evidence) and conditions of the PD on which objections were received from the Applicant and Objection Parties are considered in Chapter 3 (Consideration of Specific Licence Conditions). Whilst all of the evidence (including the waste licence application, Environmental Impact Statement, additional information, submissions, objections, submissions on objections and information presented at the oral hearing) has been taken into account in making our recommendations, a number of the key issues are highlighted below. These involve the Applicant's risk assessment, the impact that the proposed landfill would have on the potential for future groundwater development in the area and the presence of an existing landfill at the site.

The risk assessment in the EIS is entirely qualitative, and the only quantitative component is included in an Article 14 submission in which leakage losses through a composite landfill liner were calculated, together with the estimated dilution factor should this leakage reach the groundwater. The Applicant has not, *inter alia*, made estimates of the concentrations of key components of leachate (such as List I and List II substances as given in the EU Groundwater Directive) in any leakage that might reach potential receptors such as the aquifer beneath the landfill footprint, the aquifer at the edge of the site boundary or a nearby private well (for example, one of the horticultural wells south of the proposed facility, even though it may not lie directly down hydraulic gradient of the landfill, might have been a suitable conservative choice as a receptor to investigate the implications of any release of leachate into groundwater and how key constituents might be diluted or attenuated prior to reaching that well). Nor has the Applicant attempted to quantify, for the case where there is an inward hydraulic gradient to the landfill (as predicted for most of the site), the escape of contaminants through a composite liner by diffusion.

In assessing risk, the Applicant has relied to a large extent on the groundwater protection response matrix[14] in which the combination of low vulnerability (as indicated by the presence of 10 m of low permeability clay) and 'locally important' aquifer designation indicates an R1 ('Acceptable') response. However, this groundwater protection response matrix is only intended as a planning tool, and does not of itself replace the need for a site risk assessment following the completion of detailed site investigations. In our view, a quantitative risk assessment is necessary for such a large development as this proposed facility, in order to evaluate fully the contamination risks. Whilst we feel it is unlikely that a landfill at this proposed location will lead to deterioration in groundwater quality, based on the information available we cannot conclude with confidence that no pollution will occur. More specifically, we cannot conclude with confidence that the discharge to groundwater of List I or List II substances (as per the Groundwater Directive) would be in a quantity

[14] *Groundwater Protection Schemes*, Department of the Environment and Local Government, Environmental Protection Agency, and Geological Survey of Ireland, 1999

and concentration so small as to obviate any present or future danger of deterioration in the quality of the receiving groundwater.

Therefore we recommend that a licence should not be granted for the proposed facility. We also consider that the effect of the proposed facility on the groundwater development potential in the area, and the presence of an existing landfill at the site, are other key issues that should be taken into account by the Board in reaching a final decision on the proposed facility.

The locally important aquifer, which underlies the proposed facility and the surrounding area, is used as a source of public water supply from the Bog of the Ring wellfield, located to the north of the proposed facility, and by private wells, several of which are used in the horticultural industry, located mainly to the east and south of the proposed facility. It is clear from the evidence provided to the oral hearing that there is little scope for significantly increasing the abstraction from the Bog of the Ring wellfield and we consider it unlikely that the zone of contribution ('catchment') of this wellfield will extend sufficiently far south in the future so as to encompass the proposed facility site (but we recommend that groundwater level monitoring should be required to confirm this, in the event that the proposed facility is granted a waste licence).

From the information available, it is likely that there are potentially exploitable groundwater resources in the vicinity of the proposed facility, notably to the east and possibly also to the south. Additional investigations would be required both to quantify the resource and to assess the extent of the zones of contribution of any future wellfields. However, even in the absence of this additional information, we consider that the construction of a landfill would inhibit future groundwater development to the east and also possibly to the south of the proposed site, in that, in line with the precautionary principle, a responsible water supply provider is unlikely to locate a new wellfield where there would be a large landfill site within its potential zone of contribution. The Applicant has made it clear that Fingal County Council is not proposing to develop new wellfields in the area. Nevertheless, the impacts of a landfill on other potential users of groundwater should also be considered; for example, the development of new horticultural wells. Again, following the precautionary principle, we would not regard it as good practice to install new industrial or private wells where there is a large landfill site within their zones of contribution, even if the risk of groundwater pollution is small. In our opinion, therefore, the landfill, if it is developed, could inhibit some future groundwater development in the area. However, there is insufficient information available to determine the extent of the aquifer area that might be 'sterilised' by the proposed facility.

The Applicant identified, as part of their waste licence application, that there is an existing landfill within the site boundary of the proposed facility. There was significant discussion at the oral hearing in relation to the scale and nature of the waste within the existing landfill and the completeness of the risk assessment submitted by the Applicant. The PD issued included a requirement to remediate the existing landfill by excavation, remediation and restoration. The Applicant acknowledged that they are prepared to undertake the requirements of the PD in respect of the existing landfill. If a waste licence is granted for the proposed facility,

our recommendation in relation to this existing landfill is to include additional conditions to manage and control its excavation, remediation and restoration. If a waste licence is not granted for the proposed facility, the holder of the waste is responsible for the waste within the existing landfill and shall undertake remediation of the existing landfill as necessary.

## *4.2 Recommendations Regarding Licence Conditions*

Although we are recommending that a licence should not be granted for the proposed facility, we include the following recommendations regarding the licence conditions included in the PD (as issued) should the decision be to grant a waste licence for the proposed facility.

(1) Amend the Introduction of the licence to:

Remove reference to temporary storage of ash; and
Provide for use of inert waste from the historical landfill for remediation of the historical landfill or as construction material in the proposed facility.

(2) References to Waste Management Act shall be amended to read:

Waste Management Acts 1996 to 2008

(3) References to Environmental Protection Agency Act shall be amended to read:

Environmental Protection Agency 1992 to 2007

(4) Insert additional sub-condition under Condition 2.2.2.7

Communications Programme
(i) The licensee shall, prior to the acceptance of waste at the facility or commencement of landfill remediation, establish and maintain a Public Awareness and Communications Programme to ensure that members of the public are informed, and can obtain information at the facility, at all reasonable times, concerning the environmental performance of the facility.
(ii) The licensee shall, prior to the acceptance of waste at the facility or commencement of landfill remediation, establish and maintain a community liaison committee which will enable communication between representatives of the local residents, businesses and farmers and the licensee.

(5) Amend Condition 2.2.2.8 to read:

Maintenance Programme
The licensee shall, six months prior to the acceptance of waste at the facility or six months prior to the commencement of remediation of the existing landfill, whichever is the earlier, establish and maintain a programme for maintenance of all plant and equipment based on the instructions issued by the manufacturer/supplier or installer of the equipment. Appropriate record

keeping and diagnostic testing shall support this maintenance programme. The licensee shall clearly allocate responsibility for the planning, management and execution of all aspects of this programme to appropriate personnel (see Condition 2.1 above).

(6) Amend Condition 2.2.2.9 to read:

Efficient Process Control
The licensee shall, six months prior to the acceptance of waste at the facility or six months prior to the commencement of landfill remediation, establish and maintain a programme to ensure there is adequate control of processes under all modes of operation. The programme shall identify the key indicator parameters for process control performance, as well as identifying methods for measuring and controlling these parameters. Abnormal process operating conditions shall be documented, and analysed to identify any necessary corrective action.

(7) Insert the following additional sub-condition under Condition 3.5 (Surface Water Works):

The licensee shall establish the surface water management system as part of the Initial Development Works referred to in Condition 3.4 above.

(8) Amend Condition 3.7.1(ii) to read:

(ii) a geotextile protection layer placed over the HDPE layer (the choice of geotextile shall be proven by cylinder testing prior to the commencement of cell lining);

(9) Amend Condition 3.7.1(iii) to read:

(iii) a 500mm thick drainage layer placed over the geotextile layer with a minimum hydraulic conductivity of 1 x 10-3 $m^3/m^2/s$. The drainage layer shall be a maximum of 5% fine material passing a 10mm British Standard Sieve, granular, rounded or sub-rounded stone (10-40mm grain size) incorporating leachate collection drains. The licensee shall undertake cylinder tests to demonstrate the suitability of the drainage layer stone and any changes to the above specification shall be agreed with the Agency based on site specific tests.

(10) Amend Condition 3.7.2 to read:

A drainage system shall be installed below the lining system to remove groundwater as required. The drainage system shall comprise:

(i) a geotextile layer separating the engineered mineral liner from the drainage system;
(ii) drainage medium of minimum 500mm depth with a minimum hydraulic conductivity of $1x10^{-3}$m/sec; and
(iii) a pumped or gravity system from the drainage system to the surface water management system.

The drainage system shall be diverted to the on-site waste water treatment plant if monitoring results indicate contamination.

(11) Amend Condition 3.13.2 to read:

All vehicles leaving the facility shall use the appropriate wheel cleaners (construction vehicle or waste vehicle wheel wash). All waste water from the construction vehicle wheel cleaning area shall be diverted to the surface water management system and waste water from the waste vehicle wheel cleaning area shall be directed to the leachate management system.

(12) Insert the following sub-condition under Condition 3.14 (Leachate Management Infrastructure):

The licensee shall establish an on-site leachate treatment system and a sewer pipeline connection to an off-site waste water treatment plant prior to the acceptance of waste at the facility.

(13) Insert the following condition after Condition 3.15.1:

The licensee shall submit for agreement a detailed plan for the provision of sacrificial gas extraction systems, phased capping of the waste body and interim capping at the inter-cell boundaries.

(14) Amend Condition 3.15.3 to read:

Landfill gas collected at the site shall, as soon as is practicable, be employed for the generation of energy/electricity. The feasibility of landfill gas utilisation shall be reported annually as part of the AER. Alternatives to landfill gas utilization for energy or electricity shall be agreed in advance with the Agency.

(15) Insert the following after Condition 3.17

The licensee shall, as a minimum, install the following infrastructure prior to the excavation of overburden or waste: construction vehicle wheel wash, surface water management system.

(16) Amend Condition 3.24 to read:

Oil Separators
The licensee shall install and maintain oil separators at the facility to ensure that all surface water run-off from waste acceptance and vehicle parking areas passes through an oil separator in advance of discharge to the surface water management system. The separator shall be a Class I by-pass separator and the separator shall be in accordance with I.S. EN 858-2:2003 (separator systems for light liquids).

(17) Amend Condition 3.25.1 to read:

Firewater Retention
The licensee shall carry out a risk assessment to determine if the activity should have a fire-water retention facility. The licensee shall submit the assessment and a report to the Agency on the findings and recommendations of the assessment six months prior to the acceptance of waste at the facility or six months prior to the commencement of remediation of the existing landfill, whichever is the earlier.

(18) Amend Condition 6.2.2. to read:

The level of leachate in the leachate monitoring points in all filled or active cells shall be monitored as outlined in Schedule C2.3 (Leachate Monitoring) of this licence.

(19) Amend Condition 6.2.4 to read:

Unless discharged to sewer for further off-site treatment, primary treated leachate stored in the leachate holding tank shall be disposed of by tankering off-site in fully enclosed road tankers, subject to the licensee demonstrating capacity at the receiving waste water treatment plant to the satisfaction of the Agency.

(20) Amend Sub-Condition 6.4.3 to read:

Flares shall be operated to ensure a burn chamber residence time of minimum 0.3 seconds and burn temperature of minimum 1000$^{o}$C, unless alternative appropriate techniques are approved by the Agency under condition 6.4.4.

(21) Insert the following additional sub-condition under Condition 6.4:

The licensee shall establish a landfill management infrastructure monitoring programme, the programme shall include monitoring of the pipeline integrity and vacuum pressures along the extraction system.

The licensee shall have an independent assessment of the on-site landfill gas management system undertaken at least bi-annually following commencement of waste acceptance. The assessment shall include examination and testing of the landfill gas extraction and collection system and measurement of surface VOC emissions across the facility.

(22) Amend Condition 6.6.5 to read:

The licensee shall submit to the Agency, six months prior to the acceptance of waste at the facility or six months prior to the commencement of remediation of the existing landfill, whichever is the earlier, a detailed odour management procedure for minimization of odour generation at the site. The odour management procedure shall be amended as necessary at least annually, and shall include procedures for:

(i) acceptance and management of odorous waste deliveries;

(ii) acceptance and management of pretreated biological sludges;

(iii) minimisation of odour from the leachate collection and treatment system, including during maintenance work;

(iv) investigation of odour complaints;

(v) day-to-day operational practices to minimise odorous emissions;

(vi) operator training in relation to odour management;

(vii) minimisation of odour from the gas collection and flaring/utilisation system, including measures to be taken and potential impacts in the event of equipment failure;

(viii) minimisation of odour due to excavation of waste.

(ix) The licensee shall provide and maintain vertical and horizontal landfill gas extraction systems at the facility. The horizontal systems shall be employed during placement of waste in the cell.

(x) The licensee shall monitor pipeline integrity and vacuum pressure along the extraction system as part of the landfill gas management infrastructure monitoring programme.

(xi) The licensee shall install a sacrificial gas extraction system, include provision for phased capping of the waste body and interim capping at inter-cell boundaries as the detailed phasing plan.

(xii) The licensee shall have an assessment and report prepared of the landfill gas management system twice yearly, after commencement of waste acceptance. The assessment shall as a minimum include examination the landfill gas extraction and collection system and assessment of surface VOC emissions at the facility. The assessment shall be undertaken by an independent professional to be agreed with the Agency.

(23) Insert the following sub-condition after Condition 6.6.3:

The licensee shall establish and maintain a programme to minimise the quantity of biodegradable sludges accepted at the facility.

(24) Insert the following condition after Condition 6.6:

Waste Monitoring
The licensee shall monitor incoming residual waste accepted at the facility in accordance with Schedule C.4 Waste Monitoring and maintain a record of the results.
The licensee shall establish based on incoming residual waste monitoring the maximum acceptable ‘respiratory index’ for the incoming residual waste.

(25) Amend Condition 6.7 to read:

In dry weather:

(i) site roads and any other areas used by vehicles; and

(ii) soil stockpiles

shall be sprayed with water as and when required to minimise or prevent airborne dust nuisance.

(26) Delete Condition 6.9 Ash Storage.

(27) Amend Condition 6.13.1 to read:

The working face of the landfill shall be no more than 2.5 metres in height after compaction, no more than 25 metres wide, **no more that 50 metres long** and have a slope no greater than 1 in 3.

(28) Amend Condition 6.13.4 to read:

The working face shall at the end of each day, be covered with suitable material.

(29) Insert the following additional condition as Condition 6.15.1:

The licensee shall install in each cell a horizontal gas management system at horizontal lifts no greater than 5 metres, unless otherwise agreed with the Agency.

(30) Amend Condition 6.15.3 to read:

A proposal for the locations of four additional boreholes for ongoing monitoring of groundwater, as detailed in *Schedule C.6 Ambient Monitoring* of this licence, shall be submitted to the Agency for agreement six months prior to the acceptance of waste at the facility or six months prior to the commencement of remediation of the existing landfill, whichever is the earlier.

(31) Amend Condition 6.31 to read:

The licensee shall, six months prior to the acceptance of waste at the facility or six months prior to the commencement of remediation of the existing landfill, whichever is the earlier, develop and establish a Data Management System for collation, archiving, assessing and graphically presenting the environmental monitoring data generated as a result of this licence.

(32) Amend Condition 6.34 to read:

The licensee shall maintain 10 metres vertical thickness of clay beneath the landfill footprint after excavation. The licensee shall demonstrate 10 metres vertical thickness of clay beneath the landfill footprint after excavation to the satisfaction of the Agency prior to installation of cell lining. In the event that any additional investigations indicate 10 metres of clay are not present the licensee shall propose alternative measures to provide at least an equivalent level of protection. Technical certification of this obligation shall be submitted to the Agency prior to waste acceptance to the landfill area.

(33) Amend Condition 6.35 (Excavation of Historical Waste Area) to read:

6.35.1 The licensee shall submit to the Agency for approval, within six months of the date of grant of the licence, a detailed programme, including timeframe, for the excavation, remediation and restoration of the historical landfill area at the site. The programme shall include a detailed plan of works to be undertaken, plant and machinery to be used shall be identified, mitigation measures in addition to those specified in the waste licence application for all emissions including noise, dust, water etc shall be provided, proposals for classification and characterisation of the waste excavated, proposals for recovery and treatment of the waste excavated, identification of appropriate disposal/recovery facilities for receipt of the waste, and timeframe for completion of excavation, remediation and restoration.

6.35.2 Leachate arising from the remediation shall be directed to the on-site leachate treatment infrastructure, if available, or temporarily stored on-site prior to tankering to an appropriate facility agreed with the Agency.

6.35.3 Surface water run-off shall be directed to the surface water attenuation infrastructure.

6.35.4 Waste within the historical landfill shall be excavated, screened and classified prior to recovery or disposal. Inert waste (soil, stone meeting the standards specified in EU Council Decision 2003/33/EC) may be used to remediate the historical landfill, used for construction purposes on-site or sent off site for recovery. Recoverable waste shall be sent off site for recovery at appropriate facilities. Non-inert waste shall be disposed of within an engineered lined cell or sent off site for disposal/recovery at an appropriate facility. Hazardous waste shall be sent off site to an appropriate facility.

6.35.5 Operations and infrastructure associated with the remediation shall avoid the archaeological site to the west of the historical landfill. Excavation into undisturbed overburden should only be undertaken subject to Department of the Environment Heritage and Local Government approval and shall be supervised.

(34) Insert the following additional condition after Condition 6.35:

The licensee shall to the satisfaction of the Agency install boreholes off-site to establish and monitor the groundwater divide south of the Bog of the Ring public water extraction system. The groundwater shall be monitored in accordance with Schedule C.6 (Ambient Monitoring).

(35) Amend Condition 8.1.2 to read as follows and insert as Condition 8.1.1:

Prior to the acceptance of residual waste at the facility the licensee shall identify to the satisfaction of the Agency that residual waste to be accepted at the facility shall be subjected to pre-treatment. The pre-treatment shall be either:

(i) source segregation to include, in particular, segregation of recyclables and separate segregation of the biodegradable organic fractions (‘3 bin system’ or equivalent);

(ii) Mechanical Biological Treatment (MBT); or

(iii) energy recovery

(36) Amend Condition 8.1 to read:

8.1.1 Prior to the acceptance of residual waste at the facility the licensee shall demonstrate, to the satisfaction of the Agency, that residual waste to be accepted at the facility will be subjected to pre-treatment. The pre-treatment shall be either;

(i) source segregation to include, in particular, segregation of recyclables and separate segregation of the biodegradable organic fractions ("three bin system" or equivalent agreed with the Agency);

(ii) Mechanical Biological Treatment (MBT); or

(iii) energy recovery

8.1.2 Only residual wastes, that have been subjected to pre-treatment as demonstrated and agreed under Condition 8.1.1, shall be accepted for disposal at the facility. This requirement may, subject to the agreement of the Agency, not apply to:

(i) inert wastes for which treatment is not technically feasible;

(ii) other waste for which such treatment does not contribute to the objectives of the Landfill Directive as set out in Article 1 of the Directive by reducing the quantity of the waste or the hazards to human health or the environment.

(37) Insert the following sub-condition into Condition 8.1:

The licensee shall monitor incoming residual waste in accordance with Schedule C.4 Waste Monitoring. The licensee shall, based on the incoming residual waste monitoring, establish the maximum acceptable 'respiratory index' for the incoming residual waste.

(38) Insert the following Conditions after Condition 8.1:

8.2 The licensee shall not accept bottom ash for temporary storage.

8.3 The licensee may accept stabilised waste arising from the composting of the biodegradable fraction of municipal waste, to which fraction sewage sludge may have been added.

(39) Insert the following condition after Condition 11.2:

The licensee shall record the pre-treatment received by all waste accepted at the facility. The record shall be maintained on-site at all times and the licensee shall summarise the record for submission as part of the AER.

(40) Amend Condition 11.3 to read:

In advance of the development of any undisturbed area, the licensee shall submit conservation and management plans for agreement of the Heritage Section of the Department of the Environment, Heritage and Local Government. Development shall not commence until such agreement has been received from the Department of Environment, Heritage and Local Government.

(41) Insert the following condition after Condition 11.4:

The licensee shall record the treatment received by each load of waste prior to acceptance at the facility, the record shall be maintained on-site at all times and the licensee shall prepare a summary report for inclusion in the AER.

(42) Amend Schedule A.2 (Waste Acceptance) to read:

### *A.2 Waste Acceptance*

***Table A.1 Waste Categories and Quantities***

| **WASTE TYPE** Note 1 | **MAXIMUM (TONNES PER ANNUM)** Note 2,3 |
|---|---|
| Residual Household and Commercial Waste | 348,000 |
| Residual Non-Hazardous Construction & Demolition waste | 50,000 |
| Treated Sewage Sludge | 10,000 |
| Industrial non-hazardous sludges | 2,000 |
| Industrial non-hazardous solids | 90,000 |
| **TOTAL** | 500,000 Note 4 |

**Note 1:** Any proposals to accept other compatible waste streams must be agreed in advance with the Agency and the total amount of waste must be within that specified.

**Note 2:** The individual limitation on waste streams may be varied with the agreement of the Agency subject to the overall total limit staying the same.

**Note 3:** These figures exclude the quantities of waste which may be transferred into the engineered landfill from the historical waste disposal area. Some of this material may also be employed for construction purposes. In addition, construction and demolition or Inert waste imported to the site for use in the construction are not included in these limitations. A detailed statement (with mass balance) of waste used in construction should be included as part of the AER.

**Note 4:** The total maximum (tonnes per annum) accepted at the facility shall be limited to 300,000 tonnes following the commencement of operation of a 'waste to energy facility' in the Dublin region.

(43) Amend Schedule C.3.2 (Monitoring of Emissions to Sewer) to read:

### *C.3.2 Monitoring of Emissions to Sewer*

**Emission Point Reference No.:** SE1

| Parameter | Monitoring Frequency | Analysis Method/Technique |
|---|---|---|
| **Flow** | Continuous | On-line flow meter with recorder |
| **Temperature** | Monthly (grab sample) Note 1 | Temperature probe |
| **PH** | Monthly (grab sample) Note 1 | pH electrode/meter |
| **Chemical Oxygen Demand** | Monthly (composite sample) Note 2 | Standard Method |
| **Biochemical Oxygen Demand** | Monthly (composite sample) Note 2 | Standard Method |
| **Suspended Solids** | Monthly (composite sample) Note 2 | Standard Method |
| **Sulphates** | Monthly (composite sample) Note 2 | Standard Method |
| **Oils, fats & greases** | Monthly (composite sample) Note 2 | Standard Method |
| **Mineral Oils** | Monthly (grab sample) Note 1 | Standard Method |
| **Detergents** | Monthly (composite sample) Note 2 | Standard Method |
| **Phosphates** | Monthly (composite sample) Note 2 | Standard Method |
| **Ammonium** | Monthly (composite sample) Note 2 | Standard Method |
| **Metals (as per Schedule B.3)** | Monthly (composite sample) Note 2 | Standard Method |
| **Chloride** | Monthly (composite sample) Note 2 | Standard Method |
| **Cyanide** | Monthly (composite sample) Note 2 | Standard Method |
| **Fluoride** | Monthly (composite sample) Note 2 | Standard Method |
| **Methane Gas (as v/v)** | Continuous | Standard Methods |
| **Organic Compounds** Note 3 | Biannually (grab sample) Note 1 | Standard Method |

**Note 1:** Grab samples shall be collected from the post-treatment balance tank, prior to discharge.

**Note 2:** Composite sampling shall be provided prior to the discharge of effluent to sewer.

**Note 3:** Screening for priority pollutant list substances (such as US EPA volatile and/or semi-volatile compounds).

(44) Amend Schedule C.4 (Waste Monitoring) to read:

### *C.4 Waste Monitoring*

| Waste Class | Frequency | Parameter | Method |
|---|---|---|---|
| **Other** Note 1<br>**Incoming residual waste** | Monthly Note 2 | Respiratory index | To be agreed |

**Note 1:** Analytical requirements to be determined on a case by case basis (e.g. in the case of materials excavated from the historic landfill area and not suitable for landfill in a lined cell at the facility).

**Note 2:** All wastes should be sampled in accordance with BS EN 14899:2005 Characterization of waste. Sampling of waste materials. Framework for the preparation and application of a sampling plan.

(45) Amend Schedule C.6 (Ambient Monitoring) to read:

***Groundwater Monitoring***

**Locations:** **(i)** Groundwater Wells:- BRC1, BRC2, ER7, ER12, BRC3, HR12, HR1a, plus 4 additional locations as required in Condition 6.15, HR12 and HR1a may be replaced with alternative groundwater wells subject to the prior written agreement of the Agency;
(ii) Groundwater monitoring wells installed in accordance with Condition 6.36; and,
(iii) Discharge(s) from the drainage layer put in place beneath the main liner system (Condition 3.7.2), prior to entering the surface water attenuation system

| **PARAMETER** Note 1 | **GROUNDWATER**<br>**Monitoring Frequency** |
|---|---|
| **Visual Inspection/Odour** Note 2 | Monthly |
| **Groundwater Level (wells)** Note 5 | Monthly |
| **Dissolved Oxygen** | Monthly |
| **Electrical Conductivity** | Daily (for discharge from the drainage layer beneath the main liner)<br>Monthly otherwise |
| **Ammoniacal Nitrogen** | Monthly |
| **Chloride** | Monthly |
| **pH** | Monthly |
| **Sulphate ($SO_4$)** | Monthly |
| **Metals / non metals** Note 3 | Annually |
| **List I/II organic substances (Screen)** Note 4 | Annually |
| **Mercury** | Annually |
| **Cyanide (total)** | Annually |
| **Faecal Coliforms** | Annually |
| **Total Coliforms** | Annually |

**Note 1:** Where appropriate all the analyses shall be carried out by a competent laboratory using standard and internationally accepted procedures.

**Note 2:** Where there is evident gross contamination, additional samples should be analysed and the full suite of parameters shown tested.

**Note 3:** Metals and elements to be analysed by AA/ICP should include as a minimum: boron, cadmium, calcium, chromium (total), copper, iron, lead, magnesium, manganese, nickel, potassium, sodium and zinc.

**Note 4:** Samples screened for the presence of organic compounds using Gas Chromatography / Mass Spectrometry (GC/MS) or other appropriate techniques and using the list I/II Substances from EU Directive 76/464/EEC and 80/68/EEC as a guideline. Recommended analytical techniques include: volatiles (US Environmental Protection Agency method 524 or equivalent), semi-volatiles (USEPA method 525 or equivalent, and pesticides (USEPA method 608 or equivalent).

**Note 5:** Quarterly monitoring of the groundwater levels in the bedrock monitoring wells developed as part of the initial site investigations (wells as per Figure 3.18.5 of Volume 2 of the EIS) shall be completed and assessed as per Condition 6.15.

(46) Amend Schedule D (Specified Engineering Works) to read:

## Schedule D Specified Engineering Works

| Specified Engineering Works |
| --- |
| Initial development of the site and first cell including preparatory works. |
| Installation of the lining system and associated engineering works including drainage, if necessary. |
| Each future cell development including lining, associated engineering works including drainage, if necessary. |
| Final capping. |
| Installation of landfill gas management infrastructure. |
| Installation of leachate management infrastructure. |
| Installation of groundwater control infrastructure. |
| Installation of surface water management infrastructure. |
| Any other works notified in writing by the Agency. |

Signed: Patrick Byrne on 12th August 2008

Patrick Byrne

# Appendices

***Appendix A*** ***Proposed Decision***
(Available on the EPA website, www.epa.ie)

***Appendix B*** ***Objections and Submissions on Objections***
(Available on the EPA website, www.epa.ie)

***Appendix C*** ***Letters of Appointment***
(Available on the EPA website, www.epa.ie)

***Appendix D*** ***Order of Appearance***

***Appendix E*** ***Presentations to the Oral Hearing***
(Available on the EPA website, www.epa.ie)

***Appendix F*** ***Summary Record of the Oral Hearing***

# Appendix D

# Order of Appearance

| Date | Order of Witness/Testimony | Time | Oral Hearing Document No. | Oral Hearing Digitake Record Reference |
|---|---|---|---|---|
| **03/03/08** | Mr Hammerstein, MEP | 14:00 | 6 | P, Q, R, S, T |
| | Mr O'Toole (Applicant) | 14:50 | 1 | U, V, W, X, Z, AA, BB, CC, DD, EE, FF, GG, HH, JJ, KK, LL, MM & NN |
| | | | | |
| **04/03/08** | Mr O'Toole (Applicant) cont. | 09:30 | 1 | A, B, C, D, E, F, G, & H |
| | Mr Herlihy (Applicant) | 10:50 | 4, 11 & 36 | J, K, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z, AA, BB, CC, DD, EE, FF, GG, HH, JJ, KK, LL, MM, NN, OO, PP,QQ, RR, SS, TT, UU, & WW |
| | | | | |
| **05/03/08** | Ms Averill (Applicant) | 09:50 | 5 & 5A | C, D, E, F, & G |
| | Mr Cregan (NLAG) | 10:30 | 8 | G, H, J, & L |
| | Mr Chadwick (Applicant) | 11:20 | 3 | M, N, O, P, Q, R, S, T, U, V, W, X, Y & Z |
| | Ms Courtney (Applicant) | 14:20 | 2 | Z, AA, BB, CC, DD, EE, FF |
| | Mr Ahern (CEWEP Ireland) | 16:00 | 10 | JJ, KK, LL, MM, NN, OO, PP, QQ, RR, SS, TT, UU, VV, & WW |
| | | | | |
| **06/03/8** | Mr Herlihy (Applicant) cont. | 09:30 | 4, 11 & 36 | A, B, C, D, E, F, G, H, J, K |
| | Geological Survey of Ireland | 11:30 | | L, ,M, N, O, P, Q, R & S |
| | Mr Herlihy (Applicant) cont. | 13:40 | 4, 11 & 36 | T, W, X, Y, Z, AA, BB, CC, DD, EE, FF, GG, HH, JJ, KK, LL, MM, NN, OO, PP, QQ, RR, SS, TT, UU, VV, WW, & XX |

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| **07/03/08** | Mr Herlihy (Applicant) cont. | 09:00 | 4, 11 & 36 | A, B, C, D, E, F, G, H, J, K, L, |
| | Mr De Rossa , MEP | 10:48 | 12 & 12A | M, N, O, P & Q |
| | Mr Herlihy (Applicant) cont. | 11:35 | 4, 11 & 36 | Q, R, S, T, U, V, W, X, Y, Z, AA, DD, CC, & DD |
| | Mr Sargent, TD | 14:45 | 13 | EE, FF, GG, & HH |
| | Dr Ashley (NLAG) | 15:15 | 14 | HH, JJ, KK, LL, MM, NN, OO, PP, QQ, & RR |
| | | | | |
| **10/03/08** | Mr Bergin (NLAG) | 09:50 | 19 | C, D, E, & F |
| | Mr Rogers (Applicant) | 10:20 | 20 | F, G, & H |
| | Ms Shortt (NLAG) | 10:40 | 16 | H, & J |
| | Ms Lynch (NLAG) | 10:50 | 16A | J, & K |
| | Ms McNally (NLAG) | 11:30 | 23 | M, |
| | Mr Moore (NLAG) | 11:30 | 18 | M, & N |
| | Mr Warner (NLAG) | 11:40 | 21 | N, O, & P |
| | Mr Boyle (NLAG) | 12:00 | 24 | P, Q, R, & S |
| | Mr Moore (NLAG) | 12:30 | 25 | S |
| | Captain Howarth (NLAG) | 13:50 | 17 | V |
| | Mr Boyle (NLAG) cont. | 14:00 | 24 | W, & X |
| | Dr Reilly, TD (NLAG) | 14:20 | 28 | Y, & Z |
| | Mr Christy (NLAG) | 14:40 | 29 | AA, |
| | Mr White (NLAG) | 14:50 | 27 | BB, & CC |
| | Ms Thorn (NLAG) | 15:00 | 31 | CC, & DD |
| | Mr Sheridan (NLAG) | 15:10 | 30 | DD, & EE |
| | Mr White (NLAG) cont. | 15:45 | 27 | FF, GG |
| | Mr Chillingworth (NLAG) | 15:55 | 15 | GG, HH, JJ & KK |
| | Senator Ryan (NLAG) | 16:25 | 34 | KK, LL |
| | Ms Lenehan (NLAG) | 16:35 | 35 | LL, & MM |
| | Mr Cullen | 16:45 | 7, 7A & 22 | MM, NN, OO, PP, QQ, RR, & SS |
| | | | | |
| **11/03/08** | Mr Cullen cont. | 09:30 | 7, 7A & 22 | A, B, C, D, E, F, G, H, J, K, L, M, & N |
| | Mr Morgan & Ms Burke (Greenstar) | 12:00 | 26 | O, P, Q, R, S, T, U, V, W, X, Y, |

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|---|---|---|---|---|
| | | | | Z, AA, BB, CC, DD, EE, FF, GG, & HH |
| | Mr Lunney, Ms Larkin, Mr White (NLAG) | 14:40 | 38 | LL, MM, & NN |
| | Mr O'Sullivan (NLAG) | 17:10 | 37 | OO, PP, QQ, RR, SS, TT, & UU |
| | | | | |
| **12/03/08** | Mr O'Sullivan (NLAG) cont. | 09:30 | 37 | A, B, C, D, E, F, & G |
| | Dr Quayle (NLAG) | 13:30 | 32 | G, & H |
| | Ms McGlennon (NLAG) | 13:40 | 32A | H, & J |
| | Ms Gough (NLAG) | 11:25 | 42 | L |
| | Ms Gunning (NLAG) | 11:25 | 41 | L, & M |
| | Ms Clarke (NLAG) | 11:35 | 33 | M |
| | Cllr Daly (NLAG) | 11:35 | 40 & 40A | M, N, & O |
| | Mr Boyle (NLAG) cont. | 11:55 | 43 | O, P, Q, & R |
| | Ms Long (NLAG) | 12:25 | 44 | R, & S |
| | Ms Larkin (NLAG) | 12:35 | 39 | S, T, U, V |
| | Ms Tyrell (NLAG) | 14:35 | 45, 45A & 45B | Y, Z & AA |
| | Ms McGauley& Mr Geoghan (NLAG) | 14:55 | 46 & 47 | AA, & BB |
| | Mr Lunney (NLAG) | 15:25 | 48 | DD, EE, FF, GG, HH, & JJ |
| | | | | |
| **13/03/08** | Cllr Kilgallon | 09:10 | 50 | B |
| | Dr Staines (NLAG) | 09:20 | 51 | C, D, E, F, & G |
| | **Closing Statements:** | | | |
| | Mr Mulcahy (Greenstar Ltd.) | 10:15 | 53 | H, J, K, L, M, & N |
| | Mr Cullen | 11:05 | 49 | N, O, P, & Q |
| | Mr O'Sullivan & Mr O'Donnell (NLAG) | 11:45 | 52 | R, S, T, U, V, W, & X |
| | Mr Flanagan (Applicant) | 12:45 | 54 | X, Y, Z, AA, BB, & CC |

# Appendix F

# Summary Record of the Oral Hearing

# Table of Contents

## Introduction

The following is a summary record of the proceedings of the oral hearing into objections to the EPA Proposed Decision (PD) of a waste licence issued to Fingal County Council, Reg No. W0231-01. It does not purport to be a complete transcript of all that was said and you are referred to the Digitake recording for the complete record. We have listened to the recording and used it as an aide memoir during the preparation of the record and the report.

Appendix D Order of Appearance is provided to facilitate locating the presentations within the recording.

The oral hearing commenced at 10:30am on Monday the 3rd March 2008.

## Procedural Issues

The Chair and Assistant Chairs read into the record their letters of appointment (Copies included in Appendix C). The Chair then outlined the purpose of the oral hearing, outlined the recording being undertaken by Digitake, outlined the details of the licence application to date, and confirmed that the Chair and Assistant Chairs had visited the site and local environs. The Chair then sought confirmation of which Objection Parties were present, provided the opportunity for other parties who were not objectors to identify themselves if they wished to make an oral presentation to the hearing and a running order of appearance was outlined subject to agreed changes during the course of the oral hearing.

The following individuals, who did not associate themselves with an Objection Party, made presentations to the oral hearing: Mr Hammerstein MEP, Mr De Rossa MEP and Cllr Kilgallon.

The written evidence of the following individuals were read into the record on their behalf as they were not present: Mrs Lynch's statement was read into the record by Mr O'Sullivan, Dr Warner's statement was read into the record by Mr Boyle, and Dr Quayle's statement was read into the record by Ms McGlennon. It was noted by the Chair that the written statements of those individuals not present would be considered but the fact that the statements could not be cross examined by the other parties would be noted.

Mr Mulcahy, for Greenstar, sought clarification of the roles of the Chair and Assistant Chairs and also if each Assistant Chair's contribution would form an appendix to the report. The Chair clarified that the Chair and Assistant Chairs would prepare a report for the Board of the Agency.

Mr O'Donnell, for NLAG, sought clarification as to whether the EPA had considered the EIS and also if it was the intention of the EPA to carry out an Environmental Impact Assessment (EIA) as part of the determination of the application. Mr O'Donnell asked if the oral hearing was considering the EIS or limited to only the PD issued.

The Chair identified that an EIS had been submitted to the EPA in support of the waste licence application, the role of the oral hearing was to gather additional information from all Objection Parties which would be included in a report on the oral hearing to be submitted to the Board of the EPA. The Chair confirmed that the Chair and Assistant Chairs were there to consider the oral submissions in relation to the PD, and that the PD is open to reconsideration by the Board of the EPA based on the additional information submitted by the various witnesses. The purpose is to collect further information and therefore objectors can comment on everything submitted to date including the EIS. It was stated that the Chair and Assistant Chairs will prepare a report and recommendations which will be submitted to the Board of the EPA. The report and any information gleaned from this oral hearing will be considered by the Board of the EPA. The Board of the EPA will do one of the following based on the report: refuse the application; approve the PD as issued; or approve the PD as issued with amendments.

The Chair confirmed that neither the Chair nor Assistant Chairs had any involvement to date in relation to the assessment of the licence application and that they had no pre-determined views in relation to the licence application.

Mr O'Donnell, for NLAG raised a preliminary objection on the basis that An Bord Pleanala are currently carry out an analysis of the proposed development including an EIA and will establish whether it is appropriate to permit the development. Mr O'Donnell noted that it is possible that An Bord Pleanala will refuse the proposed development and in such case the EPA oral hearing would be mute; it would have no purpose other than engage in an exercise that would have no status and no validity and no function and yet his clients are been asked to participate and incur costs and time. Mr O'Donnell made the submission that the EPA oral hearing should be adjourned until An Bord Pleanala issue their decision regarding the proposed development and to do otherwise would be prejudicial to his clients. Mr O'Donnell identified that even if An Bord Pleanala permitted the development it is likely that it would be subject to modification and conditions as to how it will operate, be designed and function. In these circumstances his clients and the hearing cannot be clear as to the nature of what is for consideration as it is dependent on a third party [An Bord Pleanala]. Therefore the oral hearing must speculate the likely design parameters of what An Bord Pleanala may approve. In his opinion, that renders this exercise entirely fruitless, inappropriate and in his submission the oral hearing is premature until the decision of An Bord Pleanala is made. Mr O'Donnell also stated that his clients would be entirely excluded from the ramifications of any decision of An Bord Pleanala.

The Chair identified that the process before An Bord Pleanala and the waste licence application, including the oral hearing, are two separate processes. The design being considered by the EPA oral hearing is as proposed by the Applicant. If a decision of An Bord Pleanala fundamentally changes the proposed development, then that would have to be considered at that stage. The Chair stated that he considered it appropriate to proceed despite the objections raised by Mr O'Donnell.

Mr Mulcahy, for Greenstar, questioned the role of Mr Doyle as a legal advisor, and identified the decision of Judge Kelly in relation to Prenderville and The Medical Council. Mr Mulcahy also identified that each party is prejudiced by being asked to continue as the Chair is unable to tell what action the Board of the EPA will take, in

relation to carrying out an EIA, when furnished with the oral hearing report. Mr Mulcahy also identified that he considered that a reconstituted Board should assess the objections.

**Witness No. 1 Mr Hammerstein MEP**

Mr Hammerstein identified that he was a member of the Petitions Committee of the European Parliament and had been appointed by the Petitions Committee to attend the oral hearing as a result of a petition made on the 22nd November 2007 by the Nevitt Lusk Action Group (NLAG). Mr Hammerstein outlined that the Petitions Committee is open to any European citizen or group that considers they have not found adequate redress to an issue in their own jurisdiction and the issue involves European legislation.

Mr Hammerstein identified legislation which he considered relevant to the waste licence application and the oral hearing, these included: The Water Framework Directive; Groundwater Directive; Strategic Environmental Assessment Directive; Environmental Impact Assessment Directive; and Access to Information on the Environment. Mr Hammerstein stated that participation is a key element promoted by the Petitions Committee. Participation and consultations should not just be undertaken to comply with procedures, public participation must be taken into account in the decision making process. Mr Hammerstein stated that there was concern among members of the Petitions Committee in relation to groundwater resources and the application of the Groundwater Directive and the site selection. Mr Hammerstein identified on a map, extracted from the EPA published Water Quality in Ireland 2006, Key Indicators of the Aquatic Environment, that there are two fissured bedrock aquifers, one of which lies in the area of the proposed landfill and one in the south of the country. Mr Hammerstein noted that the one in the area of the proposed landfill is of high quality (zero faecal coliforms). The Groundwater and Water Framework Directives require the quality of groundwater to be preserved in the mid to long term.

Mr Hammerstein stated that another issue in the choice of any landfill is the question of permeability and impermeability. Therefore there is a need for a clear map of high permeability points where there is a risk of leaching of organic or toxic material to the aquifer. It is also important to know where fault lines are in the aquifer. There should be a study of wells which may be down gradient and also details of the water divide.

Mr Hammerstein stated that the Environmental Impact Study presented is a statement which may be in compliance, but not in total accordance with the EIA Directive. What has not been presented is a Strategic Environmental Assessment. Mr Hammerstein stated that while he does not know all the details he considers that a strategic evaluation might evaluate the proposed landfill and the proposed incinerator for South Dublin.

Mr Hammerstein stated that the Waste Directive requires that we should make sure that waste is being separated so that residual waste is limited. Mr Hammerstein also stated that a project of this sort should be subject to a full geological survey.

Mr Hammerstein referred to a letter received by the Petitions Committee from Dr Mary Kelly, Director General of the EPA (a full copy of letter and related correspondence is included as Document No. 6, Appendix E). Mr Hammerstein quoted from the letter that “every inch of Ireland is an aquifer”. Mr Hammerstein

queried if this statement was correct and he stated that the Petitions Committee considers that aquifers must be protected like surface waters. Mr Hammerstein identified that Ireland gets much of its drinking water from surface water, and he identified issues of poor surface water quality. Groundwater is an alternative source of water for drinking and agriculture.

Strategic Impact Assessments should also consider human, social, economic issues, effects on agriculture and cultural heritage. Mr Hammerstein stated that the transfer of water from one catchment to another should be a last resort. The WFD requires every catchment to have a plan.

Mr Hammerstein stated that any landfill should not be vulnerable to flooding. Also whether the landfill is above or below the water table is important. Mr Hammerstein stated that it is important in any EIA or evaluation to know what the compensatory measures are, such as what measures will be taken to prevent the worst happening or what would happen in case of flooding or leaching. The direct and indirect impact of the landfill on horticulture should be evaluated including impact on water, smell and perception.

Mr Hammerstein stated that there was concern that the EIS might not be sufficient and an EIA should take place. Mr Hammerstein stated that the issue would be considered again by the Petitions Committee.

**Cross-examination of Mr Hammerstein**

***Mr Boyle***, for NLAG, made a point in relation to access to information and he stated that the NLAG have attempted to access information regarding the possible hazard due to fire at the proposed development and that the information should be put on public file and debated, and that the EPA refused this request. Mr Boyle also identified the risks associated with slope stability including possibly causing the liner to burst; however when NLAG asked the EPA to clarify the hazard and could they debate this issue they have been told that this will be discussed with the Applicant after the licence has been granted. NLAG would not be party to this process. Mr Boyle also stated that there are hazards associated with a landfill beside a motorway and fire may melt the lining system.

***The Chair*** clarified that the questions should be directed to the witness, any points that an objector or Objection Party wished to make could be included in their own witness statements.

**Response:** Mr Hammerstein stated that he couldn't go into such issues as slope stability as he does not know the details. He stated that there is a European obligation to share all environmental information, therefore, if studies have been completed regarding the proposed development they should be made available.

***Mr O'Sullivan***, for NLAG, asked if Mr Hammerstein agreed with his understanding that the EIA Directive is to ensure that the environmentally best decision is made. Mr O'Sullivan asked if all alternatives to minimise waste in terms of the waste hierarchy should be looked at prior to a developer deciding to construct a landfill. Mr O'Sullivan noted that the Water Framework Directive (WFD) requires water quality to be maintained or improved and asked that if there is a risk that groundwater would

be damaged should the decision-maker consider the WFD and based on the risk refuse the development.

**Response:** Mr Hammerstein stated that he considers the EIS does not cover all areas of the EIA Directive, but he does not consider it an illegal EIS and he stated that it could be considered satisfactory by the European Commission. Mr Hammerstein stated that the waste hierarchy is clear in the EU. There is also a hierarchy of disposal and the Waste Framework Directive is currently been reviewed and is being discussed by the European Parliament and Council. There are requirements for member states to reduce residual waste to a minimum, but he could not say if this precludes landfill being developed. Mr Hammerstein identified that the precautionary principle says we cannot wait for complete scientific certainty to act or cease to act and that the precautionary principle is the subject of much debate.

***Mr Lunney***, for NLAG, asked Mr Hammerstein what was his experience of odour carrying from landfills. Mr Lunney asked if Mr Hammerstein can accept the Applicant's statement in the EIS that odour will be contained within the boundary of the landfill. Mr Lunney stated that they were asked to trust the Applicant and the residents were told this was a state of the art landfill yet there are flaws in the EIS. Also the Applicant is now objecting to the word "residual" in the PD. Mr Lunney asked how Ireland are performing in relation to the quantity of waste sent to landfill.

**Response:** Mr Hammerstein stated that in his experience odours from landfills could carry for kilometres, he identified the example of a landfill east of Valencia Airport. Mr Hammerstein stated that the odour depended on how gases are treated, that preventative measures are important and also the prevailing wind. Mr Hammerstein stated that some countries and regions have reduced the percentage of their waste going to landfill and that all countries should minimise the quantity of waste for disposal.

***Mr O'Donnell***, for NLAG, asked Mr Hammerstein to provide some details in relation to the letter from the Director General of the EPA regarding aquifer protection in Ireland. Mr O'Donnell stated that he was not aware of the letter, and that the quote from the letter is an extraordinary matter and he asked if that is what Mr Hammerstein is bringing to the attention of the hearing. Mr O'Donnell stated that the letter raises a number of concerns for his clients. Mr O'Donnell asked that the letter and associated documentation be made available and that his clients should be allowed to make a submission in relation to the letter at a later stage. Mr O'Donnell also raised concern that the witness was not in a position to remain at the hearing and therefore he would not be in a position to raise matters with the witness. Mr O'Donnell emphasised his concern that the most senior person in the EPA would be making technical determinations which are at the heart of the procedure and would appear to be inaccurate and incorrect.

***The Chair*** asked that the letter that was issued by the Agency and the map referred to by Mr Hammerstein be made available for all objectors. The Chair also stated that he could not remember seeing the letter on the file for the waste licence application. A copy of the letter and associated letters are included as Document No. 6 of Appendix E.

**Response:** Mr Hammerstein identified that the letter was signed by the Director General of the EPA, Dr Mary Kelly, and dated the 17 January 2008. The letter included information concerning implementation of EC Environmental Legislation. Mr Hammerstein read the following section of the letter into the record *"An aquifer is defined in national legislation as 'any stratum or combination of strata that stores or transmits groundwater'. This is a much more all-embracing conservative definition than the more specific Water Framework Directive definition, viz, 'any subsurface layer or layers of rock or other geological strata of sufficient porosity and permeability to allow either a significant flow or abstraction of significant quantities of groundwater'. The basic fact of the matter in Ireland is that every square metre of the national territory is underlain by an aquifer…."* Mr Hammerstein stated that the reason he brought the letter to the attention of the hearing is because there is a contradiction between the letter and a map provided by the EPA, reference Water Quality in Ireland 2006, Key Indicators of the Aquatic Environment. Mr Hammerstein stated that there seemed to be confusion and the Petitions Committee's concern about the aquifer was not responded to directly.

Prior to Mr O'Toole, for the Applicant, commencing his witness statement Mr Ahern, for CEWEP Ireland, asked if the Applicant would address the need for the landfill. Mr Flanagan for the Applicant stated that the issue of need would be addressed in relation to policy and planning as per Section 40 of the Waste Management Acts. Mr Flanagan stated that there is limited consideration of need under Section 40 and that need was considered as part of the An Bord Pleanala oral hearing. Mr Ahern reiterated that he was seeking to cross-examine the Applicant in relation to need, alternative landfills available and "centre of gravity".

Mr O'Donnell, for NLAG, stated that he considered Section 40 includes "need" and that the EPA has full discretion as to the information required.

Mr Flanagan, for the Applicant, stated that the Applicant had received a letter on the 22nd May 2007 stating that the application was in compliance with Section 14 of the Waste Management (Licensing) Regulations and that An Bord Pleanala consider the proposed development under Section 175 of the Planning and Development Act, 2000 and two of the expressed requirements are implications for proper sustainable development and likely significant environmental effects.

**Witness No. 2 – Applicant – Mr O'Toole**

Mr O'Toole identified himself as Director of the Waste and Energy Division of RPS Consulting Engineers Ltd. He read from a joint Witness Statement for himself and Ms Eleanor Boland (Document No. 1, Appendix E).

Mr O'Toole presented his witness statement under four headings, they were:

- Background to Waste Licence Application,
- General Description of the Proposed Development (PD),
- Objections to the PD
- Response to the Third Party Objections to the PD

Background to Waste Licence Application: Mr O'Toole identified that a waste licence application was submitted on the 5th July 2006 in accordance with Article 12 of the

Waste Management (Licensing) Regulations, 2004 and an EIS was submitted in support in accordance with Article 13. Additional information was submitted in reply to requests for further information in accordance with Article 14(2)(b)(ii) of the Waste Licensing Regulations on the 19th December 2006, 19th January 2007 and 18th May 2007.

The EPA issued a letter acknowledging compliance with Article 14(2)(a) of the Waste Licensing Regulations dated the 22nd May 2007. The PD was issued on the 20th September 2007. Fingal County Council submitted an objection to the PD on the 16th October 2007 and a submission on third party objections on the 20th November 2007.

Mr O'Toole stated that the proposed landfill would be designed, constructed, operated and restored in accordance with and to meet the requirements of:
EU Directive on the Landfill of Waste (1999) known as the 'Landfill Directive'
EPA Landfill Site Design Manual (2000)
EPA Manual on Restoration and Aftercare (1999)
EPA Manual on Operational Practice (1997)
EPA Monitoring Manual (2003)

The objective of the Applicant is to ensure that all measures are taken to prevent or eliminate or where that is not practical to limit, abate or reduce emissions from the activity concerned.

General Description of the Proposed Development: Mr O'Toole outlined that the need for the proposed development was first identified in the Dublin Waste Management Strategy published in 1997. It is also proposed as an element of a proposed integrated waste management system for the Dublin region as set out in Waste Management Plan for the Dublin Region 2005-2010. Mr O'Toole added that this approach is consistent with both EU Policy and National Waste Policy since 1998 (Changing Ours ways (1998) and Taking Stock and Moving Forward (2004)).

Mr O'Toole outlined the scale of the proposed development, in area the landfill will incorporate approximately 53 hectares to be developed as discrete cells which will include the provision of leachate collection and treatment and gas collection and utilisation. A remaining area of approximately 153ha is to be used as a buffer area for screening and landscaping and supporting landfill site infrastructure. The proposed landfill will provide approximately 11,000,000 cubic metres of void space (capacity for c. 9.4 million tonnes of waste). The proposed facility will cater for a maximum annual tonnage of approximately 500,000 tonnes initially reducing to approximately 300,000 tonnes following the development of the proposed Waste to Energy facility at Poolbeg. It is expected that the proposed development will serve the Dublin region for approximately 30 years.

The landfill will accept municipal waste, non hazardous commercial waste, construction and demolition waste, biological sludge from the leachate treatment plant proposed on-site and possibly bottom ash from the proposed Waste to Energy Plant at Poolbeg. No hazardous waste, other than the normal hazardous component that constitutes less than 1% of household waste, will be accepted.

Mr O'Toole identified that the proposed landfill will be designed and operated using 'Best Available Techniques' having regard to standards and guidelines set down by the EPA in their Landfill Manuals and in accordance with any Waste Licence that is issued. Mr O'Toole identified that the lining systems, capping system, leachate collection system, gas collection, extraction and flaring system, and surface water management system shall be in accordance with EPA Landfill Manuals and any waste licence issued by the EPA. An extensive monitoring programme will be established and monitoring will be carried out throughout the lifetime of the facility and into the closure and aftercare period. Closure and restoration will be carried out having regard to EPA Manual 'Landfill Restoration and Aftercare' and to comply with EU Landfill Directive and any conditions set by the EPA in a Waste Licence. Monitoring will continue until such time as the Waste Licence has been surrendered to the EPA.

Objections to PD: Mr O'Toole stated that Fingal County Council are broadly satisfied with the PD. Amendments are sought to a number of conditions, these amendments have been requested in the Applicant's objection to the PD. Mr O'Toole identified that the Applicant is withdrawing their objection to Conditions 3.28 and 6.34. Mr O'Toole clarified the Applicant's objection to Condition 8.1.2 and Schedules B and C. Mr O'Toole identified that Section 40(4)(cc) of the Waste Management Act, as amended, states that the EPA shall not grant a waste licence unless the activity concerned is consistent with the objectives of the relevant waste management plan and will not prejudice measures to be taken by the relevant local authority for the purpose of implementation of any such plan. Fingal County Council consider that imposing such a condition in the form of the current wording will be inconsistent with the objectives of the Dublin Waste Management Plan. Therefore the Applicant requests that Condition 8.1.2 be deleted and Condition 8.1.1 be amended to state: "Only residual wastes, which have been subjected to pre-treatment, shall be accepted for disposal at the landfill facility." Further information would be provided by another witness statement for the Applicant in relation to Schedule B and C.

Response to third Party Objections to PD: Mr O'Toole stated that the Applicant has addressed these in their submission on objections submitted to the EPA on the 20th November 2007.

**Cross-examination of Mr O'Toole**

***Mr Flanagan***, for the Applicant, clarified that the objections to Conditions 3.28 and 6.34 are being withdrawn by the Applicant. In relation to Condition 8.1.2 Mr Flanagan clarified that the Applicant had concerns with the way the condition is set out in the PD. Mr Flanagan asked if the form of wording requested for Condition 8.1.2 by the Applicant refers back to the definition of residual waste in the PD. Mr Flanagan clarified that in relation Schedule B and C of the PD, the Applicant was submitting a letter from Ms Imelda Averill of Dublin City Council in relation to the emission limit values listed in the PD (Document No. 5 & 5A, Appendix E).

***The Chair*** suggested that it may be appropriate for Ms Averill to present her own letter and address questions specific to that letter.

**Response:** Mr O'Toole read into the record the existing wording of Condition 8.1.2. Mr O'Toole stated that the PD already includes a definition of residual waste, and that

Condition 8.1.2 introduces a hierarchy of waste treatments which is not consistent with National Policy or the Dublin Waste Management Plan 2005-2010.

***Mr Ahern***, for CEWEP Ireland, identified that they had a concern that there was excess landfill capacity in the regions around Dublin. Mr Ahern asked if the table of landfill capacity (Table 1.4 of the EIS) available in the greater Dublin region had been updated. Mr Ahern asked should the Dublin Region Plan have consideration of what is happening in adjoining regions and should the EIS and table 1.4 be updated. Mr Ahern also pointed out that the oral hearing is part of the EIA process and any additional updated information should be brought into the process. Mr Ahern confirmed that he would be presenting an update of the table of landfill capacity in his statement but highlighted that it was likely that he would not be cross-examined by the Applicant in relation to his statement and he would rather have the issue discussed as part of the oral hearing rather than in the High Court at a later date.

Mr Ahern asked if the landfill would take ash from the proposed Poolbeg incinerator (waste to energy facility) and if this was included in the requested annual intake capacity. Mr Ahern questioned if the tonnage would scale back by 100,000 tonnes if bottom ash could not be accepted or would the annual tonnage not decrease significantly. Mr Ahern asked if traffic emissions considered 300,000 tonnes plus ash movements over the 30 year life of the landfill. Mr Ahern asked if ash is for temporary storage and has the Applicant looked at the impact of digging the ash up and removing it, in particular dust, nuisance and impact on air and also the emissions and road traffic associated with the removal of 120,000 tonnes of ash. Based on removal of the ash there would be movements associated with 540,000 tonnes {300,000 tonnes plus 120,000 tonnes of ash brought in and 120,000 taken back out}.

Mr Ahern proposed that an alternative to one large landfill is the use of a number of landfills adjoining the region; he asked if such an alternative was considered in the EIS and would the traffic emissions be lesser or greater under this alternative. Mr Ahern accepted that alternative landfill capacity available was discussed at the An Bord Pleanala oral hearing but he considered that any updates should be discussed as part of the EIA process.

Mr Ahern, with reference to a map of the Dublin area and the proposed landfill, quoted from the Applicant's EIS that *"it is closer to the centre of gravity of the region than any other landfill looked at"*: Mr Ahern questioned whether the proposed landfill was the closest of the potential landfill locations to the centre of gravity. Mr Ahern also enquired as to where the information and calculations regarding this issue were provided in the EIS. Mr Ahern identified that transport may be a more significant environmental impact than the landfill and asked if the alternatives including existing landfills were considered in the assessment. Mr Ahern asked if it is the Applicant's proposal for the landfill to be run by the private sector, and if that is so could a private operator seek to increase waste acceptance to the maximum permitted tonnage even if Dublin did not generate that quantity of waste. Mr Ahern identified that such practice could possibly disrupt adjoining waste management plans.

**Response:** Mr O'Toole identified that the need for the landfill was set out in the Dublin Waste Management Plan 2005-2010 and that remains the situation. The plan does include some inter-regional movement. There is an onus on the Dublin

Authorities in relation to being self-reliant and the policy includes the provision of a new landfill facility in the region. The An Bord Pleanala oral hearing considered in some detail the need and policy.

Mr O'Toole stated that the PD allows for the temporary storage of bottom ash. Mr O'Toole stated that the annual intake of 500,000 tonnes/annum represents the need prior to the proposed waste to energy plant and that annual tonnage thereafter would be a maximum of 300,000 tonnes and likely to be significantly less than that if a waste to energy plant was developed. Mr O'Toole stated that the 300,000 tonnes/annum relates to waste for disposal whereas the bottom ash is only for temporary storage and is in addition to the waste for disposal. Mr O'Toole stated that it is unlikely that long term storage of bottom ash will be required but provision is sought. Mr O'Toole stated that he was not in a position to provide an answer in relation to traffic assessments. Mr Chadwick, for the Applicant, was identified as an Applicant witness who would address the traffic emission assessment. Mr O'Toole identified that traffic and air emissions considered the worst case scenario of 500,000 tonnes/annum intake. Mr O'Toole identified that additional information provided to the EPA included an assessment of processing of ash.

Mr O'Toole stated that there were many factors in relation to calculating the centre of gravity. Transportation was considered in detail at the An Bord Pleanala oral hearing. Transportation and haul distances were considered going back to the siting studies. Locating the facility beside the M1 was also a factor. Facilities in other counties are not in the control of the Dublin Authorities and reliance on the private sector would not be in accordance with the Dublin Waste Management Plan. Mr O'Toole confirmed that the proposed facility would be run as a Public Private Partnership (PPP).

***Mr Mulcahy***, for Greenstar, questioned if Mr O'Toole was the appropriate witness to address questions in relation to the illegal landfill or who would be able to address such questions. Mr Mulcahy identified the Applicant's withdrawal of their objection to Condition 6.34 and sought to establish the motivation for the objection. Mr Mulcahy asked if Mr O'Toole was aware that Greenstar's concern related to the illegal landfill. Mr Mulcahy questioned why it was called a historical landfill rather than illegal. Mr Mulcahy asked when the landfill was operational and questioned the legality of the activity. Mr Mulcahy questioned if Mr O'Toole had regard to the Applicant's enforcement role. Mr Mulcahy asked if the illegal landfill was assessed as part of the EIS and was it adequately assessed. The recommendation was to remediate on-site and cap and monitor the existing landfill. Mr Mulcahy asked if Condition 6.35 is in accordance with their risk assessment recommendation and had an assessment of the remediation now required been undertaken. Mr Mulcahy asked if the following would be required under Condition 6.35: a risk assessment, method statement, programme of works and an assessment of environmental impacts. Mr Mulcahy asked if a risk assessment of the remediation of the landfill had been undertaken as part of the EIS. Mr Mulcahy asked if the risk assessment was based on the site investigations.

Mr Mulcahy questioned the basis of the Applicant's objection to the timelines specified in the PD and in particular how the remediation of the landfill fitted in with

this. Mr Mulcahy outlined in brief the facilities required for remediation of an illegal site and asked if planning for such had been sought.

**Response:** Mr O'Toole confirmed that the objection was withdrawn on reflection. Mr O'Toole stated that the historical landfill was encountered during investigations for the EIS. Mr O'Toole reiterated that the landfill is historic but that he could not comment on its legality. Mr O'Toole accepted that to the best of their knowledge the landfill was operational 1994 to 2000 but was not in a position to answer further. Mr Flanagan, for the Applicant, clarified that it was not originally owned by the Applicant and there was a permit for the activity but documents are no longer available. As further clarification Mr Daly, previously Environment Department Fingal County Council, confirmed that there was a permit for the landfill but that it operated outside the terms of the permit. Mr O'Toole confirmed that they had regard to the Applicant's enforcement role when preparing the EIS. Mr O'Toole outlined the investigations undertaken around and within the existing landfill when preparing the EIS; additional information including a risk assessment was provided in support of the waste licence application. The recommendation was to cap as the Applicant and consultants considered there was no risk associated with the landfill, however they are satisfied to remediate in accordance with the PD. Mr O'Toole identified that the condition required a programme to be submitted and agreed with the EPA; this would he considered, require an assessment of the works to be undertaken and impacts associated including timeframes. Mr O'Toole confirmed that the site investigations were used as the basis for the risk assessment.

Mr O'Toole explained that a timeframe "from date of grant of licence" may not be appropriate if there was a delay in developing the facility. In relation to the existing landfill Condition 6.35 requires programmes to be submitted within 12 months of the date of grant of the licence but the actual timeframes for remediation cannot be calculated at this stage until a licence has been granted and planning is also granted. The remediation cannot be completed until the proposed landfill has been developed. The planning application includes remediation of the landfill and the overall development includes significant infrastructure.

***Mr O'Donnell***, for NLAG, asked if the lining system had been decided on, as the evidence suggested that the system would be agreed with the EPA under specified engineering works. Mr O'Donnell asked if slope stability calculations had been completed and if leachate recirculation has been decided upon and what the proposal is in relation to disposal of leachate. Mr O'Donnell asked if there were any studies or analysis in relation to the practicality or feasibility of pumping leachate to sewer. Mr O'Donnell sought clarification in relation to the upgrade of Portrane waste water treatment plant.

Mr O'Donnell asked what modifications have been made to the proposal since the An Bord Pleanala oral hearing and has the EIS been modified.

**Response:** Mr O'Toole confirmed that the lining systems had been decided upon; however the PD requires specific information to be provided and agreed during the development of the facility and the specific materials have not been selected. Stability calculations and assessments are a requirement of the PD: additional specifics in relation to slope stability should be addressed to Mr Orsmond for the

Applicant. Mr O'Toole stated that while leachate recirculation is beneficial the specifics must be agreed with the EPA. The proposal is to pump leachate off site for further treatment but they have requested permission to tanker the leachate also as an initial possibility. Mr O'Toole confirmed that the route of the pipeline has not been decided upon. The proposal in the EIS is for leachate to be pumped to the proposed Portrane waste water treatment plant, however if the upgrade of that facility is not completed the leachate may be tankered to other waste water treatment plants. Way leaves and a route will have to be established for the pipeline. Mr O'Toole stated that he understood that the Portrane plant would be upgraded but Mr Daly could clarify further.

Mr O'Toole stated that there were responses to requests for further information exchanged with the EPA, submissions made and objections in relation to the PD. In relation to the EIS additional information has been submitted in accordance with Article 13.

**Tuesday 4th March**

**Continuation of cross-examination of Mr O'Toole**

***Mr O'Donnell*** asked had there been clarifications and modifications provided by the Applicant since the An Bord Pleanala oral hearing. Mr O'Donnell stated that the amendments have not been communicated to An Bord Pleanala; for example, in relation to the existing landfill their consideration is based on leaving the waste in-situ. Mr O'Donnell asked what the Applicants proposal is in relation to the existing landfill that is located within the boundary of the proposed development. Mr O'Donnell asked where in the EIS was there any consideration provided of the likely significant environmental effects of the remediation by removal of the waste contained in the existing landfill, and he also posed a question regarding the legal status of the existing landfill.

Mr O'Donnell asked whether the Applicant proposes to treat the waste from the existing landfill and if there is an obligation to treat waste prior to acceptance at a proposed landfill. Mr O'Donnell questioned what would be the likely constituents of the waste accepted at the proposed landfill and how would waste in the existing landfill be treated. Mr O'Donnell stated that the treatment/recovery of waste on-site is a new proposal, details of which were not provided in the EIS.

Mr O'Donnell asked if the Applicant's request in relation to residual waste applies to all waste including inert waste. Also what pre-treatment is envisaged for the waste on-site. Mr O'Donnell asked if there were specific proposals to achieve acceptance of only residual waste. Also are there any assessments of the likely significant effects of the waste pre-treatment. Mr O'Donnell stated that the EIS should assess direct and indirect effects of the proposal. Mr O'Donnell reiterated his difficulty with the EPA and An Bord Pleanala considering two different proposals.

**Response:** Mr O'Toole stated that there had been some clarifications and modifications provided since the An Bord Pleanala oral hearing. The non-technical summary of the EIS has been amended but the main EIS document had not been amended. Mr O'Toole confirmed that the Applicant would remediate the landfill as required by the PD. Mr O'Toole identified that the EIS proposed leaving the waste in-situ and capping the landfill but alternatively the waste would be removed. Mr O'Toole accepted that there is no specific assessment of the excavation of waste from the historical landfill; however, he considered that excavation of waste from the historical landfill was identified as a possible alternative means of remediation. The risk assessment submitted to the EPA was not submitted to, or assessed by, An Bord Pleanala, however the risk assessment is cross-referenced in the EIS.

The requirements of the Landfill Directive were acknowledged. Mr O'Toole identified that residual waste is defined in the PD and there is an exemption for inert waste. Mr O'Toole identified that the waste on-site may be subjected to screening and tromelling but a detailed proposal would have to be submitted to the EPA, and the waste recovery operation would take place on-site.

Mr O'Toole agreed that the definition of residual waste applies to all waste. The waste on-site will be pre-treated. Municipal waste will be subject to the commitments of the Dublin Waste Management Plan, including a reduction of organic waste

accepted at landfill. Reductions in organic material will be achieved by the development of two bio-treatment facilities and the proposed incinerator at Poolbeg. Mr O'Toole stated that the EIS assesses the significant likely effects of accepting pre-treated waste for landfill. The pre-treatment of waste will be undertaken off-site and therefore is not considered in the EIS. The preferred options of waste pre-treatment have been considered in preparation of the Dublin Waste Management Plan.

***Mr Flanagan***, for the Applicant, sought to clarify a number of points with Mr O'Toole including that the types and quantities of waste to be accepted are listed in the EIS and application; construction and demolition waste in the existing landfill is addressed; a risk assessment is predicated on the EIS; and that the existing landfill is outside the proposed landfill footprint.

***Mr O'Sullivan***, for the NLAG, in relation to the EPA letter to the Applicant dated the 11th October 2006, asked was it necessary, as a result of the Applicant's responses to questions, to update the EIS as well as the non technical summary.

**Response:** Mr O'Toole stated that the additional information provided by the Applicant mainly related to the waste licence application and was not specific to the EIS and therefore the EIS did not need to be updated.

**Witness No. 3 – Applicant - Mr Herlihy**

Mr Herlihy identified himself, Mr Doak and Mr Orsmond. He read from a joint Witness Statement from himself, Mr Doak and Mr Orsmond (Document No. 4, Appendix E).

Mr Herlihy presented the witness statement under the following headings:

- Background and Site Setting,
- Engineering Containment,
- Leachate Management,
- Groundwater Monitoring,
- Third Party Objections,
- Water Framework Directive,
- Protection of the Locally Important Bedrock Aquifer and Risk to Horticultural Industry,
- Impact on Bog of the Ring
- Sustainability of Aquifer.

Mr Herlihy identified the documentary information submitted to the EPA including the Waste Licence Application, Environmental Impact Statement and additional information.

Background and Site Setting: Mr Herlihy stated that the geological and hydro-geological environment in the vicinity of the site has been described in detail with the EIS and the responses to requests for further information under Article 14. Mr Herlihy stated that the bedrock geology has been classified by the Geological Survey of Ireland (GSI) as a Locally Important, Generally Moderately Productive Bedrock Aquifer (Lm). Sands and gravels that are in hydraulic contact with the bedrock provide additional storage for the bedrock aquifer. Beneath the landfill footprint

groundwater within the bedrock and sand and gravel is confined by overlying clay. A minimum thickness of 10 metres of clay will be retained below the landfill footprint following construction and that will maintain Low Vulnerability status. The combination of Locally Important Aquifer designation and the Low Groundwater Vulnerability classification results in an R1 classification in the Response Matrix for Landfills in the Groundwater Protection Schemes (DoELG/EPA/GSI 1999).

Mr Herlihy stated that the direction of groundwater flow beneath the landfill footprint is towards the south east away from Bog of the Ring public water abstraction scheme. Recharge to the aquifer beneath the landfill footprint is limited by the thickness of the clay.

Engineering Containment: Mr Herlihy discussed the requirements of the PD in relation to specific measures for the protection of the geological and hydrogeological environment in the form of engineered containment, leachate management and groundwater monitoring. Engineered containment involves using an engineered lining system to meet in full Annex 1 of the Landfill Directive and Chapter 6 (lining systems) of the Landfill Manuals, "Landfill Site Design" (EPA 2000). In addition a minimum vertical thickness of 10 m of clay will be maintained below the footprint of the landfill after excavation.

Leachate Management: the landfill will be operated on a cell by cell basis. Leachate management infrastructure will be provided and maintained at the facility and leachate levels in the waste shall not exceed 1.0m over the top of the liner at the base of the landfill. Following closure of the site an engineered cap shall be constructed in order to prevent water ingress and leachate generation.

Groundwater Monitoring: the groundwater monitoring shall include monitoring for both groundwater levels and groundwater quality. Suitable monitoring equipment shall be installed at monitoring boreholes and safe and permanent access shall be maintained to all on-site and off-site monitoring points. Trigger levels shall be established for groundwater monitoring wells. A baseline environmental monitoring programme will be completed prior to construction of the site; baseline data will include data collected to date. An annual review of hydrogeology will be produced based on groundwater level monitoring and will include groundwater level contour plots. The EPA shall be informed immediately of the occurrence of any incident with the potential to cause environmental pollution.

Third Party Objections: A number of third party objections were received in respect of the PD and Mr Herlihy addressed a number of the relevant issues that were included in the third party objections.

Water Framework Directive: Mr Herlihy stated that the construction, operation and decommissioning of the facility will not breach the Water Framework Directive as there will be no direct discharge of pollutants. The PD imposes specific measures to prevent direct discharge of pollutants and limit indirect discharge.

Protection of Locally Important Bedrock Aquifer and Risk to Horticulture Industry: the PD imposes technical precautions to prevent egress of leachate. In addition a minimum thickness of 10m of clay will be maintained below the footprint. This will

ensure the site maintains the lowest risk response of "R1" in the DoELG/EPA/GSI response matrix. Mr Herlihy stated that the engineering containment and natural geological protection establishes that any impact on the aquifer will be unlikely and that any such impact will be imperceptible.

Impact on Bog of the Ring: Mr Herhily stated that the direction of groundwater flow has been established. Water level monitoring data sets collected from June 2005 to November 2007 have demonstrated that the groundwater flow below the proposed landfill site is in a south-easterly direction towards Rogerstown Estuary and away from Bog of the Ring.

Sustainability of Aquifer: Mr Herlihy states that the low recharge is the principal constraining factor to the long term sustainable groundwater yield. Therefore Fingal County Council is not considering a further public groundwater abstraction scheme in the area. The R1 risk response classification coupled with specific mitigation measures provides adequate protection to the aquifer and does not prevent continued use of current groundwater abstractions, nor the development of further groundwater abstractions in the area.

**Cross-examination of Mr Herlihy, Mr Doak and Mr Orsmond:**

***Mr Boyle***, for NLAG, queried the scale of the groundwater resource below the proposed landfill and asked would they accept that it is potable or good quality water. Mr Boyle asked if the groundwater continues to flow south-easterly along the rock fault. Mr Boyle asked if it would be allowable to develop a public water supply if the proposed landfill was to be developed. Mr Boyle questioned the use of the DoELG/EPA/GSI matrix and its use as guidance rather than a final decision. Mr Boyle questioned the risk associated with the proposed landfill. Mr Boyle identified the quality of horticultural wells in the area and the quality of the aquifer extending under the proposed site.

**Response:** Mr Herlihy stated that it is estimated that there is approximately 2000-4000$m^3$/day yield capacity down gradient of the landfill. The groundwater flow below the proposed site is estimated as 1500$m^3$/day. The water is considered potable. Mr Herlihy stated that the Applicant had identified two potential well fields south east of the proposed landfill. The hydrogeological setting would disconnect the proposed landfill from the groundwater. The source protection matrix cannot be based on anticipated source protection areas. The proposed development would not reduce the water quality. The proposed landfill is over an area classified as R1 under the matrix.

***Mr Misstear*** (Assistant Chair) asked the witness, as a means of clarification, to identify if the contours shown around the Bog of the Ring and the two hypothetical wellfields (additional information May 2007) are zones of influence or zones of contribution. Mr Misstear stated that his interpretation was that they are zones of influence and that they would only represent the zones of contribution if the watertable were horizontal.

**Response:** Mr Herlihy stated that the contours are calculated based on recharge. Mr Doak accepted that the zones represented a zone of contribution for the case of a horizontal water table.

***Mr Boyle*** asked if, under the landfill, there is a large bed of gravel up to 12 metres in depth and if the Applicant could estimate the percentage of the site underlain by gravel. Mr Boyle asked if there is gravel south-east of the site, what depth of gravel is present and how far south it extends, and if the gravel north of Bog of the Ring extended south. Mr Boyle identified the Bog of the Ring Groundwater Source Protection Zones report prepared by the GSI, the model used, and particularly the transmissivity value of 840$m^2$/day applied to part of the model area in the Courtlough valley.

Mr Boyle asked if gravel occurred in the Annsbrook area (south of the proposed landfill). Mr Boyle referred to the DoELG/EPA/GSI document which refers to additional investigations where there are faults and more permeable zones including gravel. Mr Boyle identified that groundwater flow as south-easterly towards Rogerstown Estuary.

Mr Boyle asked if you pumped a greater volume of water from the local aquifer, would the groundwater divide move from its current estimated location. Mr Boyle also referred to statements in the Site Selection Report in relation to the risk of the water divide moving south from Bog of the Ring. Mr Boyle highlighted to the hearing that the Applicant was asked to provide a Modflow Model for a hypothetical well field south of the landfill and he noted that such a model was not submitted for assessment. Mr Boyle identified a GSI letter to the EPA which indicates that additional monitoring data may be necessary to establish the groundwater divide. Mr Boyle posed a number of questions in relation to flow in gravel compared with bedrock, movement of the water divide in gravel, the possibility that the fault line links to the Bog of the Ring, the flow direction and rate of flow in the fault, and the possible use of dye tests. Mr Boyle asked if the Applicant had been asked to map groundwater movement in the gravel. Mr Boyle asked if the Applicant had modelled the landfill.

Mr Boyle identified the location a number of groundwater wells around the area of the proposed landfill. Mr Boyle provided details of the well-drillers estimated yields and the current uses of the groundwater being pumped from these wells. Mr Boyle quoted from the Landfill Site Selection Report (study used to identify the proposed landfill area as the most suitable site) in relation to the groundwater flows at Annsbrook. Mr Boyle asked for an interpretation of groundwater contours presented by the Applicant. Mr Boyle referred to the Geophysics Investigations Volume 5 of the EIS, in particular Mr Boyle identified depths to bedrock and a number of the resistivity curves/profiles and asked for a number of points of interpretation to be clarified by the witnesses.

***Mr Misstear*** (Assistant Chair) asked if the change in contours on the groundwater contour maps might represent a change in transmissivity or a discharge to surface water. Mr Misstear also highlighted that the geophysics map assumes a horizontal ground surface. In addition Mr Misstear identified that there are two versions of the Bog of the Ring, GSI Report, one dated January and the second March 2005.

***Response:*** The Applicant acknowledged the two versions of the report and that they would identify the reason for the two drafts of the Bog of the Ring report.

***Mr Boyle*** referred to the aquifer characteristics, fracturing and faulting, identified in the Bog of the Ring GSI report. Mr Boyle asked if faults were detected beneath the site and he referred to a number of the resistivity profiles which include "fault" on the profiles. Mr Boyle claimed there may be a north south fault line. Mr Boyle claimed that "source protection areas" for the protection of groundwater (as per GSI guidance) are relevant for horticultural wells.

Mr Boyle asked where the surplus water from dewatering from the drainage blanket beneath the basal lining system would be discharged. Mr Boyle also asked about the quantity of such water and the presence of a perched water table. Mr Boyle asked does the legislation differentiate between bedrock groundwater and perched groundwater. Mr Boyle asked where would rainfall falling on the site drain to and he asked for clarification in relation to allowing the perched water table rise after initial filling of the landfill.

**Response:** Mr Orsmond stated that there are pockets of gravel below the proposed landfill, he estimated that there was approximately 10-15ha of the site underlain by gravel at a thickness of 3-11 metres and the balance of the site is underlain by 0-3 metres of gravel. Mr Orsmond confirmed that gravel was present in some boreholes at various thicknesses and that gravel extended south easterly based on GSI well records. Mr Herlihy identified that the gravels are discontinuous and patchy. Mr Herlihy stated that additional information has been gathered since the GSI report modelled groundwater flows. Transmissivity values calculated are in the order of 71-86$m^2$/day.

Mr Orsmond identified borehole records which indicate gravel at Annsbrook. Mr Herlihy identified that the investigations are extensive and extend beyond the landfill footprint. Mr Herlihy agreed that the groundwater flow in the bedrock is south-easterly.

Mr Herlihy stated that significant additional information has been gathered since the site selection report, and the EIS and the TES Report on Bog of the Ring are more accurate. Mr Herlihy stated that the request for a Modflow Model was addressed in responses to the EPA, and that they had enough site information without requiring a model. Mr Herlihy stated that they believe there is adequate information to establish the water divide and any movement in drought conditions has also been considered. Groundwater flow has been mapped for the entire site including the fault area based on the detailed information available. Mr Herlihy stated that the groundwater flow in the bedrock and gravel is similar and gravel provides additional storage. Mr Doak stated that a LandSim or similar model is only required in R4 or $R3_2$ areas.

Mr Herlihy stated that the well yields are driller's estimates. The groundwater contours are based on data collected in boreholes and the changes in contour slope are possibly due to increases in transmissivity and changes in gravel depths, but not discharges to surface water in the south west.

Mr Orsmond stated that geophysics cannot be relied upon on its own and should be considered in association with borehole data. Mr Orsmond confirmed for Mr Misstear that the summary depth to bedrock map based on geophysics takes account of the

actual borehole data. Mr Orsmond assisted Mr Boyle by clarifying the interpretations of the geophysics investigations.

Mr Herlihy acknowledged that there are faults in the general area, they were not specifically looking for faults in the landfill footprint. Mr Orsmond stated that they did not detect a fault below the landfill site. Mr Orsmond also identified that there are changes in lithologies. Mr Orsmond stated that there is a structural feature through the site. Mr Doak stated that source protection areas are for significant public extractions rather than for resources, voluntary source protection areas can be established for industrial wells. Mr Orsmond stated that Kerrigan's, Moore's and Thorn's wells are not down gradient of the landfill.

Mr O'Toole stated that water from excavation would be discharged to surface water following attenuation and explained the proposed drainage blanket. The quantity has not been established at this stage and pumping would only occur during construction and initial filling. Mr Doak stated that legislation does not make a distinction between bedrock and perched groundwater. Mr Doak stated that rainwater will preferentially move as surface water run-off. Clarification of the engineering design of the landfill lining system and drainage blanket was provided.

***Mr O'Sullivan*** asked that the Applicant make available a document referred to by Mr Doak in relation to a recharge coefficient of 5%.

***Mr Misstear*** (Assistant Chair) who was a quoted author of a report referred to by Mr Doak, clarified that the reference may be of little relevance as the reference was based on c.40 metres of till in Co. Monaghan.

**Continuation of cross-examination of Mr Herlihy, Mr Doak, and Mr Orsmond:**

***Mr Boyle*** quoted from the DoELG/EPA/GSI report on Groundwater Protection Schemes which identifies sources to include public, group and industrial supplies. Mr Boyle sought clarification in relation to artesian situations and the hydraulic gradient across the site. Mr Boyle asked the Applicant to calculate the piezometric head relative to the base of the landfill after excavation.

Mr Boyle asked when and if "base-heave" would occur and could it occur at the landfill site possibly during construction or initial filling. Mr Boyle asked when "blow-out" would occur and is it likely on-site. Mr Boyle asked would there be dewatering of the aquifer.

Mr Boyle asked how the Applicant proposed to maintain water level below the cells being developed while maintaining water above the base of the liner in neighbouring filled cells. Mr Boyle asked if a leakage from a cell could be dispersed through the drainage blanket and should a double lining system be considered. Mr Boyle asked if Ireland is the only country where landfills can be constructed beneath the water table.

**Response:** Mr Herlihy stated that there are artesian areas north of the landfill footprint and there is a hydraulic gradient across the site. Mr Orsmond provided the calculations at a number of boreholes. Mr Orsmond clarified that the maximum depth of excavation from existing ground level would be 10 metres.

Mr Orsmond described when base heave could occur, and that it would not occur at the proposed site due to the 10 metres of clay below the site. Mr Herlihy stated that the artesian wells are generally outside the landfill footprint. Mr Orsmond provided an explanation of when blow out might occur and that it would not be likely to occur on-site. Mr Herlihy stated that they did not expect to have to dewater the aquifer, they would be dewatering perched water.

Mr O'Toole stated that the requirement in the PD to maintain a drainage blanket under the entire site would pose some difficulty however this could be achieved by developing the site from south to north. The specific engineering works would have to be agreed with the EPA. The Applicant noted that they have asked that Condition 3.7.2 of the PD should be modified. Mr O'Toole also clarified the depth of leachate and groundwater as a hydraulic head outside the cell liner. A second liner system is considered unnecessary as there are 10 metres of clay; the discharge from the drainage blanket will also be monitored. Mr O'Toole stated that Denmark does provide for landfill below the water level; Mr Herlihy stated that the perched water level is above the bedrock water level.

***Mr Cullen,*** prior to cross-examining the witnesses, asked if the Agency had been presented with the maps as provided by the Applicant at the An Bord Pleanala oral hearing October 2006. He acknowledged that similar maps were provided as further information but they were not identical and he asked if the Applicant might clarify the changes and inconsistencies between the maps. The maps referred to were those showing the bedrock surface, gravel thickness and also geological cross sections. Mr Cullen submitted as evidence copies of the maps provided to the An Bord Pleanala oral hearing, Document No. 7 & 7A, Appendix E.

Mr Cullen by way of assistance to the Applicant offered to identify a number of differences he had identified between the drawings submitted to An Bord Pleanala and those submitted as additional information to the EPA. In particular Mr Cullen identified that Drawing 21.5 submitted to the EPA (December 2006) does not include borehole locations whereas the version submitted to An Bord Pleanala does. Drawing 21.2 submitted to the EPA (December 2006) includes a more limited caption compared to the drawing submitted to An Bord Pleanala. There are also differences between a number of the gravel thicknesses marked on the maps and Mr Cullen identified examples of these. Mr Cullen stated that one third of the data points do not penetrate the full gravel thickness. Mr Cullen stated that he did not note differences between the cross section submitted to the EPA and the one submitted to An Bord Pleanala; however he would like to be advised of any changes. Mr Cullen stated that it was disconcerting that An Bord Pleanala and the EPA inspector were presented with different drawings. Also Mr Cullen considered that he, objectors and the Chair were disadvantaged in the absence of a gravel thickness map.

***Mr O'Sullivan***, for NLAG, also noted that they were at a disadvantage.

***Mr Flanagan***, for the Applicant, stated that he needed to take instructions in relation to the drawings submitted and that it might take some time, and that overnight might be appropriate to consider this. Mr Flanagan asked if Mr Cullen could identify any other issues that the Applicant should address.

***Mr Cullen*** stated that there were other issues which cause complications which he could outline. Mr Cullen referred to a cross sectional drawing submitted to the EPA in January 2007 and identified that the dates on that map and similar maps provided to An Bord Pleanala appeared incorrect. The cross section B-B[1] showed little correlation with the depth to bedrock map and gravel thickness map. The bedrock map towards the GSI fault line shows a trough, the gravel map shows the trough filled with gravel, therefore Mr Cullen considers that the gravel is deeper and more extensive than the cross section indicates. The cross section B-B[1] crosses the southern area of the landfill and the geology has been transferred from the published GSI maps. However the rock outcrops to the east were not transferred. The cross section shows a significant depth of clay and no reference to the outcrop. Mr Cullen stated that the geophysical map included borehole data but predicted the depth to bedrock where there was no data.

Mr Cullen identified that the Agency asked Dr Sleeman of the GSI to review the borehole logs. Dr Sleeman presented an alternative picture compared to the GSI published geology. Dr Sleeman suggested that the Naul formation boundary was south of the landfill and the entire footprint was over the Loughshinny formation. Mr Cullen noted that the Applicant was asked to consider this proposal by the EPA.

***Mr Shortt***, for NLAG, highlighted the difficulty caused by the Applicant including new information particularly for the NLAG expert witness to have an opportunity to examine the information. Mr Mulcahy, for Greenstar, agreed with the concern identified by Mr Shortt, and asked if it was feasible to continue with other witnesses, particularly objection witnesses on the 5th March in the absence of the information identified by Mr Cullen.

***Mr Flanagan*** for the Applicant identified that there were two versions of the GSI Bog of the Ring Source Protection report. The January report was provided to Fingal and the Applicant believes that the report was published by the GSI in March 2005. Mr Conroy for the Applicant identified that there are three differences between the January and March 2005 GSI reports on the Bog of the Ring. Mr Conroy identified the three text changes.

***Mr Mulcahy***, for Greenstar, asked if a copy of the report could be made available to all parties.

**Wednesday 5th March**

***Mr Flanagan***, for the Applicant, stated that they were working on the maps identified by Mr Cullen the previous day and that the maps would be provided as soon as possible for the objectors and the hearing.

***Mr Cullen*** highlighted that changing the drawings should not be considered lightly as they represent a change to those in the EIS and a possible change to those presented to An Bord Pleanala. Mr Cullen also identified that the information presented to the EPA only indicated a bedrock aquifer under the landfill footprint. Mr Cullen read a paragraph from the letter from Dr Mary Kelly DG EPA to the Petitions Committee and Mr Cullen stated that the letter is in contradiction with the information before the EPA, An Bord Pleanala and currently before the oral hearing. Therefore revised drawings should take account of the direction provided in the letter from Dr Kelly.

***Mr Mulcahy***, for Greenstar, stated their concern about the Applicant getting the drawings wrong on a number of occasions and questioned if you can have confidence that the other information is correct and he asked for an explanation from the Applicant.

***Mr O'Sullivan*** asked that the maps be provided in "pdf. Format" for delivery to their expert and also shared Mr Mulcahy's concerns.

***Mr Flanagan*** committed to provide to the hearing the March 2005 version of the Bog of the Ring Source Protection report by the GSI.

**Witness No. 4 – Applicant – Ms Averill**

Ms Averill introduced herself as working as a Senior Executive Scientific Officer in the Central Laboratories in the advisory services section. The Central Laboratories provide analytical and advisory services to the Dublin Local Authorities.

Ms Averill then read into the record a letter she had written to Mr Peter O'Reilly Senior Engineer, Water Services Department (Document No. 5, Appendix E). The letter outlined the terms of the consent conditions recommended by the Central Laboratory under four points, these were submitted by Fingal County Council to the EPA under Section 52 of the Waste Management Acts. The letter identified the details included in the PD issued by the EPA and in particular that the PD included the consent Emission Limit Values submitted by Fingal expressed as maximum concentrations rather than daily mean concentrations as per Fingal's consent. Schedule C.3.2. of the PD specifies monitoring of emissions to sewer as grab samples rather than composite samples specified in the Fingal consent. The identified changes between the consent submitted by Fingal and the PD were identified to possibly cause difficulties in compliance with zinc and chloride and therefore increased emission limits of 10.0 and 5,000mg/l for zinc and chloride respectively were requested.

**Cross-examination of Ms Averill**

***Mr O'Sullivan***, for NLAG, asked about the planned connection to Lusk sewer, the route and the way leave.

**Response:** Ms Averill stated that she is only involved in the emission limit values and monitoring and therefore could not address the question.

***Mr Boyle***, for NLAG, asked who set limits for the surface water discharges. Mr Boyle questioned if the limits of discharge to surface water should be in the EIS. Mr Boyle expressed his concern in relation to the cumulative effects on surface water of the existing landfill on-site, the proposed development and the Murphy landfill in the area and asked if Ms Averill could not address the question then who would.

**Response:** Ms Averill stated that the EPA set the surface water discharge limits, the Local Authority only proposed consent limits for discharges to sewer under Section 52 of the Waste Management Acts. Ms Averill stated that the limits are in the PD and might be included in the EIS but not necessarily. Ms Averill stated that she could not address discharges to surface water. Mr Flanagan stated that the Applicant would make someone available to address questions about emissions to surface water if necessary. Mr Flanagan also disagreed with Mr Boyle's statement that the Applicant should consider the cumulative effect of the three landfills.

***Mr Mulcahy***, for Greenstar, asked why the Applicant was seeking a higher emission limit. Mr Mulcahy asked who attended the meeting to discuss the limit values proposed in the PD referred to in Ms Averill's statement. Mr Mulcahy asked what was the equivalent mean concentration if the maximum was 5000mg/l, and whether she would recommend a mean daily or a maximum as the preferred limit. He also asked how she could now recommend a higher emission limit.

**Response:** Ms Averill stated that the Applicant attended the meeting. In response to Mr Mulcahy's question regarding the equivalent mean value Ms Averill stated that statistically it would be between 3000-3500mg/l. Ms Averill stated that her recommendation was a daily mean as it allows for a more balanced view of the load on the treatment plant. Ms Averill stated that when she had originally proposed figures for the consent agreement she was basing them on a precautionary principle and that there might be storm overflows on the pipeline; she was revising the figures now that she was clear the pipeline would be a private pipe to Lusk pumping station and there are no overflows proposed in the length of pipe.

***Mr Boyle***, for NLAG, noted that the Portrane waste water treatment plant has not been commenced and he also noted that tankering would be a risk: he asked Ms Averill to comment. Mr O'Sullivan noted that there was no proof that a private sewer would not overflow and that the Lusk treatment plant is under capacity.

**Response:** Ms Averill stated that she was not involved in limiting the tankering of leachate and was only recommending limits for leachate delivered by sewer. Ms Averill stated that the risk is reduced, as the proposed sewer is a private sewer with no overflows. Mr Daly, Senior Engineer Fingal stated that the proposed Portrane waste water treatment plant had been granted approval by An Bord Pleanala for a 65,000p.e. plant and that acceptance of leachate had been included. The sewer infrastructure between Lusk and Portrane is also to be upgraded.

**Witness No. 5 – NLAG - Mr Cregan**

Mr Cregan introduced himself as a Quality and Safety Consultant, Independent Auditor and Inspector and Registered Trainer for the Food Industry. Mr Cregan read from his witness statement (Document No. 8, Appendix E).

He stated that over the past 12 years he had helped vegetable producers in the area to develop food production to the present high standards. Mr Cregan highlighted that potable water supply for food production and processing are a pre-requisite for entry to the food supply chain. Standards for food production are continually increasing and a need for exceptionally high standard of water is part of this process. Mr Cregan identified that producers in the area grow crops which are considered "high risk", including salads, scallions, fruit, and prepared foods which are not cooked before being eaten ("medium risk" are cooked vegetables including cabbage and broccoli, and "low risk" include potatoes). Mr Cregan stated that many companies in the area producing fruit and vegetables would be affected by any reduction in the quality of groundwater, or by dust from the proposed landfill which may carry bacteria onto growing produce.

Mr Cregan stated that North County Dublin is currently benefiting from the emphasis on locally produced food, the cleanliness of the area, its clean water and air and the perceived freedom from environmental pollution. Mr Cregan considers that mechanical breakdown, recycling, composting, and biodegradable techniques for the management of waste are more environmentally and human health friendly than landfill. Mr Cregan identified that the costs of water quality monitoring and water treatment can be prohibitive to medium and small companies and therefore the high quality groundwater is vital and why a public supply is unacceptable. Mr Cregan stated that water quality analysis at least annually is required by Bord Bia Quality Assurance schemes, and he also stated that chlorinated water was not acceptable. Mr Cregan stated that the perception within the food industry is that if approval were to be given for the proposed landfill the assurances necessary to sell or supply fresh produce would require more testing of the products and greater investment in water treatment plants. Survival of the industry would become impossible and compensation would be required.

**Cross-examination of Mr Cregan**

***Mr O'Sullivan***, for NLAG, asked Mr Cregan a number or points of clarification in relation to the heavy reliance on the groundwater, whether a public water supply would be a suitable alternative, what is the required water quality, whether the landfill would result in dust emissions and could this affect crops, what was Mr Cregan's view of perception if there was a landfill and what is the usage of water per hectare.

**Response:** Mr Cregan confirmed that the groundwater is used extensively and that it is tested regularly. The water quality needs to be within specification and potable to get approval and certified. The standard is zero coliforms in the water for processing. The dust may contain bacteria as could air water and odour. Perception would be important. Mr Cregan outlined that fruit and vegetable contain significant percentages of water.

***Mr Boyle***, for NLAG, asked Mr Cregan to comment on the quality of the water in Moore's well compared with other supplies in Ireland.

**Response:** Mr Cregan stated that the water in Moore's well was potable.

***Mr Reynolds*** (Assistant Chair) asked Mr Cregan to clarify what the specification for water was and was it specific to the industry.

**Response:** Mr Cregan stated that they use the European Standard for potable water.

**Witness No. 6 – Applicant - Mr Chadwick**

Mr Chadwick identified himself, outlined his qualifications and experience. He read from his Witness Statement (Document No. 4, Appendix E). Mr Chadwick identified the topics he would address within his witness statement as follows:

- Emissions to atmosphere,
- Dust impacts,
- Odour impacts,
- Climate impacts
- Noise impacts.

Emissions to atmosphere: Mr Chadwick stated that there is a gas compound proposed containing gas flaring and utilisation facilities. Emissions from the proposed plant have been modelled using an air dispersion model to determine the resultant ground level concentration of pollutants at the site boundary. Air Quality Standard Regulations (S.I. 271 of 2002) have been used as the relevant assessment criteria for protection of human health. Where there are no statutory limits for pollutants, the World Health Organisation Guidelines have been referenced. Mr Chadwick stated that the results in the EIS represent the highest predicted ground level concentrations at the site boundary. Ground level concentrations beyond the site boundary will be lower than those predicted. Therefore it is predicted that the operation of the flare units or gas utilisation plant will only have negligible impact on air quality beyond the site boundary.

Dust impacts: Mr Chadwick stated that there is potential for dust generation during the construction and operation of the proposed landfill. Mr Chadwick stated that it is best practice to mitigate dust emissions at source, therefore a series of mitigation measures have been proposed in the EIS. The mitigation measures are based upon the construction industry guidelines in the Building Research Establishment document entitled 'Control of Dust from Construction and Demolition Activities'. Dispersion modelling has been carried out to specifically determine the risk to human health of the bottom ash storage area. The model was based on a number of conservative assumptions to determine a worst case impact. The model results indicate that dispersion of these low risk dusts will lead to a maximum boundary concentration that is less than one third of the relevant guideline for dust concentrations. Mr Chadwick also identified conditions of the PD which would control and monitor dust emissions.

Odour impacts: Mr Chadwick stated that there is potential for odour emissions from the proposed landfill. He outlined the potential sources of odour emissions and stated that each of these potential sources have been included in a detailed odour dispersion

model to determine the potential odour nuisance. The odour emission rates employed in the model are based on a database of measurements undertaken at Irish landfills. The model simulates all potential sources of odour emitting simultaneously and is therefore a deliberate overestimation to generate a worst case odour emission scenario. Mr Chadwick stated that the odours from the proposed landfill have been suitably mitigated through a series of detailed discussions and model iterations with the landfill engineering design team. Mr Chadwick identified that a number of the mitigation measures are requirements of the PD. Mr Chadwick stated that in addition to engineering mitigation for odour control, there are also odour mitigation measures proposed for the management of odours through good working practices on the site. The implementation of an odour management plan is a mitigation measure listed in the EIS and required by condition in the PD. Mr Chadwick stated that with these source mitigation measures engineered into the landfill design and the management of odours during operations, the potential impact would be within the appropriate odour annoyance criteria at all sensitive receptors beyond the site boundary.

Climate impacts: Mr Chadwick stated that GasSim, a landfill gas modelling software package was used to simulate the production of landfill gas from the proposed landfill. A simulation for the planned operations at the proposed landfill both with and without the implementation of the biodegradable waste diversion targets was undertaken. The profile of annual generation of landfill gas throughout the lifetime of the landfill indicates that a maximum flow of gas from the landfill is likely to occur in 2011 at 3000$m^3$/hr with the introduction of the biodegradable waste diversion targets or a peak of 5000$m^3$/hr in 2039 without the introduction of the targets. Landfill gas may be mitigated initially when the biodegradable waste diversion targets are achieved, as this will reduce the organic fraction of the waste. Mr Chadwick stated that it is proposed to utilise the landfill gas collected through combustion engines to generate energy. If it is not possible to utilise the gas it will be flared in accordance with the Landfill Directive. Mr Chadwick stated that the measures outlined above for the reduction of greenhouse gases from the proposed landfill comply with the targets of the National Climate Strategy 2007-2012 for the waste sector and do not conflict with national climate policy.

Noise impacts: Mr Chadwick stated that a noise impact assessment had been undertaken to determine the potential for on-site operations of the proposed landfill. The results indicate that noise levels at the nearest sensitive receptors will be below the limits specified in the PD and this is without the inclusion of significant noise screening that will be provided by 7-metre earthen berms around the site. The berms are predicted to reduce the noise levels at the nearest noise sensitive receptors by 10-15dB(A).

**Cross-examination of Mr Chadwick:**

***Mr Flanagan***, for the Applicant, sought clarification that all the wastes for acceptance at the proposed facility are covered by the mitigation strategies proposed.

**Response:** Mr Chadwick confirmed that the mitigation strategies related to all wastes.

***Mr Boyle,*** for NLAG, asked what the prevailing wind was and how the odour plume presented was circular and should it not extend to the north east. Mr Boyle asked if the assessment took account of the proposed location for the new school c. 300 metres

from the site boundary and if the children in Hedgestown School would smell the landfill, and would there ever be a day when they would smell odour. Mr Boyle identified that the school has received approval to move further to the west, closer to the landfill and he identified the location of the new school site.

**Response:** Mr Chadwick stated that the prevailing wind was westerly, the model takes hourly wind direction information and the predicted plume is the 98 percentile. The 98 percentile is a statistical representation used for odour modelling. The model does not predict odour at the school. Mr Chadwick stated that the second odour plume map, which represents year 15, shows the odour plume more dispersed due to increased odour sources. Mr Chadwick stated that when there is a prevailing wind the odour plume is less than depicted in the model map as the odour will disperse.

***Mr O'Sullivan***, for NLAG, asked if Mr Chadwick had inspected a landfill where there was no odour outside the boundary. Mr O'Sullivan asked if sacrificial horizontal gas extraction would be included. Mr O'Sullivan asked about the use of various agents to mask odour. Mr O'Sullivan noted that he found the worst odours occurred when there was low wind speed such as early morning or night-time and therefore would the plume not shift to the east and he noted that the model is useful but there will be occasions when odour occurs.

Mr O'Sullivan asked was dust from the existing landfill included in the assessment and are sources such as tromelling included. Mr O'Sullivan asked if there was vulnerability for the food industry to dust emissions including bacteria.

Mr O'Sullivan asked if the existing landfill remediation plant were included in the noise assessment (e.g. screening plant) and if not should remediation plant have been included in the EIA and EIS. Mr O'Sullivan asked if emissions from materials such as asbestos, which could be present in the C & D waste, were assessed. Mr O'Sullivan asked if the berms would provide any benefit due to the topography of the area.

**Response:** Mr Chadwick stated that he did not claim there was no odour from landfill, and odour could be detected on sites, however he had inspected sites where odour did not extent beyond the boundary. The model of the proposed landfill indicates no odour outside the boundary and there will be mitigation measures including sacrificial horizontal gas abstraction installed as proposed in the EIS. Mr Chadwick stated that he had visited sites which used masking or neutralising agents. Mr Chadwick agreed that worst odour occurs in low wind speeds and that the model used hourly data from Dublin Airport and it resulted in the model map presented. Mr Chadwick stated that the model is based on the worst meteorological year and on an active face of 2650m$^2$.

Mr Chadwick stated that the dust mitigation includes all landfill activities, there is also to be a dust mitigation plan developed. The PD also includes dust mitigation measures and monitoring requirements. Mr Chadwick stated that the carrying of bacteria and bio-aerosols with dust is common in the composting sector and it is considered that the risk reduces after 250 metres, and there is a buffer of 250 metres or greater around the proposed landfill.

Mr Chadwick stated that the plant that would be used in remediation of the historical landfill were not specifically included in the assessment, but that the assessment was based on a worst case scenario for the construction and operation of the proposed facility. Mr Chadwick identified the plant included in the model and also stated that the model did not include the mitigation provided by the earthen berm, therefore the berms would provide additional mitigation. The current assessment does not include for asbestos as none has been identified but would be assessed to the satisfaction of the EPA if identified.

***Mr Boyle***, for NLAG, questioned the statement that there are only medium to low risk crops in the area. Mr Boyle stated that the 15 year model map extended over the farm of Mr Thorn and odour could affect the crops grown. Mr Boyle identified that there were significant traffic related emissions of dust associated with Ballealy landfill and that crops are grown in that area and that if the proposed landfill is developed dust will also affect crops grown in this area.

**Response:** Mr Chadwick stated that there was low risk due to the buffer provided and that he did not observe high risk crops but he could be corrected on that point. Mr Chadwick stated that he did not accept that odour would affect crops. Mr Chadwick stated that dust minimisation would be included in the proposed development.

***Ms Larkin***, for NLAG, asked if Mr Chadwick was aware of the extent of complaints made in relation to landfill odour despite some of the landfills having conditions to control odour, residents continue to have to complain of smells, dirt and dust. In these cases the odour plumes had been predicted to stay within the site boundary

**Response:** Mr Chadwick acknowledged that there could be significant odour complaints about landfills, and a small number of landfills cause significant nuisance. These don't have the mitigation measures as included in this proposed landfill.

***Mr Mulcahy***, for Greenstar, asked for clarification of the identity of those who prepared the various elements of the EIS covered by Mr Chadwick's statement of evidence. Mr Mulcahy asked for an explanation for the fact that the baseline noise survey did not include a point at the houses within the landfill footprint whereas baseline air quality monitoring was undertaken at this point.

Mr Mulcahy asked for clarification if the perimeter berms proposed were a mitigation measure. In relation to the existing landfill Mr Mulcahy asked when Mr Chadwick became aware of it and what remediation was to be undertaken. Mr Mulcahy asked when the decision to leave the waste in-situ was made and particularly was it before the risk assessment was completed. Mr Mulcahy questioned Mr Chadwick's experience of remediation of illegal landfills and the methods and plant associated with such activity which would be additional sources of emissions. Mr Mulcahy asked if additional assessment was required for the remediation of the existing landfill and why did the assessment provided to date only consider leaving waste in-situ and where is there evidence of assessment of remediation.

Mr Mulcahy asked if the environmental aspects of access to the existing landfill and infrastructure associated with remediation were assessed. Mr Mulcahy stated that any assessment of emissions after grant of a licence would exclude the public and

objectors. Mr Mulcahy asked if there had been an assessment completed since grant of the PD and had Mr Chadwick been aware of the proposed move of the school in Hedgestown.

**Response:** Mr Chadwick stated that he oversaw each of the areas covered by his statement and prepared the models for dust and air; an acoustic specialist, Barry Sheridan, prepared the noise assessment and Dr Brian Sheridan prepared the odour model. Mr Chadwick stated that there were seven air quality baseline monitoring points and five noise monitoring points. The location of these was based on different industry standards and the technical expertise of the specialist.

Mr Chadwick stated that the noise modelling did not include the berms but they were mitigation measures that would reduce noise by 10-15dBA. Mr Chadwick stated that he became aware of the existing landfill during the scoping of the EIS and he was advised that it would be left in situ and monitored. Mr Chadwick stated that he was unable to say definitely when the decision to leave in-situ was made, however he explained that he had been provided with an initial description which involved leaving the waste in-situ and it was considered to be best from an air emissions point of view as any extraction has potential to cause dust but mitigation measures are included for the entire site. Mr Chadwick identified that he had no experience of remediation of illegal landfills but had experience of backfilling licensed landfills. He considered dust to be the main emission. Sources associated with remediation of the existing landfill were not included but Mr Chadwick stated that the PD required the Applicant to provide information in relation to remediation and an assessment would be provided at that stage. Mr Chadwick stated that excavation of the C & D material would be similar to any excavation and therefore covered by the assessment provided. Remediation is not explicitly mentioned but excavation is generally addressed.

Mr Chadwick stated that access to the existing landfill would be similar to internal haul roads. A further assessment would be provided to the EPA in relation to infrastructure and mitigation proposed. Mr Chadwick stated that no assessment has been completed since grant of the PD and he had not been aware of the proposed relocation of the school.

***Mr Misstear*** (Assistant Chair) asked for two points of clarification, first in relation to whether temperature inversions, which may occur in winter time, may be a worst case scenario and secondly does the model take account of such cases.

**Response:** Mr Chadwick stated that temperature inversion occurs frequently in winter and results in reduced dispersion of pollutants. Such circumstances can relate to increased odour complaints. The model treats calm conditions as wind speeds of less than 0.5 metres/second and considers temperature inversion situations.

***Mr O'Sullivan***, for NLAG, noted that the EIS refers to waste in the existing landfill as "principally C & D" and he also notes that the photographs of trial pits show domestic and commercial waste.

***Mr Flanagan***, for the Applicant, pointed out that the limits in the PD relate to the entire site and the mitigation measures aim to achieve those limits.

**Witness No 7 – Applicant - Ms Courtney**

Ms Courtney identified herself, her qualifications and experience. She read from her Witness Statement (Document No. 2, Appendix E). Ms Courtney stated that she researched and prepared the baseline information for the archaeological chapter of the EIS and she reviewed all of the information for the purpose of the statement. Ms Courtney addressed point number 5 of the objection to the PD submitted by Greenstar Limited.

The objection stated: "*In addition, Figure 2.8 in Volume 2 of the EIS suggests that the illegal dump encroaches on the proposed archaeological buffer. No consideration has been given to the risk to archaeological features which may underlie the illegal dump and no communication of this risk to their local heritage has been made public to local people and other stakeholders."*

Ms Courtney stated that the presence of a historical landfill and its proximity to a newly revealed sub surface archaeological monument is discussed and highlighted throughout the archaeological chapter of the EIS and in the accompanying figures. The impact of the historical landfill is clearly shown on the aerial photograph included in the archaeology report as figure 3. All sites and features revealed as a result of on-going archaeological investigations in 2005 and 2006 have been recorded for the purposes of the EIS and brought to the attention of the relevant authorities. Given the level of earthmoving works (figure 3 aerial photograph referred to above), it was considered, by the consultant archaeologists and the authorities, that the most appropriate mitigation strategy to investigate this area is licensed monitoring. Ms Courtney stated that all archaeological issues would be resolved to the satisfaction of the Minister of the Department of Environment, Heritage and Local Government.

**Cross-examination of Ms Courtney:**

***Mr Boyle***, for NLAG, asked Ms Courtney to identify the significance criteria for assessing archaeology. Mr Boyle identified that two sites are to be retained outside the landfill footprint but within the landfill boundary. Mr Boyle read the definition of Nevitt into the record and asked if Ms Courtney agreed with it and the information provided by the Place Names Commission and referred to the local names associated with the sites to be retained.

Mr Boyle identified sites within the landfill footprint and posed a number of questions in relation to the dating of these sites, their possible characterisation and possible links to Celtic ritual pits, and that they may contain valuables. Mr Boyle asked if the sites could be related, could be of group value and are possibly rare due to the name "Nevitt" occurring only at this location in Ireland. Mr Boyle identified a number of possible links to sites in the UK with names similar to Nevitt and identified that artefacts had been found at a number of the sites investigated in the UK.

**Response:** Ms Courtney identified that the significance criteria are listed in the EIS and include status of the site, preservation, documentation, rarity, visibility, vulnerability and group value. Ms Courtney confirmed that two sites remain outside the landfill footprint. Ms Courtney agreed with the definition of Nevitt and stated that the detail from the Place Names Commission was included in the EIS. Ms Courtney stated that the site to be retained has not been excavated, only geophysical surveys

were carried out and trial trenches were excavated to establish its extent but it may be similar to other sites excavated in the wider area.

Ms Courtney stated that the sites within the landfill footprint had been investigated and would be excavated before the landfill was developed. Ms Courtney stated that they dated from the 8-10$^{th}$ century, were early medieval and there were no valuables found in the investigations undertaken. The second site within the landfill footprint is a D-shaped enclosure also from the 8-10$^{th}$ century. Ms Courtney stated that the sites could be from the same time period but can't conclude that they are rare and the scale of the site is 2km by 1km and are not considered unique. Ms Courtney stated that based on the geophysics they have not identified any links as proposed by Mr Boyle.

***Mr Mulcahy***, for Greenstar, asked at what stage was the archaeology identified at the site. How were the buffer zones drawn for the two sites outside the landfill footprint, how was the northern boundary of "Site A" established. Mr Mulcahy asked if the extent of "Site A" was constrained by the landfill and Mr Mulcahy sought clarification that if as stated in the EIS that "Site A" is significant and avoiding it is considered positive, what is the effect of remediation by excavation of the historical landfill. Mr Mulcahy asked if the trial pit and borehole investigations were monitored and was that normal practice.

**Response:** Ms Courtney stated that the archaeology was not identified based on a walk-over assessment, the geophysics identified the presence of the sites. The exclusions were drawn based on the contours of the area, hedgerows etc and also two trenches were installed at "Site A" to establish the western extent. The existing landfill was considered as a boundary for the exclusion zone, and not included as part of the buffer as the area contained a landfill and had previously been excavated as a quarry. Test trenching was not possible in the existing landfill but if excavated in future its archaeology will be monitored. If remediation involves excavation it will be investigated and monitored in accordance with Department approval. Ms Courtney stated that the trial pits were not monitored by an archaeologist but logs were examined. Ms Courtney stated that monitoring of the logs was appropriate and an archaeologist would only be required to be present if excavation was taking place.

***Mr Ahern***, CEWEP Ireland, apologised that he wasn't present earlier for cross-examination of Mr Chadwick but asked if he might ask Mr Chadwick a number of questions in relation to the air emission modelling undertaken. These were questions he posed on Monday 3$^{rd}$ and was referred by the Applicant to ask them of Mr Chadwick.

***Mr Flanagan*** stated that Mr Chadwick was no longer present and he would have to establish if he could return or if someone else could answer Mr Ahern's questions. Mr Flanagan also noted that the March 2005 version of the GSI Bog of the Ring Source Protection Report was now available and could be submitted (Document No. 9, Appendix E). The updated geology maps were in the process of been printed and would be circulated as soon as possible.

**Witness No. 8 – CEWEP Ireland - Mr Ahern**

Mr Ahern identified himself his qualifications and experience. He read from his Witness Statement (Document No. 10, Appendix E). Mr Ahern began by providing a background to the Confederation of European Waste to Energy Plants (CEWEP) which was founded in 2002. CEWEP's mission is to secure, as part of Government Policy, the banning of landfill of untreated combustible waste. In Ireland CEWEP monitors policy and market developments in the waste sector. In 2005 CEWEP observed and reported on the fact that landfill approvals were not all consistent with Regional Waste Management Plans. Although landfill does have a role to play in an integrated waste management system, excess landfill prevents the development of alternative technologies higher up the waste hierarchy.

Mr Ahern stated that CEWEP submit that the proposal contravenes Irish and European waste policy, the facility is not needed (certainly not at the capacity proposed) and it would pose an unnecessary risk to the environment. The proposed facility does not constitute sustainable development and if the EPA were to grant a licence, it would not fulfil its statutory mandate pursuant to Section 52(2) of the EPA Act 1992 (as amended).

**Legal and Policy Background**

European Legislation and Policy: The Landfill Directive aims, as far as possible, to prevent or reduce risks to the public health and the harmful environmental effects caused by landfill disposal. The Directive sets targets for diversion of biodegradable waste from landfill. Ireland has obtained a 4 year derogation on the targets. The Directive seeks to discourage the landfilling of waste and encourage waste prevention and other forms of waste recovery. The EPA cannot grant a waste licence unless it is satisfied the activity will comply with the Landfill Directive (Section 40(4)(bb)).

National Law: The EPA must have regard *inter alia* to: the need for a high standard of environmental protection and promote sustainable and environmentally sound development, processes or operations; and achieve a proposed balance between the need to protect the environment and the need for infrastructural, economic and social progress and development.

Irish Waste Policy: Landfill has a role in Ireland's waste management system, however as outlined by Department of Environment's "Changing our Ways" landfill has "limited the development of integrated waste management approaches". Subsequent policy documents recognise that there is a requirement to eliminate reliance on landfill. The 2007 Agreed Programme for Government aims for less than 10% of waste to be consigned to landfill in the future. Mr Ahern also referred to a number of other Irish Policy documents and international reports to reinforce the importance of diverting waste away from landfill. Accordingly, Mr Ahern indicated that it is clear that Irish Government Policy (to which the EPA is statutorily obliged to have regard) dictates that development consent should not be granted for a landfill in circumstances where there is no clearly demonstrated need for the landfill.

**Need for the Scheme**

Excess Capacity and Waste Plans: CEWEP has found that the amount of approved landfill capacity currently exceeds the capacity required for residual waste as a result of landfill developments that were not in line with the targets and strategies in Regional Waste Management Plans or Irish Policy. Examples of Ballynagran in Co Wicklow and three decisions in Co. Kildare were provided. As a result, there is excess capacity in the greater Dublin region and this has undermined the contents of the Dublin Region Waste Management Plan 2005-2010. Even if the proposed landfill is considered to be in line with the Dublin Region Waste Management Plan 2005-2010, this is insufficient justification for the project.

To follow the Dublin Waste Management Plan and approve the proposed landfill, despite excess landfill capacity in neighbouring regions would contravene: policies and objectives of the Minister and Government, contrary to the EPA Waste Management Acts and Protection of the Environment Act, and the Planning and Development Acts 2000-2006. It would adversely affect Ireland's ability to comply with the Landfill Directive. Excess landfill capacity inhibits the development of alternative treatment methods. An example of a recent decision of An Bord Pleanala is quoted.

National Excess Capacity: It is estimated that the total capacity approved by the EPA is approximately 4 million tonnes per annum and 3.5 million tonnes by An Bord Pleanala, while 2 million tonnes is required according to EPA figures published in the National Waste Report 2006.

Excess Capacity in the Dublin Region: The capacity of the proposed landfill was decided upon in early 2006 before a number of landfill approvals in the Greater Dublin Area. Even the reduced capacity of 300,000 tonnes cannot be justified. The capacity available in the region is up to 683,000 tonnes by 2008 and 654,500 thereafter (this is shown in a table presented in the witness statement and represents an update of Table 1.4 included in the EIS). The tables were revised to reflect an available capacity of 440,000 tonnes per annum indicated at the An Bord Pleanala oral hearing; however, despite these revisions the capacity of the proposed landfill remains unchanged by the Applicant.

The EIS for the proposed landfill includes the acceptance of bottom ash from waste to energy plants and during the oral hearing the Applicant accepted that they intend to take 150,000 tonnes of ash from Poolbeg in addition to 300,000 tonnes of waste per annum. Reference was made to the An Bord Pleanala decision and in particular Condition 13 of the decision in relation to the Poolbeg incinerator which requires all mitigation measures proposed and recommended in the Environment Impact Statement to be implemented. One of these mitigation measures identified that bottom ash and FGT residue will be exported by boat. Therefore the proposed landfill should not be given capacity to deal with ash, as there is no need to do so.

**Impacts of Excess Capacity**

Local Impacts

The Dublin Waste Management Plan and the EIS predicted a short-term capacity deficit; however the policy document Changing Our Ways states that landfill should

not be developed to resolve a short term capacity shortage. The short term deficit can be catered for in other landfills and the proximity principle is not a bar to this.

National Impacts: Excess landfill capacity is an issue of national importance and planners and policy must restrict landfill capacity. The proposed landfill will have negative implications for Ireland's entire waste management system by reducing the cost of landfilling, adversely affecting Ireland's ability to meet the Landfill Directive targets and have an unnecessary impact on the environment.

Residual Waste: CEWEP recognises that the PD (Condition 8.1) attempts to restrict the amount of biodegradable waste by stipulating only residual household and commercial waste can be accepted. However CEWEP is concerned that the condition will not be effective as it cannot be adequately monitored or enforced due to the mixed application of pre-treatment across the collection region. In the absence of MBT or waste to energy the landfill will be entitled to rely on pre-segregation of recyclables and the biodegradable fraction of the waste stream. The PD requires the Applicant to submit a proposal outlining how the pre-treatment condition will be met. This requirement raises a number of important and unanswered questions including how in practice will this operate, what criteria will the EPA consider, is there to be a geographical limit, what is MBT, how is the condition to be interpreted, and on what basis is MBT being effectively prioritised ahead of waste to energy.

**Additional Environmental Impacts**

Impacts of Landfilling Biodegradable Waste: The diversion of biodegradable waste is important to meet EU diversion targets, landfilling such waste impacts on public health and the environment. Implementing waste management options higher in the Waste Hierarchy would reduce these impacts.

The majority of odour-related complaints received by the EPA about waste facilities were regarding landfilling or non-hazardous waste transfer stations (EPA review 2006). Ten landfills were responsible for 90% of odour complaints received by the EPA regarding waste licensed facilities.

Transport Impacts: The proximity principle for treatment of waste is often a reason to develop regional landfill capacity to minimise the cost and environmental impact of waste transportation. It is submitted that there is no net gain from choosing to construct the proposed landfill. The proximity principle is assessed through a "centre of gravity" analysis which looks at the total distances travelled to transfer waste from source to the disposal site. CEWEP has conducted this analysis and the detail is presented in the witness statement. The assessment for the proposed landfill considers where the waste is coming from (namely the city centre) rather than the transfer stations in the south and west of Dublin. The CEWEP calculation indicates the transport impacts to transfer the waste to the proposed landfill or to sites with excess capacity in the Greater Dublin region is similar. The site selection and treatment of "centre of gravity" for waste in the EIS is deficient; CEWEP contend that in fact the "centre of gravity" is in west Dublin.

Environmental Impact Assessment: Directive 85/337/EEC requires member states to put in place a consent procedure that ensures that the environmental impact of projects is adequately assessed. In this jurisdiction, the responsibility for carrying out an

environment impact assessment of a waste facility is shared between An Bord Pleanala and the EPA and is the subject of complaint by the Commission against Ireland. CEWEP reserves its rights in the event that the divisions of functions between the Board and the EPA is found not to comply with the EIA Directives.

It is submitted that the EPA has a responsibility to consider the adequacy of the EIS submitted even if it has been considered by An Bord Pleanala. It is submitted that the EIS submitted is seriously deficient in a number of respects including that there is a failure to consider the need for the project and alternatives. The alternatives section provides an inadequate consideration of alternatives for the provision of this landfill and relative alternative locations and consideration of its capacity. It fails to consider the need to have such a facility and the impact of not providing this landfill capacity.

It is further contended that the EPA is obliged to have regard to any new information that has come to light which was not before An Bord Pleanala. In particular, the EPA must have regard to the granting of approval by An Bord Pleanala for permission for the Poolbeg incinerator.

**Cross-examination of Mr Ahern**

***Mr Flanagan***, for the Applicant, proposed that the quote provided by Mr Ahern and taken from the Government's policy document "*Waste Management, Changing Our Ways (1998)"* was in advance of regional waste management plans and section 5.3.1 of that document states that Local Authorities have been encouraged to adopt a regional approach and he stated that Dublin has adopted a regional approach. Mr Flanagan stated that the Dublin Waste Plan is the primary vehicle and the objective in the plan is that only 16% of waste generated would be sent to landfill. The Dublin Waste Plan sets out how the region could and should be self-reliant and on that basis the region is at crisis point due to lack of landfill capacity within the region. Self-reliance requires control over its own destiny and landfill sites identified by Mr Ahern are privately operated. Mr Flanagan claimed that Kerdifstown and Usk landfills identified by Mr Ahern couldn't accept residual waste.

Mr Flanagan asked did the table of transport distances assume all waste goes through transfer stations and that some waste from the north of Dublin would go directly to the proposed landfill.

Mr Flanagan asked if Dublin should right the wrongs of other regions and if Mr Ahern or CEWEP had objected to other landfill facilities. Mr Flanagan asked if the proposal is in accordance with Government Policy to divert biodegradable waste from landfill. The Dublin Waste Plan includes for bio-treatment facilities (Ballyogan and Killshane). Mr Flanagan asked if Mr Ahern's proposition was to hand over landfill to facilities outside the regions which he [Mr Flanagan] considered was in breach of the Dublin Waste Management Plan.

**Response:** Mr Ahern stated that "*Waste Management, Changing Our Ways (1998)"* was still applicable and not predicated on waste management planning. A Section 60 notice (Policy Direction issued under Section 60 of the Waste Management Acts 1996 – 2005) said there should be regional movement of waste. Mr Ahern stated that he didn't accept that the Dublin region had to be self reliant, and that the Dublin region has used landfills in Kildare for years. Mr Ahern identified that the landfills are a mix

of public and private. He did not accept that the identified landfills (Kerdifstown and Usk) could not take residual waste and noted that the table should have been completed by the Applicant as part of the EIS and the table could be further adjusted by allocating additional capacity at some sites e.g. Wicklow. Mr Ahern accepted that the table was a simplified table.

Mr Ahern stated that Dublin should correct the wrongs of other regions in the national interest. CEWEP have objected to Usk and a landfill in Cork. Mr Ahern stated that excess landfill capacity would reduce diversion of biodegradable waste and there was no incentive to separate biodegradable waste when there is cheap landfill. The EIS should have considered using a mix of public and private landfills.

***Mr O'Sullivan***, for NLAG, noted Mr Ahern's experience of EIS and asked for his view on the EIS and was it full and complete, and is the fact that there are decisions to be made between the EPA and the Applicant after a waste licence is granted in conflict with EIA. Mr O'Sullivan asked what his view was in relation to the waste to energy ash, double handling and potential impacts. Mr O'Sullivan asked for his view on odour from landfills and if the tables in the witness statement are based on baled waste what effect would unbaled waste have and economically are they going to transfer waste from North Dublin direct to the facility.

**Response:** Mr Ahern stated he did not consider the EIS full or complete. Mr Ahern stated that there needed to be flexibility in a licence but he considered Condition 8 to be too loose. Mr Ahern stated that he was surprised that the ash was in addition to the 300,000 tonnes. Mr Ahern stated that modern landfills where there is proper integrated waste management will not have an odour but in Ireland low landfill costs are reducing the development of the other elements necessary e.g. MBT and therefore in absence of such there is a difficulty avoiding odour. Unbaled waste may result in increased traffic movements and it is most likely that a transfer station would be developed in North Dublin.

***Mr O'Donnell***, for NLAG, asked Mr Ahern to clarify the figures presented for waste, if the facility is bound by the Landfill Directive, and must all waste be pre-treated. Mr O'Donnell asked for Mr Ahern's opinion on residual waste and the treatments required and in particular if biodegradable waste required mechanical and/or biological treatment. Mr O'Donnell asked what percentage reduction is achieved by pre-treatments and if the witness could comment objectively on the sustainability of the proposal.

In relation to the removal of waste from the existing landfill to the proposed landfill Mr O'Donnell asked if it is something that is problematic and would Mr Ahern consider that the EIS addresses this.

**Response:** Mr Ahern confirmed that the quantities quoted were for untreated waste and the Landfill Directive applies to all facilities and there are National Targets for waste reduction. Mr Ahern identified that the Landfill Directive mainly refers to biodegradable waste and that mechanical and biological treatment is required. MBT and waste to energy can achieve c.40% and 90% volume reductions, respectively. The total capacity of Poolbeg and the proposed landfill is 1.1 million tonnes/annum and the total national requirement is 1.9 million tonnes. Mr Ahern stated that society

must deal with waste but only deal with what is needed and alternatives need to be looked at.

Mr Ahern stated that remediation of the existing landfill must be done correctly and after the Ministerial direction he would be sensitive about dealing with the waste. Technically it may not a big issue, but legally it may be.

Mr Ahern was invited by the Chair to identify the question that he had sought to pose to Mr Chadwick (witness for the Applicant), who was not present at the oral hearing when Mr Ahern arrived. Mr Ahern outlined that he sought to establish if the alternative transport strategy as proposed by CEWEP had been modelled as an alternative from the point of air emission impacts and climate. Mr Ahern stated that he considered it unlikely that this modelling was completed but asked that a statement be submitted to the oral hearing by the Applicant to address the question.

***Mr Flanagan*** for the Applicant stated that he would need to be advised by Mr Chadwick.

Mr Flanagan stated that updated maps (2 no.) were now available and submitted, Document No. 11,Appendix E, and that the cross section drawing was not updated.

***Mr Byrne*** (Chair) stated that the GSI had been invited to attend to clarify their classification of groundwater and other issues raised and would attend on Thursday the 6th at 11:00. Mr Cullen asked that they should be made aware of the letter written by Dr Mary Kelly as their aquifer classification was referred to in the letter.

***Mr Shortt***, for NLAG, stated that there was a lack of clarity and fairness in the process, 16 errors were identified in the maps at the An Bord Pleanala oral hearing, the PD is based on erroneous documentation, there is a lack of quality management, and the process is a farce and he asked that the oral hearing be stopped.

**Thursday 6th March**

**Continuation of cross-examination of Mr Herlihy, Mr Doak, and Mr Orsmond**

***Mr Orsmond*** identified changes to the two drawings resubmitted by the Applicant (Document No 11, Appendix E).

On drawing 21.5 *Bedrock Geology and Rockhead Elevation* the following changes were noted:

- Borehole numbers were included,
- Metres OD used to create the model are included on the drawing
- Date and revision number updated.

On Drawing 21.5 *Extent of Gravel Deposits Underlying Low Permeability Superficial Deposits* the following were identified:

- Additional note below the legend "BRC5 has 1.8m of gravel and AGB4 has been replaced with ASA3";
- Additional note below drawing "Not all boreholes will have reached the base of the GRAVEL due to refusal";
- Labels on boreholes moved slightly and the date and revision number updated.

***Mr Cullen*** read into the record a paragraph from the letter signed by Dr Kelly (DG EPA) to the Petitions Committee and asked if the witnesses could indicate the horizon referred to as gravel and if the gravel aquifer referred to is as per the drawing submitted by Mr Cullen on 7/11/2006. Mr Cullen asked if the gravel layer marked by Mr Cullen and Mr Orsmond are probably the same as they indicate gravel beneath the landfill footprint. Mr Cullen asked if his drawing had been submitted to the GSI and if not was Dr Kelly's letter and the GSI references based on Mr Orsmond's map.

Mr Cullen asked if Map 21.5 (Bedrock Geology and Rockhead Elevation) was generated by a model and how did it deal with "greater than depths" and boundaries. Mr Cullen identified that the model indicates a ridge between ER01 and HR08 but there are no boreholes in that area and geophysics indicate that there is no ridge and in fact there is a north/south trough. Mr Cullen asked if the model only used data inputted while other data available was not inputted into the model and Mr Cullen identified data point HR9 which was not included in the model but would indicate different results. Mr Cullen identified that SHR03 did not reach bedrock and was included in the model despite the footnote indicating that such data was not included.

Mr Cullen in reference to Drawing 21.2 (Extent of Gravel Deposits Underlying Low Permeability Superficial Deposits) asked if it was based on a model that depicted gravel thickness. Mr Cullen asked how it dealt with greater than depths as 20 of the boreholes did not reach the base of the gravel. Mr Cullen identified a number of points (GS16, GS10, ASA3) where gravel may be greater than indicated. The map therefore is not a contour of gravel thickness as it does not include the full gravel depths and is more appropriately a drawing which indicates presence of gravel rather than thickness. The note, "not all boreholes will have reached the base of the GRAVEL due to refusal", which was absent from the drawing submitted to the EPA, is a necessary note.

**Response:** Mr Herlihy stated that he would have to defer the question in relation to Dr Kelly's letter to the GSI and Dr Kelly. Mr Herlihy acknowledged that there are similarities between Mr Cullen's and the Applicant's map but Mr Orsmond's map (Applicants) shows depths of gravel. Mr Herlihy stated that they did not submit Mr Cullen's map but were in regular contact with the GSI and provided data to the GSI.

Mr Orsmond stated that the model averaged between boundary conditions and "greater-than" (i.e. >) is taken as the input depth. Mr Orsmond stated that geophysics were considered but cross correlation is required for the model. He stated that the model is based on borehole data only but accepted that a lower rock profile through the area between ER01 and HR08 was possible. In relation to SHR03 Mr Orsmond stated that there were other boreholes in the area.

***Mr Misstear*** (Assistant Chair) for clarification asked was the model based on an interpretation between the closest boreholes available.

**Response:** Mr Orsmond agreed that the map was based on a model but where the boreholes did not reach base of gravel they used cross reference with the geophysics to determine rock head. Where they did not penetrate gravel they used data from other boreholes. Mr Orsmond acknowledged that there might be a greater depth of gravel in some locations. The map is a thickness of gravel and based on interpretation shows the extent of gravel as greater than 7 metres but also shows areas of thin gravel.

**Geological Survey of Ireland (GSI)**

***Mr Byrne*** (Chair) introduced the GSI representatives who agreed to attend at the request of the Chair. Mr Byrne outlined that Mr Misstear (Assistant Chair) would firstly ask the GSI a number of questions of clarification and then the Objection Parties would have an opportunity to ask questions. There was no witness statement provided.

The GSI representatives introduced themselves as Ms Natalya Hunter Williams and Ms Eibhlin Doyle.

***Mr Misstear*** (Assistant Chair) asked if they could provide an outline of the basis of groundwater protection schemes and the purpose of such schemes. Mr Misstear noted that the classifications in the proposed landfill area are "Low Vulnerability" and "Locally Important Aquifer" and asked if they could provide the basis for such. Mr Misstear asked if there were any plans to change the aquifer classification. Mr Misstear asked if the zone of contribution to the Bog of the Ring is likely to include the landfill footprint. Mr Misstear read two quotes referred to by Mr Hammerstein and Mr Cullen and taken from a letter issued by Dr Kelly DG EPA to the Petitions Committee and asked if the GSI had any comments to add.

**Response:** Ms Hunter Williams stated that groundwater protection schemes were to provide guidelines to planning and licensing authorities and were a framework for risk based decision making. There are two elements to the schemes, i) Land-surface zoning including vulnerability and aquifer potential and ii) groundwater protection responses. The groundwater protection scheme map is superseded by site investigations once a site is selected. The vulnerability classification is based on the

thickness of subsoil and is classified as low vulnerability as there is greater than 10 metres of subsoil. The aquifer classification covers an area of c.800 $km^2$ and is Lm, Moderately Productive, based on 73 productivity data points and other criteria. Ms Hunter Williams stated that there were no plans to change the classification. Ms Hunter Williams stated that the Report prepared by the GSI in relation to Bog of the Ring, for Fingal County Council, established that the southern boundary is defined by a water divide at current pumping which does not extend into the landfill footprint. In relation to Dr Kelly's letter, Ms Hunter Williams stated that the definition of an aquifer covers nearly all the national area as either regionally, locally or poor aquifer; only limited areas are not defined as an aquifer. In relation to classification in this area, the GSI have classified the bedrock but have not delineated the gravel separately; the gravel may provide additional storage.

**Questions for the GSI**

***Mr Shortt***, for NLAG, referred to and quoted from the GSI letters sent to the EPA prior to the PD been issued. Mr Shortt asked for confirmation that the guidelines are for outlining planning. In relation to the groundwater divide Mr Shortt identified that the GSI had indicated that additional monitoring was required and asked for further comment.

**Response:** Ms Doyle confirmed that the guidelines are for outlining planning. Ms Hunter Williams acknowledged the statement in her letter was based on the information at that time but stated she had no further comment.

***Mr Boyle***, for NLAG, referring to the GSI Bog of the Ring Report and asked if the movement of the water divide south is as a result of the transmissivity and do rock faults and gravel influence the transmissivity and could the water divide be different in gravel, bedrock and the faults.

**Response:** Ms Hunter Williams stated that the model is steady state but included transmissivity and recharge, and transmissivity is influenced by gravel and faults. The water divide would only be different if the gravel and bedrock were separated by an impermeable zone. The permeability in aquifers in Ireland depends on faulting and fracturing and these are taken account of in the classification. The zone of contribution depends on fracturing, faulting and permeability.

***Mr O'Sullivan***, for NLAG, asked if the GSI considered that the precautionary principle should apply to protect groundwater resources until they are proven to be other than a resource.

**Response:** Ms Hunter Williams stated that the assessment is for the Local Authority, An Bord Pleanala, and EPA.

***Mr Cullen*** asked if there is an identified groundwater resource, but one which is not yet developed, could you apply the precautionary principle. How does the groundwater protection scheme fit into sustainability. Is there a reason not to develop a resource if transmissivity and recharge are present.

**Response:** Ms Hunter Williams stated that the land surface zoning protection classification is for the current situation, and the precautionary principle is applied

regardless of abstraction as groundwater is assessed by a risk based framework. Groundwater is protected by the scheme; however, incorporating future sources is a matter for the EPA and Department of Environment. There are many aspects to sustainability and it is a matter of national policy. Ms Hunter Williams identified that, as is the case anywhere in the country, there is no reasons not to develop a groundwater resource.

***Mr Flanagan***, for the Applicant, asked if the precautionary principle is included in the matrix, and if the southern boundary of the Bog of the Ring zone of contribution does not extend into the landfill. Mr Flanagan asked if the matrix is used for assessment of suitability of developments.

**Response:** Ms Hunter Williams agreed that the precautionary principle is included in the matrix and based on the GSI assessment the southern boundary of the Bog of the Ring zone of contribution did not extend into the landfill footprint. The response matrix is an initial tool and conditions apply to the classification.

***Mr Mulcahy***, for Greenstar, asked for clarification between how the matrix deals with sources and resources.

**Response:** Ms Hunter Williams stated that the protection afforded is based on the relevant response matrix.

***Mr Boyle***, for NLAG, asked if the response matrix were to be updated as a result of additional legislation and to take account of localised highly productive areas.

**Response:** Ms Hunter Williams stated that the classification takes account of high yielding sources but presents the generalised view.

**Continuation of cross-examination of Mr Herlihy, Mr Doak, and Mr Orsmond:**

***Mr Cullen*** asked how the site conceptual model deals with boundaries and identified GS10 in particular. Mr Cullen asked for confirmation that the cross section submitted to the EPA is similar to that submitted to An Bord Pleanala. Mr Cullen identified a number of changes between the cross section included in the EIS and that submitted to the EPA in January 2007: landfill footprint reduced, gravel shown on section A-A$^1$, dip in bedrock increased in A-A$^1$, and the extent of gravel around the GSI fault is reduced and the boundary moved west. Mr Cullen stated that he considered that the section should show the bedrock at SHR5 and HR10 to be lower and that the trough continues between SHR05 and HR10; the trough is deeper than in the section, and the trough should be infilled with gravel. Mr Cullen identified that he considered the piezometric head shown on the section should dip more than shown between BRC2 and SRH3A.

***Mr Misstear*** (Assistant Chair) clarified with Mr Orsmond that the shift in contours, visible in Figure 21.2 Extent of Gravel Deposits Underlying Low Permeability Superficial Deposits (Document No. 11, Appendix E), is due to the model cross-referencing borehole data.

***Mr Cullen*** identified the following with reference to the GSI Map for the region labelled as Map 13 and Figure 4 Bedrock Geology of the EIS: that bedrock is

encountered east of Jordanstown and not shown on the section B-B. Mr Cullen submitted that in Figure 6 subsoil map, reference to "rck" may refer to shallow bedrock. Mr Cullen stated that the effect of the above points is that the outcropping would indicate the extent of the trough and also that the thick clay to the east of the landfill on the section is incorrect.

Mr Cullen identified that the EPA referred the borehole data to Dr Sleeman of the GSI and he considered that there might be justification to move the Loughshinny/Naul formation boundary further south. The EPA also asked that the Applicant should liaise with the GSI and revise the geology map as necessary. Mr Cullen asked if any other relevantly qualified person assessed the borehole logs. Mr Cullen asked why they did not accept Dr Sleeman's recommendation and why in the January response from the Applicant did they partly quote Dr Sleeman leaving out part of it in relation to faults. Mr Cullen asked what effect would Dr Sleeman's recommendation have had at the site and he suggested that the whole site would be underlain by the Loughshinny formation.

Mr Cullen asked how does the Conceptual model (Figure 9 of the EIS) reflect the depth to bedrock and gravel maps or the cross sections. Mr Cullen considered that the conceptual model is essential. Mr Cullen noted that the Applicant had previously accepted up to 20 metres of gravel and yet in the conceptual map and text gravel is only referred to as discontinuous and non-aquifer. Does the conceptual model include the gravel layer mapped by Mr Orsmond. Mr Cullen further asked is the fault represented on the conceptual model and does the conceptual model show all details i.e. gravel, trough, and faults and is the conceptual model adequate for a risk assessment. Mr Cullen asked where the geophysics conclusions (January 2007) are included in the conceptual model.

**Response:** Mr Orsmond confirmed that the model interprets between points. Mr Herlihy confirmed that the cross sections are the same but that the location of the landfill is shown on the An Bord Pleanala map. Mr Herlihy identified that the section shows the gravel thickness interpreted by the Applicant and at the time they didn't have the depth to bedrock map. Mr Herlihy stated that the section gives an overall picture of the geology and that the sections show the slope of the piezometric surface appropriately.

Mr Herlihy identified that the GSI map is 1:100,000 and therefore the bedrock identified may be off the section. Mr Herlihy considered that the depth of the clay could be less than presented in the section but the rock outcrop identified ion the GSI map could be an isolated outcrop.

Mr Herlihy read from Dr Sleeman's letter to the EPA and he confirmed that they did consult with the GSI and they considered that it was unnecessary to remap the geology. The Applicant considered that Dr Sleeman's letter adequately addressed the issue. Mr Herlihy quoted from Dr Sleeman's letter where he stated that it makes no practical difference to the overall picture of the geology or its influence on groundwater, therefore the Applicant considered it unnecessary to redraw the map of geology. Mr Herlihy identified that Dr Sleeman's letter is on the record for the inspector.

Mr Herlihy identified that figure 9 should be read in association with the text. Mr Herlihy pointed out that figure 9 is just a sketch; bedrock is the main aquifer and gravel only provides additional storage. The gravel layer is not shown on the conceptual model diagram. Reference to the fault is in the text. The conceptual model is not the only information used for the risk assessment. Mr Doak referred to the EPA publication Code of Practice Environmental Risk Assessment for Unregulated Sites, April 2007, to outline what the Applicant considered as a conceptual model.

**Questions for Mr Conroy, Tobin Engineers and Mr Spain, Fingal County Council**

***Mr Cullen*** sought clarification in relation to the Locally Important Aquifer, that the Bog of the Ring was within that Aquifer, that the yield was approximately 4000 $m^3$/day, that 4000 $m^3$/day was considered the safe yield, and that Bog of the Ring does not prevent other groundwater abstraction from the aquifer.

**Response:** Mr Conroy confirmed the above points.

***Mr Cullen*** asked Mr Spain was the decision to expand Leixlip Water Treatment Plant rather than investigating further abstraction in the area based on economics, and was it made before investigations (including test drilling) were undertaken, and did this decision pre-date the landfill proposal.

**Response:** Mr Spain stated that Leixlip is due to be expanded in 2009 and that it was mooted 3-4 years previously.

**Continuation of cross-examination of Mr Herlihy, Mr Doak and Mr Orsmond:**

***Mr Cullen*** asked if recharge was considered as the main constraining factor to developing a well field south of the proposed landfill and were sustainability and cost implications also reasons in the absence of investigations. Mr Cullen asked if the hypothetical wells south of the proposed landfill would not sustain a supply of significance. Mr Cullen noted that the flow beneath the proposed landfill calculated by the Applicant is 1500 $m^3$/day, and he asked what the flow in the gravel and at deeper depths was.

Mr Cullen moved to the hypothetical well field proposed by the Applicant and asked how the location was selected and if it had been made clear that the wells further south were in an "Ll" rather than "Lm" area. Mr Cullen asked how the Applicant had established the recharge over the area. Mr Cullen identified that increased recharge would lessen the zone of influence and he also identified that the GSI consider subsoil mapping necessary to calculate recharge.

Mr Cullen identified that the EPA had asked for a numerical model of the hypothetical supplies and he enquired why the model was not provided. Mr Cullen asked what transmissivity would have been used in the model if it was completed and asked if the landfill would be in the inner or outer source protection area of these hypothetical wells. Mr Cullen asked if the GSI and groundwater drilling/investigations in the area indicated that a groundwater resource was present, and wouldn't the proposed landfill conflict with a groundwater resource? Mr Cullen

stated that there is a conflict between a source and a resource and you can't put a landfill in an inner source protection area.

Mr Cullen with reference to the EPA Guidelines on Site Selection (draft for consultation) under sustainable development noted that landfill should not negatively impact on future resources, and asked if the Nevitt was a usable groundwater resource. Mr Cullen noted that the inspector under the precautionary principle had identified that groundwater abstraction east of the proposed landfill should not be developed and yet the non-technical summary indicates no long term effect of the landfill.

**Response:** Mr Herlihy identified that recharge was a factor in relation to supply but there were other factors. Sustainability was based on sustainable groundwater yield and the thick clay layer. Mr Conroy, Tobin Consulting Engineers, identified that the hydraulic efficiency at Bog of the Ring had decreased by c.54-78% and areas with lower potential would not be economical. Mr Spain, Fingal Co. Co., stated that studies had identified Bog of the Ring as the best potential source in all Dublin. Mr Herlihy stated that abstraction beyond 4,000$m^3$/day would be constrained by recharge. Mr Herlihy stated that they had not calculated a flow within the gravels and had used an average transmissivity to calculate the flow beneath the proposed landfill. The aim of the calculation was to look at the impacts of a leakage from the proposed landfill and therefore a depth of 35 metres into bedrock was considered adequate.

Mr Herlihy identified that they had selected points on the fault zone and assumed that it may extend further south. Mr Herlihy identified that wells in "Ll" may also provide some excellent yields. Mr Herlihy stated that the recharge used was similar to that calculated by the GSI in the Bog of the Ring and did take account of the vulnerability map for the area. Mr Herlihy stated that they did not consider additional subsoil mapping was necessary as they had adequate information to calculate recharge.

Mr Herlihy identified that they had considered the model unnecessary. Mr Herlihy stated that he considered the source protection zoning to be inappropriate as the wells are hypothetical and there is 10 metres of clay beneath the landfill. Mr Herlihy stated that the GSI are clear in relation to protecting groundwater; source protection is for current sources.

Mr Doak identified that under the Water Framework Directive "quality" included quantity and quality. He also noted that the landfill is underlain by at least 10 metres of clay.

**Mr Misstear**, (Assistant Chair) noted that the inner source protection area applies to horizontal time of travel in the aquifer.

***Mr Boyle***, for NLAG, clarified a number of borehole data points and proposed alternative interpretations of the points in relation to the depth of gravel which might be present rather than as presented by the Applicant. Mr Boyle identified a topographical divide (north of the landfill footprint) between BG1 and HR08 which he considered was as referred to by the GSI in their report on the Bog of the Ring. Mr Boyle also identified the surface water stream present in the 1760 map of the area, included in the EIS, as also showing the particular water divide.

**Response:** Mr Herlihy identified that many of the points had been discussed in detail with Mr Cullen and some of the interpretation could be as presented by Mr Boyle. The Applicant did not accept the interpretation submitted by Mr Boyle in relation to the water divide and claimed that the stream in the 1760 map appeared to flow into a bog and would have provided water to support the bog rather than entering the groundwater.

**Friday 7th March**

**Continuation of Cross-examination of Mr Herlihy, Mr Doak and Mr Orsmond**

***Mr Mulcahy***, for Greenstar, asked for clarification about the purpose of the conceptual model (for existing landfill) presented in the EIS, who it informs, when it was prepared and its development during the process. Mr Mulcahy noted that H.1 (risk assessment) does not form part of the EIS and the waste licence is not part of the EIS. Mr Mulcahy asked if the conceptual model had been updated in the EIS.

Mr Mulcahy asked if a deficiency in the conceptual model may mislead the reader and in particular referred to the absence of the gravel layer. Mr Mulcahy referred to Dr Kelly's letter to the Petitions Committee and in particular her reference to a gravel aquifer and asked what may have lead to such a statement. Mr Mulcahy asked what information had been provided to the GSI and in particular had Mr Orsmond's map of gravel been provided. Mr Mulcahy identified that the gravel over the bedrock was not shown on the conceptual model and asked when was Mr Orsmond's gravel map prepared. Mr Mulcahy asked if the transmissivity is different between gravel and bedrock how can they be considered the same and therefore the model is wholly inaccurate.

***Mr O'Donnell***, for NLAG, identified that the non technical summary states that gravel is present outside the landfill footprint.

***Mr Mulcahy*** asked for clarification in relation to the motivation and reason for appealing Condition 6.34 of the PD which related to a minimum clay thickness of 10 metres.

Mr Mulcahy identified that a numerical model had been required by the EPA; however, the Applicant didn't provide such a model and Mr Mulcahy identified the legal significance of this. Mr Mulcahy asked for the Applicant to identify information required for a model and specifically asked if a transmissivity figure was required and if a figure based on 35 metres depth into bedrock was appropriate. Mr Mulcahy argued that the Applicant had claimed to have enough information but had also said that they would require deeper wells to establish transmissivity.

Mr Mulcahy asked if the Applicant claimed that sustainable yield would be limited by recharge. Mr Mulcahy asked if the fault line identified east of the landfill was the area identified as most fruitful by the GSI.

**Response:** Mr Doak stated that the conceptual model is a schematic of the situation on-site and it informs the preliminary risk assessment which goes on to inform the qualitative risk assessment at which stage you return and update the conceptual model. Figure 9 and the text is the conceptual model and is supported by geological cross sections. Mr Doak stated that the model is to inform the relationship between the proposed landfill and groundwater for the reader of the EIS. The model was prepared in the preparation of the EIS and is based on British Standard BS 10175. The risk assessment submitted in H.1 of the waste licence application forms a second step in the risk assessment. Mr Herlihy identified that the conceptual model was

updated specifically for the historical landfill in support of the waste licence; the model in the EIS relating to the whole landfill was not updated.

Mr Herlihy stated that the issue of Dr Kelly's letter had been discussed with Mr Cullen. Mr Herlihy referred to the GSI evidence in relation to classification of the gravel and that the Applicant had provided all data to the GSI but may not have provided Mr Orsmond's map specifically. The Applicant accepted that there was gravel in places and there was gravel which constituted additional storage. Mr Orsmond stated that the map was prepared during the planning oral hearing but the data had been established during ground investigations in 2004-2006. Mr Herlihy stated that the model is a simplification of the situation.

***Mr Flanagan***, for the Applicant, stated that the objection to Condition 6.34 had been made but had later been withdrawn by the Applicant.

Mr Herlihy stated that they had provided a response to the EPA but had not completed the model and that the model was not completed based on the hydrogeological information available. Mr Herlihy identified the main information required for a model and stated that transmissivity from the site investigation and in the wider area, including Bog of the Ring, would have been used.

Mr Herlihy agreed that recharge would limit significantly greater abstraction, and the constraining factors would be similar to Bog of the Ring. Mr Herlihy agreed that the fault line east of the landfill was the area identified as most fruitful by the GSI.

**Witness No. 9 - Mr De Rossa MEP European Parliament**

Mr De Rossa read into the record his witness statement (Document No. 12, Appendix E). Mr De Rossa stated that he was a member of the European Parliament and also a member of the Petitions Committee but he was not speaking on behalf of that committee, as they had not yet taken a position on the issue. Mr De Rossa identified that the Commission is pursuing 28 cases against Ireland for breaches of environmental laws and the Commission has expressed concern that Ireland has not properly transposed 10 of the 20 Articles of the Landfill Directive.

Nevitt/Lusk Landfill Proposal: Mr De Rossa expressed his support for the voluntary action group and identified that for citizens to engage with the process is a daunting and costly task, both in financial and personal terms. The EPA's role has to be to protect the citizen's fundamental right to a clean environment by rigorously challenging the Applicant's assertions.

The Proposed EPA Decision: Mr De Rossa expressed his surprise that the EPA's PD to grant a licence relied on the expertise of Fingal Co. Co. and the expressed EPA view that certain matters which clearly have an environmental impact are outside their remit. In particular Mr De Rossa identifies off-site traffic impacts. He asked why the EPA does not give any weight to the aquifer as valuable in its own right and worth protecting, why can't the water strategy for Fingal not be dealt with, why is the development of a second landfill in Lusk outside its remit, and why do the EPA accept calculations provided by the Applicant. Mr De Rossa stated that he would have thought the task of the EPA is to measure the concerns presented using

independent expertise. Mr De Rossa expressed his deep scepticism of a major plan which is justified by an Environmental Impact Statement rather than a detailed Environmental Impact Study. A strategic study has not been completed and it is not addressed how the proposal fits with the reduction of biodegradable waste going to landfill as required by the Landfill Directive.

Aquifer: Mr De Rossa highlighted that the non technical summary originally stated that what gravel that could be found was outside the landfill footprint, yet the non technical summary was changed where the claim was dropped. There is no admission by Fingal Co. Co. about the presence of a large aquifer and an official study to identify its extent and its value as a water supply. Mr De Rossa asked does the quality of water used by the horticultural industry not have a bearing on the conclusions to be drawn from the site's unsuitability as a landfill.

Mr De Rossa stated that Fingal Co. Co. admit that leachate can escape for up to 100 years and that we know that it is physically impossible to prevent all leakage of leachate. Mr De Rossa quoted from the inspector's report that "the development of the landfill at the Nevitt site may effectively prevent the development of an additional water abstraction system, from this reservoir" and stated that this is the most bizarre application of the precautionary principle.

Conclusion - What can be Done?: Mr De Rossa in conclusion advised what can be done at this stage of the proposal and in particular stated that the EPA must act to protect the aquifer and its potential.

**Cross-examination of Mr De Rossa**

***Mr O'Sullivan***, for NLAG, asked if alternatives to landfilling of waste should be looked at rather than just alternative sites for a landfill and he asked if Mr De Rossa could comment on whether the precautionary principle should be applied where there is a risk to an aquifer.

**Response:** Mr De Rossa stated that the European Union has a waste hierarchy and an aim of the Landfill Directive is to reduce landfilling of waste and in particular biodegradable waste. Mr De Rossa also identified that the Water Framework Directive seeks to ensure water including groundwater is of a good standard and that water bodies must be protected. Mr De Rossa stated that the precautionary principle is not a legal requirement but it is a principle applied in all environmental legislation. Mr De Rossa noted that the precautionary principle is not intended to restrict all development but a water resource should not be ignored.

**Continuation of Cross-examination of Mr Herlihy, Mr Doak and Mr Orsmond**

***Mr Mulcahy***, for Greenstar, moved on to ask questions in relation to the landfill referred to variously as the illegal, historical, contaminated, unauthorised landfill. Mr Mulcahy asked when the existing landfill had been identified and if the Local Authority had informed the consultants of the existence of the landfill. Mr Mulcahy asked if the trial pits and boreholes were dug to investigate the previously deposited waste and, if they were dug in 2005, why was it not included on the conceptual model and was it not the purpose of the conceptual model to show all sources of possible pollutants. Mr Mulcahy noted that the risk assessment was undertaken after the conceptual model.

Mr Mulcahy noted that the EIS refers to 10 metres of clay beneath the landfill and he asked if that only referred to the proposed landfill and, if so, how could you not consider the existing landfill in the conceptual model.

Mr Mulcahy asked what data were used in the risk assessment and if the trial pits and boreholes were used. Mr Mulcahy asked if there was an investigation into the landfill operation, type of material received etc. Mr O'Donnell, for NLAG, added at this point that a witness for NLAG would state that they had complained about odour from the existing landfill when it was operational and therefore there should be a file on the site. Mr Mulcahy identified that the source of the waste had not been established and that as part of a preliminary investigation that it should have been established.

Mr Mulcahy asked how the distribution of trial pits in the existing landfill had been chosen and why there was only one trial pit in the north eastern corner of the site, despite the fact that the site had previously been a sand and gravel quarry. Mr Mulcahy noted that the trial pits were up to 100 metres apart in the northern section. Mr Mulcahy asked what the waste was found to be.

Mr Mulcahy noted that water samples were taken from three boreholes (ER7 upgradient, HR12 downgradient and GS18 within the waste), and asked why HR12 was used as the downgradient sampling point when it was some distance away and samples could have been taken from other boreholes downgradient but closer to the existing landfill. Mr Mulcahy identified that a number of parameters in the water sample taken from GS18 exceed the EPA guidelines and particularly identified ammoniacal nitrogen as elevated and asked if this was likely to be from leachate.

Mr Mulcahy referred the witnesses to Council Decision 2003/33/EC Establishing Criteria and Procedures for the Acceptance of Waste at Landfills and asked how was the waste determined to be inert in accordance with this Council Decision. Mr Mulcahy also identified that the Council Decision referred to a "source" and claimed that the Applicant did not investigate or know the source. Mr Mulcahy identified that the Council decision is referred to in the EPA Guidance in relation to illegal landfills and requires that the inert category of waste must be validated with results and the findings of investigations.

Mr Mulcahy asked what quantity of waste was present and the tonnage and how was the depth of 4 metres established as appropriate in the calculation. Mr Mulcahy claimed that the waste depth could be deeper and his estimates indicate up to 6 metres, as the trial pits finished at 3.5 metres and that the volume of waste and tonnage would have an effect on the remediation operations.

Mr Mulcahy identified that the proposal was to leave the waste in-situ, whereas the inspector, the EPA and now the Applicant were accepting that the waste should be removed. Mr Mulcahy identified that the Local Authority had responsibilities in relation to waste monitoring and enforcement and asked was this role considered in the risk assessment.

**Response:** Mr Orsmond stated that the design team had become aware of the landfill during the site investigations. Ms Boland stated that the consultants may have been

aware of it during the siting study (site selection). Mr Orsmond identified that in May 2005, 15 trial pits, four boreholes and geophysics were undertaken. Mr Herlihy added that the conceptual model was of the proposed landfill and H.1 of the waste application considered the existing landfill. Mr Doak stated that the conceptual model was a simplified model and the existing landfill was not considered in the model as the risk assessment did not consider it as a significant risk.

The Applicant acknowledged that the landfill footprint is underlain by 10 metres of clay but that 5-6 metres of clay is present under the existing landfill. Mr Doak stated that the existing landfill is principally C & D waste of an inert nature as determined in the EIS and is not a risk. The site investigations informed this decision and thereafter a risk assessment was undertaken for the waste licence application.

Mr Orsmond identified that the trial pits were dug to establish the extent, boundary and type of waste. Mr Doak stated that BS 10175 was followed to an extent but that the age of the waste is not required under BS 10175 but is required in the EPA guidance (April 2007); the age of the waste was not the focus of the investigation. Mr Doak stated that as part of the "source-pathway-receptor" principle what had been established was the source in terms of type of material and contaminants.

Mr Orsmond explained that the trial pit locations were chosen based on accessibility to the existing landfill, and some areas in the north east were inaccessible, he explained that the Applicant had assumed that the whole field had been in-filled and had used topography to assist in establishing the boundary.

Mr Doak explained that they could have used BRC4 as the downgradient borehole but chose not to. Mr Doak stated that they had qualified that the waste was not all C & D. Mr Doak explained that the groundwater sampling indicated that there was also some contamination upgradient, however he admitted that the contamination wasn't equivalent. The ammoniacal nitrogen could have been from agriculture or other sources but they hadn't determined the source. Mr Doak stated that they didn't expect that it was from the waste as the waste was classified as inert C & D waste which would be unlikely to generate a leachate. The presence of faecal coliforms in the sample from GS18 could indicate that the contamination was from manure or similar. The waste material present was suggested to be only likely to produce a suspended solids leachate.

Mr Doak stated that the waste was visually assessed and stated that Council Decision 2003/33/EC provides for physical assessment of inert waste. Mr Doak stated that for the risk assessment it was not necessary to know the source of the waste; he focused on a risk assessment of the movement of the contaminants. Mr Doak accepted that additional assessment and testing of the waste in the existing landfill would be required as part of the waste movement.

Mr Doak stated that there were 160,000 $m^3$ of waste and claimed that the tonnage was not relevant for the risk assessment. The depth was established based on the boreholes and trial pits. The tonnage calculated in the risk assessment was based on guidance in the Landfill Levy Regulations and the conversion factor was accepted to be incorrect.

Mr Doak stated that he still stood over the recommendation in the risk assessment however the Applicant was satisfied to remove the waste in accordance with the PD. Mr Doak stated that he was responsible for undertaking a risk assessment and didn't make any determination in regard to the legal status of the waste and existing landfill.

***Mr Flanagan*** for the Applicant stated that in the context of the risk assessment the enforcement function of the Local Authority is not relevant.

***Mr Misstear*** (Assistant Chair) asked for the Applicant to clarify if there was a map which indicated the anticipated thickness of clay after the landfill is constructed.

**Response:** Mr Flanagan and Mr O'Toole referred Mr Misstear to the December 2006 response from the Applicant and in particular section D.3.F page 26 and figure 8.1, revision A01, at the back of the submission. Figure 8.1 shows cross sections with the existing ground level, the excavation level and the base of the clay.

**Witness No. 10 - Mr Sargent TD**

Mr Sargent, Minister of State at the Department of Agriculture, Fisheries and Food with responsibility for Food and Horticulture, read from his witness statement (Document No. 13, Appendix E). Mr Sargent outlined the region's importance for the national horticulture industry and the general importance of the national horticultural industry based on facts and figures published by his Department, Bord Bia and the Central Statistics Office. The national output of edible horticultural produce in 2006 was 327 million. Mr Sargent outlined the scale of the field vegetable sector including potatoes, protected crops and soft fruit, apples, packing companies, and highlighted the geographical concentration of the horticultural industry.

Water Quality and Horticulture: Mr Sargent stated that the availability of safe, high quality irrigation water is essential for horticulture crops in this region. The national and international quality assurance systems require the routine testing of all water used in production and post harvest treatment of fresh produce. Some new investments in the glasshouse industry are that crops are grown entirely in water or are fully dependent on irrigated water supplies. In North County Dublin, 89% of large scale commercial growers have irrigation equipment for their field crops. Many growers in North County Dublin are drilling boreholes and building reservoirs to supplement traditional methods of irrigation water extraction from streams and rivers.

There are voluntary schemes operated by Bord Bia which act as benchmarks for safe, and clean horticultural produce. Water quality analysis is required under the Bord Bia Quality Scheme for Producers and Packers and Quality Standards for the preparation of cut vegetables.

Risk to Water Quality: The proposed landfill poses a risk to the horticultural industry, the greatest risk is the loss of clean, safe water for crop irrigation and post harvest processing of produce.

The horticultural industry and the North Leinster Aquifer in the context of future challenges: A regular supply of irrigation water in sufficient quantities and of safe quality will be essential to sustain production. It is therefore essential that the existing

groundwater sources in this area must be protected for future generations. The EPA must be satisfied that emissions from the landfill will not cause significant adverse environmental impacts.

**Cross-examination of Mr Sargent TD**

***Mr Boyle***, for NLAG, asked if the list of packing companies referred to by the Minister was exhaustive.

**Response:** Mr Sargent stated that it was just a sample and he was aware of others in the local area.

***Mr Cullen*** asked would the Minister have the same view of existing groundwater supplies and a resource not yet developed.

**Response:** Mr Sargent sated that he was present as Minister for Food and Horticulture and stated that while not a hydrogeologist he was conscious of European Directives and in particular the Groundwater Directive and its requirements to protect groundwater.

**Witness No. 11 – NLAG – Dr Ashley**

Prior to Dr Ashley commencing Mr O'Donnell stated that while most of the evidence to date had been technical the EPA must take account of broader issues including sustainability. He stated that the NLAG represents the local community which was losing a significant area of land under compulsory purchase, families were losing their homes and the community was to be split by the proposal.

Dr Ashley did not provide a written witness statement (but did submit a research paper, Document No. 14, Appendix E). Dr Ashley identified that he is a hydrogeologist and has been employed by the NLAG. He outlined that he would present his statement under four points: Evolution of the Conceptual Model, Current Knowledge and Gaps, Regulatory and Legislative Position and Best Practice, and his Assessment of Suitability of the Site.

<u>Evolution of the Conceptual Model:</u> Dr Ashley outlined that he had became involved after the site selection and at that time the perceived picture was simply of glacial till overlying bedrock and a possible fault line to the east. There was a detailed model of the Bog of the Ring but it did not cover the proposed site. The conceptual model at that stage would have been as presented by the Applicant in Figure 9 of the EIS. By the time of the An Bord Pleanala oral hearing more information had been gathered and geology was considered more complex. Dr Ashley considered that a different conceptual model would have been appropriate, and the cross sections while updated were not comprehensive. He noted that two new maps had been provided to the oral hearing but he was surprised that further changes had been identified in cross-examination; therefore he considered that knowledge was still evolving.

<u>Current Knowledge and Gaps:</u> The conceptual model is the start but it needs to be comprehensive and agreed to establish the hydrogeology and answers. The model should take account of rainfall and its movement to groundwater or surface water and its relationship in bedrock, gravel etc. There continue to be arguments about the

transmissivity/permeability of gravels, the groundwater divide, groundwater flow etc and much of this is due to a lack of data and how components interact. There needs to be a comprehensive water balance and a computer simulation of the situation which is complicated. Figure 21.5 (Gravel thickness map) provided by the Applicant now indicates the presence of gravel and the Applicant should look at the groundwater resource.

Legislation and Regulation and Good Practice: In the UK the Groundwater Directive resulted in a standard approach to risk assessment and the development of a model (LandSim), but that model would not be appropriate in this case. A numerical groundwater model is required to evaluate the risks.

Assessment of Suitability of Site: An aquifer system has been identified and the gravel can provide additional storage and a pathway for groundwater. There is a continuous aquifer beneath the site, the combined aquifer (bedrock and gravel) is being exploited and there is no evidence of over exploitation. Dr Ashley claimed that if a landfill were developed no one would put a borehole close to the landfill as landfills all leak. There is concern about the limited thickness of clay and the micro-structure of glacial till, as studied in Ireland (reference to Document No. 14, Appendix E), which is fractured and these fractures provide for movement of groundwater. The presence of contamination (faecal coliforms and nitrate) in the groundwater samples taken on-site indicates that contamination is entering the groundwater prior to a landfill being developed. Dr Ashley also identified two cases where horticultural activities were negatively affected by waterborne contamination. He stated that the proposed landfill if developed would limit future horticultural groundwater development, threaten wells already extracting groundwater and that we must protect groundwater for all users and not just public supplies.

**Cross-examination of Dr Ashley**

***Mr Cullen*** asked Dr Ashley to identify the gravel thickness map he referred to in his statement and what he interpreted the map to show. Mr Cullen identified for Dr Ashley that 20 of the boreholes used in developing the map had not shown the full thickness of gravel and the actual thickness might be greater than indicated.

**Response:** Dr Ashley identified the gravel thickness map as Rev A02. He stated that the map would be taken to mean the thickness of gravel at borehole locations contoured by a computer model. He further stated that he was aware that the issue of 20 boreholes not extending to the full depth of gravel had been discussed.

***Mr Flanagan***, for the Applicant, asked for Dr Ashley to confirm that all information in relation to the proposed landfill had been made available to him and that the Co. Co. co-operated with him and provided some funding. Mr Flanagan asked if he agreed that groundwater levels had not changed significantly and flow mapping remains the same. Mr Flanagan identified a number of locations in the EIS where gravel deposits, subsoil deposits, recharge and groundwater levels were discussed. Mr Flanagan stated that the landfill is in fact not below the water table, and the water present is not bedrock groundwater. Mr Flanagan identified that the GSI had not classified the gravel as an aquifer.

Mr Flanagan asked if Dr Ashley accepted that the conceptual model is linked to the text. Mr Flanagan stated that in the UK the GSI matrix is not used. Mr Flanagan asked if Dr Ashley was aware of the Bog of the Ring report prepared by the GSI and the maps presented to the oral hearing by the Applicant which showed limited gravel thickness in areas.

Mr Flanagan asked for comment in relation to the requirements of Annex 1 of the Landfill Directive in relation to lining requirements compared with the lining proposed by the Applicant and required by the PD. In particular Mr Flanagan identified that the Applicant proposed to maintain 10 metres of low permeability clay below the landfill and that this would provide a disconnect between the landfill and the groundwater. Mr Flanagan stated that the liner and the risk of leaks had been addressed in the EIS and the figures presented are worst-case, as they don't consider the 10 metres of low permeability clay.

**Response:** Dr Ashley stated that he was not aware of any information not having been provided; however, he stated that he had not been able to fully examine all the information. Dr Ashley didn't agree that groundwater levels had remained the same, and identified variations between seasons. Dr Ashley stated that he accepted the references were in the EIS but claimed that there wasn't an analysis of the points and that elsewhere in the EIS gravel was referred to as patchy, localised and discontinuous. Dr Ashley considered that the water into which the landfill will be sited is the water table and interlinked to bedrock groundwater. Dr Ashley accepted that the GSI did not classify the gravel as an aquifer but that it did provide additional storage; however in hydrogeology an aquifer is anything that can yield water.

Dr Ashley accepted that the conceptual model is linked to the text, but the model does not show gravels. The GSI matrix is not used in the UK but the matrix does not determine all actions and is used in terms of planning/strategy rather than for a final decision.

Dr Ashley acknowledged he was aware of the requirements of the Landfill Directive and proposals put forward by the Applicant but he wasn't an engineer. Dr Ashley stated that he did not consider that 10 metres had been demonstrated below the landfill, and that there are still questions as to whether it would be a disconnect but would more appropriately be considered to provide a low hydraulic conductivity. Dr Ashley stated that a real calculation of the flow of water and contaminants had not been completed. Any barrier beyond the Landfill Directive requirements would reduce movement of contaminants.

***Mr Burke***, member of the public, asked Dr Ashley if there were 10 metres of low permeability clay would there not be a lake. He pointed out that boulder clay has fissures and is permeable and should not be referred to as clay.

**Response:** Dr Ashley stated that the question drew attention to the fact that we are referring to the bulk material rather than individual clay mineralogy and possibly it should be referred to more correctly as glacial till. The material is variable and may contain boulders, sands etc.

***Mr O'Donnell***, for NLAG, asked if Dr Ashley considered the proposed landfill could be developed without a risk of environmental pollution.

**Response:** Dr Ashley stated that he wouldn't be confident to say that environmental pollution would not be caused by the proposed facility.

***Mr Misstear*** (Assistant Chair) asked Dr Ashley to clarify a number of points:

- Why was the LandSim computer model not suitable in this situation?
- The Environment Agency's guidelines include many possible tools: do they have suggested tools for what they might describe as hydraulically contained landfills?
- Is there research showing possible fissures at depth in glacial tills in Ireland, and could he provide the paper referred to in his statement?

**Response:** Dr Ashley responded with the following information:

- LandSim is based on a standardised conceptual model and assumes that the landfill is developed in one stratum, underneath which there is soil / rock which is essentially dry, with the water table some distance below the base of the landfill. The model assumes that any contaminants which leak out of the landfill will seep down through this otherwise dry layer before they hit the water table. In this case, there is no such dry layer, as the clay in the boulder clay has water in it.
- Dr Ashley stated that he wasn't aware of Environment Agency guidance.
- Dr Ashley stated that he was unable to refer to any research showing fissures at depth, and stated that the research document referred to was published in 2007 and would be made available (Document No. 14, Appendix E).

**Monday 10th March**

**Witness No. 12 – NLAG - Mr Bergin**

Mr Bergin provided a Witness Statement (Document No. 19 Appendix E), and his evidence to the hearing was based on his text. Mr Bergin identified that he is a local farmer and he provided details of the agricultural and horticultural importance of the North County Dublin (NCD) area.

Mr Bergin identified the importance of the NCD area in terms of agricultural value and stated that the area can produce particularly high yields of cereal crops and to destroy such land for the purposes of providing a landfill is not acceptable. Mr Bergin stated that the agricultural lands in NCD are considered some of the best in Ireland. He questioned placing a landfill on a regionally important aquifer. Mr Bergin identified that on his farm, at Roscall, Ballyboghil (approximately 3.5km south of proposed facility), they have a groundwater borehole which yields significant quantities of groundwater (drilled in 1999, 9 inch diameter and c.400ft deep) which is used for irrigation and washing of vegetable crops that are grown in the NCD area. The borehole yield of 25,000gal/hr is the highest capable from the 9inch borehole. Boreholes located on the east-west or north-south faults have high yields and he provided a number of examples. Mr Bergin identified that the importance of water is rising each year for washing and irrigation. Dry weather is becoming more frequent and water demands are increasing. Many growers use Mr Bergin's borehole as it is a high yielding well. The borehole can supply three farmers using 10,000gal/hr irrigation systems and can also supply three rivers from the borehole (Turvey River, Ballboghil River, Corduff River) for irrigation down stream.

Risk of contamination of the aquifer is considered huge and leaks from the landfill would be detrimental to the local horticulture industry. Any leak into the aquifer from the landfill would rule out the current industry and water could not be used on crops for human consumption. The cost of using mains supply would be prohibitive. Even the perceived risk of contamination from the landfill in terms of food production would be enough to significantly damage the horticulture industry in the area. Mr Bergin noted that the Dublin Authorities are considering taking drinking water from the River Shannon, this does not seem logical given the huge potential of the groundwater resource in the NCD area. Fingal Co. Co. should carry out additional groundwater assessments along local fault lines and at appropriate depth.

**Cross-examination of Mr Bergin**

***Mr Cullen*** queried whether the details regarding the yield of Mr Bergin's well had been either submitted to, or requested by, the GSI for assessment.

**Response:** Mr Bergin stated that the yield of his or other local boreholes had not been submitted to the GSI and bodies such as Fingal Co. Co. or GSI have not assessed the well yields.

***Mr Boyle***, for NLAG, asked if Mr Bergin was aware that GSI have classified the aquifer as a locally/moderately important aquifer. Mr Boyle also stated that the criteria for classifying Regionally Important Aquifer is the presence of a "high number of high yielding wells", a high yielding well being >400$m^3$/day, Mr Boyle

asked are there a number of such wells in the area. Mr Boyle asked how many farmers does Mr Bergin supply groundwater to. Mr Boyle also asked about the use of the Corduff River for irrigation of horticultural land.

**Response:** Mr Bergin stated that he was unaware of the GSI classification but that his well had not been considered as part of the classification. He considered that work should be done to assess groundwater yield in the area. Mr Bergin said that there are at least 3 wells in the area that are capable of yielding above 400 $m^3$/day. Mr Bergin said that 8-10 of largest vegetable growers in the country are supplied from his well and he would think that these farms would produce more than 50% of certain vegetables (e.g. parsnips, broccoli, lettuce) in Ireland. He considered that up to 15,000 acres could be irrigated from his well. Mr Bergin stated that there are a significant number of growers getting irrigation water from the Corduff River and if it were to become contaminated it would severely impact on the growers in that area.

***Mr Misstear*** (Assistant Chair) asked Mr Bergin as to the yield of the well and the size of the pump being used in his well.

**Response:** Mr Bergin clarified that the pump was a multistage pump that has been in place since 1999 and it is in a 9inch diameter borehole.

**Witness No. 13 – NLAG - Mr Rogers**

Mr Rogers provided a Witness Statement (Document No. 20, Appendix E), and his evidence to the hearing was based on his text. Mr Rogers identified himself as a farmer in the NCD area and that he represents the Irish Farmers Association on a voluntary basis in the local area.

Mr Rogers highlighted the importance of horticulture in the area and that the horticulture industry depends on clean water in a number of ways; i) water for greenhouses and tunnel crops, ii) processing of crops (washing, peeling, etc), iii) irrigation of field crops, iv) smaller wells are also used for other uses such as filling crop sprayers. Mr Rogers stated that using river water for irrigation is not as good as groundwater as diseases and pests tend to be more prevalent in river water sources. It is also considered that irrigation will be required on a more frequent basis as our climate changes in the long-term and the provision of the significant food source of NCD should get precedence ahead of a landfill.

There are many spin-off industries in the area such as machinery sales, agricultural contractors etc. In 2006 the horticulture business was worth €60million to the country. The impact of the proposed landfill on the horticulture industry in the area has not been fully assessed. "Foodmiles" are now a consideration for consumers and this will increase the demand for Irish grown fruits and vegetables. Also the demand for organic food is increasing and the requirement for clean water for this sector is necessary and local monitoring would indicate that the current quality of groundwater is excellent.

**Cross-examination of Mr Rogers**

***Mr O'Sullivan***, for NLAG, asked whether the production of organic fruit and vegetables could be sustained if the water being used had to be pre-filtered before use.

He also asked if the use of mains water from the local authority would be an option in terms of use within the horticultural business.

**Response:** Mr Rogers stated that the use of any poor quality water in the production of organic fruit and vegetables would be likely to be unacceptable. He would not accept that mains water would be sufficient for use in the horticulture industry in terms of quality and quantity and that groundwater from local wells is by far the best option as a water source for the industry.

**Witness No. 14 - NLAG – Ms Shortt**

Ms Shortt provided a Witness Statement (Document No. 16 Appendix E), and her evidence to the hearing was based on her text. Ms Shortt identified herself as a local resident and she lives in one of the houses that would be demolished as part of the proposed development.

Ms Shortt highlighted that the possible "eviction" of the Shortt family from their family home is of significant stress and upset to the family and friends. The Shortt family have lived and grown in their home for many years and the loss of the current family home cannot be replaced or compensated for. Ms Shortt claimed that the proposed loss of the family home is not necessary. The proposed landfill and associated destruction of the local environment, community and aquifer is not acceptable and is immoral and is not for the greater good. The local pristine aquifer will be contaminated as the landfill will leak and the chosen site seems to be based on a geographical basis rather than scientific reasons.

**Witness No. 15 – NLAG - Ms Lynch (read into the record by Mr O'Sullivan)**

Ms Lynch provided a Witness Statement (Document No. 16A, Appendix E), and as she was not present at the hearing Mr O'Sullivan read the text of her witness statement into the record on her behalf.

Ms Lynch lives approximately 600m east of the proposed facility. Ms Lynch has been living under threat since it was announced that the proposed landfill was to be built in the area. There are significant concerns regarding pollution that may be caused due to leachate both in water being used by households and the groundwater used by the horticulture industry. The landfill will leak during its proposed 30 operational years and for a significant number of years afterwards. Concerns were also expressed regarding leachate recirculation on-site. The leachate is proposed to be treated at an installation that is not yet approved and the details of the sewer to be provided have not yet been determined. Mr Hammerstein (MEP), Mr De Rossa (MEP) and Mr Sargent (TD) provided submissions to the oral hearing and the contents of their submissions highlight inadequacies at the proposed facility and the importance of the horticulture industry in the area. Many questions regarding the proposed development have not been answered by the Applicant which have significant implications for the decision making process. Such questions relate to aquifer protection, impact of the unauthorised landfill, movement of waste to the proposed facility, effect of waste reduction in the future etc. The proposed development has and will have a negative impact on the value of the property in the

area. The precautionary principle should be considered in making a decision about this proposed development.

**Witness No. 16 – NLAG - Ms McNally**

Ms McNally provided a Witness Statement (Document No. 23, Appendix E), her evidence to the hearing was based on the statement. Ms McNally identified that she lives in the area of the proposed development and her family own and operate a joinery business on the boundary of the proposed development.

Ms McNally stated that McNally Joinery is a successful award winning joinery and any negative impact on the industry from the proposed development could result in major negative economic impacts for the local community. Human resources are critical to the business and reference was made to "Maslow's Theory". Recruitment of staff at the business may become difficult if the landfill were to be developed in the area. Odours from the landfill might result in some of the "D-needs" (ref. Maslow's Theory) not being met and may cause staff to be anxious. The impact of proposed facility on the joinery business could be significant in terms of working conditions and dealing with customers. The Applicant has not proven that the proposed development is needed and it is a threat to the livelihoods of the McNally family.

**Cross –examination of Ms McNally**

***Mr O'Sullivan***, for NLAG asked questions in relation to "Maslow's Theory" and he asked was it the case that according to the theory if the proposed landfill were to be developed that people living in the area might feel unfulfilled and may have an effect on peoples lives and perception of their surroundings.

**Response:** Ms McNally said that she would consider that people would feel less fulfilled as the quality of life would be affected and odours would have a negative impact on people. Also there may be a negative psychological effect on people due to the presence of the landfill in the area.

**Witness No. 17 – NLAG - Mr Martin Moore**

Mr Moore provided a Witness Statement (Document No. 25, Appendix E), and his evidence to the hearing was based on his statement. Mr Moore identified that he is a farmer who lives with his family on the Nevitt Road (nearest house on eastern side of the proposed landfill).

Mr Moore stated that he is "An Bord Bia" approved and this entitles him to sell his produce to high quality premium markets. The development of the proposed landfill may jeopardise these market outlets and the viability of his farm. The loss of community and farming neighbours would have a significant impact on Mr Moore in terms of advice and support in his farming activities. The possible contamination and nuisances would increase risk to personal health and farm produce. Odours from the landfill will have significant impact on his and his family's life. Also the devaluation of property in the area would be significant for Mr Moore and there is no compensation for such devaluation. Road closure in the vicinity of Mr Moore's home would cause inconvenience and would lengthen any journeys to the west of Mr Moore's farm and residence.

**Cross-examination of Mr Moore**

***Mr O'Sullivan***, for NLAG, asked if Mr Moore has a borehole water supply on his property and whether Mr Moore is located near to the historical landfill that is located on the site of the proposed development and does he remember the dumping of waste there.

**Response:** Mr Moore said that he does not have a well at his property. He stated that he remembered the dumping of waste at the historical landfill and that dumping used to occur at night and that he used to get odours coming from the historic landfill similar to odours he would have got from other landfills.

***Mr Boyle***, for NLAG, asked if the site for the new school is close to Mr Moore's property.

**Response:** Mr Moore stated that he was aware of the site for the new school and it would be approximately 350m from the proposed landfill.

**Witness No. 18 – NLAG - Mr Warner (read into the record by Mr Boyle)**

Mr Warner provided a Witness Statement (Document No. 21, Appendix E), and as he was not present at the hearing Mr Boyle read his statement into the record. Mr Warner's statement provided information and comment regarding the archaeology of the area.

The statement claims that there are a number of issues pertaining to the archaeology of the area that have not been given due weight by the Applicant and the interpretation of the information also needs to be questioned. The origins of the place name "Nevitt" would indicate that the area was possibly the main sacred pagan grove for the region or even for Ireland. The archaeological assessors should have ruled out this townland as an area for destructive development. The methods used to survey the proposed development area may not have been as useful as it appeared in the application. Each was assessed individually and not considered in the whole picture.

**Witness No. 19 - NLAG – Mr Boyle**

Mr Boyle provided a Witness Statement (Document No. 24, Appendix E), and his evidence to the hearing was based on his statement. Mr Boyle initially presented the archaeology section of his witness statement.

Mr Boyle claimed the Fingal Landfill study failed to recognise the significance of the townland of Nevitt. The surviving field names in the area also indicate the presence of an ecclesiastical site and such a rare site should be avoided in terms of development. Mr Boyle highlighted a number of archaeological sites that were identified during the archaeological assessment and indicated the importance of such features and local place names in archaeological terms. Mr Boyle identified that an interpretation of the findings of the archaeological assessment of the site would suggest that there are a number of shrines within the site area.

**Witness No. 20 - NLAG – Mr Thomas Moore**

Mr Moore provided a Witness Statement (Document No. 18, Appendix E), and his evidence to the hearing was based on his statement. Mr Moore identified that he is a local vegetable producer and owns a local food processing business located approximately 1km from the proposed development.

Mr Moore's business, Superdawn, supplies fresh produce to many catering outlets such as hospitals and prisons. The water used in his processing facility is from an on-site well and the quality of the water used over the history of his business has been excellent. Mr Moore said that he is of the opinion that if the proposed landfill goes ahead he would have to close his business as the groundwater would be contaminated and dust from the landfill would also cause problems. All of the years spent building the business could be undone be one failure at the proposed landfill.

**Cross-examination of Mr Moore**

***Mr O'Sullivan***, for NLAG, asked if Mr Moore's business prepares high risk foods and, if so, what quality measures are in place for this outlet and is the current water supply on-site vital to his business and would an alternative supply of mains water be of use if the groundwater could not be used.

**Response:** Mr Moore said that there is regular ongoing testing of the water used in his process and the pristine groundwater being used is a vital component of his business. He considered that a supply of mains water would not be as good as the current groundwater supply.

**Witness No. 21 – NLAG – Captain Howarth**

Capt. Howarth provided a Witness Statement (Document No. 17, Appendix E), and his evidence to the hearing was based on his statement. Capt. Howarth identified that he has considerable professional experience in flying commercial aeroplanes and as a pilot training instructor.

Capt. Howarth expressed concern regarding the location of the proposed development with regard to the safety aspect of airplane flights within the area of the proposed developments. The location of the proposed site may be greater than 13 km from Dublin Airport, however it is within the "Control Zone" of Dublin Airport. Capt. Howarth outlined that there would be a risk of bird strike as a result of birds scavenging at the proposed landfill and that if a sequence of mishaps were to occur an airplane would be at a height in the vicinity of the proposed landfill where bird strikes may occur.

**Cross-examination of Capt. Howarth**

***Mr Flanagan***, for the Applicant, asked if Capt. Howarth was aware of the fact that the Irish Aviation Authority did not express concerns in relation to the siting of the proposed facility.

**Response:** Capt. Howarth stated the he was aware of the contact with the Irish Aviation Authority and that once the siting of the proposed development met certain criteria then they would not object to the development.

***Mr Boyle***, for NLAG, asked Capt. Howarth that given the significant population of birds currently at Balleally Landfill, what might be the actual impact of such birds on airplanes.

**Response:** Capt. Howarth said that the potential impact of a bird strike on an airplane would be significant.

**Witness No. 19 - NLAG – Mr Boyle (Continuation of Statement)**

Mr Boyle provided a Witness Statement (Document No. 24, Appendix E), and his evidence to the hearing was based on his statement. This was the second part of Mr Boyle's evidence to the oral hearing.

Mr Boyle raised concerns about geotechnical issues including the problems with maintaining an inward hydraulic pressure on the landfill and problems associated with maintaining adequate friction at the liner sidewalls. Mr Boyle also expressed concerns regarding perched groundwater in gravels at the site and that these gravels could offer a pathway for contaminant movement, could increase the vulnerability of the aquifer, could cause blow-out or heavy springs, could cause slow base heave during operations and could cause upward leakage from the aquifer and cause slope failure.

**Witness No. 22 – NLAG - Dr Reilly (TD)**

Dr Reilly provided a Witness Statement (Document No. 28, Appendix E), and his evidence to the hearing was based on his statement. Dr Reilly identified that he is a resident of the area and an elected TD for Dublin North and represents the concerns of voters and residents in the area. He is also a practising GP in the area.

Dr Reilly expressed concerns regarding the potential contamination of the local aquifer from the proposed landfill and the associated problems, which that would cause the local horticulture businesses. The proposed landfill would be likely to leak and if the local aquifer was contaminated it would be a local and national disaster. The quantum of the aquifer has not been fully assessed and it may be a viable source of drinking water for the ever-expanding North County Dublin. The safety of the proposed incinerator ash to be accepted at the facility is of concern with regard to heavy metals, toxins and dioxins. There are also concerns regarding the impact that additional traffic would have in the area. Dr Reilly also stated that the landfill should not go ahead until a full Health Impact Study was completed.

**Cross-examination of Dr Reilly**

***Mr O'Sullivan***, for NLAG, asked questions in relation to a Health Study and should a baseline Heath Study be completed in the area if a landfill were to be built. He also asked if the baseline study might be compromised due to the presence of the historical landfill at the site.

**Response:** Dr Reilly said that a Health Impact Assessment should be completed in the area if the landfill were to proceed. Dr Reilly said that the presence of the landfill would bias results but a Health Impact Assessment should nevertheless go ahead.

**Witness No. 23 – NLAG - Mr Christy**

Mr Christy provided a Witness Statement (Document No. 29, Appendix E), and his evidence to the hearing was based on his statement. Mr Christy identified himself as a local resident and his main concerns were in relation to habitat destruction.

Mr Christy said that the area of the proposed landfill is an area of unusually high quality habitat within the Fingal area. Much of the good quality areas within Fingal have been lost and this area should not be lost to development. Balleally Landfill is visible from the area of the proposed landfill and this is surprising given that locals were assured that a second landfill would not be constructed within the area. People in the area have put up with enough with the operation of Balleally and another landfill should not be built in the area.

**Cross-examination of Mr Christy**

***Mr O'Sullivan***, for NLAG, asked about the nature of the high quality habitats in the area and would they be considered rare in the Fingal area.

**Response:** Mr Christy said that there are at least two watercourses flowing through the area and there are significant hedgerows within the proposed landfill area. There are migratory birds, birds of prey and wader species using the area.

**Witness No. 24 – NLAG – Mr Declan White**

Mr White provided a Witness Statement (Document No. 27, Appendix E), and his evidence to the hearing was based on his statement and he also presented a physical model. Mr White identified that he is a local resident in the Nevitt area with his family.

Mr White stated that surrounding areas will have views into the landfill and the new school will be very close to the site of the proposed landfill and the location of a school in such a location is unacceptable. The aquifer beneath the facility was not fully assessed in the waste licence application. North County Dublin is a key component of vegetable and fruit production in Ireland and these businesses rely on good quality groundwater. The EIS did not adequately assess key aspects with regard to groundwater in the area. There are a number of high yielding wells in the Nevitt area and a MODFLOW model was not completed to assess the groundwater beneath the proposed facility. The potential connection of groundwater beneath the facility and the Bog of Ring area is likely based on the geology of the area. Also the zone of contribution of some local wells (industrial) extend below the proposed landfill site and the landfill should therefore not be built in the area. If the proposed landfill goes ahead it will prohibit the development of any new public groundwater supply schemes in the area.

The EPA inspector made his decision on information that has since been updated and reviewed and new information has been provided at the oral hearing. Mr White said

that additional information is required to make a decision on the proposed development and this additional information should be obtained. A full assessment of the impact on the local horticulture industry was not completed and the reliance of this industry on clean groundwater cannot be underestimated. The HSE should also be involved in this process, as there is a risk to health of a significant number of people in the area.

Mr White presented his physical model after Ms Thorn and Mr Sheridan had presented their statements. The model was presented at the front of the room where people gathered around to examine the model and listen to Mr White's commentary in relation to the model. The model and associated maps showed the position of local wells and local geological features. Mr White stated that there was evidence to suggest that there is a viable water source in the area of the proposed landfill.

**Witness No. 25 – NLAG - Ms Thorn**

Ms Thorn provided a Witness Statement (Document No. 31, Appendix E), and her evidence to the hearing was based on her statement. Ms Thorn identified that she is a resident of the area and works on the family farm to the east of the proposed landfill.

Ms Thorn stated that she works on the family farm and has serious concerns about the proposed development. Ms Thorn said that her sons are also hoping to make a living from the land however the development of a landfill in the area would put this at risk. Ms Thorn expressed concerns about the potential impact a landfill would have on local groundwater as they use groundwater at their home and farm. She said that she is worried about the quality of life that she may have if the landfill goes ahead. The loss of neighbours if they are removed due to the development of the landfill would be sad and the loss of good neighbours is significant. The odours from a landfill might have a negative impact on the quality of life in the future.

**Witness No. 26 – NLAG - Mr Sheridan**

Mr Sheridan provided a Witness Statement (Document No. 30, Appendix E), and his evidence to the hearing was based on his statement. Mr Sheridan identified that he lives east of the proposed landfill site.

Mr Sheridan stated that the EIS prepared is inadequate and biased. There has been a lack of transparency shown by Fingal Co. Co. in relation to the proposed development. The information included in the EIS was tailored to suit the development. There is information missing with regard to the groundwater and the presence of springs in the area. The proximity principle has not been suitably applied in this situation. The proposed management of leachate at the facility is of concern and the control of vermin and flies is also of serious concern. The potential health impacts of the proposed landfill are of serious concern and in particular there is a risk to children's health. Other issues raised by Mr Sheridan were the issue of increased traffic, devaluation of local property, and destruction of a local community due to the proposed "eviction" of some local residents. The closure of local roads would also add 4 to 5 miles onto his daily journey. The cul-de-sac caused by the local road closure could lead to misuse of the local roadways.

**Cross-examination of Mr Sheridan**

***Mr Boyle***, for NLAG, asked if Mr Sheridan was aware of the presence of wells in the "Well Meadow" near to borehole AGB10.

**Response**: Mr Sheridan said he was aware of such wells, but didn't know the name of the field, and he identified how water often flows out of that field onto the local roads and this appears to be causing subsidence of the local road.

**Witness No. 27 – NLAG - Mr Chillingworth**

Mr Chillingworth provided a Witness Statement (Document No. 15, Appendix E), and his evidence to the hearing was based on his statement text. Mr Chillingworth identified that he is a local resident.

Mr Chillingworth questioned the validity of the traffic assessment, as the data used in the EIS may not have included all of the relevant data and reflected the actual increases, predicted increases and changes in traffic quantities. Mr Chillingworth highlighted a number of serious anomalies in the figures provided in the EIS. He compared traffic movements at Balleally Landfill with those used in the EIS and highlighted the obvious discrepancies between both. He also indicated issues with regard to haulage routes to be used by traffic entering and leaving the facility. The trip distribution aspect of the traffic assessment was also questioned. Mr Chillingworth raised other aspects of the traffic analysis such as noise and emissions. He also considered that the impact of the proposed development on the M1 and local road network has not been assessed. Other developments such as Bremore Port and Tesco distribution centre were not considered and the change in travel time to the local school was considered in terms of a car journey rather than walking.

**Cross-examination of Mr Chillingworth**

***Mr Flanagan***, for the Applicant, advised Mr Chillingworth that the figures presented in his text regarding traffic movements at Balleally Landfill were related to capping works rather than normal waste vehicle movements.

**Response:** Mr Chillingworth said his understanding was that the figures provided in his statement, as provided by Fingal Co. Co., did represent waste movements into the Balleally Facility.

***Mr Boyle***, for NLAG, asked was Mr Chillingworth aware of the proposed ESB inter-connector project and its possible impact on traffic in the area. Mr Boyle added that this project would be a hugely complicating factor in the future of traffic in the area and had Mr Chillingworth an opinion on this.

**Response:** Mr Chillingworth stated that he was not aware of the proposed ESB inter-connector project.

***Mr O'Sullivan***, for NLAG, asked about the current overloading of the M1 and how the proposed development would affect this situation.

**Response:** Mr Chillingworth said that the M1 is overloaded and traffic jams are common on the M1 and present a danger for road users in the area.

**Witness No. 28 – NLAG - Senator Ryan**

Senator Ryan provided a Witness Statement (Document No. 34, Appendix E), and his evidence to the hearing was based on his statement.

Senator Ryan identified the water resource in the area, the risk to the resource and the associated risk to the local horticulture industry if the local groundwater resource was contaminated. Good quality water is a vital resource and is in short supply in Dublin as is seen by the proposals to pump water to Dublin from the River Shannon. The potential groundwater source in the area should not be jeopardised by the development of a landfill in the area. The landfill will leak and impact on the local groundwater resource which is of national importance. If any of the proposed control measures at the landfill fail it would have a significant impact on local food producers and the development of a landfill in this area is a risk that should not be taken.

**Cross-examination of Senator Ryan**

***Mr O'Sullivan***, for NLAG, asked was Senator Ryan aware of the concerns amongst people living around the River Shannon and their objections to the proposed water abstraction from the River Shannon and therefore should the groundwater in the North County Dublin area be given full protection. Mr O'Sullivan also asked what would be the opinion of Senator Ryan with regard to possible risk of leaks from the landfill and the inability to repair any such leaks.

**Response:** Senator Ryan said that whilst he could not predict what might occur with regard to the Shannon abstraction scheme he considered the groundwater in the North County Dublin area should be protected where possible. Senator Ryan agreed that there was a risk of leaks occurring and not being able to repair leaks was a significant issue.

**Witness No. 29 – NLAG - Ms Lenehan**

Ms Lenehan provided a Witness Statement (Document No. 35, Appendix E), and her evidence to the hearing was based on her statement.

Ms Lenehan identified herself as one of the "Nevitt 8" in that her house is due to be demolished if the proposed development goes ahead. The Nevitt area is a small farming community and the continuation of the farming in the Nevitt area is now in jeopardy. The current situation is very stressful and emotional for local residents. Money is the only mechanism available for compensation but this does not account for emotional upheaval of family and local residents. Local residents are being ignored and are not being listened to. The locals must accept the statutory compensation if the development proceeds and there is no moral justice in the process. Since 2001 this threat of eviction has been present. Little information was made available to locals. Ms Lenehan gave a summary of the developments since 2001 and how no decision has been issued yet and no closure has been provided to locals. Disruption and eviction at this time in Ms Lenehan's life is very unwelcome and disturbing.

**Witness No. 30– Mr Cullen**

Mr Cullen provided a Witness Statement (Document No. 22, Appendix E), and his evidence to the hearing was based on his statement text. The main issue included in Mr Cullen's evidence was regarding the nature of the groundwater at the proposed facility.

Mr Cullen evidence included that the Loughshinny Formation has been shown to be an important groundwater resource in North County Dublin. There are a number of high yielding wells in the area and the yield from Mr Bergin's (Witness No. 12) well was noted. There is a significant groundwater resource in the area of the proposed landfill and the Applicant has not fully assessed the groundwater resource at the proposed facility. A numerical modelling exercise was not carried out by the Applicant as requested by the EPA. Therefore there is insufficient information with the Agency in order to determine the full groundwater potential in the area.

The hydrogeological conditions at the proposed facility are similar to those at the Bog of the Ring. Mr Cullen noted that the Agency did not have accurate drawings when assessing the application as some of these drawings have since been amended.

The key grounds for Mr Cullen's objection include: the proposed landfill is to be located above a proven and significant groundwater resource; the Applicant failed to quantify the magnitude of the groundwater resource identified beneath the landfill footprint; failure of the Applicant to fully report on the residual impact/effects of the landfill on the groundwater resource identified by the Applicant beneath the landfill footprint; the development of the landfill at this location is contrary to the national guidelines on groundwater protection; the development of the landfill at this location is contrary to the EPA guidelines on site selection; the development of the landfill at this location is contrary to the concept of sustainability; the development of the landfill at this location is in breach of the Water Framework Directive; the EPA did not receive the numerical model requested by the inspector as part of the waste licensing process and which was deemed necessary in order to assess the application; and some of the additional hydrogeological information supplied to the Agency by the Applicant is at variance with the geological and hydrogeological information provided in the EIS and supporting technical appendices. Mr Cullen also presented a series of maps and drawings as part of his evidence. These included a revised conceptual geological model of the proposed facility, revised cross sections, depth to bedrock and gravel thickness maps.

**Tuesday 11th March**

**Cross-examination of Mr Cullen**

***Mr Flanagan***, for the Applicant, asked if Mr Cullen's own company had done previous work on the Loughshinny Formation in 1994 and that there is a lot of information elicited over a period of greater than 20 years regarding the groundwater resource in the area. The KT Cullen report of 1994 referred to assessments that had being on-going since 1983 and that some information obtained during this time indicated (TW6 and TW7, 1.25km and 0.5km north east of the proposed landfill) that there was a lower recharge than expected in the area and structural deformation at the Bog of the Ring was east-west rather than north-south.

Mr Flanagan asked had previous work in the area shown that the groundwater productivity of gravels in the area was not as good as being presented by Mr Cullen at this oral hearing. Mr Flanagan noted that there is a source protection area established for the Bog of the Ring, and the gravel aquifer is not classified by the GSI. Mr Flanagan also noted that Mr Cullen took a quote from the EPA Inspector's Report for the proposed facility and used the term "effectively prevent" rather than "may effectively prevent" regarding the development of a groundwater abstraction in the vicinity of the facility. Mr Flanagan asked Mr Cullen to confirm his response to the following question from the ABP Inspector at the planning oral hearing, 'were you aware of any circumstances in which a modern engineered landfill would give rise to pollution to groundwater'.

Mr Flanagan made reference to a letter to the EPA from Dr Sleeman (GSI) in which he stated that variations in groundwater characteristics, in terms of lithological differences, in the area would be negligible. Mr Flanagan also stated that the reference to source protection areas has no application to the current proposal on the evidence of the GSI. Mr Flanagan asked was Mr Cullen aware that all of the information gathered in relation to groundwater in the area was submitted to the GSI and the GSI then issued their report on the area in 2005.

Mr Flanagan asked if Mr Cullen would agree that an engineered modern landfill is an environmentally sound development and is a development that will last for a number of years through a number of phases and that the facility would be sustainable for that period. Also in relation to sustainability and Section 52 of the EPA Act Mr Flanagan said that the Agency should keep itself informed of the policies and objectives of the local sanitary authority and in this instance Fingal Co. Co. do not plan any further groundwater abstractions in the area.

Mr Flanagan asked with regard to the Groundwater Directive would the proposed landfill give rise to deterioration of groundwater quality or would there be direct discharges to groundwater. Mr Flanagan asked if the Inspector's Report reference to the gravel layer acting as additional storage for the groundwater aquifer was similar to that provided by the GSI.

Mr Flanagan asked whether there was a low permeability layer of clay beneath the proposed facility that would offer protection to the aquifer. In relation to maps presented by Mr Cullen, Mr Flanagan asked if the 5m contour in Fig. 4 covers less than 50% of the landfill footprint and if there are a number of boreholes from around

that contour that show gravels 0m – 1m. It was then put to Mr Cullen that in fact there is not a 1km$^2$ layer of gravels greater than 5m thick at this location and therefore not a gravel aquifer, and that this was supported by the findings of resistivity results from investigations at the facility. Mr Flanagan put it to Mr Cullen that the 5m thick layer of gravel presented in his conceptual model as provided to the oral hearing is not actually present as suggested in the model.

**Response:** Mr Cullen acknowledged the previous work of his company and agreed a significant amount of groundwater assessment work had been done at the Bog of the Ring and surrounding areas.

Mr Cullen responded that his evidence to the oral hearing was not in relation to the Bog of the Ring. Previous work was focussed on the Bog of the Ring; however, other wells in the North County Dublin area have better yields than Bog of the Ring and the EIS seemed to focus on the Bog of the Ring and the potential impact of the proposed landfill on it rather than groundwater resources at the proposed landfill area. To some degree the focus on the Bog of the Ring was based on information in the 1980s and 1990s; however, the approach to groundwater development in the area would be different given the knowledge that is now available. Mr Cullen agreed that the GSI's position was provided in their submission to the oral hearing. Mr Cullen accepted that he had omitted the word "may" from the reference to the Inspector's Report in his evidence. Mr Cullen acknowledged that he responded 'no' when asked was he aware of any circumstances in which a modern engineered landfill would give rise to pollution of groundwater, at the ABP oral hearing.

Mr Cullen stated that the GSI have indicated that the application of groundwater protection schemes to resources that are not being used would be an issue for the DoELG and EPA. Mr Cullen acknowledged that information was provided to the GSI.

Mr Cullen acknowledged that a modern engineered landfill is an environmentally sound development but he queried the use of the term 'sustainable'. He also accepted that as far as he's aware Fingal Co. Co. do not intend to provide any further groundwater abstractions in the area.

Mr Cullen accepted the inspector's and GSI's interpretation of the gravel layer. Mr Cullen agreed that there was a layer of clay. Mr Cullen said he did not suggest that the 1km$^2$ of gravel was at the landfill footprint but that it was present in the Nevitt area. With regard to resistivity information Mr Cullen said such information could only be relied upon with the use of borehole data and his own map includes information from boreholes. Mr Cullen said that there is not a scale in his conceptual model and that the GSI have not classified the gravels in the area as a gravel aquifer as they may not have had the benefit of a corrected gravel thickness map. Mr Cullen also responded that he did not say that the GSI have classified the gravel aquifer in the area and all he is saying is that there is a gravel aquifer in the area and he has not classified it any further in terms of its importance.

***Mr O'Sullivan***, for NLAG**,** asked Mr Cullen as to the difference between the zone of contribution and zone of influence as referred to in his evidence. Mr O'Sullivan

asked Mr Cullen to outline the barriers to further development of groundwater resources in the Nevitt area.

Mr O'Sullivan also asked Mr Cullen was it his understanding that the aquifer in the Nevitt extends into Meath and is a large productive aquifer that could be exploited as a groundwater resource. Mr O'Sullivan asked the relevance of the Applicant not completing a MODLFOW model and is it likely that the Agency would have arrived at different conclusions if the MODFLOW model had been completed and submitted. Mr O'Sullivan also asked that if the base of the landfill is located below the piezometric surface, would leaks from the landfill then be direct discharges to groundwater.

**Response:** Mr Cullen summarised that the zone of influence is essentially the cone of depression around a groundwater abstraction whereas the zone of contribution would be the longer-term recharge area to the groundwater source. Mr Cullen said that he recalled that Mr Conroy (TES), for the Applicant, had told the hearing that there is no barrier to further groundwater abstraction outside of the Bog of the Ring area and he also considered that similar evidence was provided by the GSI. He said that he is of the opinion that an alternative wellfield could be provided in the Nevitt area.

Mr Cullen said the aquifer is indeed wide in extent and in areas where fracturing is present it is high yielding. Mr Cullen considered that the completion of the MODFLOW model would have indicated that there is a significant groundwater resource in the Nevitt area. Mr Cullen stated that he considered that the discharges from the landfill would not cause any significant deterioration of the groundwater beneath the facility.

***Mr Boyle***, for NLAG, asked Mr Cullen was he aware that the proposal was to provide a drainage blanket under the lined cells and to collect groundwater and also maintain a 1m head of water above the liner base. Mr Boyle referred to Fig. 7. of Mr Cullen's evidence regarding a hypothetical wellfield and asked if Mr Bergin's well was included in the hypothetical wellfield would it extend the estimated zone of influence. Mr Boyle asked regarding the hypothetical wellfield (Fig 7) would the protection zones and zones of contribution include the area of the proposed landfill and therefore the area would be an R3 protection zone.

Mr Boyle asked if Mr Cullen was aware of the location of Kerrigan's food processing plant and industrial groundwater well and would the proposed landfill be in the zone of contribution of Kerrigan's well (800m south of proposed landfill). Mr Boyle referred to Fig. 4 of Mr Cullen's evidence and put it to Mr Cullen that the gravel layer shown on this map had the potential to hold a significant amount of groundwater given that it is saturated.

Mr Boyle asked if Mr Cullen had Annsbrook data (an alternative landfill site included in the landfill site selection study) when preparing his evidence. Mr Boyle asked as to the meaning of a series of "??" at the southern part of the gravel maps presented by Mr Cullen and was Mr Cullen aware that gravels to the south of his map were measured at depths of up to 4 to 5 m in depth.

Mr Boyle asked Mr Cullen regarding his previous comment about the low permeability clays beneath the proposed landfill and that they would provide protection of the aquifer and that did investigations not show that there is a lot of gravel in the area.

Mr Boyle questioned Mr Cullen in relation to gravels and the location of Thorn's well at Hedgestown and that did he agree that gravels in this area were connected to gravels located at the footprint of the landfill. Mr Boyle also asked if there was a continuous gravel layer northwards from the landfill along the Courtlough Valley and towards the Bog of the Ring area. Mr Boyle asked if in low water conditions, would groundwater in the gravels south of the Bog of the Ring/north of the proposed landfill flow towards the Bog of the Ring.

**Response:** Mr Cullen said that, as he understood it, the drainage blanket under the lined cells would provide for the removal of groundwater to prevent uplift of the lining system. Mr Cullen said that the main aim of Fig. 7 was to show that wells located further south than those on his map might extend beyond the extent of fractured zones and the impact of any of these hypothetical wells on Mr Bergin's well would need to be considered. Mr Cullen responded with clarification that that the inner source protection area could extend to 1 km as is the case of the Bog of the Ring.

Mr Cullen said that he had not included Kerrigan's well in his original analysis but it is possible the zone of contribution may include the proposed landfill. Mr Cullen agreed that the gravel layer shown was significant in extent and was saturated.

Mr Cullen said that he was aware of the information from Annsbrook but had not considered it when preparing his evidence for this hearing. Mr Cullen said that the "??" indicated that the southern extent of the gravels in his map was open ended and that he was aware of gravel thicknesses in the southern areas around Annsbrook having heard evidence during the course of the oral hearing.

Mr Cullen said the information he was aware of showed that there was some gravel lenses and that was accepted by the Applicant but there did appear to be a lot of clay deposits in the area.

Mr Cullen agreed that gravels in the Hedgestown area were connected to gravel located at the footprint of the landfill. Mr Cullen said that it was his understanding that gravels did extend north towards the Bog of the Ring as suggested by Mr Boyle; however, Mr Cullen said that he did not say that the Bog of the Ring was necessarily in the same catchment area. Mr Cullen said that pumping trials had not shown the Bog of the Ring scheme's influence to extend to the areas of gravel being referred to by Mr Boyle.

***Mr Misstear***, (Assistant Chair) sought clarification from Mr Cullen in relation to the wells at Trim, County Meath referred by Mr Cullen, whether an assessment of recharge had been undertaken and how was the yield established. Mr Misstear sought clarification that Mr Cullen's main concern was not that the landfill would contaminate the aquifer but it would preclude the development of the aquifer. Mr

Misstear asked if Mr Cullen was aware of any other potential sources of groundwater contamination in the area.

Mr Misstear sought clarification of the status of the aquifer under the Water Framework Directive. Mr Misstear identified the fault line shown by Mr Cullen and sought clarification.

**Response:** Mr Cullen clarified that the Trim wells were in the Loughshinny formation, and that an assessment of recharge was not carried out and the yield was based on an extended pump test. Mr Cullen stated he could not reconcile the proposal with the concept of sustainability and the groundwater resource beneath the footprint of the proposed facility had not been addressed as being a "casualty" of the proposal. Mr Cullen stated he was aware that the historic landfill was a cause of concern in terms of groundwater contamination, but he had been reassured by the Applicant's evidence to suggest capping of this area would mitigate against contamination of groundwater, but he was not aware of any other barrier to further abstraction in the area.

Mr Cullen noted that the status of the aquifer was "at risk of over abstraction". Mr Cullen indicated that the fault line was his interpretation based on the data available.

**Witnesses No. 31 – Greenstar Ltd. – Mr Morgan Burke & Ms Margaret Heavey**

Greenstar provided a Witness Statement, including a powerpoint presentation, (Document No. 26, Appendix E), and the evidence to the hearing was based on this statement. The Greenstar evidence was provided in two sections, the initial presentation from Mr Burke and the second part of the presentation was provided by Ms Heavey. The main concern expressed by Greenstar related to the presence of a landfill at the proposed facility and the manner in which the Applicant has dealt with this landfill in the waste licence application and EIS.

Mr Burke claimed there was no consideration given to the illegal landfill during the initial site selection process. The ground investigations carried out on behalf of the Applicant in the area of the illegal landfill were inadequate to establish the required information to fully assess the extent and impact of the illegal landfill.

Deficiencies of the site investigation included:

- The depth of waste was not determined. The base of the waste body was not proven in twelve of the fifteen trial pits. None of the trial pits extended below 3.5m bgl.
- The density and distribution of site investigation points was uneven across the study area and this level of investigation is considered to be inadequate to appropriately assess the illegal landfill area.
- The lateral extent of the illegal landfill area was not established. No intrusive investigations were undertaken in the areas immediately to the north and west of the illegal landfill.
- Greenstar consider that the Applicant underestimated the volume of waste.
- The Applicant also assumed that the material encountered primarily consisted of construction and demolition waste which was considered to be inert,

however there is no basis for considering construction and demolition waste to be inert.

- There was no assessment of leachate or landfill gas and no laboratory analysis of the waste types that were found at the illegal landfill.
- The investigation works carried out by the Applicant at the illegal landfill were inadequate in terms of groundwater investigation in the area and there was evidence of groundwater contamination at a borehole located within the waste body (GS18).
- The illegal landfill is possibly encroaching on an archaeological site located to the immediate south of the illegal landfill.
- The assessment of the illegal landfill by the Applicant did not meet the requirements of the "Code of Practice: Environmental Risk Assessment for Unregulated Waste Disposal Sites" (EPA 2007). The scope of the specified intrusive investigations should have been consistent with best practices applied since the publication of BS 10175:2001 Investigations of potentially contaminated sites – Code of Practice.
- The initial assessment phases and subsequent investigations were not in accordance with the British Standard and the works did not appear to be supervised by an experience environmental scientist.
- The risk assessment completed by the Applicant was insufficient given that the information used in the risk assessment was incomplete and inadequate and many of the conclusions of the risk assessment were based on unsupported assumptions.

Mr Burke claimed that a comprehensive site investigation should have been requested by the Agency as part of the application process and such an assessment must be completed prior to determining the type of activity that requires licensing.

Ms Heavey provided background information regarding Greenstar's operations and performance and outlined the reasons and grounds for Greenstar's objection to the proposed development.

Ms Heavey identified that in her opinion the environmental impacts of the illegal landfill have not been adequately assessed. The PD does not address the remediation of the illegal landfill in a manner that is equitable with previous licences granted to remediate illegal dumps and the approach taken in the PD is contrary to Government Policy as applied by the EPA in previous cases. The legitimate waste industry is at a significant disadvantage when competing against illegal activities. Previous waste licences had the effect of discouraging large scale illegal dumping and it is considered to be setting a dangerous precedent to disregard these regulatory standards. The departure from Government policy is sending out an inconsistent message to illegal dumpers and the PD is not based around the minimisation of environmental risk during and after remediation of the illegal dump. There is no reference to the illegal landfill in the non-technical summary of the EIS and the effects of removing, processing, storing and disposing of the excavated waste were not fully assessed in the EIS.

Ms Heavey also considered that there are a number of inadequacies in the EIS and in the initial site selection process in relation to the presence of the illegal landfill and the impact the landfill is having and may have on the local environment. It is also

considered that the inadequacy of the EIS has not been appropriately resolved by the conditions of the PD. Ms Heavey provided a summary of illegal landfills licenced by the EPA in Ireland and provided details of the improved enforcement against such illegal landfills and the Ministerial Direction (Circular WIR: 04/05) that was issued under Section 60 of the Waste Management Act 1996 (as amended) and considered that the PD runs contrary to requirements of the Ministerial Direction.

Ms Heavey also considered that the PD does not ensure that the illegal landfill would be remediated in the "shortest practicable time" as required by the Ministerial Direction. Ms Heavey provided evidence regarding the approach being taken by the regulatory authorities regarding illegal waste activities in recent years and examples were provided of illegal landfills which where licensed by the EPA for remediation but no additional waste was permitted to be accepted for disposal at these facilities.

Ms Heavey provided a case history for the Roadstone Facility at Blessington which was remediated, by Greenstar on behalf of Roadstone Ltd., under the conditions of a Waste Licence. Ms Heavey outlined that considerable management resources were required for the management and control of the project. Significant infrastructure and plant were required to provide for the processing, segregation and handling of the waste being excavated. The works associated with the remediation of a large illegal landfill are significant in terms of potential impacts on the environment, the amount of area required to manage the waste, associated leachate and surface water management, on-going monitoring requirements, and waste analysis. Ms Heavey claimed that it is apparent that the conditions within the PD for the proposed facility are not in any way comparable with the requirements set out in waste licences for other similar illegal landfalls. In conclusion Ms Heavey noted that the illegal landfill at the proposed facility may be one of Ireland's largest illegal landfills and no enforcement action has been taken to-date. There is no prioritisation of the remediation of the illegal landfill and the remediation of such a site would require an EIA. The development of this proposed facility would be contrary to the Section 60 Ministerial Direction and would also be contrary to EPA precedent. Any future development at the proposed facility should only be for the remediation of the illegal landfill.

**Cross-examination of Mr Burke and Ms Heavey**

***Mr Flanagan***, for the Applicant, asked if Mr Burke would agree that the EPA's overall objective was to ensure that environmental pollution was not caused. Mr Flanagan also asked if Greenstar's evidence suggested a 15-20% increase in the volume of waste located within the historic landfill.

Mr Flanagan asked if the borehole HR12 was considered to be a representative location for the monitoring of groundwater downgradient of the facility. Mr Flanagan asked that in terms of potential effects on the environment from the materials within the historic landfill would they come under five headings; air, noise, surface water, groundwater and archaeology. Mr Flanagan put it to Mr Burke that the Applicant had indicated in the EIS that the historic landfill did contain organic material and such material would be removed to the proposed landfill and the Applicant has identified that there is a landfill at the facility.

Mr Flanagan asked if the EIS should envisage the measures contemplated to address potential adverse impacts and effects and that regardless of the Applicant's initial considerations, the removal of the waste from the historic landfill was now accepted as the best option. Mr Flanagan stated that the assessment of the historic landfill was part of the main development which is in total 210 hectares of which the historic landfill makes up only 4 hectares and in this context the overall proposal for the construction and operation of the proposed facility and the impact of the entirety of the proposal (including the excavation and movement of c.3 million cubic metres of overburden) has been considered in terms of air, noise, surface water, groundwater and archaeology.

Mr Flanagan asked if the Code of Practice, referred to by Mr Burke in his evidence prescribed remediation measures or if it requires that there is no environmental pollution following the completion of the remediation. Mr Flanagan put it to Mr Burke that there is a suite of measures provided in the PD to control the operations within the whole site and there are over sixty conditions in the licence providing appropriate mitigations to ensure that the emission limits are adhered to on a continuous basis. Mr Flanagan identified that the waste licence application preceded the EPA code of practice regarding unauthorised landfills.

Mr Flanagan asked if Greenstar considered the Roadstone Ltd., Blessington Site to be comparable and having the same characteristics as the landfill on the subject site. Mr Flanagan put it to the Greenstar witnesses that the information regarding the contamination of groundwater at the historic landfill is presented in the EIS. Mr Flanagan again put it to the Greenstar witnesses that the characteristics of the Blessington site are not the same as the Nevitt site: in relation to emissions to air the facility at Blessington has residents very close and in terms of surface and groundwater characteristics both sites are quite different. Mr Flanagan put it to the Greenstar witnesses that the groundwater system at Blessington is quite different and the aquifer is unconfined. Mr Flanagan put it to Ms Heavey that in the Blessington situation the application was only to remediate an illegal landfill and the situation at the Nevitt site is quite different.

Mr Flanagan said the EPA is within their remit to require the removal of the waste if required and that the PD provides conditions for the whole site.

**Response:** Mr Burke agreed with the overall objective of the EPA and he also stated that the volume of waste at the illegal landfill would depend on a number of considerations such as depth of waste and the density of the waste material.

Mr Burke did not agree that HR12 was a suitable location for monitoring pollutants emanating from the illegal landfill. Mr Burke accepted the main potential affects of the illegal landfill. Mr Burke accepted Mr Flanagan's point in relation to the EIS, but added that the assessment of the illegal landfill was not sufficient.

Mr Burke said that the appropriate actions to be taken could not be established without a thorough and complete assessment of the illegal landfill. Mr Burke accepted the scale of the illegal landfill within the overall proposal but identified that it is in terms of the 30-year lifespan of the proposed facility.

Mr Burke sated that the Code of Practice does not prescribe remediation measures. Mr Burke considered that there are a number of issues that are not appropriately addressed by the PD. It was his opinion that the EPA did not have adequate information to assess when deciding what conditions and emission limits to apply.

Ms Heavey stated that both the proposed facility and Blessington sites are similar in terms of involving the remediation of significant illegal landfills and that she could not compare the sites as the extent of the illegal landfill at the Nevitt is unknown and the Nevitt site could indeed be a worse situation than the Blessington site. Mr Burke agreed that the information is included in the EIS but his assessment of the data provided would be quite different to the assessment and conclusions reached by the Applicant. Ms Heavey agreed that there were residents located quite close to the illegal landfill at Blessington. Ms Heavey said that she could not answer questions in relation to specific issues about the Blessington site. Ms Heavey said that in the case of Blessington the application was to remediate only, but in Whitestown and Coolnamadra the application was to accept waste as well as remediate the sites, but in these cases the EPA in accordance with Government policy prohibited the acceptance of waste. Ms Heavey also added that the extent of the illegal landfill at Nevitt is still unknown.

Ms Heavey said the assessment of the illegal landfill is incomplete and the EPA could not make appropriate decisions based on the information provided. Ms Heavey agreed that the PD does provide conditions and controls for the entire site.

***Mr O'Sullivan***, for NLAG, asked if non-technical people reading the EIS would have been likely to be made aware of the presence of a significant illegal landfill. Mr O'Sullivan then asked questions in relation to the Blessington site and of Greenstar's experience. Mr O'Sullivan asked was the amount of material excavated at Blessington more than initially estimated.

Mr O'Sullivan asked Ms Heavey if the remediation of the illegal landfill would be likely to require site specific methodology and a site specific EIS to assess the impacts of the remediation of the illegal landfill. He also asked would it appear if the Nevitt site was suitable for a landfill development.

**Response:** Mr Burke said that it would be unlikely that someone reading the EIS would become aware of the scale of the illegal landfill. Ms Heavey stated that were the extent of the waste at the illegal landfill established it is unlikely that the amount of waste excavated would be similar.

Ms Heavey said that other illegal landfills had specific EIS referring just to the illegal landfills and associated remediation works. She also said that in her opinion the Nevitt site would not be suitable for landfill based on Government Policy.

**Witnesses No. 32 –NLAG – Mr Lunney, Ms Larkin, Mr White**

The NLAG provided a powerpoint presentation that had been previously presented to the EU petitions committee (Document No. 26, Appendix E).

The statement included that there is a significant groundwater resource beneath the proposed facility and the proposal is therefore in breach of the Landfill Directive and Groundwater Directive. The proposed development is not a sustainable development and should not be given permission to proceed. There is a fissured bedrock aquifer beneath the proposed facility that has very significant potential yield. The EIS has not identified and addressed the presence of this significant water resource nor has the Applicant assessed the impact the proposed development would have on the local horticulture industry. The GSI produced an aquifer map of the area, however the Applicant has provided information that is incomplete and inaccurate. There is a clean and plentiful supply of groundwater from the aquifer beneath the facility.

Horticulture is the main livelihood for many residents in the area and indeed this area provides much of the fruit and vegetables that are consumed in Ireland. Many of the local horticulture businesses use wells as a source of water for washing and irrigation and it is considered that a lot of these wells were not appropriately assessed as part of the EIS. The archaeology in the area is now at risk due to the proposed development and the old "nematon" found in the area is of vital importance in terms of its historical significance.

There is enough landfill capacity in Ireland at the moment and there is no need for this development. Ireland is struggling to meet its requirements in terms of waste recovery and recycling and this is a result of the increased availability of landfill in the country. The Applicant has provided a lot of inaccurate and incomplete information regarding a number of aspects of the application including the local horticulture industry and the local groundwater regime. The proposed development would also make a future water supply unusable.

The witnesses also showed a DVD and this included a video and narrative summary of the area in terms of importance of the aquifer, the horticultural industry and the local archaeology.

**Witness No. 33 – NLAG - Mr O'Sullivan**

Mr O'Sullivan provided Witness Statement (Document No. 37, Appendix E), and his evidence to the hearing was based on his statement.

Mr O'Sullivan stated that following the site selection process the site at the Nevitt was identified as the preferred site and the work of the NLAG has highlighted a number of gaps and inconsistencies in the application and in particular the highly productive aquifer underlying the proposed facility. The primary objective of the NLAG has been to bring to the notice of the Applicant information in relation to the local aquifer, the importance of this aquifer as a potable water source, its importance to the local horticulture industry and its importance nationally as a major groundwater resource.

The necessity for such a facility has not been fully demonstrated, especially in the context of planning permissions and waste licences granted for other large-scale waste disposal facilities in Leinster. The availability and scale of the proposed landfill would discourage the achievement of the national recycling targets which form part of the current national policy on waste management. The Landfill Directive requires a

reduction in reliance on landfill and diversion of biodegradable waste from landfill and this proposed development would not encourage the achievement of such targets.

The proposed development is in conflict with recent and current Government and European policies on waste management and with best international practice. Reference was made to a number of national policies and the current Programme for Government each of which require a reduction in reliance on landfill and diversion of biodegradable waste from landfill. An analysis of current licensed landfill capacity was presented and it was considered that whilst there are a number of Regional Waste Plans in Ireland waste is already moving across regions and the available waste capacity for the Dublin region should also include available void space in surrounding regions.

Mr O'Sullivan stated that the proposed development would not comply with the principle of sustainable development and the proposed development would place an existing groundwater resource at risk and is therefore not sustainable. The proposed development would increase the difficultly for Ireland becoming or remaining in compliance with the EU Waste Framework Directive and the Landfill Directive. The site selection and decision making process fails to meet the basic requirements of the EU Directive on Environmental Impact Assessment (EIA). There is a systemic problem in Ireland in how the EIA process is implemented, in that both planning and environmental bodies are independently assessing EISs with no combined or comprehensive assessment of the environmental consequences. The EIA process is designed to involve the public and in this context the EIS should contain all relevant details. However, in this case all relevant information was not included in the EIS. Mr O'Sullivan referred to a judgement from the House of Lords (Berkeley Case), which said that the EIA Directive is not satisfied unless there is an accessible compilation of all the information available to the public prior to making a decision on the development.

The proposed landfill development on the selected site would be in conflict with the Precautionary Principal and the Polluter Pays Principle. The Agency should not grant a licence for the facility as there is a significant unauthorised landfill already within part of the facility and it would be in breach of Section 40(4) of the Waste Management Act 1996 to grant a licence to allow for the further deposition of waste at the facility.

**Wednesday 12th March**
Mr O'Sullivan completed his evidence on the morning of the 12th March, as summarised above.

**Cross-examination of Mr O'Sullivan**
***Mr Flanagan***, for the Applicant, put it to Mr O'Sullivan that the Programme for Government did provide for the development of any landfills that exist in Regional Waste Plans and that the Programme for Government is not indeed waste policy. Mr Flanagan also put it to Mr O'Sullivan that his reference to the Berkeley Case was not at all comparable to the current proposed development and that the EIS is a document that should be prepared at the start of the process of information gathering and dissemination. Mr Flanagan put it to Mr O'Sullivan that there was a large cohesive EIS document prepared at the start of the process. Mr Flanagan put it to Mr O'Sullivan that his evidence showed that the Dublin Waste Region has an urgent need for landfill.

**Response:** Mr O'Sullivan agreed that the Programme for Government did provide for the development of any landfills proposed in the Regional Waste Plans; however he did consider that the Programme for Government does form part of national policy. Mr O'Sullivan agreed that the current situation was different from that of the Berkeley Case; however he repeated that an EIS should be an "accessible compilation of information". Mr O'Sullivan considered that the production of an EIS at the start of the process may lead to a lack of revised information being provided to the public and decision makers. Mr O'Sullivan said that there is a large volume of material prepared at the start of the process by the Applicant; however, very little information regarding some key issues, the existing landfill and local aquifer, were included in this document and that there is now a scattered and disparate number of documents with regard to the development. Mr O'Sullivan said that the Regional Waste Plan does show that the Dublin region does require landfill void space but it is not necessarily required within the Dublin area.

**Witness No. 34 – NLAG - Dr Quayle, (read into record by Ms McGlennon)**

Dr Quayle provided a Witness Statement (Document No. 32, Appendix E), and his evidence was read into the record on his behalf by Ms McGlennon.

The application for the proposed development details the groundwater risk as low and no numerical modelling on the groundwater resource has been carried out. In addition there has been no analysis of the possible effect on local agricultural abstractions from the groundwater in the area and leachate leaking into the groundwater may have negative impacts on the local environment. The application has not provided sufficient information regarding the operation of the facility and in particular with regard to leachate management. There had not been enough consideration given to the management of leachate and the prevention of contamination of groundwater and surface water. The Applicant has not properly assessed the potential impacts that the proposed development might have on the "breadbasket" of North Dublin.

The restoration of the proposed landfill appears to be a traditional domed shaped form, however it is unclear what are the proposed profiles post or pre- settlement heights. The proposed restored landfill would not be in keeping with the local

landscape and the detailed modelling of landscape finish options have not been provided. The use of the restored landfill for agriculture would be inappropriate. The size of the proposed development is questionable given that thermal treatment capacity is due to come on-line in the near future. The information regarding the limited acceptance of household waste but high gas yields do not seem to match. The proposed facility should not proceed on grounds of environmental inappropriateness and is non-sustainable and there should be a third party assessment of the information submitted.

**Witness No. 35 – NLAG - Ms McGlennon**

Ms McGlennon provided a Witness Statement (Document No. 32A, Appendix E), and her evidence to the hearing was based on her statement.

Ms McGlennon identified that she is a long term resident of the area and lives within 300 m of the proposed development. The aquifer in the area should be afforded full protection, as fresh water is a vital commodity. There is a moral responsibility to protect fresh waste resources and Ms McGlennon read from Sean Mc Donagh's book entitled "Dying for Water" which emphasised the need for the protection and provision of clean water, and that fresh water will be to the 21st century as oil was to the 20th century.

**Witness No. 36– NLAG - Ms Gough**

Ms Gough provided a Witness Statement (Document No. 42, Appendix E), and a DVD and her evidence to the hearing was based on her statement.

Ms Gough identified that she is a local resident and she lives approximately 300 m from the proposed development. She expressed concerns regarding the proximity of the proposed development to the local national school as it is downwind of the proposed development. She also expressed concerns regarding the potential negative impacts that the existing illegal landfill might have on local residents. Ms Gough enjoys her current lifestyle and this is now under threat by this proposed development. There are already two landfills operating in the area, causing associated heavy traffic and there will be additional traffic from the expansion of the existing landfills. The additional traffic for the proposed development would be an additional risk and proposed road closures would also add to her daily journeys. The covering of trucks accessing the facility is of concern as many of the existing waste trucks using local roads do not cover the loads and they travel at excessive speeds and damage local roads. Local roads can no longer be used for recreation and assurances would need to be given that the conditions of any waste licence would be enforced. The proposed development would have a serious negative impact on the quality of life in the area.

Ms Gough also presented a DVD which included details of the local national school and the houses that would be subject to compulsory purchase orders. The DVD was shown to the Chair and Assistant Chairs and all interested parties present.

**Witness No. 37– NLAG - Ms Gunning**

Ms Gunning provided a Witness Statement (Document No. 41, Appendix E), and her evidence to the hearing was based on her statement.

Ms Gunning identified that she has lived all her life in the locality and the proposed development would obscure the current views from her residence. If the proposed development proceeds the current views of natural landscape will be obliterated. The development of the proposed landfill would lead to closure of local roads which would be an inconvenience. Additional traffic serving the proposed development would have negative impacts in terms of noise, safety, emissions from vehicles and local road congestion. There is a vast amount of usable water beneath the proposed development and it cannot be guaranteed that this water would not become contaminated. There is a great diversity of wildlife in the area that would be destroyed by the proposed development. In addition many scavenging birds might be attracted to the proposed development and may present a risk to aeroplanes using Dublin Airport.

She expressed concerns regarding the potential negative effects the proposed development might have on the health of residents in the area and in particular the children in Hedgestown School. There are key archaeological aspects noted in the area and the development of the proposed landfill would destroy these vital parts of our heritage. The removal of local houses to build the proposed development would have a detrimental impact on the structure of the local community. The landfill at Balleally has polluted the local environment around the site and Fingal County Council previously gave assurances that no more dumps would be provided in Lusk.

**Witness No. 38 – NLAG - Ms Clarke**

Ms Clarke provided a Witness Statement (Document No. 33, Appendix E), and her evidence to the hearing was based on her statement.

Ms Clarke identified that she is a resident in the area and her husband has been ill and they intended to sell their house to relocate to another house; however it has become apparent that the sale of her house is now nearly impossible due to the proximity of her house to the proposed landfill. There is significant stress associated with trying to sell their house and also the potential health impacts associated with a landfill. Fingal County Council has had no regard to the human misery being brought onto the families in the area.

**Witness No. 39 – NLAG – Cllr. Daly**

Cllr. Daly provided a Witness Statement (Document No. 40 and 40A, Appendix E), and her evidence to the hearing was based on her statement.

Cllr. Daly expressed concerns with regard to the risk being posed to the local water supply by the proposed development. She added that in the context of the current poor quality of drinking water in Ireland it is vital that the groundwater is given full protection. Cllr. Daly said that she had raised the issue of the importance of the

aquifer beneath the proposed facility at Council level; however, she did not receive a satisfactory response, and responses seemed to be defending the landfill development rather than addressing the actual situation regarding the hydrogeology and environmental sustainability of the proposal. The presence of the important groundwater supply at the proposed facility seems to be considered a hindrance; however the proposed landfill can be relocated but the local groundwater resource could not be relocated.

The necessity for the landfill is not convincing and efforts should be focused on waste reduction, prevention and recycling rather than the provision of a landfill. The potential impact of the proposed development on the local horticulture industry was not appropriately addressed in the EIS. The local horticulture industry is of local, regional and national importance and any threat to the good reputation of this industry should be avoided.

The siting of the proposed development at the Nevitt site is in breach of International Civil Aviation Organisation Regulations. The proposed development should not be granted a waste licence and despite the significant money spent on the project to-date and the momentum behind the project it is not too late to halt the project and seek alternatives for waste management.

**Witness No. 19 - NLAG – Mr Boyle (Continuation of Statement)**

Mr Boyle provided a Witness Statement (Document No. 43, Appendix E), and his evidence to the hearing was based on his statement.

Mr Boyle stated that the proposed development should not proceed because of the presence of high yielding wells in the area serving the horticulture industry, including Kerrigan's, Moore's, Bergin's & Thorn's wells. Source Protection Zones provided around local industrial wells should prohibit the development of the proposed landfill; however these zones cannot be fully established due to the fact that the groundwater flow patterns beneath the proposed development have not been adequately established. There is a possibility based on the information provided in the application and by Mr Cullen that there may be a pathway for groundwater to move towards the Bog of the Ring. The zone of contribution or the protection zones for Mr Thorn's and Mr Kerrigan's high yielding wells have not been determined as part of the EIS for this proposed development. The EIS also fails to adequately assess the importance of Mr Bergin's and Mr Moore's wells. It is also the case that the Courtlough River provides a source of irrigation water to the horticulture industry south of the proposed development and there will be discharges of surface water from the proposed development to this river and it is essential that the water in the Courtlough River be maintained in a pristine condition.

***Mr Misstear*** (Assistant Chair) sought clarification regarding the yield of Mr Kerrigan's well.

**Response:** Mr Boyle noted that this information was previously provided to the EPA and that the pump capacity at the well was 648 $m^3$/day. It was acknowledged that it is unlikely that Kerrigan's well is used on a continuous basis.

***Mr O'Toole***, for the Applicant, clarified the information they had in relation to Kerrigan's well, as being 6.5 $m^3$/day for vegetable washing (based on personal communication with Mr Kerrigan). Mr Flanagan, for the Applicant, clarified that many of the maps provided in Mr Boyle's evidence were from a site selection report rather than the EIS / Waste Licence Application.

**Witness No. 40 – NLAG – Ms Long**

Ms Long provided a Witness Statement (Document No. 44, Appendix E), and her evidence to the hearing was based on her statement.

Ms Long identified that she lives beside a modern engineered landfill at Inagh, Co. Clare which is licensed by the EPA. Ms Long said that despite assurances the landfill gives rise to smells of landfill gas and there is a history of non-compliance at the facility. The odours are often worse in the evenings and at the weekends when the site is closed. Local residents have complained about the odours from the landfill since October 2002 and there is often inadequate cover applied at the landfill. There are also problems with surface water run-off from the facility and again there is a history of non-compliances. There was also a big increase in the number of birds in the area and these birds have interfered with local farming practices. It is also apparent that bird control measures at the facility do not always work effectively. The visual impact of the landfill is significant and will worsen as the site develops and construction noise from the facility is also very disruptive.

**Cross-examination of Ms Long**

**Mr O'Sullivan**, for NLAG, asked Ms Long to clarify if Clare County Council did describe the landfill as a state of the art facility.

**Response:** Ms Long said that it was described as state of the art and that locals expected such a facility to be developed. Ms Long said that the smell coming from the site is often very bad and she has to leave her own home to get away from the odours.

**Witness No. 41– NLAG - Ms Larkin**

Ms Larkin provided a Witness Statement (Document No. 39, Appendix E), and her evidence to the hearing was based on her statement.

Ms Larkin identified that she is a resident of the area and as a non-technical person she considered that the non-technical summary provided in the EIS was inadequate and is a manipulation of the facts, with omission of critical environmental issues relating to the proposed development. The potential impact of the proposed development on the local horticulture industry has not been fully assessed and the EIS non-technical summary does not reflect on the reality of the situation in this regard. The use of groundwater by the local horticulture industry is vital and must be protected and the well survey carried out by the Applicant was inadequate.

The impact that the proposed development would have on the local community has not been fully assessed in terms of the relocation of families, division and splintering of farmlands and there is no detail of emotional or social support to be provided to

families being impacted upon by the proposed development. Some areas of archaeological interest have been identified but again the non-technical summary did not provide adequate information in regard to these features. Incomplete information has been provided to the EPA with regard to the location and extent of the existing illegal landfill at the Nevitt site. In addition, the local M1 Business Park has the potential to provide thousands of jobs. However the development of a landfill in the area and how it will impact on these jobs has not been completed. The devaluation of property in the area is a significant issue and homes in the area are currently worthless and not just a 5% reduction in previous values as was indicated.

Odours from the proposed landfill will impact on the local community and will diminish the quality of life in the area. The reality will be that odours from the proposed landfill will have a significant impact on local residents. It is also likely that birds will become a nuisance in the area. Ms Larkin expressed her concern regarding the ability for Fingal County Council to operate the proposed facility in a compliant manner. Also, Fingal County Council have objected to certain conditions of the waste licence which is not satisfactory. If the development were to proceed it would be critical that all of the required infrastructure would be in place prior to the operation of the facility. Fingal County Council gave assurances that no other landfill would be provided in the area and it is unacceptable that they now are driving forward with this proposal. The application of the precautionary principle in this instance is the wrong way around and the protection of the local groundwater should be given precedence over the proposed landfill.

The perception that might be present amongst consumers of fruit and vegetables produced in the area might be greatly affected if the proposed development proceeds and this negative perception might be the end of the local horticulture industry. There has been a misappropriation of public funds regarding the purchasing of the existing illegal landfill by Fingal County Council rather than prosecuting the owner of the site. A significant remediation bill now needs to be funded by more public funds. The EIS has not identified a resource beneath the facility and this is misleading and the groundwater resource in the area needs to be protected for future use. If the proposed development proceeds and the local wells become polluted then it will be too late for the local groundwater resource and the local residents.

**Witness No. 42 – NLAG - Ms Tyrrell**

Ms Tyrrell provided a Witness Statement (Document No. 45, Appendix E), and her evidence to the hearing was based on her statement.

Ms Tyrell identified that she is a local resident living on the west side of Lusk. She said that Balleally Landfill has grown over the last number of years and it has caused the local community endless frustration and illness and there is a lack of community compensation. She asked how can local residents consider that a new landfill would be any better than the Balleally site. Ms Tyrrell identified that assurances were given that another landfill would not be provided in the Lusk area. Nevitt is in Lusk as clarified by local priest and postmistress.

The site was selected as an area with low population density; however, it is not good enough that this small community now has to justify a case to prevent the proposed

development. Ms Tyrell also stated that "63% of people living within one mile of a tip-head have a chance of having a child with a deformity". Other questions posed included the integrity of the lining system at Balleally landfill and the problems associated with the disposal of leachate. How will the massive amounts of leachate be dealt with at the Nevitt site. There are also many unanswered health related questions with regard to the operation of the Balleally site.

Who can guarantee that the proposed development will not expand beyond the current proposals. Is the proposed landfill going to be used by other local authorities. There will be problems with birds, flies and in particular odours from the facility. These negative items will have significant negative impact on the local community. There was a lot of psychological pressure put on the local community. The Applicant told Ms Tyrell that the landfill would go ahead and there would be no compensation.

Ms Tyrell also complained about the quality of the reporting in local media and how this reporting has had negative impact on the local community.

**Witnesses No 43 – NLAG - Ms McGauley & Mr Geoghegan**

Ms McGauley and Mr Geoghegan provided Witness Statements (Documents No. 46, and 47, Appendix E), and their evidence to the hearing was based on their statements.

Ms McGauley and Mr Geoghegan identified that they are local residents and live to the south of the proposed facility. They have 4 children and are very concerned about the potential impacts the landfill might have on their health and their family. It is obvious that Balleally landfill emits awful smells and the same is likely to happen in the Nevitt if the proposed development proceeds. The devaluation of property is also a serious concern. Since the proposed development became known to the local community there have been arguments and there is a split amongst the community and the structure of the community is being destroyed. Proposing to put a dump on a good water supply seems to be ridiculous and the increased number of vehicles on the local roads is also of serious concern. There is no trust in Fingal County Council any longer and they are now not keeping to their promise to not provide another landfill in the area. The water crisis, as seen recently in Galway, could now become a reality in the Nevitt area.

**Witness No. 44 – NLAG - Mr Lunney**

Mr Lunney provided a Witness Statement (Document No. 48, Appendix E), and his evidence to the hearing was based on his statement.

Mr Lunney identified that he and his family moved to the area to have a better quality of life; however, since this proposed development has become known their life has been disrupted. The landfill was inaccurately named as being Nevitt-Tooman when it is quite clearly in Nevitt. Mr Lunney made reference to the Fingal County Council Citizen Charter and how partnership and ensuring a good quality of life is a key aspect of this charter.

The need for the landfill is not convincing and more efforts should be made by Fingal County Council to reduce and recycle waste as was intended by a number of national

programmes and national/international waste policy. Fingal County Council have not yet provided brown bins in the Nevitt area to provide for diversion of biodegradable waste from landfill. The size of the proposed landfill is not sustainable and would not lend itself to helping achieve national targets and waste objectives. It seems untenable that local authorities are both regulators and market players. Waste is an asset and should be used for energy recovery and electricity generation. The provision of a landfill in the Nevitt area would be a blow to the community and it would cause problems over its lifetime such as birds, flies and odours. The EPA do not appear to have considered all of the information available with regard to this proposed development and this development should not proceed based on the risk it poses to a significant water resource.

Mr Lunney also expressed concerns in relation to the management of groundwater and leachate at the facility and the request by the Applicant for a waiver to complete an assessment of the stability of the proposed landfill. Mr Lunney made reference to the RPS site selection document for "Site G" (located in South County Dublin). This document highlights negative impacts a landfill may have on agriculture and it is surprising how the negative impacts identified for the South County Dublin site were not applied to the Nevitt Site. Mr Lunney also made reference to an IBEC waste discussion document which highlighted how there is a poor level of recycling and waste prevention in Ireland. Mr Lunney also read a paper into the record regarding the security of groundwater resources. The paper focused on private water rights and water security. Mr Lunney stated that he hoped this document would focus on the fact that the ownership of water has not been established in Ireland and if contamination occurs local residents might take litigation against the facility operator.

Reference was made to Article 8 of the European Convention of Human Rights. Mr Lunney quoted that *"Everyone has the right to respect for his private and family life, his home and his correspondence. There shall be no interference by a public authority with the exercise of this right except such as is in accordance with the law and is necessary in a democratic society in the interests of national security, public safety or the economic well-being of the country, for the prevention of disorder or crime, for the protection of health or morals, or for the protection of the rights and freedoms of others."*

**Thursday 13th March**

**Witness No. 45 – Green Party - Cllr. Kilgallon**

Cllr. Kilgallon provided a Witness Statement (Document No. 50, Appendix E), and his evidence to the hearing was based on his statement.

Cllr Kilgallon identified that the proposal to place a landfill in the heart of Ireland's food producing area is of serious concern. The placing of the landfill on an area which is an important aquifer is not acceptable and the provision of water supplies into the future is a key challenge and all water resources should be protected for use in the future.

The current illegal dump has not been satisfactorily accounted for in the application. It is also of concern that much of the waste being brought to the facility would be brought from long distances and such waste should go to neighbouring waste regions. Landfill should be the last resort in terms of waste management and this is reflected in the current programme for Government.

**Witness No 46 - NLAG – Dr Anthony Staines**

Dr Staines provided a Witness Statement (Document No. 51, Appendix E), and his evidence to the hearing was based on his statement.

Dr Staines identified that he is Professor of Health Systems Research, Dublin City University. He initially expressed concerns regarding the content of the EIS and the source of the material used in the EIS and copyright issues. Dr Staines said that it appeared that large sections of the health section of the EIS were appropriated from previously published documents without permission. Dr Staines considered that it is necessary to complete a Heath Impact Assessment (HIA). A HIA should be used to ensure that the health consequences of decisions are not overlooked and it could be used before, during or after a development if necessary.

Dr Staines outlined what a HIA comprises of and what a HIA would look like and how it would work in practice. A summary of the content of a HIA was provided and explained. Dr Staines provided a critique of the "Public Health" section of the EIS and stated that he considered this section of the EIS to be deficient and not adequate or useful in terms of an assessment of the human health impacts of the proposed development. There is no description of the process used to produce this section of the EIS.

It was concluded by Dr Staines that much of the information included in the EIS is primarily a literature review and the literature reviewed as part of the EIS is out of date. There is no trace of any credible attempt to estimate potential impacts and no consideration given to mitigation of any such impacts. The proposed development requires a proper HIA (in line with Institute of Public Health In Ireland guidance) to ensure reasonable consideration of human health issues in the planning and licensing process.

**Cross-examination of Dr Staines**

***Mr O'Sullivan***, for NLAG, asked should the EPA take human health impacts directly into consideration rather than just ensuring compliance with relevant emission and ambient limits. Mr O'Sullivan also asked if the presence of an illegal landfill at the site of the proposed development should require special attention in terms of health assessment.

**Response:** Dr Staines responded that the EPA guidance for content of an EIS states that health and environment must be considered on an equal level. This health assessment work needs to be done, but as to who actually does it needs discussion and regardless the information provided in the EIS is inadequate and a decision couldn't be made based on the content of the EIS. With regard to the illegal landfill it needs to be assessed urgently to establish the risks that may be associated with the illegal landfill.

***Mr Flanagan***, for the Applicant, asked if Dr Staines would have personal concerns regarding the proposed development as he is a local resident.

**Response:** Dr Staines said that he was not present at the oral hearing with a personal interest.

***Ms Tyrrell*** asked could the community around the Balleally Landfill be used as a community to assess the impacts of the existing landfills.

**Response:** Dr Staines said that the assessment of a community around an existing landfill is difficult, as the previous health condition of the community cannot be assessed.

***Mr Boyle***, for NLAG, asked Dr Staines would he think that there would be odours from the landfill extending beyond the landfill.

**Response:** Dr Staines stated that in his experience odours would probably extend to areas beyond the facility boundary.

**Closing Statements**

**Greenstar Ltd.**

***Mr Mulcahy***, for Greenstar Ltd., provided a statement to the hearing (Document No. 53, Appendix E). Mr Mulcahy based his closing statement on the submitted written text.

Mr Mulcahy provided a summary of the proposed development in terms of planning and licensing applications. He noted that the proposed development has gathered significant momentum, however this should not be a deciding factor in any decision regarding the licensing of the proposed development. Following a site selection process the current site was decided upon, one of the reasons being the archaeological significance of the other sites, this being rather ironic given the archaeological information that has come to light during the hearing.

The presence of an illegal landfill at the facility is of serious concern to Greenstar and although this illegal landfill was known to the Applicant they failed to adequately address this in the EIS. No adequate assessment was completed to assess the extent and nature of this illegal landfill and the risk assessment carried out by the Applicant was not put before An Bord Pleanala.

It has also become quite clear that there is a significant amount of new information being provided to this hearing regarding the hydrogeological setting at the proposed development site.

Mr Mulcahy outlined the functions of the Agency and reference was made to the *Martin v An Bord Pleanala* and Ors Supreme Court case. Mr Mulcahy also referred to the enforcement role of the Agency and also the requirement of the Agency to ensure that the EIS satisfies the legislative requirements. Reference was also made to the *Berkeley v Secretary of State for Environment* case and what was required by an EIS. Mr Mulcahy stated that it is clear that the manner in which the illegal landfill was dealt with in the EIS by the Applicant falls short of the requirements of the regulations and of the type of statement described by Lord Hoffman (Berkeley case). If the EIS and EIA are inadequate it would be unlawful for the Agency to licence this project.

Mr Mulcahy questioned the legal standing of a PD and the fact that the Applicant appears to have used the PD as a starting point and this may have deprived the Agency of an opportunity to obtain further information required to fully assess the application. Mr Mulcahy said that the PD once objected to has no legal standing. He also considered that the Agency should not be assessing the objections to a decision that has already been made by the Agency and all objections should be considered afresh by a differently constituted board.

It was submitted that the decision to issue a PD was based on flawed information and the EPA Inspector erred in failing to have regard to the principle of sustainability and the precautionary principle. Mr Mulcahy stated that the EIS contains no assessment of the impact of the unauthorised landfill, and although reference was made to a risk

assessment at the facility it was not included in the EIS. The Applicant appears to suggest that the conditions and limits in the PD will apply to the illegal landfill even though the impacts of the illegal landfill have not been assessed.

Mr Mulcahy highlighted a series of shortcomings in the application and PD with regard to the assessment and control of the illegal landfill. Not enough information was provided to the Agency regarding the processing, excavating, handling and movement of the excavated waste material and it has not been assessed or considered. The conditions provided to control the illegal landfill should not have been included as these provide a "post-licensing consent" which should not be the case and all of the significant environmental aspects being addressed by just one condition is wholly inadequate. The failure of the Applicant to address the potential impacts of the illegal landfill cannot be simply resolved by the inclusion of one condition in the PD that would allow for post-consent assessment. The proposed development is not in accordance with current Government policy and precedent. Reference was made to the Ministerial Direction 04/05 regarding illegal landfills. The Agency has dealt with the licensing of unauthorised landfills in the past and precedent has been set at the likes of the Blessington and Whitestown facilities. The failure of the Agency to carry through on the apparent commitment to take the issue of unauthorised landfills seriously by allowing commercial activity at the proposed development would be a serious blow to the legitimate waste industry in Ireland.

It seems apparent that there is a significant groundwater resource beneath the proposed development and the Applicant appears to have used the DoELG/EPA/GSI Groundwater Protection Matrices inappropriately and it should have been used just as a planning tool and a guide.

The Agency should have regard to sustainable development and it is apparent that the proposed development would not be a sustainable development in the sense that the provision of the development would "sterilise" a significant groundwater resource beneath the proposed development. It was also submitted that Article 14 of the Waste Management (Licensing) Regulations was not complied with as the Applicant did not submit a MODFLOW model to the Agency, as was requested.

The Applicant has placed too much reliance on the requirements of the Dublin Waste Plan in justifying the need for the proposed development and the Applicant has contended that there is urgent need for landfill capacity rather than there is an urgent need for Dublin's residual waste to be landfilled which is quite a different matter. The alternatives to managing waste in the Dublin Region have not been fully explored by the Applicant and there is not an urgency for the provision of the proposed development and time should be taken by the Applicant to consider the situation and there is no need to rush headlong into an irreversible mistake. The Applicant is supposed to be the first line of defence in tackling unregulated waste activity, and in protecting groundwater resources and the proposed development shows that the Applicant has failed in this regard, and the granting of a waste licence by the Agency to the Applicant would undermine the efforts of the Agency and local authorities in the enforcement of regulations to stop environmental pollution.

Mr Mulcahy submitted that, on the basis of the information before the Agency, it couldn't be said that the requirements of Section 40(4) of the Waste Management Act have been met and the application should be refused.

**Mr Cullen**

***Mr Cullen*** provided a statement to the hearing (Document No. 49, Appendix E). Mr Cullen based his closing statement on the submitted written text.

Mr Cullen identified that the selection of the Nevitt site as a landfill location was influenced by its R1 status in the GSI's response matrix for landfills. It has however become clear that there is a major groundwater resource beneath the footprint of the proposed development. The Applicant and the Agency remain the only ones that have failed to recognise the significance of the groundwater resource beneath the proposed development. The GSI have advised that *"The Groundwater Protection Responses, which combine factors of aquifer category and groundwater vulnerability, are intended for use in outline planning and screening of potential development sites"*. Choosing the site over the only productive aquifer in the Dublin Region and in proximity to the Bog of the Ring would increase the risk to the groundwater resource. The resource beneath the proposed facility is equal to if not more significant than the nearby Bog of the Ring resource. It is obvious from the site investigation that a very productive aquifer is present beneath the landfill yet the Applicant proceeded with the planning and licensing process. The Applicant should have recognised the potential of the groundwater resource that has been assessed and established, and it appears that there are no barriers to the development of a groundwater abstraction scheme in the area. The contention that the groundwater resource beneath the proposed development is at least the same as the Bog of the Ring has not been contested by the Applicant, the GSI or the Agency. Drawing a groundwater resource from beneath a landfill would not represent best practice and the provision of a landfill in the area would prohibit the development of a groundwater resource in the area and would "sterilise" the groundwater resource. The groundwater resource was not quantified and the Applicant failed to provide a numerical model as requested by the Agency. The absence of this model is a significant omission and it was an exercise that was easy to complete and it would have shown if there was a viable groundwater resource beneath the facility.

A series of inaccuracies regarding geological and hydrogeological information have been provided to the Agency (e.g. bedrock surface levels, gravel thicknesses, etc). Mr Cullen submitted that the drawings and maps he provided to the oral hearing provided a more accurate interpretation of the Applicant's investigations and he identified that there have been a series of amended maps provided to the hearing that the Agency did not assess prior to this hearing. The information submitted by the Applicant in the waste licence application regarding gravel thickness, the east-west geological cross-section and the map of the bedrock surface all fall short of an accurate presentation of the Applicant's site investigation. The information should be accurate, considering that some of the local residents would be evicted if this development proceeds.

The Applicant submitted a possible alternative groundwater abstraction to the south of the Nevitt; however it is submitted that the location of this alternative wellfield is not in a similar hydrogeological setting and in addition the EPA inspector was incorrect to

conclude that the proposed landfill would lie outside of the zone of contribution to the alternative wellfield.

The development of a landfill at the Nevitt would be contrary to the 2006 EPA guidelines on site selection, national guidelines on groundwater protection, the Water Framework Directive and sustainable development. The development of a landfill at the Nevitt would deny future generations the groundwater resource that has been identified and this would surely be contrary to sustainable development. It would seem that there is a conflict between the protection of groundwater resources and the need to provide waste management infrastructure. Common sense would dictate that the development of the landfill at the Nevitt is unsustainable. If the landfill is refused permission to proceed then money should be spent on the development of the groundwater resource in the area.

**Nevitt Lusk Action Group (NLAG)**

***Mr O'Sullivan*** and ***Mr O'Donnell*** provided the closing statement for the NLAG in two parts**.** Part I of the closing statement was presented by Mr O' Sullivan who provided a statement to the hearing (Document No. 52, Appendix E) and he based his closing statement on the submitted written text; Part II of the closing statement was presented by Mr O'Donnell.

**Mr O'Sullivan** identified that the range of the issues to be considered by the Agency was argued at the outset of the hearing and the Agency must consider all of the information lodged with the Agency before and during the hearing. The lack of integration between the decision making process being carried out by An Bord Pleanala and the Agency undermines the purpose of the EU Directives on EIA. It was submitted that the requirement to ensure and guarantee an effective integration of the EIA process before granting a permit has not be complied with. Information regarding the proposed development provided to An Bord Pleanala is not the same as being considered by the Agency. Mr Hammerstein, MEP, expressed concerns that the proposed development was not subject to a Strategic Environmental Assessment.

The Applicant has not consulted fully or openly with local residents and failed to accept the validity of new information submitted by the NLAG. Such information showed that there was a significant groundwater resource beneath the proposed facility and this resource was being used by the existing horticulture industry. These wells should be considered as public supplies as the water is used to wash and process high risk foods.

The EIS failed to assess the importance of the horticulture industry, its dependence on groundwater or the productivity of the boreholes in the Nevitt area. Key geotechnical issues highlighted during the hearing indicated that there may be liner failure, slope failure and leachate may leak into the aquifer. Base-heave and blowouts may also occur as the landfill is proposed to be built below the water table.

The Applicant has understated the transmissivity values for gravels in the Nevitt and also failed to establish the presence or absence of R3/R4 responses to nearby wells. The Groundwater Response Matrix for landfills needs to be amended to provide for the protection of potentially productive zones for the future. There were obvious

faults in the data provided by the Applicant with regard to the geological and hydrogeological setting in the Nevitt area. The precautionary principle demands that a waste licence be refused because of the adverse impact on the potentially viable groundwater resource.

The EIS has failed to assess the potential impacts and extent of the illegal landfill located on the site of the proposed development. This aspect of the application is inadequate and the illegal landfill should be handled in accordance with the Ministerial Direction 04/05 regarding unauthorised landfill sites.

The argument proving the need to provide the landfill has not been convincing and the Agency should have regard to the need for the facility. There is excess landfill capacity in Ireland and the Dublin Region requires better waste management not necessarily more landfills.

**Closing Statement of Mr O'Donnell**

Mr O'Donnell identified that the critical party to which the submission refers are the local residents and consideration should be given to the challenges to which they face if the proposed development is to proceed and it is likely that the proposed development would have a devastating impact on the local community. It should be considered that the most significant source of groundwater within the Fingal area is within 1000 m of the site of the proposed development. It must be concluded that if the Applicant knew previously what they know now they would not have proposed to put a landfill at the proposed location.

There are a number of legal principles that should be considered in making a decision on the proposed development. The Agency is required to carry out an EIA prior to making any decision. In order for such a decision to be made sufficient information should be provided in the EIS on all aspects of the development.

The principal aspects of the development have not been determined as the decision of An Bord Pleanala has not yet been issued and it is therefore not yet known what the proposed development will be. An Bord Pleanala might modify the proposed development and this hearing is held in absence of knowledge as to what the development will be. There are in effect two proposals for one development and it appears that An Bord Pleanala have no information before them regarding the illegal landfill. No consideration has been given regarding the treatment of waste and indeed the treatment of hazardous waste requires an EIS.

The Applicant has approached the hearing with the opinion that the hearing should be a review of the PD; however, this cannot be the case, as the Agency cannot be reviewing its own decision. The assessment by the hearing committee must independently review the information submitted and little regard should be had of the PD.

The EIA to be conducted is only one aspect of the assessment for the proposed development, the Agency and committee shall consider the requirements of the Waste Management Act. The onus is on the Applicant to show that all aspects of the legislation can be satisfied. Section 44 (b) of the Waste Management Act 1996 states that the Agency must be satisfied that the activity concerned carried out in accordance

with the conditions of a licence will not cause environmental pollution. Environmental pollution in respect of waste relates to the holding, transport and the recovery or disposal of waste. Consideration should also be given if there is a risk to waters (Section 5(1) of the Waste Management Act 1996) and there is no evidence that the proposed development will not give rise to a risk to waters. It is also likely that a nuisance will be caused through odours.

The proposed facility will adversely affect the countryside and areas of interest. The community in this area will be shattered yet the Applicant has not shown how the proposed development will not adversely impact on the countryside. There is ample evidence to show that the proposed development will have an impact that would not allow for the development to be licensed in accordance with the Waste Management Act 1996.

The failure of the Applicant to provide accurate information and a complete response to the Agency's requests shows an arrogance which should not be condoned by the Agency when considering the application. The proposed development is a commercial development and the urgency for this development is no longer present as there is enough waste capacity in Ireland. The reliance of the Applicant on the provisions of the Dublin Waste Plan is not a sufficient reason to justify the need for the facility.

**Fingal County Council (Applicant)**

***Mr Flanagan*** provided a statement to the hearing (Document No. 54, Appendix E). Mr Flanagan based his closing statement on the submitted written text.

Mr Flanagan clarified that it was not his intention to confine the discussion at the hearing to the PD only but it was the focus of the discussions. A summary of the legislative background was provided and reference was made to the relevant waste legislation and what aspects of legislation had to be complied with by the Applicant and how the Applicant in this case had complied with the Waste Management Act and the Landfill Directive. The Landfill Directive sets out requirements to be complied with in terms of technical aspects of the development.

The Applicant made an application in accordance with the Waste Management (Licensing) Regulations and in May 2007 the Agency wrote to the Applicant advising them that the application was valid in accordance with Article 14(2) of the Waste Management (Licensing) Regulations, 2004. During the course of the exchange of information between the Agency and the Applicant there were extensive submissions/observations by third parties and there were further submissions by third parties by the way of objections following the issuing of the PD.

As part of this exchange of information the Agency requested the Applicant to provide information regarding the likely effects of the removal of the waste from the historic landfill at the proposed development and the Applicant addressed these issues.

Mr Flanagan noted that a number of references were made to the legal requirements of the EIA process and he noted how the Applicant had complied with such

requirements and how the application and application process had adhered to such requirements. The mitigation measures envisaged to avoid, reduce and remedy significant adverse environmental affects of the proposed development were identified.

It was submitted that the EIS, as part of the overall information contained in the application for the waste licence, as supplemented by additional information submitted and sought during the consultation process ought to ensure that Agency can perform its functions under Section 40(4) of the Waste Management Act and it is considered that this was the case in this application process.

With regard to the historic landfill, regardless of whether the waste material is to be removed or remain in situ the emission controls provided in the PD apply to the full site to which the application refers and the EIS cannot therefore be deemed inadequate. The Agency has in the PD set out the requirements of Section 40(4) of the Waste Management Act and the measures enshrined in the PD set out the parameters under which the mitigation measures can be further developed and it is not the situation that the control of emissions has been "left over" for further determination. There are up to 74 conditions that apply to the historic landfill as they do to other parts of the proposed facility. There is sufficient data regarding the historic landfill in the EIS and there only appears to be argument regarding the interpretation and conclusions drawn from the analysis of this data.

The EIS is the start of the process onto which are superimposed the technical requirements of domestic legislation for a waste licence and the Landfill Directive. Reference was made by the Objection Parties to R Blewett v Derbyshire County Council where it was stated that the EIS was the start of a process that is supplemented by further reformation during the public consultation process. It is rejected that the Applicant and the Agency have not adequately addressed the issue of the historic landfill at the proposed facility.

It is rejected by the Applicant that there has been a failure on their behalf to comply with either a Ministerial Direction under Section 60 of the Waste Management Acts, or the Code of Practice under Section 76 of the Environmental Protection Agency Acts. Reference was also made to the Ministerial Direction and that the Local Authority / Agency should have regard to the Direction. There have been comparisons of the proposed development to the Blessington site, however it is noted that the application for the Blessington site was to remediate a facility whereas in this case the application is for the development of a landfill and buffer zone for which an EIA is being carried out for the entirety of the site including the historical landfill. It is also the case that the Code of Practice (EPA Code of Practice Environmental Risk Assessment for Unregulated Sites) came into being subsequent to the waste licence application. The characteristics of the Blessington site are different to those at the Nevitt site and in particular in terms of proximity of residences and the presence of an unconfined aquifer at the Blessington site.

The PD provides for a facility to be developed and operated in accordance with the Landfill Directive; the proposed facility would not be in breach of the Water Framework Directive. The proposed development site is classified as R1 by the GSI and it is not located within a source protection area within the GSI matrix. The

restoration of the historical landfill should be seen within the context of the entire development that will involve the processing of nearly 5,000,000 $m^3$ of material and the historic landfill will account for just between 160,000 - 200,000 $m^3$ of material. And it is also just 4 ha of a 210 ha site. The treatment of the historical waste should also be looked at in the overall context of the proposed development as distinct from the site specific remediation at the Blessington site.

The issue raised in relation to the requirement for the facility and the point put forward by Indaver, in effect, proposes that the management of waste in the region is handed over to the private sector. It was also noted that with regard to the information provided to the hearing from Indaver regarding landfill capacities there is not as much capacity as was suggested.

The Programme for Government should not be considered as Government Policy as per the Waste Management Act 1996 but the Regional Waste Plan is the policy that is in place for the management of waste in the region. The Agency is required by Section 52 of the Environmental Protection Agency Acts to keep itself informed of policies and objectives of public authorities and in this light it is noted that it is the policy of the Applicant not to engage in any further development of a public water supply in the Nevitt area. And the interpretation of Section 52(1)(b) of the Waste Management Act 1996 would be considered to be much narrower than proposed by the Objection Parties submissions to the hearing.

The mitigation strategies provided for in the PD are established techniques to ensure that there is no linkage from the source to receptor. Mr Flanagan clarified that the Applicants objection to Condition 8.1.1 only relates to amending the first line of that condition, i.e. the sub-headings i) and ii) should remain in place and the Applicant's objection to Condition 8.1.2 remains.

Mr Flanagan submitted that the GSI has affirmed the Resource Protection Matrix R1 for the proposed development. The proposed development has been designed in accordance with the technical requirements of the Landfill Directive and the technical requirements of the EPA landfill site design manual. The evidence overwhelmingly establishes that the proposed development so designed, does not pose a risk of pollution to the groundwater. The presence of low permeability clays between the landfill and the groundwater protects the groundwater resources. The proposed development is consistent with the objectives and policies of the Regional Waste Plan. Appropriate conditions, emission limits, controls and monitoring proposals have been enshrined in the PD. Any subsequent compliance measures within the context of Section 40(4) of the Waste Management Act 1996 are to be construed within the parameters enshrined in the PD. It was also submitted that if any submission has been made to the Agency other than referring to environmental control and emissions they must be treated with the utmost caution.

**The oral hearing concluded at 1.41pm on 13th March 2008**