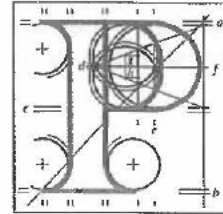


**Our Case Number:** ABP-314964-22



**An  
Bord  
Pleanála**

Patrick Boyle  
Hollywood and District Conservation Group  
Hands Lane  
Rush  
Co. Dublin

**Date:** 20th December 2022

**Re:** Proposed development of a Circular Economy Campus and an Integrated Waste Management Facility at the Hollywood Landfill  
Hollywood Great, Nag's Head, Naul, Co. Dublin, A41 YE92

Dear Sir,

An Bord Pleanála has received your recent submission in relation to the above mentioned proposed development and will take it into consideration in its determination of the matter.

A receipt for the fee lodged is enclosed.

The Board will revert to you in due course with regard to the matter.

Please be advised that copies of all submissions / observations received in relation to the application will be made available for public inspection at the offices of Fingal County Council and at the offices of An Bord Pleanála when they have been processed by the Board.

More detailed information in relation to strategic infrastructure development can be viewed on the Board's website: [www.pleanala.ie](http://www.pleanala.ie).

If you have any queries in the meantime, please contact the undersigned officer of the Board.

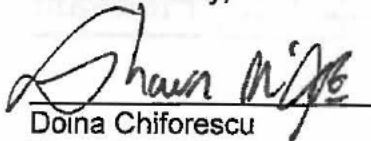
Tel	Tel	(01) 858 8100
Glaao Áitiúil	LoCall	1800 275 175
Facs	Fax	(01) 872 2684
Láithreán Gréasáin	Websáit	<a href="http://www.pleanala.ie">www.pleanala.ie</a>
Ríomhphost	Email	<a href="mailto:bord@pleanala.ie">bord@pleanala.ie</a>

64 Sráid Maoilbhríde  
Balle Átha Cliath 1  
D01 V902

64 Marlborough Street  
Dublin 1  
D01 V902

Please quote the above mentioned An Bord Pleanála reference number in any correspondence or telephone contact with the Board.

Yours faithfully,



Doina Chiforescu  
Executive Officer  
Direct Line: 01-8737133

PA04

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ABP – PAO6F.314964

Objection  
to an application by  
Integrated Materials Solutions Limited Partnership  
(Limited Partnership No: 1457)  
for an integrated waste management facility  
at Hollywood Great, Nag's Head, Co Dublin

from  
Patrick Boyle, B.E.  
Hollywood and District Conservation Group  
Hands Lane, Rush, Co. Dublin

## 1. The Fingal Limestone Aquifer

The map of Ireland (attached) is of “groundwater bodies and groundwater flow regimes” throughout Ireland.

The feature coloured green crossing Fingal from east to west between Rogerstown Estuary to the south and Skerries to the north and continuing over much of east County Meath, is categorized as “productive fissured bedrock”. On the GSI Response Matrix for Landfills (see attached) it has an Aquifer Category of Locally Important Moderately Productive Fissured Bedrock (Lm). It would be expected to sustain groundwater well yields of between 100m<sup>3</sup> and 400m<sup>3</sup> per day. (see attached “Aquifer Classification-GSI”)

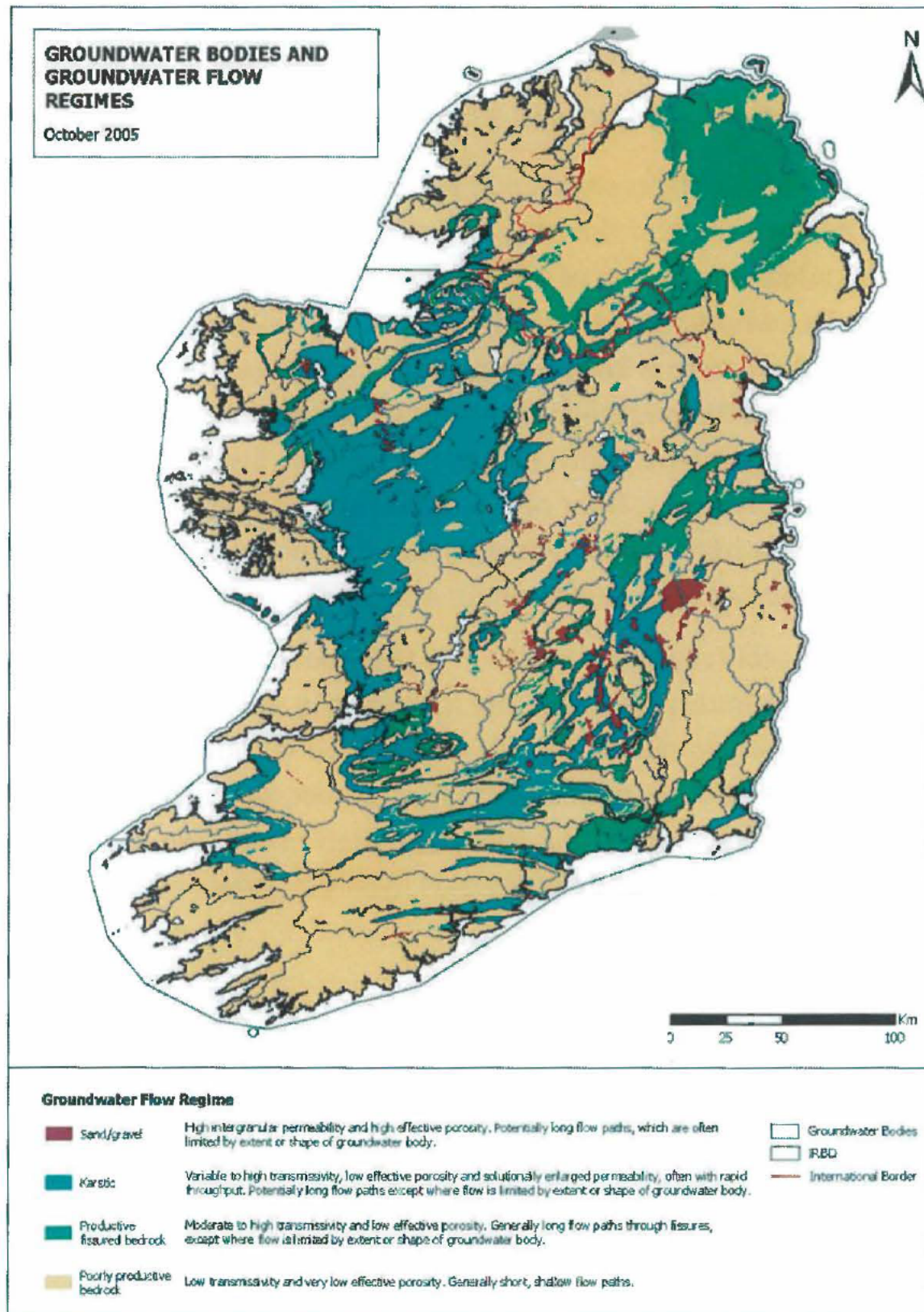
Moving south on the map of Ireland there we find generally poorly productive bedrock until one reaches the vicinity of Gory, County Wexford. Aquifers south of Fingal and north of Gory are generally classified as Poor (P) and expected to yield less than 100m<sup>3</sup> of groundwater per day.

Given the rarity and value of locally important aquifers as sources of groundwater the GSI and EPA discourage the siting of landfills on these features, preferring instead sites chosen on poor aquifers.

The aquifer is used by Irish Water as a source of public drinking water at The Bog of the Ring, producing approximately 3,500m<sup>3</sup> of water per day, and extensively by the local horticultural industry.

It therefore comes as a disappointment to residents that Integrated Materials Solutions Limited would ignore these recommendations by choosing this Locally Important aquifer in Fingal as a landfill site for a leachate producing substance i.e., incinerator bottom ash (IBA), when alternative less important poor aquifer sites are so readily available.

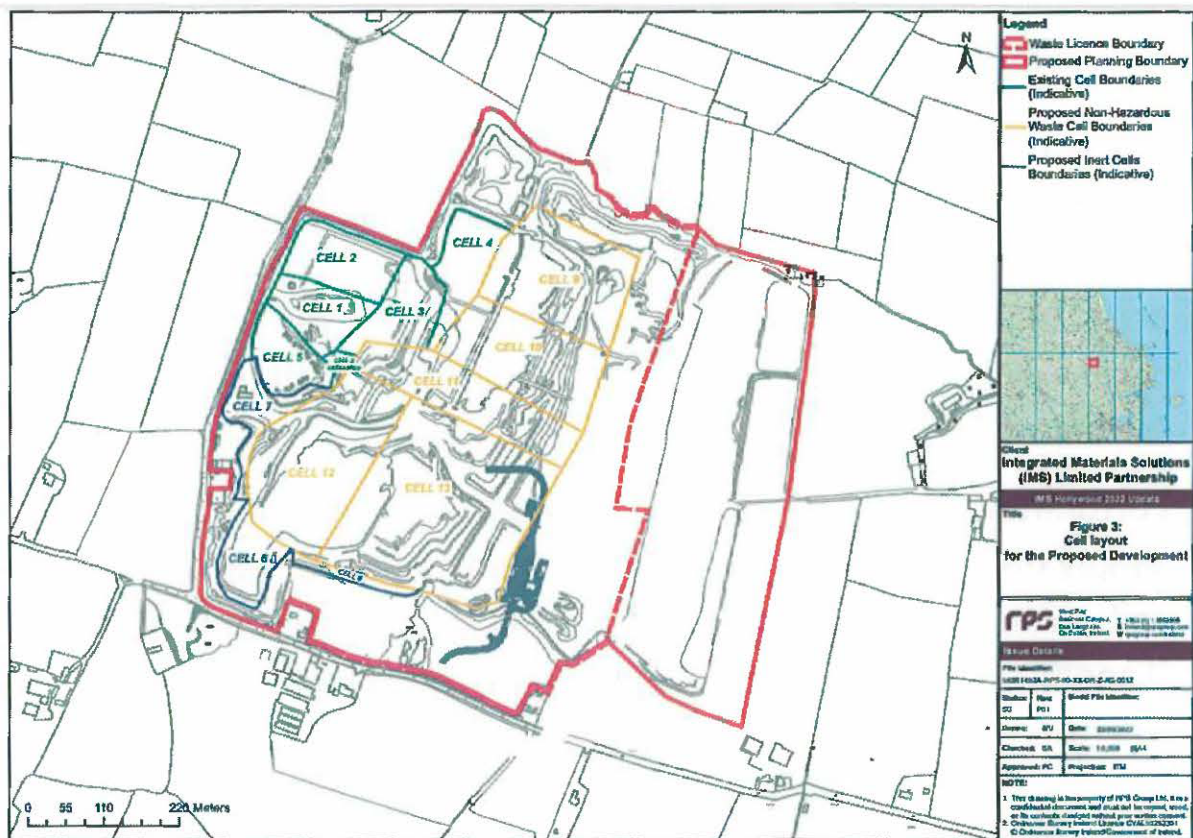
On behalf of Hollywood and District Conservation Group I therefore strongly object to this proposal.



## 2. The Proposed Landfill Site

The proposed landfill is situated in a former rock quarry on the south-eastern slope of the Hill of Knockbrack, a Namurian shale rock feature, which sits on top of and is surrounded by the limestone aquifer. The whole feature is in the shape of a syncline. In geological terms the Namurian is known principally as the Walshestown Formation and the underlying limestone the Loughshinny Formation. The boundary between both passes through the proposed landfill, i.e. the Northern-most floor of the quarry sits on Namurian shale (W) whilst the southern section sits on the Loughshinny limestone (Lf) (see site maps and GSI geology map attached).

Note: An inaccuracy in the location of this boundary on the GSI map places the boundary too far to the north of the site. The site floor is thus principally Namurian, i.e., classed as a poor aquifer (See corrected site geology map attached). However, site specific investigations have found this rock to be highly fractured and may well be capable of groundwater yields locally in excess of 100m<sup>3</sup>/Day.



### 3. Namurian well yields for the site have not been established by the applicant.

This is an important issue if one were to apply the Response Matrix for landfills as the governing factor. (See Groundwater Protection Response for Landfills). Is it de facto a “poor aquifer” or “locally important”? Given that the Vulnerability Rating for the site is “Extreme”, i.e., there is no underlying natural soil protection, and the water table lies directly below the landfill liner, we cannot accurately determine whether the Response, based on local site-specific conditions, will be R32 or R23.

Fortunately, the EC Directive supersedes the EPA /GSI Matrix and simply disallows any emission of contaminants into surface water, soil, air or groundwater. Ref. S.I. No 321 of 2020, European Union (Landfill) Regulations, “Purpose of Regulations”.(See attached)

#### **Aquifer Classification - GSI**

“Yield is one of the main concerns in aquifer development projects, yields from existing wells are conceptually linked with the main aquifer categories:

- Regionally important (R) aquifers should have (or be capable of having) a large number of ‘excellent’ yields: in excess of approximately 400 m<sup>3</sup>/d (4,000 gph).
- Locally important (L) aquifers are capable of ‘good’ well yields 100-400 m<sup>3</sup>/d (1,000-4,000 gph).
- Poor (P) aquifers would generally have ‘moderate’ or ‘low’ well yields - less than 100 m<sup>3</sup>/d.”

<https://www.gsi.ie/ga-ie/programmes-and-projects/groundwater/activities/understanding-ireland's-groundwater/aquifer-classification/Pages/Aquifer-classification-how-to.aspx>

## Landfilling of Waste: a Hazard for Groundwater

The generation of leachate is one of the main hazards to groundwater from the disposal of waste by landfilling. Good site selection, design and operation assists in minimising the risk of pollution. Leachate from landfills for non hazardous waste is a highly polluting liquid and its composition is dependent on the nature of the waste within the landfill. The pollution potential can be evaluated by calculating the volume and predicting the composition of leachate that will be generated.

The volume of leachate depends principally on the area of the landfill, the meteorological and hydrogeological factors and the effectiveness of the capping. It is essential that the volume of leachate generated be kept to a minimum. The design and operation of the landfill should ensure that the ingress of groundwater and surface water is minimised and controlled.

Leachate composition varies due to a number of different factors such as the age and type of waste and operational practices at the site.

The conditions within a landfill vary over time from aerobic to anaerobic thus allowing different chemical reactions to take place. Most landfill leachates have high BOD, COD, ammonia, chloride, sodium, potassium, hardness and boron levels. Ammonia is a contaminant which may be used as an indicator of contamination, particularly in terms of surface water, as it can be toxic to fish at low concentrations (1 mg/l). Chloride is a mobile constituent which is often used as an indicator of contamination. The leachate from landfills for non-hazardous waste may produce reducing conditions beneath the landfill, allowing the solution of iron and manganese from the underlying deposits.

Leachates from landfill sites for non-hazardous waste often contain complex organic compounds, chlorinated hydrocarbons and metals at concentrations which pose a threat to groundwater and surface waters. Solvents and other synthetic organic chemicals are a significant hazard, being of environmental significance at very low concentrations and resistant to degradation. Moreover, they may be transformed in some cases into more hazardous compounds.

Landfills have the potential to produce leachate for several hundred years.

## Groundwater Protection Response Matrix for Landfills

The reader is referred to the full text in *Groundwater Protection Schemes* (DoELG/EPA/GSI, 1999) for an explanation of the role of groundwater protection responses in a groundwater protection scheme.

The siting, design, operation and monitoring of landfills must comply with the guidelines outlined in the EPA's Landfill manuals except where such facilities hold a waste licence issued by the EPA. A Waste Licence is required for all landfills.

From the point of view of reducing the risk to groundwater, it is recommended that all landfills be located in, or as near as possible to, the zone in the bottom right hand corner of the matrix.

The appropriate response to the risk of groundwater contamination is given by the assigned response category (R) appropriate to each protection zone (Table 1).

**Response Matrix for Landfills**

VULNERABILITY RATING	SOURCE PROTECTION AREA		RESOURCE PROTECTION Aquifer Category					
			Regionally Important (R)		Locally Important (L)		Poor Aquifers (P)	
	Inner	Outer	Rk	Rl/Rg	Lm/Lg	Ll	Pi	Pu
Extreme (E)	R4	R4	R4	R4	R3 <sup>1</sup>	R2 <sup>2</sup>	R2 <sup>2</sup>	R2 <sup>2</sup>
High (H)	R4	R4	R4	R4	R3 <sup>1</sup>	R2 <sup>2</sup>	R2 <sup>2</sup>	R1
Moderate (M)	R4	R4	R4	R3 <sup>1</sup>	R2 <sup>2</sup>	R2 <sup>2</sup>	R2 <sup>2</sup>	R1
Low (L)	R4	R3 <sup>1</sup>	R3 <sup>1</sup>	R3 <sup>1</sup>	R1	R1	R1	R1

In all cases standards prescribed in the *EPA Landfill Site Design Manual* (EPA, 1999) or conditions of a waste licence will apply.

**R1** Acceptable subject to guidance in the *EPA Landfill Design Manual* or conditions of a waste licence.

**R2** Acceptable subject to guidance in the *EPA Landfill Design Manual* or conditions of a waste licence.

- Special attention should be given to checking for the presence of high permeability zones. If such zones are present then the landfill should only be allowed if it can be proven that the risk of leachate movement to these zones is insignificant. Special attention must be given to existing wells down-gradient of the site and to the projected future development of the aquifer.

**R2** Acceptable subject to guidance outlined in the *EPA Landfill Design Manual* or conditions of a waste licence.

- Special attention should be given to checking for the presence of high permeability zones. If such zones are present then the landfill should only be allowed if it can be proven that the risk of leachate movement to these zones is insignificant. Special attention must be given to existing wells down-gradient of the site and to the projected future development of the aquifer.
- Groundwater control measures such as cut-off walls or interceptor drains may be necessary to control high water table or the head of leachate may be required to be maintained at a level lower than the water table depending on site conditions.

**R3** Not generally acceptable, unless it can be shown that:

- the groundwater in the aquifer is confined; or
- there will be no significant impact on the groundwater; and
- it is not practicable to find a site in a lower risk area.

**R3** Not generally acceptable, unless it can be shown that:

- there is a minimum consistent thickness of 3 metres of low permeability subsoil present;
- there will be no significant impact on the groundwater; and
- it is not practicable to find a site in a lower risk area.

**R4** Not acceptable.

## Regionally Important Aquifers

The siting of landfills on or near regionally important aquifers should only be considered:

- Where the hydraulic gradient (relative to the leachate level at the base of the landfill) is upwards for a substantial proportion of each year (confined aquifer situation).
- Where the proposed landfill is located in the discharge area of an aquifer. In this case surface water may be more at risk.
- Where a map showing a regionally important aquifer includes low permeability zones or units which cannot be delineated using existing geological and hydrogeological information but which can be found by site investigations. Location of a landfill site on such a unit may be acceptable provided leakage to the permeable zones or units is insignificant.
- Where the wastes types are restricted and the waste acceptance procedures employed are in accordance with the criteria specified by the EPA.

## Investigations

Special attention should be given to checking for the presence of more permeable zones, such as faults, particularly in fractured bedrock aquifers. Geophysical surveys may be used to identify zones which should be investigated further by drilling to determine their vertical and lateral extent. Hydrogeological tests should also be carried out to define the local and regional effects of the zones. Investigations should be carried out in accordance with the EPA's *Landfill Manual Investigations for Landfills*, 1995.

## Landfill Directive

### Article 1

#### Overall objective

1. With a view to meeting the requirements of Directive 75/442/EEC, 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 and guidance to prevent or reduce as far as possible negative effects on the environment, in particular the pollution of surface water, groundwater, soil and air, and on the global environment, including the greenhouse effect, as well as any resulting risk to human health, from landfilling of waste, during the whole life-cycle of the landfill.

#### 4. Specially Engineered Cells.

The proposed engineered protection for the cells containing IBA is one meter thickness of low permeability clay, a plastic sheet underlay and a plastic sheet capping. This has been considered by the EPA to be insufficient in the absence of a natural clay barrier. If the protective measures do not fail during the working lifetime of the landfill, they are known to fail in the fullness of time, i.e., after closure. Again, this is prohibited by the Landfill Regulations -the protection applies "during the whole life-cycle of the landfill".

It must be borne in mind that bottom ash is not biodegradable and leachate emissions are certain to increase in the long term. Not a pleasant prospect for our public water supply, our horticultural wells or indeed the Rogerstown Special Area of Conservation which will ultimately be the recipient of all surface water leachate emissions.

#### 5. Source and/or Resource Groundwater Protection.

Much effort and argument in the applicant's submission has revolved around this issue- the applicant keen to prove that no threat would ensue to the Bog of Ring public water supply, or to groundwater elsewhere. Much attention has been given by the applicant to the low lying M1 north/south route to the east of Knockbrack Hill. The roadway is paralleled by a significant north /south highly fractured rock fault and gravel deposits from 5 to 15 metres in depth. The GSI in its study document "The Bog of the Ring Groundwater Protection Zones" refers to it as an area of low topographical relief and high permeability. Their numerical model of the Bog of the Ring Zone of Contribution places a groundwater divide at Hedgestown, some distance south of the natural topographical divide, due to pumping at the public water supply. They also estimate that an increase in

pumping rate from 3500m<sup>3</sup>/day to 4000m<sup>3</sup>/day would move the water divide a further 200 meters southwards.

The significance of this for the applicant is that were contaminated groundwater emanating from the landfill to reach a point north of the divide it would constitute a serious threat to the public water supply -the "Source" on the Matrix – and be completely forbidden. Entry to the groundwater regime below the divide would affect the "Resource" and constitute a lesser threat.

The applicant denies any such possibilities, insisting that all groundwater emissions would be to the southeast in the Loughshinny formation.

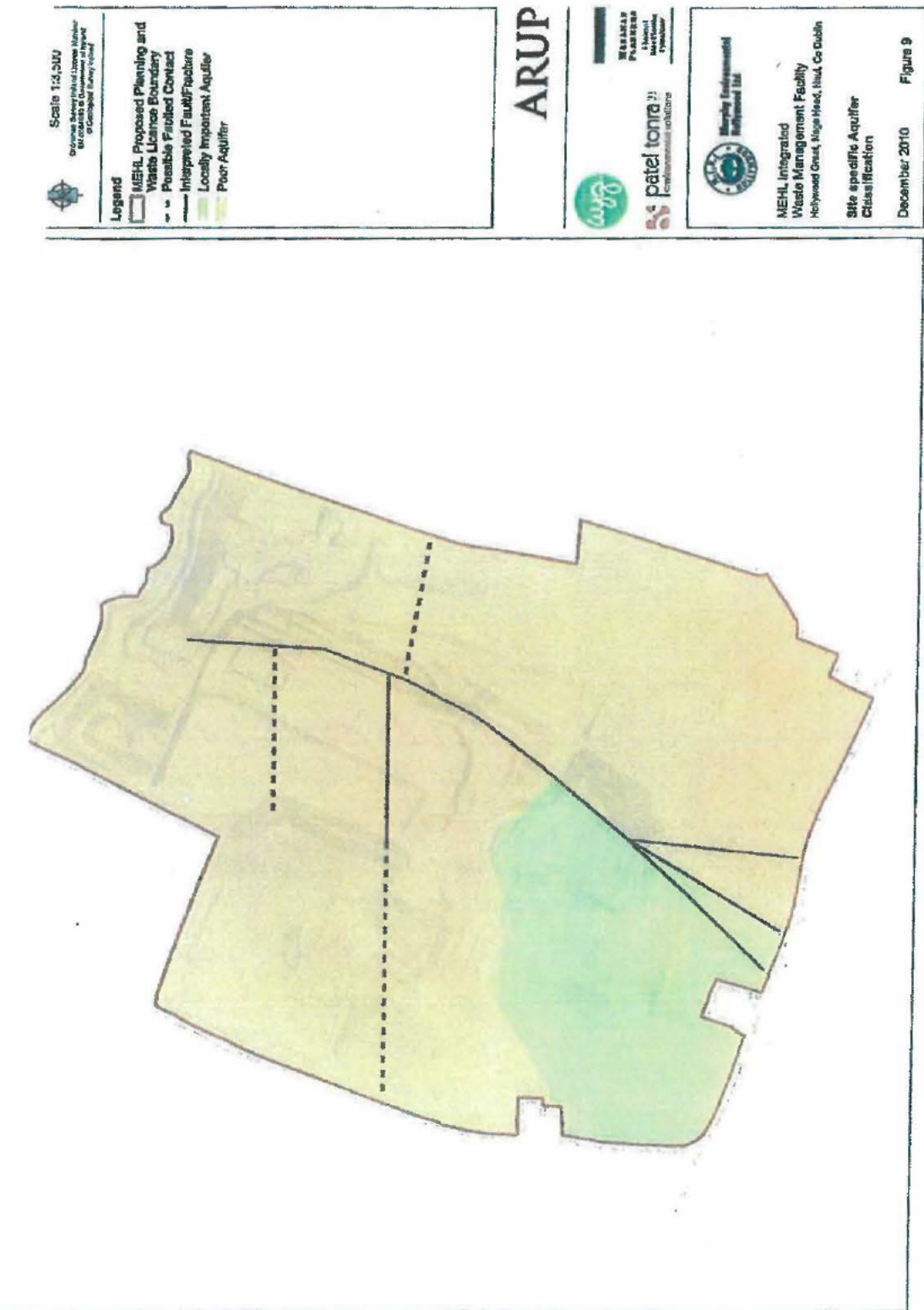
**In this he makes no allowance for the error in the GSI site geology i.e. that the waste cells are in fact underlain by the Namurian formation, where groundwater flow is proven to be eastwards, directly towards Hedgestown.**

(see Regional GSI Geological map attached)

Note

- The Loughshinny Formation is shown incorrectly too far north on the site. (see Arup corrected site cross-section and aquifer plan attached)
- The GSI map also highlights in Green the Zone of Contribution of the Bog of Ring well field and the position of the southern water divide directly east from the proposed landfill site at Hedgestown.





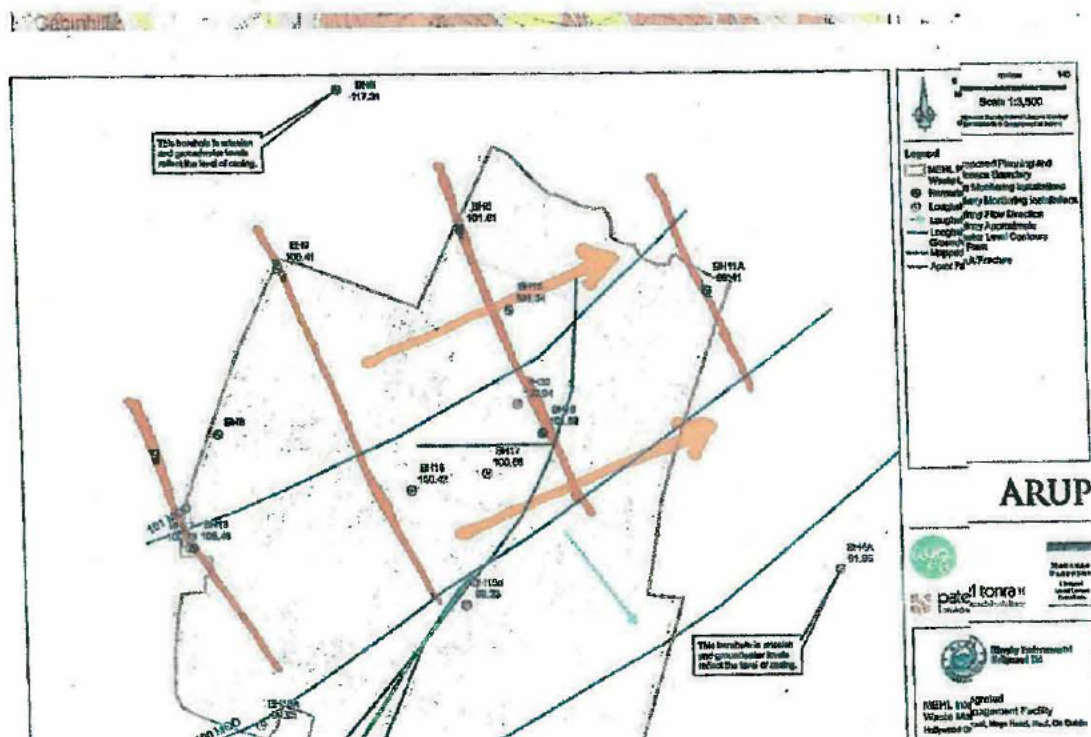
## 6. The Namurian Groundwater Level Contours and Flow Direction.

CDM Smith consultants conducted a site-specific study of the site for the applicant and produced groundwater level contours for the Loughshinny and Namurian formations. The resultant contours are shown attached.

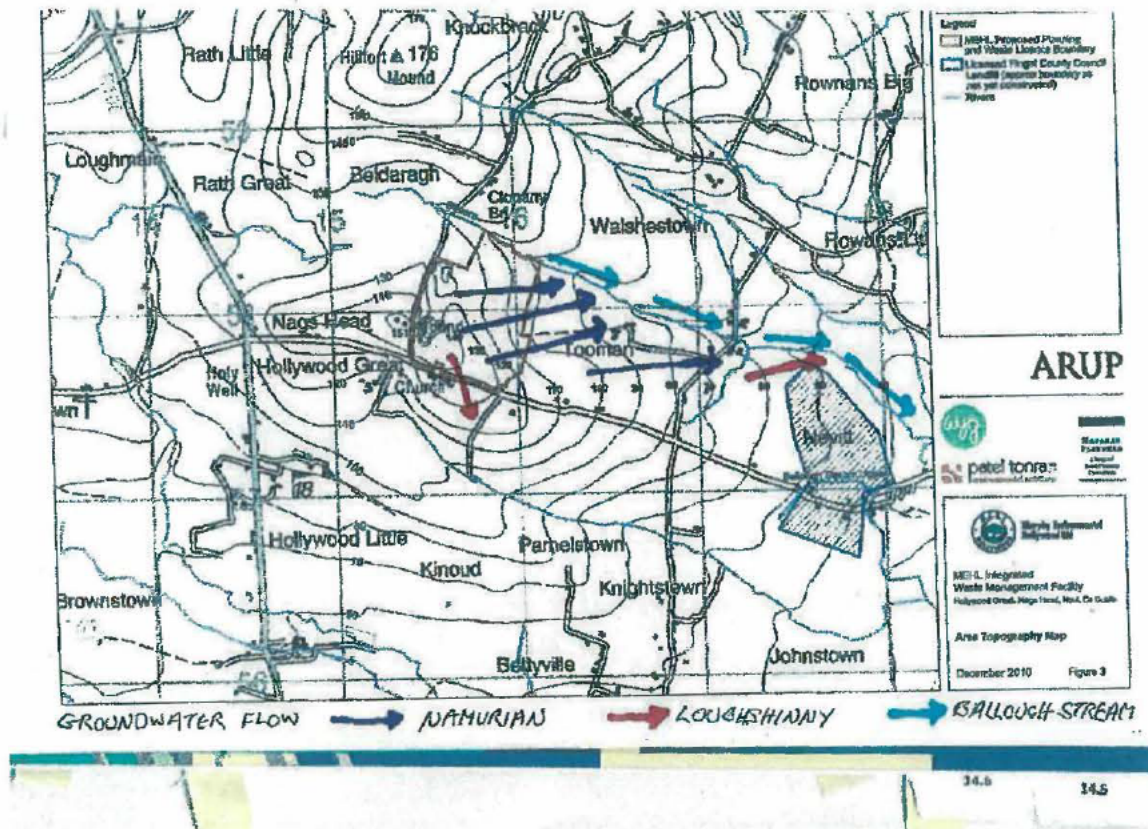


They clearly demonstrate that the groundwater flow in the Loughshinny formation is to the southeast but the Namurian is likely to be eastwards, i.e. directly towards Hedgestown.

An examination of Namurian borehole data produced by Arup also demonstrates a slightly north easterly flow (see attached).



Note: In the absence of any borehole data to the east of the site being provided by the applicant, I have drawn provisional groundwater and surface water flow direction arrows eastwards based on topography. (see attached)



The issue of groundwater flow patterns immediately to the east of the site is further complicated by the presence of two north east trending faults for which the applicant has also provided no data. (See GSI Geology Map attached).



" In order to determine the groundwater flow through the site, a Water Balance calculation is required for both Loughshinny and Namurian aquifers.. The applicant failed to carry out these calculations"

## Conclusion

- This application seeks to locate a landfill site for Ireland's municipal waste incinerator bottom ash, estimated to be 5 million tons, on a site which our national guidelines deem to be demonstrably unsuitable.
- Groundwater flow directions eastwards from the site have not been established by the applicant.
- Upon investigation the local Ballough stream, with many stream-bed locations of extreme vulnerability, would potentially receive considerable Namurian groundwater emissions from the landfill to its surface water close to the proposed landfill site, and continuing downstream - contrary to the Landfill Directive.
- Pollution of the Ballough Stream would have negative environmental consequences for the Rogerstown Special Area of Conservation.
- The Namurian groundwater flow direction from the site is likely to be due east into the low lying Loughshinny Formation at Hedgestown, thereby constituting a hazard to both the Bog of Ring water supply, and the Locally Important aquifer resource - contrary to the Landfill Directive.
- The exact nature and extent of the potential damage to the environment of any leakage of leachate is difficult to estimate given the complex hydrogeological conditions surrounding the site, and the deep saturated gravels and major rock fault at Hedgestown, but the consequential damage to the reputation of the horticultural industry and Irish Water would be unacceptable.
- The applicant claims that an engineered low permeability clay liner 1 meter thick would give the equivalent leachate attenuation of 3 meters of natural clay of higher permeability. As permeability is but one of a number of factors affecting attenuation, the applicant's claims are therefore scientifically incorrect. His proposed engineered liner design is therefore inadequate.

- **The application of the European Precautionary Principle and Landfill Directive sanctions in this situation is therefore fully justified.**

## Appendix

<https://www.bordbia.ie/farmers-growers/member-status/scheme-members/horticulture-member-list/>

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## Horticulture

From [Department of Agriculture, Food and the Marine](#)

Published on 9 December 2020

Last updated on 25 October 2022

The Irish Horticulture Sector is the 4th largest agriculture sector in Ireland. With a turnover in 2021 of €521 million and directly employing over 6,600 people, while occupying less than 1% of total land, horticulture contains a diverse range of sectors, such as mushrooms, potatoes, field vegetables, protected fruit, protected vegetables, outdoor fruit, and amenity crops such as nursery stock, protected crops including bedding plants, cut foliage, outdoor foliage and bulbs, Christmas trees and turf grass.

Food safety and the quality of horticultural products is of the utmost importance to everyone. To this end a variety of schemes and regulations have been put in place by the Department of Agriculture, Food and the Marine.

Explore the content below to find out what you need to do in order to succeed in Irish horticulture.