

Environmental Protection Agency,
PO Box 3000
Johnstown Castle Estate,
County Wexford.
BY HAND

Sliding Rock,
Blackglen Road,
Sandyford,
Dublin 18

15th October 2007

Re: Waste Licence Application W 0231-01 Fingal Landfill

Dear Sir,

I wish to object to the granting of Proposed Decision (PD) W0231-01 to Fingal County Council and request that the Agency holds an oral hearing of my objection to the Agency's proposed decision.

A cheque in the sum of €300 is enclosed to cover the required fees.

Grounds of Objection.

1. Breach of Water Framework Directive

The development of the landfill at this location will result in a deterioration of the groundwater resource beneath the footprint and is therefore unsustainable and contrary to Ireland's obligations under the Water Framework Directive.¹

My submission to the Agency dated 30-3-07 (copy attached) clearly demonstrated that a groundwater supply of equal magnitude to that presently being abstracted at the nearby Bog of the Ring well field can be developed from the bedrock and gravel aquifers found immediately below the footprint of the proposed landfill.

My contention as to the magnitude of the groundwater resource readily available immediately below the landfill site has not been contested by either the Applicant, the Applicant's technical advisors or the Geological Survey of Ireland.

The Inspector's report and the Environmental Impact Statement failed to address the importance of the groundwater resource found immediately below the landfill footprint.

¹ Directive 2000/60/EC.

The Inspector's report concluded on page 25 that the development of the landfill at this location will;

'effectively prevent the development of an additional abstraction system directly to the east as detailed above, purely based on the precautionary principle.'

Article 1

Pursuant to Article 1, the purpose of the Water Framework Directive is to establish a framework for the protection of, *inter alia*, groundwater. The purpose of this framework is to:

- (a) prevent further deterioration and protect and enhance the status of aquatic ecosystems;
- (b) promote sustainable water use;
- (c) aim at enhanced protection and improvement of the aquatic environment;
- (d) ensure the progressive reduction of pollution of groundwater and prevent its further pollution; and
- (e) contribute to mitigating the effects of floods and droughts.

Thus, as an emanation of the State, the Agency is charged under the Water Framework Directive with the obligation to ensure that groundwater pollution is reduced and that further pollution of groundwater is prevented. Yet, notwithstanding, the obligations placed upon Ireland by the Water Framework Directive, the Inspector accepts that the development of the Fingal landfill will lead to some deterioration in groundwater quality beneath the landfill. This deterioration in groundwater quality runs directly contrary to the objectives of the Water Framework Directive and will prevent the development of the groundwater resource that lies immediately underneath the landfill footprint and elsewhere in the Loughshinny Formation aquifer.

In addition, to authorize a landfill to operate, in circumstances where the use of a major groundwater resource in the future is prevented, does not promote sustainable water use.

Article 4(1)(b)

Article 4(1)(b) of the Water Framework Directive sets a number of objectives for Member States specifically in relation to groundwater. For example, Member States shall;

- implement the necessary measures to prevent or limit the input of pollutants into groundwater and prevent the deterioration of the status of all bodies of groundwater,
- protect, enhance and restore all bodies of groundwater, ensure a balance between abstraction and recharge of groundwater, with the aim of achieving "good groundwater status" by 22 December 2015, in accordance with Annex V,

- implement the necessary measures to reverse any significant and sustained upward trend in the concentration of any pollutant resulting from human activity.

Conclusion

It is submitted that, in addition to the obligations in Articles 4(9) and 11(3)(a), Article 4(1)(b) imposes on Ireland the obligation to prevent or limit any further deterioration of groundwaters, and take appropriate measures to reverse any significant and sustained upward trends of pollutant concentrations. This requirement amounts to a standstill obligation and means that emanations of the Irish State (including the Agency) must ensure that, whatever the current status of a given groundwater body, no further deterioration occurs. Moreover, Article 11(3)(j) stipulates that any direct pollutant discharges into groundwater must generally be prohibited. Therefore, it may be said that Article 4(1)(b)(i) imposes a baseline requirement to avoid any further groundwater deterioration and direct pollutant discharges.

It is significant that the Water Framework Directive entered into force on 22nd December 2001. In addition, article 3 of the European Communities (Water Policy) Regulations 2003 places a duty on public authorities (which definition expressly includes the Agency) to implement the Directive. Moreover, those 2003 Regulations specifically oblige those authorities to act consistently with the objectives of the Directive and to promote compliance with it. Finally, the Water Services Act 2007 (signed into law on 14th May 2007) was enacted for the purposes, *inter alia*, of giving effect to the Water Framework Directive.

2. Breach of Environmental Protection Agency Act

Sustainable Development

The Inspector's report concluded erroneously on page 25 that consideration of sustainable development, which is a primary pillar of sustainability, is not directly within the remit of the Agency as regards licensing of waste management facilities.

On the contrary, the Agency is required under Part III of the Environmental Protection Agency Act 1992 to 2003, to have regard to sustainable development. Section 52(2) of the 1992 Act provides as follows:

52.—(2) *In carrying out its functions, the Agency shall—*

(a) keep itself informed of the policies and objectives of public authorities whose functions have, or may have, a bearing on matters with which the Agency is concerned,

(b) have regard to the need for a high standard of environmental protection and the need to promote sustainable and environmentally sound development, processes or operations, [Emphasis added].

Moreover, a review of the report of the Agency's Technical Committee in relation to its consideration of the application made under Waste Licence Register Number 213-

01, clearly demonstrates that the Agency does, as a matter of practice, consider the issue of sustainability as an integral part of the waste licensing process. This report of the Technical Committee is discussed further in Item 3 below.

2.1 Waste Licence Application 204-01

Sustainability was also given significant consideration by the Agency in its determination of Waste Licence Application 204-01.

On page 4 of the Inspector's report;

'The principle of sustainability includes pillars of social as well as environmental equity. And many protagonists of this paradigm would argue that a fourth pillar of the principle (additional to economical) would be good governance. The application before us for a non-hazardous residual domestic, commercial and industrial waste landfill has not been developed or processed in a manner equivalent to what would be required of a new legitimate and equivalent facility. For example, site selection protocols have not been followed as would be required of a legitimate facility were it to be proposed for the area. These governance short-circuits prevent the community and other social partners from engaging in the conventional manner in the full (and normal) regulatory determination process for a domestic, commercial and industrial waste facility. Having regard to the risk profile for such developments, I do not believe that such 'short-circuiting' protects the interests of society, nor does it represent good governance. Thus, such practices cannot be said to adhere to the principle of sustainability'.

The Inspector concludes on page 5 that;

' any decision to locate a domestic, commercial and industrial waste facility in the immediate (100m) catchment of the river and so close to private residences would represent an unacceptable and unsustainable precedent.' [Emphasis added]

On pages 6 and 7 sustainability is also discussed by the inspector;

'This standard of material is very robust and protective of the environment. Additional guidance on the interpretation of inert waste is presented in EU Council Decision 33 of 2003. The deposit or placing of such material on the Whitestown site where associated with the remediation and reclamation of the former illegal waste areas and the restoration of the quarry does not represent a risk to the integrity of the river, either directly or via precedent. It is the best practicable option for such material, and in my view would be sustainable. Indeed it is quite common in planning applications for quarries to have conditions requiring the restoration of worked out areas with soils, sub-soils and other suitable inert materials. In addition, the EU Landfill Directive notes the special – and low risk - character of inert wastes when employed usefully. In Article 2 of the Directive it states;

There is a national shortage of waste recovery infrastructure. The waste recovery buildings and composting units proposed by the applicants for this site are, from an environmental risk perspective, the sort of activities that would be acceptable for a location such as Whitestown. The continued operation of this infrastructure after the remediation of the historical waste areas is acceptable subject to compliance with the terms of the attached amended recommended decision.

The development and operation of waste recovery infrastructure on a site formally occupied by illegal waste does not conflict with the Ministerial Direction (Environment's Circular (WIR: 04/05) of 3 May 2005) in relation to illegal waste activities. And the restoration of the land formerly occupied by illegal waste with inert material (sourced on-site and imported) complies with the said Direction. This Ministers' Environmental Circular specifies the aim in all cases of illegal waste activity should be the making safe of the site, including the removal of waste where required as a consequence of a risk based assessment, the removal of hazardous waste where it is detected, and the removal of recyclable material if environmentally sustainable.' [Emphasis added]

Precautionary Principle

In dealing with matters about which there is inadequate scientific knowledge, the Agency is obliged to apply the precautionary principle. On this assumption, a landfill should not be authorised to operate where it could compromise a valuable groundwater resource. In this context, reference is made to Article 174(2) of the Treaty on European Union, which provides that:

Community policy on the environment shall aim at a high level of protection taking into account the diversity of situations in the various regions of the Community. It shall be based on the precautionary principle and on the principles that preventive action should be taken, that environmental damage should as a priority be rectified at source and that the polluter should pay. [Emphasis added]

As with the principle of sustainable development, section 52 of the 1992 Act obliges the Agency to have regard to precautionary principle in carrying out its functions.

3. Precedent

I respectfully suggest that permitting a landfill immediately above the significant groundwater resource found existing beneath the landfill site would represent an unacceptable and unsustainable precedent. This view agrees with the conclusions of the Agency's Technical Committee in relation to the Agency's determination of waste licence application 213-01:

'7. Discussion

From the above consideration of the objection it is clear that the principal issue with the application currently before the Agency turns on the issue of the suitability of the on-site solution to the disposal of residual Domestic, Commercial and Industrial waste. From a hydrogeological risk perspective, the assessments undertaken by the applicants conclude that the risks associated with the development of such a facility are negligible. But this is not the only consideration that is valid.

As articulated earlier, there are other regulatory and governance principles that provide a framework for good decision-making. I refer, for example, to the principles of Proximity, Sustainability, Proportionality and Precaution. These principles are interrelated. It was mentioned above that the application of a strict meaning of the Proximity Principle to regulatory decision making is not necessarily appropriate when dealing with waste that was deposited illegally. It is the view of the Technical Committee that the resolutions to illegal waste deposits which involve in the solution some on-site residual disposal component, should at the very least follow the standard regulatory norms and procedures as would apply to a legitimate operation proposing such a facility. This is particularly the case for illegal activities carried on since the coming into effect of the waste management licensing system (1997). To apply any lesser a burden would be disproportionate, and would undermine the value of pursuing legitimate regulatory protocols, and would undermine the legitimate waste industry (i.e. by promoting the pursuit of retrospective legitimatising). In addition to the application of the standard regulatory norms, illegal activities may well have to endure additional enforcement or other regulatory requirements: those requirements being applied proportionately.

The principle of sustainability includes pillars of social as well as environmental equity. And many protagonists of this paradigm would argue that a fourth pillar of the principle (additional to economical), would be good governance. The application before us for a non-hazardous residual domestic, commercial and industrial waste landfill has not being developed or processed in a manner equivalent to what would be required of a new legitimate and equivalent facility. For example, the planning and site selection protocols have not been followed as would be required of a legitimate facility were it to be proposed for the area. These governance short-circuits prevent the community and other social partners from engaging in the conventional manner in the full (and normal) regulatory determination process for a domestic, commercial and industrial waste facility. Having regard to the risk profile for such sites, the Technical Committee do not believe that such 'short-circuiting' protects the interests of society, nor does it represent good governance. Thus, such practices cannot be said to adhere to the principle of sustainability.

The applicants argue that the principle of precaution has been addressed via the evaluation of risks (modelling) and the employment of a superior standard of containment for the residual waste cells. It cannot be accepted that the Precautionary Principle is as simple as that implied for the landfill solution proposed. In this highly technical society, it is true that if one applies a sufficient amount of engineering, that almost any operation can be considered safe. However, the application of excessive engineering solutions to offset inappropriate or poor site selection is not necessarily the best procedural solution; particularly where other sites are available or could be evaluated.

Considering these arguments, the most appropriate way to assess whether or not the proposal for a residual domestic, commercial and industrial waste facility to be located on the Roadstones Blessington site, would be to consider what would be the likely view taken were this a new legitimate waste facility coming forward for determination in the statutory planning and environmental regulatory frameworks. It is not the place of the Technical Committee to address what the views of the planning authorities would be with regard to zoning, etc. But within the competency of the Technical Committee (i.e. the waste licence application process), it is unlikely that any favourable recommendation to locate a domestic, commercial and industrial waste facility within such a hydrogeological and geological setting in the immediate catchment of the Poullaphuca Reservoir, would ever issue. This Reservoir has national strategic importance, and good governance would dictate that no potentially polluting environmental activity of a scale and type such as a domestic, commercial and industrial waste facility should be located in its immediate catchment. There is another principle that underlines such a view, and that is the principle of precedent. Such a principle is hugely significant in regulatory authorisation processes. It is the view of the Technical Committee that any decision to locate a domestic, commercial and industrial waste landfill facility in the catchment of the reservoir would represent an unacceptable precedent, which could lead to intensification or development of similar potentially polluting activities with consequential and unacceptable environmental pressures.

If a new legitimate landfill proposal for a residual domestic, commercial and industrial waste facility would in principle be unacceptable for such a location, then the solution to an illegal waste issue involving the same type of facility should be equally unacceptable. The considerations under the principle of Best Practicable Environmental Option (e.g. haulage impact, truck emissions, etc.), and regardless of the groundwater modelling results, do not in our view offset the principle requirement to prohibit development of inappropriate potentially polluting industrial operations in the catchment of a nationally strategic drinking water resource.'

It is interesting to compare the scale of the proposed landfill at the Blessington site with that now planned for Fingal. The Blessington site landfill would have catered for approx. 180,000 tonnes of residual non-hazardous waste. In contrast, the landfill now proposed for the Fingal site will cater for 9,400,000 tonnes with a

projected life of 30 years. If the scale of the Blessington facility was incorrect as a precedent for the Poullaphuca Reservoir catchment then the Fingal landfill, which is more than 50 times larger, is surely much more of an unwelcome regulatory precedent for a major groundwater resource.

Allowing the Fingal landfill to proceed will establish a precedent for the development of large scale landfills;

- i) Over a major groundwater resource
- ii) Within the catchment of other potential well fields as admitted by the inspector on page 25;

'effectively prevent the development of an additional abstraction system directly to the east as detailed above, purely based on the precautionary principle.'

In fact, the location of the landfill at this location will not only prevent the development of additional well fields to the east but also beneath and to the south and west of the proposed landfill development site.

In exactly the same way as the Agency's Technical Committee recommended a refusal of the Blessington landfill any decision by the Agency to locate a domestic, commercial and industrial waste landfill facility in the hydrogeological environment found at Nevitt / Tooman would represent an unacceptable precedent, *purely based on the precautionary principle.*

It evades me completely as to why the *framework for good decision making* so eloquently and logically set out in the Technical Committee report for 203-01 was not applied in the Agency's determination of Fingal County Council waste licence application. I respectfully suggest that the application of the same logical analysis to the Fingal County Council proposal would result in the refusal of this application as it did for 203-01.

The same quality of logical analysis would conclude that the Fingal landfill proposal is an unsustainable development, which is contrary to the precautionary principle and clearly sets an unacceptable precedent.

4. Miscellaneous Issues

Spatial Planning & Good Governance

The Inspector's report concluded on page 25 that consideration of spatial planning is not directly within the remit of the Agency as regards licensing of waste management facilities.

Such a conclusion is in contrast to the Agency's consideration of Waste Application 203-01 in which the Technical Committee clearly addressed the

location of the proposed Blessington landfill within the Poullaphuca Reservoir catchment. In exactly the same way, I respectfully suggest that it would not be *good governance* to locate the largest landfill in the country immediately over a major groundwater resource and within the boundary the single most important groundwater aquifer in Fingal.

5. Summary

I wish to object to the granting of Proposed Decision (PD) W0231-01 to Fingal County Council.

The Inspector's refusal to consider the landfill proposal in the context of sustainable development is in breach of the Agency's obligations under the Environmental Protection Agency Act, 1992 and in contrasts to the Agency's approach to other recent waste licence applications.

The planned development of the Fingal landfill is clearly in breach of the Water Framework Directive as its development will according to the Inspector's Report;

'effectively prevent the development of an additional abstraction system directly to the east as detailed above purely based on the precautionary principle.'

Such an impact on the single most important aquifer in the whole of Fingal is an unsustainable development and a most unwelcome precedent. As stated previously by the Agency's Technical Committee, the principle of precedent, *'is hugely significant in regulatory authorisation processes.'*

I request that the Agency holds an oral hearing of my objection to the Agency's proposed decision.

Yours faithfully,



EurGeol Kevin Cullen PGeo.

Dr. Ian Marnane,
Licensing Unit,
Office of Licensing and Guidance,
Environmental Protection Agency.
Johnstown Castle Estate,
County Wexford.

Sliding Rock,
Blackglan Road,
Sandyford,
Dublin 18.

30-3-07

Re: Waste Licence Application W 0231-01 Fingal Landfill

Dear Dr. Marnane,

I refer to your Notice to the Applicant in accordance with Article 14(2)(ii) of the Waste Management (licensing) Regulations dated March 23rd, 2007.

In particular I refer to your Point III :- *Based on investigations carried out to date please indicate the potential range of sustainable yields, compared to the existing abstraction rates from the Bog of the Ring system, that may be attainable from the area to the South of Decoy Bridge. For the maximum of this range provide a plot of the area of likely zone of influence.*

I assume that the 'investigations to date' in your request would naturally include the results of the;

- groundwater investigations completed at the Bog of the Ring in the 1980's & 1990's,
- GSI 1: 100,000 Sheet 13, Geology of Meath, 1999
- work of the GSI in delineating the Groundwater Source Protection Zones (2005)
- TES Final Hydrogeological Assessment Report (2007)
- Hydrogeological studies carried out by the Applicant described in the EIS

A quantitative picture can only be provided through a modeling exercise that would allow for an examination of the interactions between aquifer transmissivity, aquifer storage, recharge to the aquifer, boundary conditions, discharges to surface water and existing groundwater abstractions.

The above immense volume of work however, can be readily used to provide the Agency with a qualitative picture. The following groundwater analysis indicates the likely quantum of the groundwater resource that lies in the limestone aquifer to the south of Decoy Bridge.

1. Prospects For High Yielding Wells South of Decoy Bridge

The potential groundwater productivity of the lands to the south of Decoy Bridge is already evidenced by the;

- tested yield from Trial Well No.9 completed in 1993 (Table 5, GSI March 2005)
- tested yields from the pumping wells completed by the Applicant
- reported high yields from private wells drilled in The Five Roads area

The above factors, when taken together with the geological conditions found here and which are identical to those at the Bog of the Ring. These favourable conditions are;

- Loughshinney Formation
- Faulting
- Extensive gravel deposits

The occurrence of these conditions would lead to a conclusion that a successful well field could be developed at Nevitt-Tooman.

However, the relatively poor yield reported from Trial 6 (Figure A.1 GSI, 2005) completed in 1993 highlights the difficulties of developing groundwater resources in fracture controlled aquifers.

2. Possible Production Well Locations

1. Groundwater Development in Fracture Controlled Aquifers

It is important to use all the available geological, geophysical and hydrogeological information in locating groundwater trial and/or production wells in fracture controlled aquifers to ensure that the abstraction points are located within the areas of potentially the highest transmissivity.

Information from a variety of sources should be brought together to provide to update the existing (in this case the 1:100,000 Geology of Meath, Sheet 13, of 1999) geological model so that drilling sites are targeted at those areas likely to provide the highest yields within the search area.

For example, the trial wells associated with the Bog of the Ring development the trial wells were located in 1983 on the basis of published GSI map of that time. These wells tested the likelihood that the major east west fault at the Bog of the Ring would be associated with fracturing of the surrounding limestones.

The present GSI map, published in 1999, indicates that a major north south fault continues southwards from the Bog of the Ring in the direction of the Five Roads

junction. This fault line was positioned without the benefit of any outcrop or drill hole information.

The work completed in relation to the Nevitt-Tooman landfill has greatly added to the geological picture to the south of Decoy Bridge and in particular in the area to the west of the Five Roads junction. This work has clearly demonstrated that the GSI fault lies further to the west and is represented not by a single, narrow fault zone but rather by a wide major graben like feature in the bedrock surface.

This major depression in the bedrock surface is confirmed by both the geophysics and drilling programmes completed at the Nevitt-Tooman development site. The anticipated increased transmissivity in the underlying limestones associated with the faulting is confirmed by the groundwater flow pattern and the changes in the groundwater gradient at the margins of and within the fault zone.

The location of possible production wells to the south of Decoy Bridge would therefore naturally be based on the most recent and accurate geological picture rather than the earlier and less accurate GSI regional map.

2. Geology

On the basis of the investigations to date it will be necessary to locate potential production water wells south of Decoy Bridge on, and in order of priority;

- geological structural grounds in proximity to known and postulated faults
- gravel thicknesses
- lithological considerations

The structural considerations derive from the fault bounded trough like featured revealed by the Applicant's depth to bedrock contours. The potential for increased transmissivity conditions would be greater in such areas of obvious structural disruption.

The planned production wells should also take advantage of the areas of deep gravel deposits highlighted by the Applicants contours of gravel thickness.

The coincidence of the southward flow of groundwater at the Applicant site with the fault bounded bedrock trough would suggest that the more permeable Loughshinney Formation lies directly beneath the landfill.

This hypothesis remains to be confirmed by biostratigraphic studies. As the Loughshinney Formation is very similar lithologically to the older Lucan and Naul Formations it will necessary to carry out biostratigraphic studies to establish the presence and exact distribution of each of these components of the Dinantian biozone.

It is very unfortunate that the Applicant did not take the opportunity, following the Agency's earlier request, to revise the bedrock geology of the Nevitt – Tooman area as published by the GSI in 1999.

The cores recovered (and presumably still available for examination) from 13 of the drill holes completed by the Applicant would have provided the fossil bearing material to allow for the necessary biostratigraphic studies. This work would allow for the formation boundaries to be drawn more accurately.

The Agency could of course still request the Applicant to submit these cores for examination and so add to a better understanding of the bedrock geology in this area and it particular to the distribution of the productive Loughshinney Formation.

3. Groundwater Flow Pattern

The Applicant's groundwater flow contours indicate that the area immediately to the south east of the landfill represents an area of preferential groundwater flow. Groundwater flow lines are seen converging into this area indicating an area of increased transmissivity.

Production wells located in this region would benefit from the already strong groundwater throughput indicated by the converging flow lines.

4. Chosen Production Well Locations

The accompanying map Figure 1 shows the position of 4 No. possible production water wells. These wells (subsequent to trial well drilling) would be drilled to at least 90m, possibly to 120m if required, and with the expectation that each well would be capable of a sustainable yield in the order of 1,000 m³/day or greater.

The Nevitt –Tooman well field would therefore have a projected sustainable yield of c.4,000m³/day, which is similar to the proven capacity of the Bog of the Ring scheme.

In the event that the average production well yield falls below 1,000 m³/day then additional abstraction wells would be required. Where the transmissivity is say on average only 50% of the transmissivity determined by the GSI at the Bog of the Ring then some 8 wells might be required to provide the required well field output. Figure 2 shows a possible 8 No. production well network.

The pumped groundwater could be collected by a ring or collector main and pumped via a single main to the nearby Jordanstown Reservoir as indicated in Figures 1 & 2.

Note: The number of abstraction points will be a function of the transmissivity of the bedrock and the hydraulic efficiency of the wells. This situation is often compared to drawing water from a beaker with a single straw, where many less efficient straws would be required to achieve the same result in the same time. However, the number of straws

(or wells) required does not diminish the value of the resource but only the cost of the achieving the abstraction.

The need for a high number of wells in low transmissive aquifers often renders such proposals too costly to bring into production. And so a cost – benefit analysis is required before exploring in low transmissive aquifers.

The final location of the production wells in the Nevitt-Tooman area would naturally follow on from the results of the trial wells and of course be positioned as not to interfere with housing, the M1, roads, gas main etc. The proximity to the existing Jordanstown Reservoir being an important consideration.

5. Zone of Influence and Groundwater Catchment Boundary

The TES Report of January 2007 (page 88) on the Bog of the Ring scheme concluded that the recharge to the limestone aquifer varied from 57mm to 322mm/year. The low recharge values reflecting areas of thick clay overburden with the higher recharge occurring where the overburden is more permeable and the bedrock closer to the surface. TES concluded that 25% of the catchment was recharged at the higher rate while the lower recharge rate applied to the remainder.

It follows that the average recharge over the Bog of the Ring catchment is c.120mm/year allowing for the extent of the sustainable groundwater catchment area defined in the TES Report (page 90).

As the overburden and bedrock conditions are broadly similar at Nevitt-Tooman to those described by both TES and the GSI at the Bog of the Ring it is reasonable to apply the average recharge conditions at the Bog of the Bog to a possible groundwater abstraction at Nevitt-Tooman. This would suggest that a groundwater catchment of some 12km² in area and with an average annual recharge of 120mm would sustain a well field abstraction of 4,000 m³/day .

A higher average recharge would naturally lead to a more restricted groundwater catchment.

The likely extent of the groundwater catchment boundary associated with the abstraction of 4,000m³/day from a well field at Nevitt-Tooman is shown on Figure 3.

3. Need For Computer Modeling

The picture presented in Figure 3 is derived from a qualitative examination of the groundwater flow conditions and in particular of the 'investigations to date'. The required quantitative picture can only be provided by the modeling exercise previously requested of the Applicant by the Agency.

For example, the picture presented in Figure 3 is representative of a steady state situation and takes no account of variations between the summer and winter conditions as shown in the Applicant's hydrographs. Such transient conditions and the possible interaction (if any) between the Bog of the Ring abstraction and a possible abstraction at Nevitt-Tooman would be best examined with the modeling exercise requested earlier by the Agency.

The impact of induced recharge to the aquifer by the lowering of the water table within the Nevitt-Tooman catchment zone could also be examined. This would likely increase the average recharge rate and lead to a reduction in the extent of the groundwater catchment supplying the pumping wells. This option is not possible at the Bog of the Ring where it is necessary to maintain water levels in the associated wetland.

A modeling exercise would provide a much better definition of the catchment boundary taking into account of the;

- groundwater flow pattern presented by the Applicant
- distribution of gravels
- distribution of fault lines
- the relative transmissivity of the bedrock formations
- distribution of recharge rates.

That the GSI was able to undertake a modeling exercise to establish source protection zones at the Bog of the Ring so too is it possible to undertake a similar modeling exercise to examine the potential for a similar abstraction at Nevitt-Tooman.

4. Fault Beneath Footprint

On a less serious note, the Agency can rest assured that the postulated fault beneath the proposed landfill is extremely unlikely to ever be reactivated and so the Agency should have no worries in this regard.

The issue with the fault lies not with any threat to the structural foundation of the landfill but rather the value of the associated deformation of the limestone bedrock. The increased transmissivity associated with the fault is clearly demonstrated by the rapid reduction in the groundwater gradient in this area.

5. Conclusions

The investigations to date clearly indicate that a significant groundwater resource can be developed to the south of Decoy Bridge and particularly at Nevitt-Tooman.

This qualitative analysis indicates that the groundwater resource located to the south of Decoy Bridge can be developed without interference with the existing Bog of the Ring scheme.

The groundwater catchment boundary associated with the development of this resource to the south of Decoy Bridge would include the planned landfill site at Nevitt.

The development of the landfill at this location would compromise the future exploitation of this natural renewable groundwater resource by either the Local Authority or the neighbouring landowners.

It would be considered inappropriate to locate the planned landfill within the catchment of the Bog of the Ring scheme.

It is equally unsustainable to locate the landfill within the catchment of a possible similar scheme at Nevitt-Tooman simply because the production wells have yet to be drilled and commissioned.

This position is already dealt with in the GSI's / DOELG's / EPA's Groundwater Protection Scheme manual where it is 'Unacceptable' to develop a landfill within the Inner Source Protection Area of a production well. Such a protection must surely also be available to as yet undeveloped but proven groundwater resource.

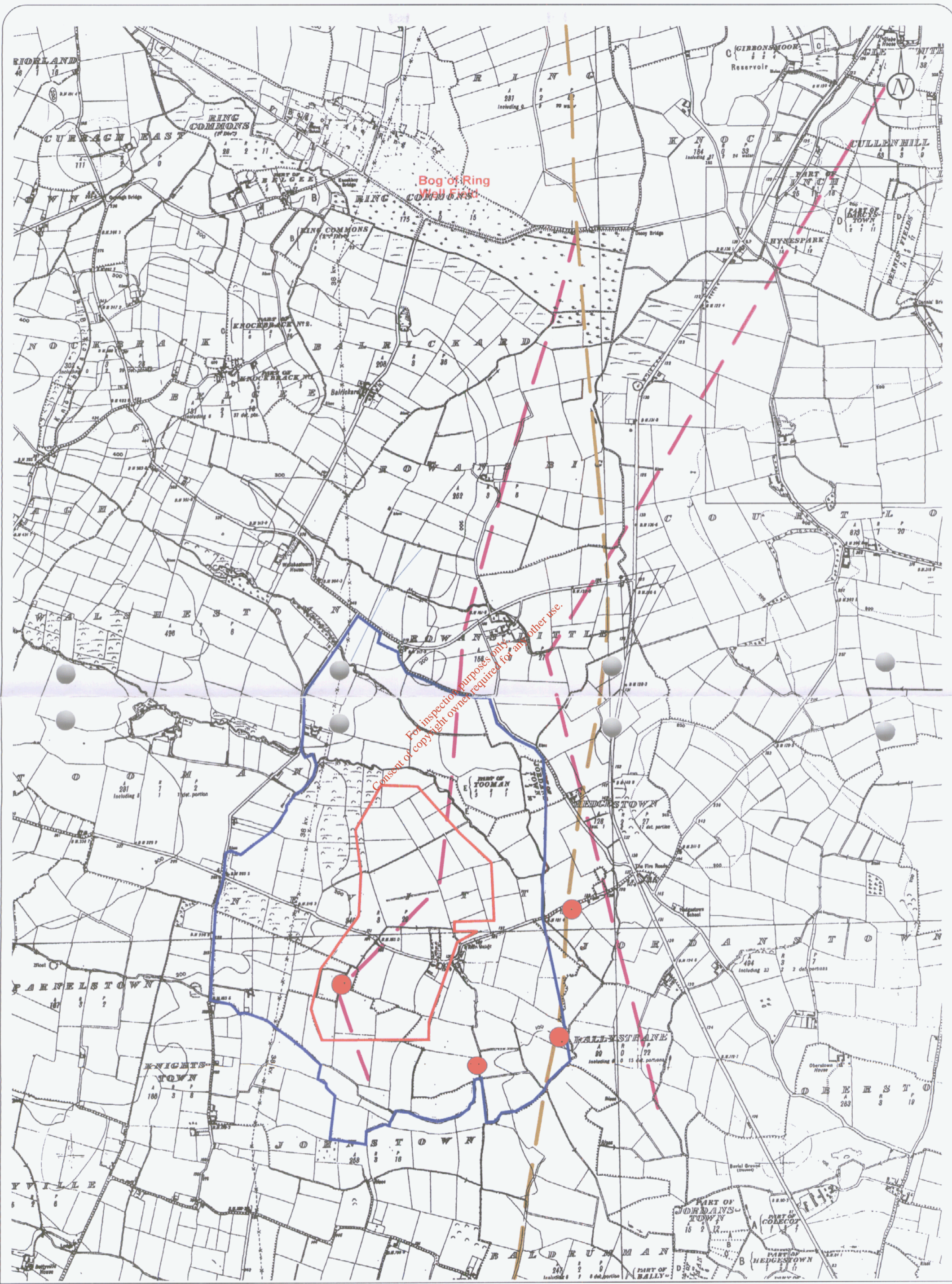
The EIS did not identify either the existence or scale of the groundwater resource that potentially could be developed to the south of Decoy Bridge nor did the EIS identify the 'likely significant impact' of the landfill on this resource.

Hopefully the above qualitative resource analysis will have gone some small way to rebalance the situation and to inform the Agency of the hydrogeological conditions to the south of Decoy Bridge and especially at Nevitt-Tooman.

The previously requested revised geological map and in particular the computer modeling are required to provide a *quantitative* basis for discounting the overall conclusions of the above *qualitative* resource analysis.

Yours Sincerely,





EurGeol Kevin T. Cullen PGeo



Note:
 Drawing is for diagrammatic purposes only.
 No measurements to be taken from the drawing.

 Possible Production Well Sites

Legend

-  : Outline of Study Area B
-  : Landfill Footprint
-  : Line of GSI Fault
-  : Possible Extent of Fault Zone

Site: Nevitt Landfill & Bog of the Ring Well Field

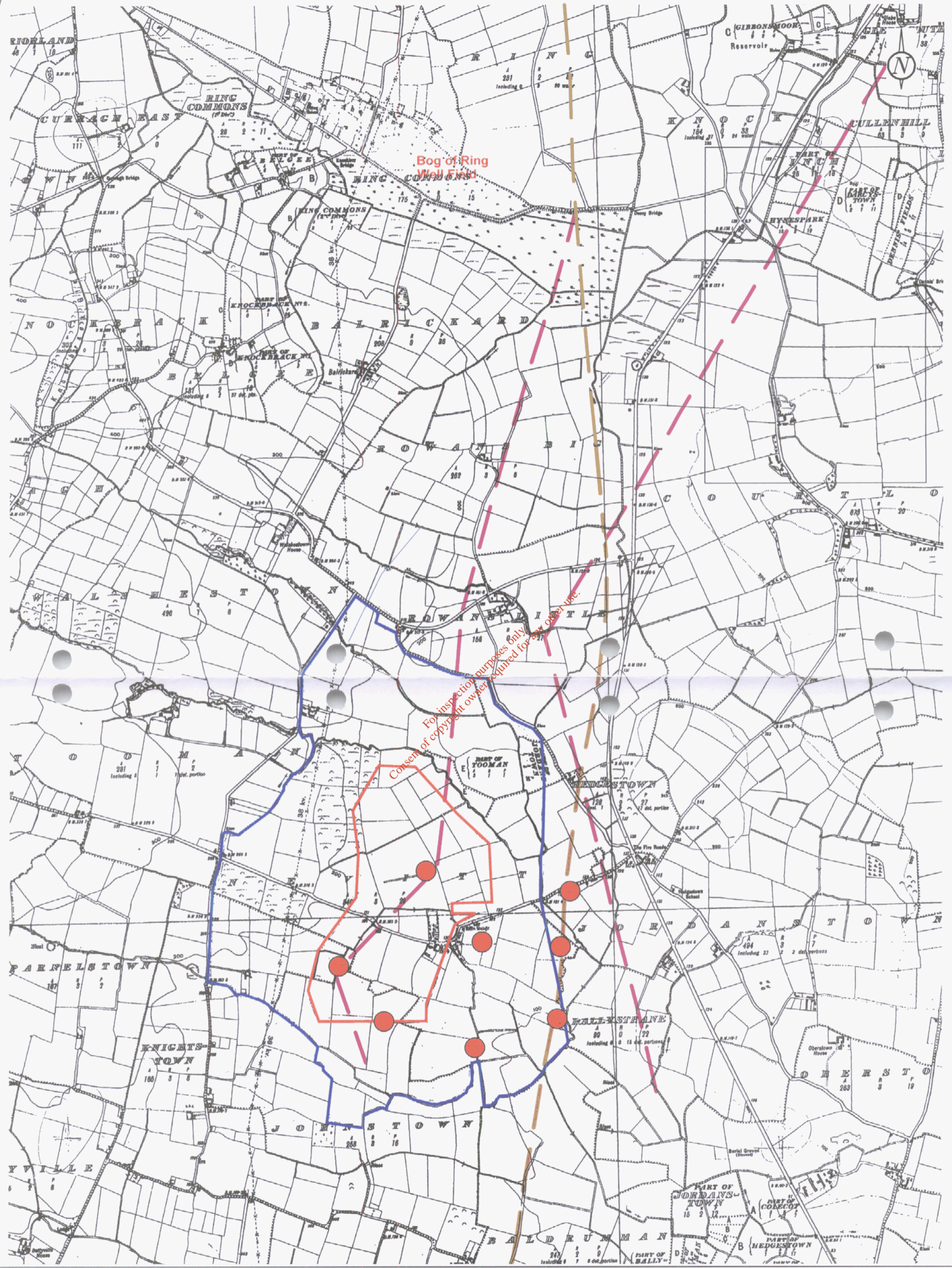
Title: Possible 4. No Well Abstraction Scheme

Drawn: --

Scale: Not to Scale





Job. No: --

Figure 1



Note:
 Drawing is for diagrammatic purposes only.
 No measurements to be taken from the drawing.

 Possible Production Well Sites

- Legend
-  : Outline of Study Area B
 -  : Landfill Footprint
 -  : Line of GSI Fault
 -  : Possible Extent of Fault Zone

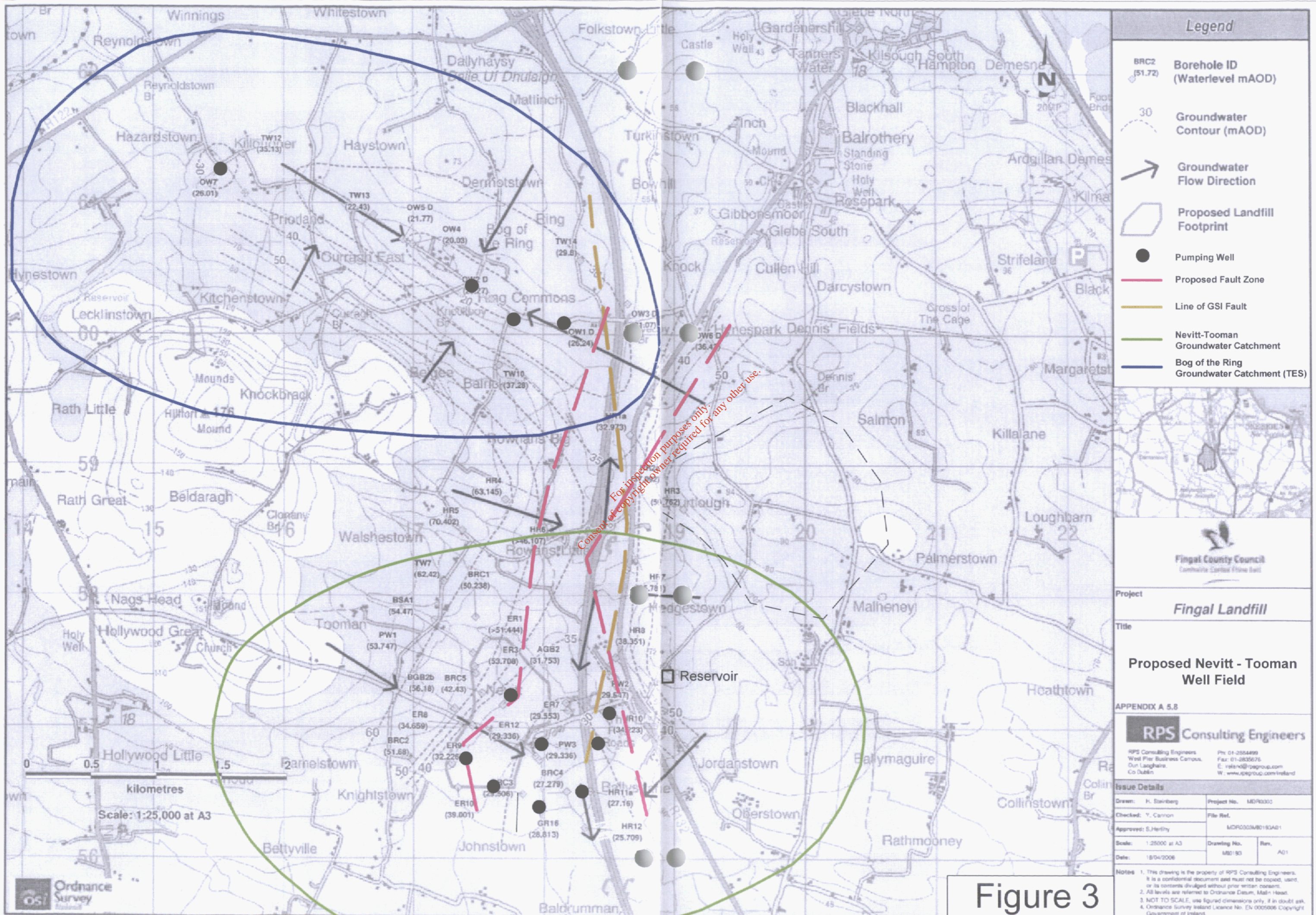
Site: Nevvitt Landfill & Bog of the Ring Well Field

Title: Possible 8. No Well Abstraction Scheme

Drawn: -- Scale: Not to Scale

Job. No: --

Figure 2



Legend	
BRC2 (51.72)	Borehole ID (Waterlevel mAO)
30	Groundwater Contour (mAO)
→	Groundwater Flow Direction
[Blue Outline]	Proposed Landfill Footprint
●	Pumping Well
— (Red Dashed)	Proposed Fault Zone
— (Yellow)	Line of GSI Fault
— (Green)	Nevitt-Tooman Groundwater Catchment
— (Blue)	Bog of the Ring Groundwater Catchment (TES)



Project
Fingal Landfill

Title
Proposed Nevitt - Tooman Well Field

APPENDIX A 5.8
RPS Consulting Engineers
RPS Consulting Engineers
West Pier Business Campus,
Dun Laoghaire,
Co Dublin
Ph: 01-2854499 Fax: 01-2835676
E: rps@rpsgroup.com W: www.rpsgroup.com/ireland

Issue Details		
Drawn: H. Steinberg	Project No. MDP0303	
Checked: Y. Cannon	File Ref.	
Approved: S. Herlihy	MDP0303MD193A01	
Scale: 1:25000 at A3	Drawing No. MDP193	Rev. A01
Date: 18/04/2008		

Notes
1. This drawing is the property of RPS Consulting Engineers. It is a confidential document and must not be copied, used, or its contents divulged without prior written consent.
2. All levels are referred to Ordnance Datum, Mean Sea Level.
3. NOT TO SCALE, use figured dimensions only. If in doubt ask.
4. Ordnance Survey Ireland Licence No. EN 0005006 Copyright Government of Ireland.

Figure 3