



126635-21/12/2012-EIS-Part A

ENVIRONMENTAL IMPACT STATEMENT

PROPOSED EXTENSION TO INTEGRATED PIG PRODUCTION FARM

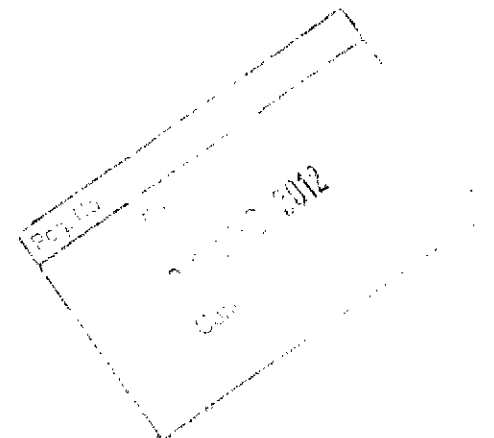
AT

ANNISTOWN
KILLEAGH
CO CORK

FOR

EOIN O'BRIEN

*For inspection purposes only.
Consent of copyright owner required for any other use.*



DECEMBER 2012

ENVIRONMENTAL IMPACT STATEMENT - TABLE OF CONTENTS		PAGE
1.	PART 0 - NON-TECHNICAL SUMMARY	
2.	PART 1 - TECHNICAL SUMMARY	
1	INTRODUCTION	10
	1.1 Relevant Regulations for Environmental Impact Statements (EIS)	10
	1.2 National Policy	10
	1.3 Organisations and Bodies Consulted	11
2	DESCRIPTION	12
	2.1 Overall Description	12
	2.2 Size and Scale of the Proposed Development	12
	2.3 Siting, Design, Construction and Structural Details	13
	2.4 Types and Quantities of Co Product and Waste	13
	2.5 Animal Carcasses	13
	2.6 Mortality, Transport and Disposal of Carcasses	14
	2.7 Other Wastes	14
	2.8 Details of Services Required	14
	2.9 Details of Feedstuffs	15
	2.10 Pig Manure Storage	15
	2.11 Accidental Spillages	15
	2.12 Control of Rodents	16
3	HUMAN ENVIRONMENT	17
	3.1 Description of Alternatives Considered	17
	3.2 Co Product Use	18
	3.3 Reduction of Risk of Disease Spread	19
	3.4 Depopulation	19
	3.5 De-Commissioning/Life Span of Development	19
4	ECOLOGY	20
	4.1 Ecological Screening Report	20
	4.2 Flora & Fauna Report	26
5	HYDROLOGY	29
	5.1 Water Quality Analysis	29
	5.2 Groundwater and Surface Water	29
	5.3 Drainage from the Site	30

For inspection purposes only.
Consent of copyright owner required for any other use.

6	CUSTOMER LANDS AND APPLICATION OF PIG MANURE	31
	6.1 Customer Lands	31
	6.2 Pig Manure	31
	6.3 Pig Manure Application	31
7	AIR QUALITY & NOISE	33
	7.1 Air Quality	33
	7.2 Noise	33
8	LANDSCAPE AND VISUAL ASPECTS	35
	8.1 Proposed Site Structures	35
	8.2 Mitigation Measures	35
9	CULTURAL HERITAGE	36
10	TRAFFIC	37
	PUBLICATIONS CONSULTED	39

For inspection purposes only.
 Consent of copyright owner required for any other use.

APPENDICES

- 1. Groundwater Risk Assessment**
- 2. Emergency Response**
- 3. Vermin Control**
- 4. Customer Farmers**
- 5. Organic Manure Nutrients**
- 6. Buffer Zones**
- 7. Organic Manure Spread Dates**
- 8. Record of Movement of Organic Fertilisers**
- 9. Approved Landscaping Methods**
- 10. Maintenance of Soil Organic Matter**
- 11. Well Report**
- 12. Carcase Register**
- 13. Natura 2000 Site Synopsis**
- 14. Veterinary Waste Disposal Contract**
- 15. Veterinary Waste Register**
- 16. Refuse Waste Register**
- 17. Carcase Disposal Agreement**
- 18. Farm Structures**
- 19. Planning Application Maps and Drawings**

*For inspection purposes only.
Consent of copyright owner required for any other use.*

Part 1

0. NON-TECHNICAL SUMMARY

- 0.1 INTRODUCTION
- 0.2 PROJECT DESCRIPTION
- 0.3 HUMAN ENVIRONMENT
- 0.4 ECOLOGY
- 0.5 HYDROLOGY
- 0.6 CUSTOMER LANDS AND APPLICATION OF PIG MANURE
- 0.7 AIR QUALITY AND NOISE
- 0.8 LANDSCAPE & VISUAL IMPACT
- 0.9 CULTURAL HERITAGE
- 0.10 TRAFFIC

*For inspection purposes only.
Consent of copyright owner required for any other use.*

1. NON-TECHNICAL SUMMARY

0.1.1 INTRODUCTION

This pig farm currently has full planning permission to operate as a 600 sow integrated pig farm, permitted under planning Reference No S/06/4260. The pig farm is owned and operated by Mr Eoin O'Brien. The proposed development will occupy a landscaped site of approximately 6.35 hectares, (15.7 acres) outlined red on the attached maps and the land ownership of 15.43 hectares (38.1 acres) is outlined blue on the attached maps all included in Appendix 19. The site is covered by an IPPC Licence No. P0790-02 and the requirements of this still apply and continue to be complied with. The main reasons for increasing the operation to a 1500 sow integrated pig farm are as follows:-

- (i) The facility is at present supplying pigs for fattening to a leased pig farm unit also operated by Mr. Eoin O'Brien, the leased unit is located more than twenty miles away and the lease is due to expire. The proposed development will secure the future economic viability of the operation on the site and will lead to improved bio-security, whilst also ensuring the optimum environmental performance of the facility. The current practice of two separate facilities is not sustainable due to rapidly increasing transport costs, additional staff and general running costs involved in running two facilities. Transport costs were identified as one of the main weaknesses of the Irish Pig Industry in the Teagasc Development Strategy for the Irish Pig Industry 2008 to 2015.
- (ii) The new Animal Welfare Regulations (SI 311 of 2010) require greater floor space for weaner and finisher pigs. There are changes to washing/cleaning requirements as well as sows being kept in groups for periods of time during gestation, this has lead to a requirement for larger buildings. The proposed development will comply with the E.U. Regulations on Animal Welfare Statutory Instrument 311 2010 and the Farm Animal Welfare Advisory Council Code of Practice for the Welfare of Pigs and Council Directive 2008 120.
- (iii) The proposed works include demolition of 6 no. existing buildings. These are approximately 40 years old and are no longer fit for purpose. The proposed replacement buildings will conform to the highest standards and will comply with all the Department of Agriculture Specifications. The Teagasc Development Strategy for the Irish Pig Industry 2008 to 2015 identified a lack of investment in the upgrading of pig production facilities as a weakness in the industry that resulted in reduced efficiency levels. The proposed replacement of existing out dated facilities with modern buildings will help to redress this weakness.

0.1.2 The proposed extension to the integrated pig unit exceeds the thresholds in Schedule 5, Part 2, Section 13a of the Irish Planning and Development Regulations, 2001 (SI No. 600 of 2001).

0.1.3 The EIS was prepared having regard to the provisions of European Communities Directive 85/337/EEC as amended by Directive 97/11/EC on the assessment of the effects of certain public and private projects on the environment. This report was also prepared in accordance with the Irish Planning and Development regulations, 2001 (S.I. No. 600 of 2001) and the Planning & Development (Amendment) Act 2010). Due regard was given to the European communities (Environmental Impact Assessment Regulations 1989 to 1999. the EIS has been written so as to address relevant requirements as set out in paragraphs 1 and 2 of the second schedule of the European Communities (Environmental Impact Assessment) (Amendment regulations, 1999 (S.I. No. 93 of 1999).

0.1.4 The EIS was prepared by the following Project Members:-

GES Limited/IE environmental Engineers

David Morrissey, Environmental Consultant

Murphy McCarthy Consulting Engineers Limited

Teagasc

Keohane MSc., BSc., Cgeol M.I.E.I.

BSc (Agri), DIP Env. Sc. Archaeology NCEA

Tony Dunlea B.E., M.I.E.I.

Pig Production Development Unit,

Moorepark Food Research Centre,

Fermoy, Co. Cork

The Planning Application, drawings and building details were prepared by Murphy McCarthy Consulting Engineers Limited along with the Traffic Assessment. The main environmental sections were carried out by GES Limited/IE Environmental Consultants and Mr David Morrissey, Environmental Consultant. Mr Ciaran Carroll, Head of the Teagasc Pig Development Department provided advice and assistance

0.2 PROJECT DESCRIPTION

0.2.1. Eoin O'Brien intends to apply for Permission to demolish 6 no. buildings consisting of 3 no. fattening houses, weaner house, dry sow/farrowing house, pump house, to construct 8 no. low emission pig houses consisting of 4 no. fattening houses, 2 no. weaner houses, dry sow house and farrowing house. The development also includes an extension to the existing farrowing house, to construct a covered loading bay/yard area, computer room/pump house, store/office building, 5 no. feed bins, 4 no. water tanks, yard area with 2m high perimeter fencing, 2 no. covered underground pig manure storage tanks, landscaped earth berm to screen the site and construction of additional internal road areas, storm/soiled water collection systems and associated site works for the extension to the existing integrated pig farm.

0.2.2. Both the new building and replacement buildings for those being demolished will be low emission buildings, which incorporate emission reduction measures. These measures are currently the best available technique for the pig production sector. The proposed storage tanks will be underground and will be covered. The storage tanks under the proposed houses will be reinforced concrete tanks. The proposed development will greatly improve the existing situation from an environmental and aesthetic perspective. The other buildings such as a computer room/pump house and store/office building are necessary for the running of the facility. The bins and water tanks will be similar to the existing equipment on site. In order to screen the development, the existing earth berm will be extended and additional earth berms provided on site from the material excavated during construction.

0.3 HUMAN ENVIRONMENT

0.3.1. The development site lies in a rural area 1.5km east of Mogeely and 3.5km west of Killeagh. Outside of a small number of dwellings in the locality, the landscape is almost entirely agricultural in character. The site is well screened from local residences due to a combination of topography, hedgerows set back from the public road and the existing earth berm on site.

0.3.2. The proposed 1500 sow integrated unit will give direct employment to 9 staff members, including a trained manager. It will also give rise indirectly to another 50 jobs in the pig meat processing, milling and service sectors. Thus creating an additional 5 jobs in the unit itself and an additional 30 jobs in the pig processing and service industries.

0.3.3. The development will have a positive impact on human beings from the increased employment it will create and the contribution it will make to food production both directly in the production of pig meat and indirectly through the supply of pig manure as fertiliser for farm lands.

0.3.4. The Teagasc Development Strategy for the Irish Pig Industry 2008 to 2015 reported that the pig industry is the third most important agricultural sector after beef and dairy production. The report stated that the pig production sector employs 7,500 people and generates €1.2 billion of revenue annually. Approximately 60% of the pork produced in Ireland is exported and the worldwide consumption of pork is increasing steadily. It has been envisaged in the Interim report prepared by the Pig Industry Strategy Steering Group (presented to the Minister in January 2010) that the industry can be grown from a €1.2 billion industry to a €1.5 - €1.7 billion industry by increasing annual output from 3.2 million pigs to 4.8 million pigs by 2015. The interim report also stated that this increased output would generate 1,500 additional jobs in the economy and drive exports to aid economic recovery. In addition to this the interim report stated that in order to achieve this increased output and employment the national sow herd would need to be increased from 150,000 sows up to 200,000 sows by 2015. A subsequent report prepared by the Irish Association of Pigmeat Processors (I.A.P.P) in April 2010 stated that output could continue to be grown further beyond 2015 to reach 5.2 million pigs by 2020. In order to achieve this level of output the I.A.P.P. report stated that the national sow herd would need to be increased to 210,000 sows by 2020. The proposed development will contribute to reaching the targets set out in the reports mentioned above.

For inspection purposes only
Consent of copyright owner required for any other use.

0.4 ECOLOGY

0.4.1. Within the EIS in Section 4.1 an Ecological Screening Report has been carried out as required under the Habitats Directive. The nearest Natura 2000 sites are as follows:- Blackwater River (Cork/Waterford) S.A.C.No 002170 located 13 kilometres to the east, Ballymacoda (Clonpriest/Pilmore) S.A.C. 000077 located 8 kilometres to the south east, Ballycotton Bay S.P.A. 004022 11 kilometres south of the facility and Cork Harbour S.P.A. 004030 located 11 kilometres to the south west. All four Natura 2000 sites consist of harbours and estuary areas.

The Screening Report concludes that Appropriate Assessment (AA), Natura Impact Statement (NIS) and Natura Impact Reports (NIR) are not required. There are no environmental designations pertaining to the proposed development site. The site does not form part of any Natural Heritage Area (NHA), Special Protection Area (SPA), Special Area of Conservation (SAC), Statutory Nature Reserve or National Park. None of the habitats noted directly correspond to those protected under Annex 1 of the EU Habitats Directive (92/43/EC). The proposed development will not result in the loss of habitat types. No rare or threatened flora or fauna species were observed on the site. Internal and external hedges will not be removed.

0.5 HYDROLOGY

0.5.1. Within Appendix 1 we enclose a Groundwater Risk Assessment carried out by IE Consulting/GES Ltd. They were engaged to undertake a groundwater risk assessment at the pig unit, to support the IPPC License application. The scope of the work included a desk based study to review all relevant documentation, to assess existing data, to undertake a site visit, to obtain groundwater level measurements from the on site well, to identify risk sources at the site, and to make recommendations for future groundwater assessment or monitoring works at the site. The report concluded that the risk sources at the site are the pig manure tanks/ channels at the site and the soak away for domestic effluent. The report proposed the monitoring of any new leak detection systems on site, the bunding of all fuel tanks on site and to assess the integrity of all tanks and pipelines on site. The proposed development will improve the existing situation as a new leak detection system will be provided under the new buildings/ tanks as shown on the drawings in Appendix 19. The tanks under the old buildings are to be demolished and the existing slurry basin is being removed. All new tanks and storage tanks under the buildings will be reinforced concrete tanks in compliance with the Department of Agriculture Specifications.

0.5.2. All clean water from the buildings will be diverted to a storm water collection system and soakaways. The stormwater system both existing and proposed are on the Site Layout Plan in

Appendix 19. The stormwater monitoring point SW1 is being relocated as noted on the drawing. This will be visually inspected on a weekly basis and observations will be recorded on a storm water monitoring register, in addition to this a storm water sample will be taken from the monitoring chamber on a quarterly basis and the sample will be submitted for laboratory analysis. The result of the analysis will also be retained on file in compliance with the conditions set out in the Integrated Pollution Prevention & Control Licence (IPPC Licence) for the facility. Soiled water from routine washing of pig pens will be contained in the slatted tanks under the pens.

0.6 CUSTOMER LANDS AND APPLICATION OF PIG MANURE

0.6.1. The annual production of pig manure from the proposed 1,500 sow integrated unit will be 27,690m³ per annum. see Section 6.2.1. There is demand for 59,394m³ per annum of pig manure for fertiliser by local farmers see Appendix 4. The volume of storage capacity on the site will be 33,614m³ (See Farm Structures Table Appendix 18). Statutory Instrument 610 of 2010 (commonly known as the Nitrates Directive) sets out a minimum capacity of 26 weeks storage for pig production units. The capacity proposed is enough to hold pig manure for 63 weeks which is far in excess of the minimum requirement of 26 weeks.

0.6.2. The pig manure will be applied as fertiliser on farm lands. There is demand for 59,394m³ per annum of pig manure as fertiliser from farmers in the locality of the unit. There is a list of customer farmers provided in Appendix 4 showing their farm codes and the amount of pig manure each farmer requires. The names of the individual farmers are maintained and available to view on the Environmental Protection Agency site register for the facility. The requirements of each farmer has been calculated in compliance with the nutrient limits set out in Statutory Instrument 610 of 2010 (i.e. the Nitrates Directive). A record of movement of organic fertilisers form (Record 3 form see Appendix 8) is completed for each farmer documenting the total amount of pig manure received by them. The Record 3 forms are submitted annually to the Nitrates Section of the Department of Agriculture Fisheries and Food and copies of them are retained on file.

0.7 AIR QUALITY & NOISE

0.7.1. The site is located in a rural area and the local environment is dominated by agricultural activities. Effects of the existing and proposed development on air, are and will continue to be insignificant outside the buildings. The ventilation system in the buildings will ensure that foul air is dispelled high into the atmosphere where it will mix with fresher air and thus minimise odour. Mitigation

measures taken will minimise the effects of odour, including the rations fed to the pigs being formulated to minimise emissions.

0.7.2. The main sources of noise on the development will be at feeding time which is for a duration of 10-15 minutes and from delivery vehicles. The noise generated on the farm is similar to noise generated on any farm enterprise. Noise levels are so insignificant that they do not require monitoring under the IPPC License conditions. The buildings proposed will be low emission buildings and incorporate emission reduction measures, this includes insulation internally throughout the ceilings which reduces the noise levels in the external vicinity of the building.

0.7.3. Thus the measures that have been put in place will ensure that impact/effects of the development on human beings will be minimised. The proposed development will improve the existing situation as they are designed as low emission buildings and the existing buildings to be demolished are 40 years old.

0.8 LANDSCAPE AND VISUAL IMPACT

0.8.1. The development is located in an agricultural area, the proposed and existing buildings will and do blend into the surrounding landscape. The development would be similar to a large farm enterprise. The buildings eaves, apex and ridge heights are kept to the minimum height and pitch outlined in the Department of Agriculture farm building specifications.

0.8.2. The development will be landscaped by extending the existing earth berm and provision of trees and shrubs listed in Appendix 9. Thus, there will be no nuisance or loss of amenity. The development will involve excavating for tanks and building foundations. The material excavated will be used to construct earth berms. No hedgerows will be removed as part of the development.

0.9 CULTURAL HERITAGE

0.9.1. There will be no damage to any site of archaeological or historic interest as a result of this development. Disturbance of the landscape will be minimal during the construction period. The site will be suitably landscaped, with the planting of trees etc., in a manner sensitive to the environment in order to fully screen the site and to enhance biodiversity. A shelter belt will be planted on the earth berm shown on the Site Layout Plan drawings in Appendix 19 using tree and shrub species listed in Appendix 9.

0.10 TRAFFIC

0.10.1. The development site is on the northern side of the L3809. This is a local primary route. As mentioned previously the site is 1.5km from Mogeely and 3.5km from Killeagh. The surrounding road network currently caters for the existing facility and other agriculture and local traffic in the area.

0.10.2. The proposed development will generate a maximum of 30 no. vehicles/day. This equates to 4 no. vehicles/hour. The existing road network has a capacity of 470 no. vehicles/hour which is well in excess of the 4 no. vehicles/hour which will be generated.

0.10.3. In conclusion, the surrounding road network has sufficient capacity to accommodate additional minor levels of traffic generated. The existing roadway is lightly trafficked and would be typical of any rural area.

For inspection purposes only.
Consent of copyright owner required for any other use.

Part 2

1. ENVIRONMENTAL IMPACT STATEMENT

- 1.0 INTRODUCTION
- 2.0 PROJECT DESCRIPTION
- 3.0 HUMAN ENVIRONMENT
- 4.0 ECOLOGY
- 5.0 HYDROLOGY
- 6.0 CUSTOMER LANDS AND APPLICATION OF PIG MANURE
- 7.0 AIR QUALITY AND NOISE
- 8.0 LANDSCAPE & VISUAL IMPACT
- 9.0 CULTURAL HERITAGE
- 10.0 TRAFFIC

*For inspection purposes only.
Consent of copyright owner required for any other use.*

1 INTRODUCTION

1.1 Relevant Regulations for Environmental Impact Statements (EIS)

The EIS was prepared having regard to the provisions of European Communities Directive 85/337/EEC as amended by Directive 97/11/EC on the assessment of the effects of certain public and private projects on the environment. This report was also prepared in accordance with the Irish Planning and Development regulations, 2001 (S.I. No. 600 of 2001) and the Planning & Development (Amendment) Act 2010). Due regard was given to the European communities (Environmental Impact Assessment Regulations 1989 to 1999. the EIS has been written so as to address relevant requirements as set out in paragraphs 1 and 2 of the second schedule of the European Communities (Environmental Impact Assessment) (Amendment regulations, 1999 (S.I. No. 93 of 1999).

1.2 NATIONAL POLICY

1.2.1. The proposed development is in line with national policy,

- (i) as expressed by the Minister for Agriculture in food harvest 2020
- (ii) as expressed in the development strategy for the Irish Pig Industry 2008 to 2015 prepared by the Teagasc Pig Production Group and
- (iii) is in line with the Interim Report 2010 prepared by the Pig Industry Strategy Steering Group and also
- (iv) the 2020 strategy for the Irish Pigmear Sector prepared by the Irish Association of Pigmear Processors. The Interim Report mentioned in (iii) sets out a growth potential for an increase in output from 3.2 million pigs per annum in 2009 to 4.8 million pigs per annum in 2015. This increase would grow the Pig Meat Sector from a €1.2 billion industry to a €1.5-€1.7 billion industry. This would generate significant additional export earnings and create in the region of 1,500 additional direct jobs in the economy. In order to achieve this potential the National sow herd will have to increase from 150,000 sows to 200,000 sows.

1.2.2. The Irish Association of Pig Meat Processors have reported that a further increase of national sow numbers by 10,000 sows would increase National annual output to 5.2 million pigs creating an additional 2,000 direct jobs in the industry and growing pig meat exports by 150,000 tonnes.

1.2.3. The proposed development is in accordance with Cork County Council Planning Policy as outlined in the County Development Plan Volume 1-Chapter 5-Economy and Employment. This section of the County Development Plan states that it is an objective of the Development Plan "to support the development of existing farm units" (Ref ECON 5-3). The proposed development will secure the future economic viability of the operation and will lead to improved bio-security whilst also ensuring the optimum environmental performance of the facility.

1.3 ORGANISATIONS AND BODIES CONSULTED

1.3.1. The scoping exercise of the EIS was carried out in line with previous submissions to Cork County Council. Other organisations and bodies consulted include: -

Cork County Council Planning Department
Geological Survey of Ireland.
Office of Public Works.
Department of Agriculture.
Department of the Environment.
National Parks and Wildlife Service.
Teagasc
Environmental Protection Agency.
Sites & Monuments Record

2. DESCRIPTION

2.1 Overall Description

2.1.1. Eoin O'Brien intends to apply for Permission to demolish 6 no. buildings consisting of 3 no. fattening houses, weaner house, dry sow/farrowing house, pump house, to construct 8 no. low emission pig houses consisting of 4 no. fattening houses, 2 no. weaner houses, dry sow house and farrowing house. The development also includes an extension to the existing farrowing house, to construct a covered loading bay/yard area, computer room/pump house, store/office building, 5 no. feed bins, 4 no. water tanks, yard area with 2m high perimeter fencing, 2 no. covered underground pig manure storage tanks, landscaped earth berm to screen the site and construction of additional internal road areas, storm/soiled water collection systems and associated site works for the extension to the existing integrated pig farm.

2.1.2. The proposal will accommodate a 1,500 sow fully integrated pig production unit, bringing the carrying capacity to 450 farrowing sows, 1050 dry sows, 9,000 weaners, 9,000 fatteners, 400 gilts and 10 boars. The proposed development entails the demolition of the existing outdated facilities on site and replacing them with modern state of the art facilities, it will also involve consolidating the existing enterprise as the practice of transporting weaners to a leased fattening facility 20 miles away will be discontinued. The development will improve management efficiency and also improve bio-security and herd productivity.

2.2 SIZE AND SCALE OF THE PROPOSED DEVELOPMENT

2.2.1. The size and scale of the proposed development have been chosen after consideration of such matters as the site, customer demand for manure, economic viability and labour efficiency.

2.2.2. In full production the pig population at this site will comprise at any one time of the following maximum stock numbers; 1050 dry sows, 450 suckling sows with bonhams, 9,000 weaner pigs, 9,000 fattening pigs, 400 maiden gilts and 10 boars. Pigs will be removed for slaughter at approximately six months of age.

2.3 SITING, DESIGN, CONSTRUCTION AND STRUCTURAL DETAILS

2.3.1. The proposed development is situated on the site of an existing pig unit facility, which was constructed in 1976, with extensions added most recently in 2006. Development involves the construction of new buildings and items of plant to accommodate the additional animal numbers. The buildings will comply with the new Animal Welfare Requirements which require additional floor area per animal as set out in S.I. 311 of 2010. The new housing designs comply with the low emission designs set out in the BREFF notes (2006). Details of the site layout and design are shown in Appendix 19.

2.4 TYPES AND QUANTITIES OF CO PRODUCT & WASTE

2.4.1. The co-product produced is pig manure. The wastes produced are animal carcasses, emissions, veterinary waste, fluorescent tubes and general refuse.

2.4.2. The major co product from the proposed facility is pig manure; the yearly production of which amounts to 27,690 m3. This pig manure will be exported to customer farms as fertiliser.

TABLE 1: Pig manure Production (See Appendix 5)

Water:Meal Ratio of finishers	M3/sow/week	Number of sows	Total M3/week	Total M3/year
2.5:1	0.355	1,500	532.5	27,690

Source S.I. 610 of 2010 Table 1.

2.5 ANIMAL CARCASSES

2.5.1. The anticipated number of animal carcasses for disposal due to mortalities on an annual basis is estimated as follows:-

Sows	@	4%	=	60
Piglets	@	8%	=	2,450

Weaners	@	1.5%	=	500
Fattening Pig	@	1%	=	325

Carcasses will be temporarily stored in a covered sealed metal skip for transport and disposal to a licensed rendering plant at regular intervals. A signed agreement to this effect is given in Appendix 14.

2.6 MORTALITY, TRANSPORT AND DISPOSAL OF CARCASSES

2.6.1. Management practices on the unit will be actively focused on minimising pig mortality. Nevertheless, some will occur and the mortality under good management has been estimated in Section 2.5.1.

2.6.2. Carcasses will be temporarily stored in a covered sealed trailer skip for transport to a licensed rendering plant at regular intervals in the manner normal on such farms.

2.7 OTHER WASTES

2.7.1. A register of all other wastes (i.e. carcasses, veterinary waste, fluorescent tubes, and refuse) will be maintained on site, recording the date, volume and destination. A copy of these registers will be available on site for inspection by Cork County Council, and the EPA at any reasonable time.

- Carcass Register. (see Appendix 14)
- Veterinary Waste Register (see Appendix 15)
- Refuse Register (see Appendix 16)

2.8 DETAILS OF SERVICES REQUIRED

2.8.1. The estimated daily water requirement of the proposed unit in full production will be 83,000 litres (83 M3). A bored well provides water and this well has sufficient capacity for the new development. The analyses of a water sample taken from this well is included in Appendix 11, along with location map. The results of water sample analysis are within the parameters set by the E.P.A. The well will be relocated as part

of the proposed development, this is noted on the attached Site Layout Plan drawings in Appendix 19.

2.8.2. An 80 KVA transformer, adjacent to the site provides electricity supply. A generator on site provides the back up supply with 150 KVA capacity. The existing pole infrastructure servicing this site will be sufficient to deal with the additional power required for this development.

2.9 DETAILS OF FEEDSTUFFS

2.9.1. About 170 tonnes per week of a balanced meal mixture will be consumed on the unit by all categories of pigs. This feed supplied uses the following raw materials (barley, wheat, soyabean meal, sugar beet pulp, pollard, Soya oil, fish meal, molasses, minerals and vitamins). All feeds will be prepared on a low protein basis. This work is supervised on site by Devenish Nutrition. All pigs will also have access to water in compliance with Animal Welfare regulations S.I. 311 of 2010.

2.10 PIG MANURE STORAGE

2.10.1. All pig manure on site will be collected from the animals by underground concrete tanks, built to Dept of Agriculture specifications. A freeboard of 200mm has been allocated to all tanks under slats to contain gasses in compliance with condition 6.8 of the I.P.P.C licence for the facility. This is included for in the Farm Structures Record Appendix 18. It is proposed that new storage tanks will be provided with a leak detection system as shown on the drawings in Appendix 19. There will be no impact from these on surface or ground waters.

2.11 ACCIDENTAL SPILLAGES

2.11.1. Pig manure is the only material of concern, as oil storage tanks on site will be locally banded. The risk of any sizeable leakage or spillage is minimal. In the event of an accidental spillage of a tanker leaving the site the owner/manager will notify Cork County Council and the EPA and will take the necessary measures to clean up such a spillage. An Emergency Response Procedure has been put in place to deal with such a situation. This procedure is included in Appendix 2. An Emergency Response Procedure is also included in Appendix 2 to deal with any Emergency situation developing on site which may create an environmental risk.

2.12 CONTROL OF RODENTS

2.12.1. Staff members successfully carry out the control of rodents on the site. Mr Eoin O'Brien insures that this work is carried out professionally and that proper records are maintained. A copy of the format used to record this procedure is included in Appendix 3 and is retained on file for the I.P.P.C. licence.

*For inspection purposes only.
Consent of copyright owner required for any other use.*

3. HUMAN ENVIRONMENT

3.1 DESCRIPTION OF ALTERNATIVES CONSIDERED

3.1.1 Location of Structures

The site location maps, 1:10560 (6" to 1 mile) and 1:2500, Building Drawings and Site Layout Plans for this development are included in Appendix 19 . The proposed unit is located in the Townland of Annistown, about 1.5km east of Mogeely and 3.5km west of Killeagh. The unit is well set back from the public road which links Killeagh to Mogeely. This facility is located in a wholly agricultural area.

3.1.2 Description of Site

3.1.2.1. There is already an existing pig farm at this site and it is ideally suited to the proposed development as it would consolidate the enterprise and therefore improve the efficiency of production.

3.1.3 Alternative Site Layout and Designs

3.1.3.1. Alternative site layouts and designs were considered. The proposed site layout minimises excavation and maximises the screening of the buildings by the proposed and existing earth berms. The optimum depth of tank was decided upon on the basis of air draughts, capacity, emission reduction and costs etc.

3.1.3.2. Generally the most economical and efficient layout for pig production and pig movement was designed for, with a view to reducing environmental impacts, compliance with animal welfare regulations and providing a safe and healthy environment for staff and livestock.

3.1.4 Alternative processes considered

3.1.4.1 There is no other satisfactory alternative process for pig production. The pig unit is designed to operate with the best technology under the supervision of a highly trained and experienced manager.

3.1.5 Employment and Human Well-being.

3.1.5.1. In full production the pig unit will employ 9 full time staff. These staff will reside locally with a significant positive economic impact on the area. The unit will also indirectly lead to another 50 jobs in pig meat processing, feed compounding and the service sectors.

3.1.5.2. The Teagasc Development Strategy for the Irish Pig Industry 2008 to 2015 reported that the pig industry is the third most important agricultural sector after beef and dairy production. The report stated that the pig production sector employs 7,500 people and generates €1.2 billion of revenue annually. Approximately 60% of the pork produced in Ireland is exported and the worldwide consumption of pork is increasing steadily. It has been envisaged in the Interim report prepared by the Pig Industry Strategy Steering Group (presented to the Minister in January 2010) that the industry can be grown from a €1.2 billion industry to a €1.5 - €1.7 billion industry by increasing annual output from 3.2 million pigs to 4.8 million pigs by 2015. The interim report also stated that this increased output would generate 1,500 additional jobs in the economy and drive exports to aid economic recovery. In addition to this the interim report stated that in order to achieve this increased output and employment the national sow herd would need to be increased from 150,000 sows up to 200,000 sows by 2015. A subsequent report prepared by the Irish Association of Pigmear Processors (I.A.P.P) in April 2010 stated that output could continue to be grown further beyond 2015 to reach 5.2 million pigs by 2020. In order to achieve this level of output the I.A.P.P. report stated that the national sow herd would need to be increased to 210,000 sows by 2020. The proposed development will contribute to reaching the targets set out in the reports mentioned above.

3.2 Co. Product Use

3.2.1. This proposed development has the potential to provide a locally produced organic fertiliser product for customer farms in the area, thus reducing their dependence on imported chemical fertilisers that are produced from finite resources. The facility will also provide a market for locally grown grain, which can in turn be fertilised by the pig manure resulting from this development. In this way the proposed development will contribute to a more sustainable system of agriculture in the locality.

3.3 REDUCTION OF RISK OF DISEASE SPREAD

3.3.1. The economic viability of a pig production unit at going rates depends primarily on feed conversion ratio and low mortality. High standards of hygiene will ensure that disease is controlled and contained. Access to the unit is strictly restricted, to control the spread of disease to the pig herd. The procedures for dealing with dead animals, as set down in Section 2.6. are standard for the industry.

3.4 DEPOPULATION

3.4.1. Destocking of a unit or complete slaughter of stock on a unit because of a notifiable disease has not happened in Ireland for more than 40 years. In the unlikely event of such a disease outbreak, the Department of Agriculture takes total control. In this event Mr Tom O'Brien has an agreement with Duggan Waste Services Ltd, to remove all carcasses from the site in sealed containers, and delivery of same to a licensed rendering plant (See Appendix 8).

3.5 DE-COMMISSIONING/LIFE SPAN OF DEVELOPMENT

3.5.1. All pig units require a major capital investment every 10-15 years to keep them efficient and pleasant places to work. So long as this investment is made there is no reason that a unit of this type could not operate for up to 40 years. However, if for economic reasons or technical reasons this does not occur decommissioning will take place. All pig manure and organic matter will be thoroughly removed from the site. All equipment and materials of value will be salvaged. Unused feed, medication, and fuel will be returned to suppliers. It is then proposed that the unit be left standing after making it safe and secure. It is highly unlikely that this scenario would ever develop due to the high initial capital investment in the unit.

4. ECOLOGY

4.1 Ecological Screening Report

4.1.1 Introduction

4.1.1.1. The EU Birds Directive (2009/147/EC) and the EU Habitats Directive (92/43/EEC) state that member states are required to designate areas in order to protect certain habitats and species contained within them that are considered important to conserve. The designated sites are known as Special Areas of Conservation (SAC) or Special Protection Areas (SPA). The collective term Natura 2000 sites, is used to refer to Special Areas of Conservation and Special Protection Areas.

The EU Habitats Directive requires that an appropriate assessment is required where a project is likely to have a significant effect on the conservation objectives of any Natura 2000 site and the implementation where necessary of measures to preclude negative effects.

The guidelines for completing an appropriate assessment are outlined in "Assessment of plans and projects significantly affecting Natura 2000 sites, methodological guidance on the provisions of articles 6(3) and 6(4) of the Habitats Directive 92/43/EEC" (2001), Department of Environment, Heritage and Local Government (2009, revised February 2010) *Appropriate Assessment of plans and Projects in Ireland* and the National Parks and Wildlife Services (2010) Circular NPW 1/10 & PSSP 2/10 *Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities*. A step by step process is provided for in the guidelines.

The first step is referred to as screening and it is applied to determine whether a particular project would have significant environmental effects on a Natura 2000 site and if so would require the implementation of another step known as an Appropriate Assessment.

The Appropriate Assessment analyses the potential impact of a project on the integrity of a Natura 2000 site, with respect to its function, structure and conservation objectives. If it is found that there are adverse impacts on a Natura

2000 site the potential mitigation of such impacts must then be assessed. Alternative solutions must be examined if a project is to have an adverse impact on a Natura 2000 site. If no alternative solution is found the implementation of the plan may proceed only for imperative reasons of overriding public interest provided that compensatory measures that will offset the impact of the project on a Natura 2000 site are enacted.

4.1.2 Screening of Proposed Project

4.1.2.1. The project being proposed is the construction of pig accommodation and pig manure storage facilities at Annistown, Killeagh, Co. Cork. The project is to take place on the site of an existing pig production unit and will involve the replacement of some of the existing structures with modern state of the art accommodation in order to improve production efficiency. The proposal also involves the consolidation of the existing production facility by eliminating the requirement to transport pigs for finishing to a leased facility more than twenty miles away, thus eliminating the need to transport the pigs from the unit and also improving the biosecurity of the existing facility.

The proposed development will take place in an agricultural area and excavation of the site and construction of the new buildings will take place on an area of improved grassland containing a sown sward of perennial ryegrass (*Lolium perenne*) and white clover (*Trifolium repens*). The site is surrounded by agricultural lands to the North, East and West it is bounded by a road to the south. The nearest Natura 2000 site to the proposed development is approximately 8 kilometres away in a south easterly direction. The Natura 2000 site in question is the Ballymacoda (Clonpriest and Pilmore) site.

The boundary at the western side of the proposed site at Annistown consists of a section of well established hedgerow containing species such as hawthorn (*Crataegus monogyna*), ash (*Fraxinus excelsior*), sycamore (*Acer pseudoplatanus*) willow species such as sally (*Salix cinerea*), goat willow (*Salix caprea*) and eared willow (*Salix aurita*), holly (*Ilex aquifolium*) hazel (*Corylus avellana*) brambles (*Prunus spinosa*) furze (*Ulex europeas*), ivy (*Herera helix*) and occasional beech (*Fagus sylvatica*). The section of hedgerow on the western boundary will not be interfered with in anyway during the proposed construction process.

There is a stream flowing at the western side of the hedgerow forming the boundary of the property. The stream is known both as the Dower River and also as the Aughnasassonagh River. The river flows in a southerly direction and is a minor

tributary of the Womanagh River. This stream will not be interfered with in any way while the proposed construction works are being carried out.

The proposed development will have the following features

- The existing entrance and access avenue will be retained the trees lining the access avenue will also be retained.
- All pig manure will be stored in reinforced concrete tanks under the pig houses and also in holding tanks outside the houses. It will be directed to the holding tanks by means of underground channels constructed with reinforced concrete. It is proposed that a leak detection system will be put in place to monitor the integrity of the tanks.
- The pig manure will be transported from the storage tanks to local grassland and tillage farmers and it will be used as an organic fertiliser on their lands in compliance with Statutory Instrument 610 of 2010.
- All storm water from the site will be directed to a soak away and will be inspected weekly and sampled quarterly in compliance with the conditions set out in the I.P.P.C. license for the holding.
- An earthen berm will be put in place to the South, East and West of the site. The berm will be landscaped using a selection of tree and shrub species recommended by the Department of Agriculture. This will improve the aesthetic and biodiversity value of the site.

4.1.3 Designated Natura 2000 Site Ballymacoda (Clonpriest & Pilmore) 000077

4.1.3.1. The site of the proposed development at Annistown, Killeagh, Co. Cork is not located in a Natura 2000 site. The nearest Natura 2000 site to the proposed development is the Ballymacoda (Clonpriest & Pilmore) site located approximately 8 kilometres to the south east of the proposed site.

The Natura 2000 site at Ballymacoda is located mostly downstream of a bridge known locally as the Crompaun bridge on the R633 road between Youghal and Ballymacoda. A segment of the site extends approximately 500 metres upstream from the bridge in a northerly direction. The area of the site contains 486.53 Hectares of the Womanagh Estuary and the adjoining fields running from the Crompaun

Bridge down to the sea. The site code for this Natura 2000 site is SAC/SPA 000077 and a site synopsis for the area is attached in Appendix 18.

The site is made up of the estuary of the Womanagh River. The sands and mud flats of the estuary are of conservation interest for a number of macro invertebrate species. The flora of the estuary includes green algae (mostly *Enteromorpha* spp), various types of brown seaweeds and common cord grass (*Spartina anglica*). The site has been designated as it contains four coastal habitats listed in Annex I of the E.U. Habitats Directive. The four Annex I habitats are listed in Table 1 below.

Table 1. Annex I Habitat Types Present at Ballymacoda Natura 2000 Site.

Site Code	Habitat Code	Habitat	% cover Approx
000077	1140	Mudflats and sandflats not covered by seawater at low tide	65
000077	1130	Estuaries	12
000077	1330	Atlantic salt meadows	6
000077	1310	Salicornia and other annuals colonizing mud and sand	1

The channel of the estuary is surrounded by salt marshes and wet fields, the salt marshes being classified as Atlantic salt meadows containing species such as Sea Purslane (*Halimione portulacoides*), Sea Lavender (*Limonium humile*) and Sea Milkwort (*Glaux maritima*), the lower levels of the marshes contain annual salt marsh species such as Glasswort (*Salicornia* spp) and Sea Blite (*Suaeda maritima*). The salt marshes of the Womanagh estuary are of particular conservation value as they are classified as 'lagoon' type, this type of salt marsh is rare. Table 2 below contains an overview of all of the different habitat types that are present in this Natura 2000 site, the proportion of each habitat type present is given as a percentage of total ground cover.

Table 2 General Site Features

Habitat types	% cover
Tidal rivers, Estuaries, Mud flats, Sand flats & Lagoons	77
Salt marshes, Salt pastures, Salt steppes	6

Coastal sand dunes, Sand beaches, Machair	3
Shingle, Sea cliffs, Islets	1
Bogs, Marshes, Water fringed vegetation & Fens	1
Humid grassland, Mesophile grassland	2
Improved grassland	10

The Ballymacoda (Clonpriest & Pilmore) Natura 2000 site also contains a section of Special Protection Area that has been designated due to the importance of the area for waterfowl. The site is used by a total of 107 species of waterfowl including two Annex I species, the Golden Clover and Bar-tailed Godwit. There are eleven other species that have been present on the site at what are considered to be nationally important numbers. In addition to this a number of other waterfowl species occur at the site in locally important numbers. Table 3 below lists the two Annex I Bird Directive species present.

Table 3. Annex 1 Bird Species Present

Site code	Species code	Species
000077	A140	<i>Pluvialis apricaria</i>
000077	A157	<i>Limosa lapponica</i>

The conservation value of the Ballymacoda (Clonpriest & Pilmore) Natura 2000 site lies in the fact that it contains a number of important coastal habitats listed in Annex I of the E.U. Habitats Directive and due to the fact that it is important as a site frequented by numerous species of waterfowl including two Annex I Bird Directive species.

4.1.4 Conservation Objectives for Ballymacoda (Clonpriest and Pilmore) SAC No 000077

4.1.4.1. The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network in favourable

conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is reached when its natural range, and area it covers within that range are stable or increasing, and the specific structure and functions which are necessary for its long term maintenance exist, and are likely to continue to exist for the foreseeable future and the conservation status of its typical species are favourable.

The favourable conservation status of a species is achieved when population dynamics data on the species concerned indicate that it is maintaining itself on a long term basis as a viable component of its natural habitats, and that the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and that there is, and will probably continue to be a sufficiently large habitat to maintain its populations on a long term basis.

The overall objective is to maintain or restore the conservation status of the Estuaries, Atlantic salt meadows, the Mudflats and Sandflats for which the S.A.C. has been designated and also to maintain or restore the conservation status of *Salicornia* and other mud and sand colonizing annuals for which the site has been designated.

4.1.5. Predicted Impacts

4.1.5.1. There are no predicted impacts to Natura 2000 sites from the proposed development.

The development will be taking place 8 kilometres away from the nearest Natura 2000 site which is the Ballymacoda (Clonpriest & Pilmore) site. The development will involve the construction of modern pig accommodation with pig manure storage tanks constructed from reinforced concrete and will operate in compliance with the conditions set out on its Integrated Pollution Prevention and Control licence (licence number P0790-02) issued by the Environmental Protection Agency. The development will take place on an area of improved grassland that is used at present for grazing bovines and for forage conservation. The proposed development will be surrounded by an earthen berm to the East, the West and the South, the

earthen berm will be landscaped using broadleaf trees and shrubs. There will be no removal of hedgerows during the construction process.

4.1.6. Conclusion

4.1.6.1. In conclusion the above screening shows that an Appropriate Assessment is not required. The development will not have an impact on the designated sites and there are no environmental designations pertaining to the proposed development site. The proposed site does not form any part of a Natura 2000 site, Statutory Nature Reserve or National Park. The proposed development will not result in the loss of any habitat type. No rare or threatened flora or fauna were observed on the site.

4.2 Flora & Fauna Report

4.2.1. Introduction

4.2.1.1. This report reviews the ecology of the pig production site being managed by Mr. Eoin O'Brien at Annistown, Killeagh, Co. Cork and is required in order to support a planning application for the proposed development. The site on which the proposed development will take place consists of improved grassland with a low diversity of plant species all of which are common to areas of improved grasslands.

FLORA & FAUNA IN THE EXISTING ENVIRONMENT

4.2.2. Habitat types

4.2.2.1. The area around the site contains vegetation which can be grouped under the following headings:-

- (a) Grassland
- (b) Hedgerow
- (c) Man made features

- a) Grassland

The lands surrounding the existing pig production unit contain improved grassland. The grassland is dominated by cultivars of perennial ryegrass (*Lolium perenne*) and white clover (*Trifolium repens*) which have been

sown for grazing and fodder conservation purposes. This vegetation is typical of lands used for productive agriculture. There is also a sparse distribution of typical grassland weeds such as dock leaves (*Rumex obtusifolius*), thistle (*Cirsium vulgare*), ragwort (*Senecio jacobacea*) buttercup (*Ranunculus repens*) and nettles (*Urtica dioica*). There are no rare or endangered species present in the grassland area.

b) Hedgerow

A mature hedgerow occurs to the west of the pig production unit and forms the boundary between Mr. O'Brien's property and the neighbouring property. The tree and shrub species noted were hawthorn (*Crataegus monogyna*), ash (*Fraxinus excelsior*), sycamore (*Acer pseudoplatanus*) willow species such as sally (*Salix cinerea*), goat willow (*Salix caprea*) and eared willow (*Salix aurita*), holly (*Ilex aquifolium*) hazel (*Corylus avellana*) brambles (*Prunus spinosa*) furze (*Ulex europeas*), ivy (*Herera helix*) and occasional beech (*Fagus sylvatica*). The understory plants include nettle (*Urticadiocia*), cow parsley (*Anthriscus sylvestris*) and hogweed (*Heraclium sphondylium*). Hedgerows provide important nesting and feeding sites for wildlife in areas of productively managed farmland, they also act as nature corridors forming a link between habitats. The proposed development will take place some distance away from the hedgerow and the hedgerow will be retained in it's present condition.

c) Manmade features

A line of broadleaf trees have been planted on both sides of the avenue approaching the pig unit. The trees planted are mostly cherry (*Prunus avium*) with some sycamores (*Acer pseudoplatanus*) as well, the tree line may be useful to wildlife as a roost or nesting site as well as being a potential feed source. The trees will be left in place and will not be interfered with as part of this development.

There is a high earthen bank to the south of the site and partially to the east and the west. The earth bank acts as a screen and a wind break around the site. It has become colonised by brambles (*Prunus spinosa*) and wild grass species such as scutch grass (*Elymus repens*). The earthen bank is of low ecological value. It is proposed to improve the aesthetic and ecological value of the earthen bank by extending it in a northly direction to the west and also in a northly direction to the east of

the proposed development and by then planting trees and shrubs on it using some of the Department of Agriculture approved varieties listed in Appendix 9.

4.2.3. FAUNA

4.2.3.1. Birds observed during the course of the survey included species commonly found in areas of mixed farmland. Members of the crow family (*Corvus* sp) and wood pigeon (*Columba palumbus*) as well as black birds (*Turdus merula*) and wrens (*Troglodytes troglodytes*) were noted around the site as well as pied wagtails (*Monticola alba yarellii*) and chaffinches (*Fringilla coelebs*).

Mammal species that frequent areas of mixed farm land include field mice (*Apodemus sylvaticus*), rabbits (*Oryctolagus cuniculus*), fox (*Vulpes vulpes*), badger (*Meles meles*), the Irish hare (*Lepus timidus hibernicus*) and the Irish stoat (*Mustela erminea hibernica*). The only species of amphibian that may be present in the area is the common frog (*Rana temporaria*). Invertebrate species on this type of productively managed farmland will include a number of common species but the presence of rare species is considered unlikely.

4.2.4. IMPACT & MITIGATION MEASURES

4.2.4.1. The proposed development will take place on an area of improved grassland that is used at present for grazing livestock and producing conservation forage. This type of farmland is common in the area and has a low ecological value. The ecological value of the area will be improved by planting broadleaf trees and shrubs on the earthen berm that will be placed around the proposed development to shelter it and screen it. The newly planted shelter belt will consist of types of native broadleaf trees and shrubs as recommended by the Department of Agriculture (see Appendix 9). The varieties of trees and shrubs will complement those already present on surrounding hedgerows and thus improve the ecological value of the site as they may be used by insects, birds and mammals as roost sites or feeding areas.

5. HYDROLOGY

5.1 Water Quality Analysis

5.1.1. Within Appendix 1 we enclose a groundwater risk assessment carried out by IE Consulting/GES Limited (they were engaged to undertake the Risk Assessment) to support the IPPC License application. The scope of the work included a desk based study to review all relevant documentation, to assess existing data, to undertake a site visit, to obtain groundwater level measurements from the on site well, to identify risk sources at the site, and to make recommendations for future groundwater assessment or monitoring works at the site. The report concluded that the risk sources at the site are the pig manure tanks/ channels at the site and the soak away for domestic effluent. The report proposed the monitoring of any new leak detection systems on site, the bunding of all fuel tanks on site and to assess the integrity of all tanks and pipelines on site. The proposed development will improve the existing situation as a new leak detection system will be provided under the new buildings/ tanks as shown on the drawings in Appendix 19. The tanks under the old buildings are to be demolished and the existing slurry basin is being removed. All new tanks and storage tanks under the buildings will be reinforced concrete tanks in compliance with the Department of Agriculture Specifications.

5.1.2. Water samples were taken from the well supplying the unit, and from the stormwater runoff point. Full analyses results of a recent sample from an independent laboratory are included in Appendix 11. The analysis results are within the parameters set down by the E.P.A. The well will be analysed annually for pH, C.O.D. Nitrate, Total Ammonia, Total Nitrogen, Conductivity & Ortho-phosphate and it will be analysed twice yearly for both Total Coliforms and Faecal Coliforms. The storm water monitoring point will be visually inspected weekly, and a water sample taken quarterly, as is required by conditions C.2.3 & C.6.1 of the IPPC Licence for the facility.

5.2 GROUNDWATER AND SURFACE WATER

5.2.1 Conditions for monitoring surface and ground waters at the site are set down in the Integrated Pollution Prevention & Control licence for the facility.

5.2.2. The well supplying water to the site will be analysed annually in compliance with condition 6.10 of the I.P.P.C. license. The results of the well water sample analysis will be maintained on site for inspection by Cork County Council, and EPA officials, at all reasonable times. The location of this well is marked as on the location maps. (see Appendix 19).

5.3 DRAINAGE FROM THE SITE

5.3.1. Uncontaminated roof water from the pig unit is collected via the proposed stormwater collection system, to a monitoring point identified as SW1 on the site layout plan. A sample will be taken from this point quarterly and analysed for COD at an independent laboratory. All soiled water from the site is diverted to the pig manure storage tanks. A visual inspection of the storm water monitoring point will be made and recorded weekly in compliance with condition 6.10 of the I.P.P.C. license.

*For inspection purposes only.
Consent of copyright owner required for any other use.*

6 CUSTOMER LANDS AND APPLICATION OF PIG MANURE

6.1 Customer Lands

6.1.1. The proposed areas on which pig manure will be applied are generally located within 15 miles of the facility. Pig manure will only be applied to lands between 12th January and 15th October in compliance with Statutory Instrument 610 of 2010 (See Appendix 7).

6.1.2. The location of customer farmers for pig manure is shown on maps taken from Ordnance Survey Discovery Series No. 81 as shown in Appendix 4 in compliance with the requirements of the IPPC license. Pig manure will be applied to lands managed by customer farmers at rates compliant with S.I. No 610 of 2010.

6.2 Pig Manure

6.2.1 The annual production of pig manure from the proposed 1,500 sow integrated unit will be 27,690m³ per annum. There is demand for 59,394m³ per annum of pig manure for fertiliser by local farmers, see Appendix 4. The volume of storage capacity on the site will be 33,614m³ (See Farm Structures Table Appendix 18). Statutory Instrument 610 of 2010 (commonly known as the Nitrates Directive) sets out a minimum capacity of 26 weeks storage for pig production units. The capacity proposed is enough to hold pig manure for 63 weeks which is far in excess of the minimum requirement of 26 weeks.

6.3 Pig Manure Application

6.3.1. The pig manure will be applied as fertiliser on farm lands. There is demand for 59,394m³ per annum of pig manure as fertiliser from farmers in the locality of the unit. There is a list of customer farmers provided in Appendix 4 showing their farm codes and the amount of pig manure each farmer requires. The names of the individual farmers are maintained and available to view on the Environmental Protection Agency site register for the facility. The requirements of each farmer has been calculated in compliance with the nutrient limits set out in Statutory Instrument 610 of 2010 (i.e. the Nitrates Directive). A record of movement of organic fertilisers form (Record 3 form see Appendix 8) is completed for each farmer documenting the total amount of pig manure received by them. The Record 3 forms are submitted annually to the Nitrates Section of the Department of Agriculture Fisheries and Food and copies of them are retained on file.

6.3.2. In addition to abiding by the nutrient limits set out in the Nitrates Directive, farmers applying pig manure to their lands are also obliged under part 4 of the Nitrates Directive to comply with the defined buffer zones and spreading conditions. The said buffer zones and spreading conditions are outlined in detail in Appendix 6. Pig manure will be applied to lands during the growing season when crops will utilise the nutrients being supplied thus minimising the risk of leaching. Pig manure will not be applied to lands between 15th October and 12th January See Appendix 7.

6.3.3. Conditions for monitoring surface and ground waters at the site are set down in the Integrated Pollution Prevention & Control licence for the facility. A register of pig manure quantities, date of delivery, name and farm code of landowner will be maintained for inspection by Cork County Council, and the EPA at all reasonable times.

6.3.4. There is a requirement under E.U. cross compliance agriculture legislation, that farmers with lands in continuous tillage production should soil sample their lands to test for organic matter levels. In cases where, following soil sample analysis, the organic matter level falls below a threshold of 3.4% a plan has to be implemented to improve the organic matter content of soils. The application of organic fertiliser such as pig manure to such lands is one of the approved methods of improving soil organic matter. The use of organic fertilisers is the method most compatible with tillage operations as it does not require a change to husbandry practices as some of the alternative methods would (see Appendix 10). The proposed facility would supply local tillage farmers with a source of organic fertiliser to improve soil organic matter

7. AIR QUALITY & NOISE

7.1 Air Quality

7.1.1 Impact

7.1.1.1. The proposed development will take place in an entirely agricultural hinterland where typical farm odours are to be found and expected. These odours arise from farmyards and lands during the day to day operations. New buildings will be designed with ventilation facilities that are state of the art for the pig industry based on best available technique. The old buildings are being demolished and the proposed works will improve air quality through their modern design.

7.1.2 Mitigation Measures

7.1.2.1. The following measures will be in place:

- Incorporation of low protein diets on site in line with best practice
- The use of a high-tech computerized ventilation system, in animal houses with a back up system. As a result foul air is dissipated high into the atmosphere where it will be mixed with fresher air thus reducing odours in the locality.
- Strict hygiene and cleanliness will be observed at and around the unit as it will operate as a high hygiene minimal disease unit.
- The skip for collecting dead animals will be covered at all times. Carcasses will be removed off site by Duggan Waste Services Ltd, on a regular basis, and delivered to a licensed rendering plant.
- Transporting pig manure in suitably contained, leak proof vehicles.

7.2 Noise

7.2.1 Impacts

7.2.1.1. The noise generated on the existing and proposed pig farm are similar to noise generated on any farm enterprise. The main noises sources with a pig unit are animals at feeding time, ventilation fans, feed lorries unloading and tractors loading pig manure. The noise level at feeding time lasts for 10-15 minutes, the noise levels from delivery vehicles and from the pigs at

other times is insignificant. The noise generated by these is inaudible other than within the immediate vicinity of the buildings and activity area.

7.2.1.2. Noise levels are measured in decibels and a weighting factor (A) is applied to approximate the frequency response to the human ear. This weighted decibel scale, dB (A) correlates well with human sensations of loudness, disturbance and annoyance. The existing noise levels on site are generally low and typical of a quiet rural area during daytime. Noise levels are not audible from the site above background noise levels. Noise level have never been an issues and the facility is in operation with over 40 years.

7.2.2 Mitigation Measures

7.2.2.1. The noise generated on the farm is similar to noise generated on any farm enterprise. Noise levels are so insignificant that they do not require monitoring under the IPPC License conditions.

7.2.2.2. The buildings proposed will be low emission buildings and incorporate emission reduction measures, this includes insulation internally throughout the ceilings which reduces the noise levels in the external vicinity of the building. Insulation levels in modern pig unit are high, normally 60mm extruded polystyrene in walls and 60mm extruded polystyrene in ceilings. This will greatly muffle noise levels from the interiors of the pig buildings.

8. LANDSCAPE AND VISUAL ASPECTS

8.1 Proposed Site and Structures

8.1.1. Pig farm unit is located in a rural agricultural area. Structures comprise of long, low A roofed houses. The tallest structures on site will be the feed bins at circa 11m high. The proposed buildings consist of single storey, steel framed structures with concrete block plastered walls and fibre cement roof sheeting. The proposed building layouts and design will match the existing buildings on site.

8.1.2. The site is set back from the public road and the existing earth berm screens the site and this will be extended as part of the proposed development. The overall heights and roof pitches are the minimum allowed by the Department of Agriculture Specifications. The height of the eaves level is approximately 2.7m high and the ridge is 8.9m high approximately.

8.2. Mitigation Measures

8.2.1. All the proposed buildings have been designed to match the existing structures. It is proposed to provide selected landscaping in the form of specimen trees, shrubs, particularly on the proposed earth berms which will screen the site. Details of the proposed landscaping plan are set out in Appendix 8.

8.2.2. The development is located in an agricultural area, the proposed and existing buildings will and do blend into the surrounding landscape. The development would be similar to a large farm enterprise.

8.2.3. The development will be landscaped by extending the existing earth berm and provision of trees and shrubs. Thus, there will be no nuisance or loss of amenity. The development will involve excavating for tanks and building foundations. The material excavated will be used to construct earth berms. No hedgerows will be removed as part of the development.

9. CULTURAL HERITAGE

9.1. Due to the relatively small scale of the proposed development, and the absence during former extraction on site, archaeology may be dealt with summarily. The archaeological status of the proposed site was assessed by consulting the Sites and Monuments Record Maps for County Cork. The proposed construction site is contained in Ordnance Survey sheet number 66 for County Cork. There are no sites recorded on or adjacent to the proposed development site, there are no archaeological sites present in the town land of Annistown. The nearest features listed on the Sites and Monuments record are in neighbouring town lands. The details of each feature and their approximate distances from the site are shown in the table below.

Sites & Monuments Record Code	Feature Type	Townland	Approximate distance & direction from site
CO066-082	Enclosure	Carrignashinny	720 metres South West
CO066-057	Enclosure	Deer Park	600 metres West
CO066-061	Enclosure	Garranejames	1210 metres South
CO066-065	Fulacht Fia	Garranejames	500 metres East
CO066-063	Enclosure	Drominane	1,500 metres North East

9.2. The proposed development is located a considerable distance away from the nearest archaeological features and therefore it will have no impact on any of these features.

9.3. Several walkovers on the site did not reveal any features of archaeological interest. The possibility exists that undetected features of archaeological interest are present at the site. Such features may be discovered only during excavation for building. In the event that finds or features of potential archaeological significance are discovered on site during excavation for building, it is recommended that the relevant statutory bodies be notified.

10. TRAFFIC

10.1 INTRODUCTION

- 10.1.1. The development site lies in a rural area, 1.5km east of Mogeely and 3.5km west of Killeagh on the northern side of the local primary route L3809, which links Mogeely to Killeagh and is located 130m west of Aghnasassonagh Bridge.
- 10.1.2. The existing entrance is well set back from the public road and the entrance has generous splays on both sides to allow for HGVs to enter and exit the site. The entrance road in to the site is a hardcored 3.5m wide road, tree lined on both sides.
- 10.1.3. The public road is a county road with a typical carriage width of approximately 5.5m with verges of varying width, commonly in the order of 1m either side in the vicinity of the site.

10.2 PROPOSED DEVELOPMENT

10.2.1. Within the table below the typical time generation for a typical working day is shown. They come under the following headings:-

1. Staff Transport
There will be 9 no. staff members entering and existing the site daily. This will result in 18 no. movements daily.
2. Feed Delivery
Conservatively we have taken that there will be one delivery per day on average by animal feed delivery lorries.
3. Pigs to Factory
Conservatively we have taken that there will be one HGV per day on average collecting pigs to bring to the processing plant. This is more likely to be in the range of only 2-3 times per week. The carcass collection lorry visits the site once every two weeks, therefore this would be allowed for within this conservative figure above.
- 4/5 Pig Manure Deliveries from Site
These deliveries are based on the total volume of 27,690m³/per annum of pig manure. The tractor and tanker have a capacity of 11.4m³ and the HGV has a capacity of 27.3m³. The volume to be removed is divided 20% to tractor and tanker and 80% to HGV.

	Description	Trips in		Trips Out		Two-Way
		Car	HGV	Car	HGV	Car & HGV
1	Staff Members	9		9		18
2	Feed Deliveries		1		1	2
3	Pigs to Factory		1		1	2
4	Pig Manure Delivery from Site HGV		3		3	6
5	Pig Manure Delivery from Site by Tractor & Tanker		1		1	2
		9	6	9	6	30 per day

30 no. per day equates to 4 no. vehicles/hour on average over the working day

10.2.2. We have assessed the existing road capacity using RT180 Geometric Design Guidelines (NRA) as summarised in the Table below:-

Road	Level of Service	Carriageway Width (m)	Reduction Factors Applied		Design Capacity (veh/hr)
			Restricted Lateral Clearance	Roadside Development %	
			L3809	C	

The above figure of 30 vehicles per day in Table 1 equates to 4 no. vehicles/hour on average over the length of the working day. The local road has a capacity of 470 no. vehicles/hour, therefore the development is using up approximately less than 1% of the available capacity in the road network.

10.3 CONCLUSION:

- 10.3.1. The "Guidelines for Traffic Impact Assessment" (IHT) states that if the increase in background traffic is less than 10% for uncongested roads and less than 5% for congested roads, then development is considered to have no impact on the surrounding network. The additional traffic generated by the development is insignificant in terms of the existing traffic volumes and road capacity.
- 10.3.2 Considering the very low traffic volumes associated with the L3809 and the low levels of traffic generated by the development, junction capacity is clearly not an issue.
- 10.3.3 The surrounding road network has sufficient capacity to accommodate the traffic generated by the proposed development. The road network can safely accommodate the minor increase in traffic, particularly as the surrounding roads currently cater for agriculture and other local traffic.

PUBLICATIONS CONSULTED

2020 Strategy – Irish Pig Meat Sector (2010) prepared by the Irish Association of Pig Meat Processors (I.A.P.P.).

A Development Strategy for the Irish Pig Industry 2008 to 2015 (2008) prepared by the Teagasc Pig Production Development Unit.

AGNET(1992) Weather soils and pollution from agriculture. Compiled by Marie Sherwood, Management.

Carney, P.G. and Dodd, V.A.(1989) A comparison of predicted and measured values for the dispersion of malodours from slurry. J. Agric. Engng. Res. 44:67-76

Conor, O.T. and Hartnett, P (1990) Developments in slurry handling equipment to reduce odour and ammonia emissions. Environmental impact of land-spreading of wastes seminar, 30-31 May 1990, Johnstown Castle Co. Waterford.

Cork County Development Plan. Cork County Council

Daley D. and Warren, P. (for print) Groundwater Vulnerability – The Irish Perspective.

Dodd V.A. and Looby K (1992) Planning requirements for intensive pig unit. Pig health Society 20th Annual Symposium.

EPA (1996) Integrated Pollution Control Licensing. BATNEEC guidance notes for the pig production sector.

EPA (1997) Draft guidelines on the information to be contained in Environmental Impact Statements.

European Communities (Good Agricultural Practice for Protection of Waters) Regulations 2010 – S.O. No. 610 of 2010.

European Communities (Welfare of Farmed Animals) Regulations 2010 – S.I. No. 311 of 2010.

Flanagan (1992) Parameters of water quality. Interpretation and standars. Second edition. Environmental Research Unit.

Flora Hibernica: The Wild Flowers, Plants and Trees of Ireland – Pilcher Jonathan - Collins Press 2004.

Food Harvest 2020 – A Vision for Irish Agri Food and Fisheries (2010) prepared by the Department of Agriculture, Fisheries and Food.

I.M.A.G. Wageningen Legislation –Research related to odour problems due to intensive livestock operations in the Netherlands.

Integrated Pollution Prevention and Control. Reference Document on Best Available Techniques on Emissions from Storage July 2006, European Commission.

Interim Report to the Minister of Agriculture, Fisheries and Food, Mr Brendan Smith T.D. (2010) prepared Tom Moynihan the Pig Industry Strategy Steering Group.

IDA Ireland (1992) The IDA Strategy for the Pigmear Industry. Presented by Mr. Derek Breen (Project Manager – Food and Agribusiness Division)

Klarenbeck J.V. (1980) Odour measurements in Dutch Agriculture, Current Research, Results and Techniques. Institute of Agriculture Engineering, Wageningen Research Report. Page 6

MAFF (1991) Code of good agricultural practice for the protection of water. Welsh Office. Department of Agriculture, July 1991.

Moloney J. (1991) Environmental Impact Assessment of 10,000 place pig fattening unit. 3 April, 1991

Moore, B, Land spreading animal wastes. Tipperary S.R. County Council.

Reading the Irish Landscape – Mitchell Frank and Ryan Michael – Dublin: Townhouse and Countryhouse 1997.

RT180 Geometric Design Guidelines (NRA).

Teagasc 1993) Management data for Farm Planning 1993

Teagasc (1994) Soil analysis and fertiliser, lime, animal manure and trace element recommendations. Johnstown Castle, Research and Development Centre, Co. Wexford.

Tunney, H and Power V (1988) Soil Fertility in Ireland – Phosphorus. Farm and Food Research – October Edition.

MOGEELY PIG FARM

APPENDIX 1

GROUNDWATER RISK ASSESSMENT

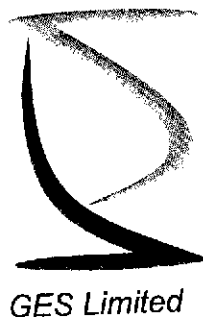
*For inspection purposes only.
Consent of copyright owner required for any other use.*

TOM O' BRIEN
ANNISTOWN, KILLEAGH, CO. CORK

APPLICATION FOR IPPC LICENCE
REG. NO. P0790-02

GROUNDWATER RISK ASSESSMENT

*For inspection purposes only.
Consent of copyright owner required for any other use.*



Innovation Centre
Green Road
Carlow

Tel:- 059 91 33084
Fax:- 059 91 40499
Email:- info@iece.ie



Integrated Engineering Consulting Engineers
A Joint Venture Partnership Between VA Consulting Engineers & Geotechnical & Environmental Services Ltd



TOM O' BRIEN
ANNISTOWN, KILLEAGH, CO. CORK

APPLICATION FOR IPPC LICENCE

REG No. P0790-02

GROUNDWATER RISK ASSESSMENT

*For inspection purposes only.
Consent of copyright owner required for any other use.*

IE Consulting / GES Ltd.
Innovation Centre
Green Road
Carlow

Client :-
Tom O' Brien,
c/o NRGE,
Mooresfort,
Lattin,
Co. Tipperary.

Document No:	IE565/479
Issue No:	01 - ISSUE
Job No:	IE565
Date:	7 th July 2010
Revision:	2.0
Prepared By:	Orla O' Connell B.A. MSc.
Checked By:	P McShane BEng(Hons) MIEI J Keohane MSc BSc CGeol MIEI

Copyright © IE Consulting 2010

This report or its contents must not be reproduced for any purpose without written permission.
It is to be used only for the purpose for which it is supplied

Table of Contents

1	INTRODUCTION	5
2	OBJECTIVES OF ASSESSMENT	5
3	SCOPE OF WORKS	5
4	DATA SOURCES	6
5	SITE INFORMATION	6
5.1	Site History	6
5.2	Site Structures	8
5.3	Site Services	8
5.3.1	Fuel	8
5.3.2	Water Supply	8
5.3.3	Wastewater Effluent Disposal	9
5.3.4	Stormwater Runoff Disposal	9
5.3.5	Pig Manure Collection and Recovery	9
5.4	Operation Overview	10
5.5	Raw Materials and Energy Inputs	11
5.5.1	Feed Stuffs	11
5.5.2	Site Fuel	11
5.5.3	Veterinary Supplies/Supplements	12
5.5.4	Pig Slurry	12
5.5.5	Animal Carcasses	12
5.5.6	Domestic Waste and Recycling	12
5.6	Contamination History and Spillages Events	12
6	ENVIRONMENTAL SETTING	13
6.1	Topography	13
6.2	Meteorology	13
6.3	Hydrology	13
6.4	Geology	14
6.5	Soils and Subsoils	14
6.6	Depth to Bedrock	15
6.7	Hydrogeology	16
6.7.1	Groundwater Body (GWB) Characteristics and Aquifer Classification	16
6.7.2	Groundwater Levels, Flow Direction, and Gradient	17
6.7.3	Groundwater Vulnerability	18
6.7.4	Dower Spring Source Protection Area	19
6.8	Groundwater Quality	19

6.8.1	Regional Data.....	19
6.8.2	Site Groundwater Quality Information.....	19
7	GROUNDWATER RISK ASSESMENT AND POTENTIAL CONTAMINATION SOURCES.....	21
8	CONCLUSIONS AND RECOMMENDATIONS.....	25
9	REFERENCES.....	26

<i>Appendix A</i>	<i>Drawing No. IE565-001-A</i>
	<i>Drawing No. IE565-002-A</i>
	<i>Drawing No. IE565-003-A</i>
<i>Appendix B</i>	<i>Site Structure Details</i>
<i>Appendix C</i>	<i>Layout Maps of Site</i>
<i>Appendix D</i>	<i>Site Inspection Reports</i>
<i>Appendix E</i>	<i>GSI Webmapping Data</i>
<i>Appendix F</i>	<i>Certificates of Analysis</i>

For inspection purposes only.
 Consent of copyright owner required for any other use.

1 INTRODUCTION

IE Consulting/GES Ltd. were requested by NRG Ltd. on behalf of Tom O' Brien to undertake a groundwater risk assessment at the pig unit in Annistown, Killeagh, Co. Cork.

Tom O' Brien applied for an Integrated Pollution Prevention and Control (IPPC) Licence on 27th November 2008 (P0790-02).

In response to the IPPC licence application, the Environmental Protection Agency (EPA) issued a request for the following information in a letter dated 1st May 2009:

"Please submit a comprehensive evaluation of the potential risk to groundwater posed by the Pig farm. This evaluation should include a hydrogeological evaluation, an assessment of the underlying aquifers classification and vulnerability, and should refer to the relevant source protection areas. This evaluation should also include any historical contamination of the groundwater on site".

2 OBJECTIVES OF ASSESSMENT

The objectives of the assessment were as follows:

- To characterise the existing environment, with particular regard to the existing hydrogeological setting and groundwater flow regime.
- To identify activities/items on site that may pose a potential risk to the groundwater.
- To estimate the risk that these activities may have on the existing groundwater quality and flow regime.

3 SCOPE OF WORKS

The scope of works proposed for the groundwater risk assessment is outlined as follows:

- An initial desk based study which included a review of the following:
 - Review of previous available reports and documents pertaining to the site;
 - Obtain existing hydrogeological data from the Geological Survey of Ireland (GSI);
 - Assessment of on-site activities and any risk to groundwater;
 - Assessment of existing on-site groundwater borehole and groundwater quality;
 - Assessment of hydrological regime of the adjacent Dower River (Aughnasassonagh River);
 - Assessment of existing private wells up-gradient and down-gradient of the site.
- A site visit was undertaken on 14th April 2010 to confirm the findings of the initial hydrogeological study, obtain a groundwater level measurement from the on-site borehole, identify site activities and structures that may pose a risk to groundwater beneath the site.
- Preparation of a groundwater risk assessment report including any recommendations for further works, if deemed necessary, based on the information collated as part of the desk

study and site visit, as well as recommendations for future groundwater assessment or monitoring works as may be required by the Environmental Protection Agency (EPA).

4 DATA SOURCES

The primary data sources for the desk study of this assessment were:

- Information submitted by Tom O' Brien as part of the IPPC licence application (P0790-01 and P0790-02);
- Information available on EPA website and in hard copy format in the EPA office in Iniscarra, Co. Cork on previous Dairygold Farms Ltd. IPPC licence applications (P0438-01 and P0438-02);
- Information available on Dairygold Farms Ltd. historical files;
- Previous GES Ltd. report concerning the site when operated by Dairygold Farms Ltd. entitled "Hydrogeological Assessment" (Report No. 99/19/01) pertaining to the spreadlands associated with the Annistown Pig Unit, Killeagh, Co. Cork;
- Geological Survey of Ireland (GSI) online webmapping;
- Geological Survey of Ireland Source Protection Plan for Dower Spring;
- Environmental Protection Agency (EPA);
- Ordnance Survey of Ireland (OSI);
- Met Eireann;
- Site walkover on 14th April 2010.

5 SITE INFORMATION

5.1 Site History

A summary of the site development history of the pig farm at Killeagh is presented in Table 1 below.

Year	Activity
1965	East Cork Co-operative Pig Enterprises Ltd. was formed and 55 acres of agricultural land was purchased at Annistown, Co. Cork.
1965	Planning permission was obtained by East Cork Co-operative Pig Enterprises Ltd.
1975	Planning permission was granted for an extension of the pig unit for sow accommodation.
1982	Planning permission was obtained for the retention and relocation of existing pig fattening units and retention and modification of slurry holding tanks and out-buildings to a final capacity of 300 sows and 2500 fattening places.
1989	Mitchelstown Co-operative Agricultural Society Ltd. (predecessors of

Consent of copyright owner required for any other use.
For inspection purposes only.

Year	Activity
	Dairygold Co-operative Society Ltd) acquired the "engagements, undertakings and assets" of East Cork Co-operative Pig Enterprises Ltd.
1993	All pig farming operations of Dairygold were integrated into Dairygold Farms Ltd.
1998	Dairygold Farms Ltd. proposed to convert the pig unit from a 280 to a 600 sow-breeding unit, producing 13,200 weaners per annum.
2006	Tom O' Brien received planning permission to expand the pig unit from a 280 sown unit to comprise a 600 sow unit.

Table 1. Summary of Site History and Relevant Planning Applications

The initial pig farm unit was developed on a Greenfield site by East Cork Co-operative Pig Enterprises in 1965.

Planning permission was granted for an extension to the unit for sow accommodation in 1975. Planning permission was obtained for the retention and relocation of houses and slurry holding tanks for 300 sows in 1982.

Dairygold Farms Ltd. (formerly Mitchelstown Co-Operative Agricultural Society Ltd. acquired the pig unit in 1989. In 1998, Dairygold Farms Ltd. were granted planning permission by An Bord Pleanala for the extension of the unit to comprise a 600 sow integrated pig unit. Subsequently permission was sought to modify the plans and extend the unit.

In 1998, Dairygold Farms Ltd. applied to the Environmental Protection Agency (EPA) for an IPPC licence under the 6.2 Intensive Agriculture class of activities (Reg. No. P0438-01). This application and the subsequent IPPC licence application (Reg. No P0438-02) were withdrawn by Dairygold Farms Ltd.

The pig unit was purchased by Tom O' Brien in 2004 and planning permission was sought to expand the 280 integrated sow unit to comprise a 600 sow unit. In 2006, planning permission was granted by Cork County Council for the pig unit extension.

The expansion of the unit from a stocking rate from 280 to 600 sows is required to be licenced by the EPA. The current IPPC Licence Application (P0790-02) is for the existing 600 sow integrated pig unit on the site at Annistown, Killeagh, Co. Cork.

The site is being operated as a minimal disease unit in which access into the housing units is strictly controlled. As part of the unit expansion, the facility has been upgraded, particularly in terms of pig slurry collection and storage. The new pig housing units constructed to accommodate the additional numbers have been constructed above or partially below ground level. All new housing have leak detection systems and slurry is diverted via a newly constructed channel network to the on-site slurry pit in order to reduce the residence time of the slurry in the underground tanks. As part of the expansion it is proposed to replace the existing slurry pit with a lined slurry basin. It is estimated that in excess of 80% of the stock is housed in the newly constructed buildings.

5.2 Site Structures

An examination of historical aerial photographs (www.osi.ie) indicates that the footprint of the site area and the site building locations has not altered during the period 1995 to 2005. As a result of the extension to the integrated pig unit, the area within the site boundary has increased from 1.6 hectares (3.6 acres) to 3.86 hectares (9.5 hectares).

The location of the site in a regional context is presented in *Drawing No. IE565-001-A (Appendix A)*. The extent of the pre-extension site layout (1995-2004) compared to the existing and proposed layout is presented in *Drawing No. IE565-002-A (Appendix A)*.

A list of the pre- and post-expansion structures and the architectural drawings associated with these are presented in *Appendix B*. The sick bay, previously located in the south-eastern corner of the site has been removed and replaced by the dry sow housing unit.

This list of structures and associated drawings indicate that the depth of the underground tanks beneath the new buildings ranges between 0.61m and 1.2m below ground level. The depth of the slurry collection channels ranges between 1.525m and 1.83m below ground level. All new buildings are constructed with mass concrete. The depth of the storage tanks beneath the existing structures ranges between 0.6m to 1.3m below ground level. At the southern end of the site, the storage tanks are above ground.

5.3 Site Services

5.3.1 Fuel

An oil-fired boiler produces all heat used on the pig unit. A 150kVA standby generator fulfils the electrical demands of the unit during a power interruption. The fuel storage locations and the generator are shown on *Drawing No. IE565-002-A (Appendix A)*.

5.3.2 Water Supply

Water supply for the site is provided from the on-site well on the eastern edge of the site (*Drawing No. IE565-002-A and Drawing No. IE565-003-A, Appendix A*).

According to information obtain from NRG Ltd. this well was installed by Dairygold Farms Ltd. No drilling log is available for this borehole and the depth of the borehole is unknown.

The wellhead of the on-site well is currently open, with the casing extending approximately 0.2-0.3m above ground level. The provision of a wellhead cover and a surface seal around the site well would prevent the entry of surface water, rodents and other surface contaminants into the site water supply.

Based on annual pig unit water requirements for the current wet feed system, it is estimated that the average annual water usage at the site is 7000m³/yr. This equates to a daily water usage of approximately 20m³/day. It is proposed to install a water meter on the well in order to monitor future water usage at the site.

Water from the well is stored in a 1,000 gallon (4.5m³) storage tank adjacent to the well on the eastern side edge of the site. An additional 12,000 gallon (54m³) storage is provided in 2No. large tanks on the western side of the site (*Drawing No. IE565-002-A, Appendix A*).

The available water quality information for this well is discussed in Section 6.8.

5.3.3 Wastewater Effluent Disposal

Based on a report by Murphy McCarthy Consulting Engineers, submitted to the EPA as part of the Dairygold Farm Ltd. IPPC licence application (P0438-01), the septic tank and soakaway in use at the site was constructed when the piggery was first developed in 1965/1966 (*Appendix C*).

The approximate location of the septic tank and soakaway is presented in *Drawing No. IE565-002-A (Appendix A)*. T tests carried out approximately 10m south of the soakaway indicated a "T" value of 5, which is indicative of a high permeability Sand/Gravel material. The depth at which the test was taken and the soil/subsoil composition was not recorded on the report.

There are currently 3-4 No. employees at the site at any one time. The estimated maximum volume of effluent entering the septic tank is 0.5m³/day. The composition/construction of the septic tank cannot be confirmed. The depth of the soakaway is unknown.

5.3.4 Stormwater Runoff Disposal

Currently roof water is collected and diverted to a soakaway at the southern end of the site. A stormwater monitoring point has been installed immediately upstream of the structure. A copy of the stormwater pipe layout submitted as part of the active IPPC licence application (P0790-02) is presented in *Appendix C*. The soakaway structure is 8-10m in radius and is 1.5-2.0m in depth. As part of the on-site monitoring regime, it has been proposed to sample the runoff for COD/BOD on a quarterly basis and visually inspect the monitoring point on a weekly basis.

Prior to the practice of on-site separation and disposal of roof runoff, surface water from the site was discharged via a land drain into the adjacent Dower River (Aughnasassonagh River). As part of the IPPC licence No. P0438-01, it was proposed to block this former drain to the stream and infill the trench. The approximate route of this drain to the adjacent river is shown on *Drawing No. IE565-003-A (Appendix A)*. This drain was decommissioned by the previous site owners, Dairygold Farms Ltd.

5.3.5 Pig Manure Collection and Recovery

All slurry from the pig unit housing are collected in storage tanks under the slats in each of the pig housing units. The older slatted tanks are comprised of mass concrete, the base of which (pre 2005) are set below existing ground level to maximum depth of 1.3m. As mentioned previously, the base of the as-built structures are higher in elevation than the older units. At the southern end of the site, the storage tanks are above ground.

Mass concrete collection channels, ranging in depth between 1.525m and 1.83m below ground level, divert the effluent directly into the existing slurry pit from the newly constructed tanks.

An underground mass concrete channel network diverts slurry collected in the tanks beneath the older housing to the slurry pit. Sluice gates are used to control the release of slurry into the slurry pit. An overview of the proposed slurry collection system is presented in *Appendix C*.

Information from the Dairygold Farm Ltd. IPPC licence application (P0438-01) indicate that the older slurry tanks were inspected by Murphy McCarthy Consulting Engineers Ltd. in February 1996 and 13th December 1998 (*Appendix D*). However, although it was noted that tanks were “visible portion of the tanks appeared to be well constructed in mass concrete” the scope of the inspections were limited by the fact that the housing units were full. All new structures are constructed of mass concrete.

The slurry is currently collected in an open underground slurry pit, which comprises a surface area of 462m² and slopes from ground level to a maximum depth of approximately 2m below ground level at the centre of the pit. Slurry may be pumped in the above-ground slurry tank for storage. The capacity of this tank is 1538m³. The stored slurry is pumped from the slurry pit into tractor tankers for recovery in accordance with the Nutrient Management Plan.

As part of the expansion of the pig unit, it is proposed to decommission the existing open slurry pit and install a covered engineered geomembrane-lined covered storage basin (*Appendix C*).

5.4 Operation Overview

The objective of the site operation is to serve as a fully integrated pig production unit in which pigs are produced and fattening to factory weight.

The numbers of various pig types and the associated pig manure production, as presented in the IPPC licence application, is shown in *Table 2* below.

Pig Type	Number of Stock	NEAT excreta Pig/week (litres)	Total litres/week	Total m ³ /week
Farrowing Sow	180	100	18,000	18
Dry Sows	420	35	14,700	14.7
Boars	35	35	140	0.14
Gilts	160	35	5,600	5.6
Weaner	3600	13	46,800	46.8
Fattener	3600	30	108,000	108
Total Pig Manure (per week)			193,240	193
Total Pig Manure (per annum)			10,048,480	10,048
Extraneous water 6%			602909	603
Total annual production pig manure			10,651,389	10,651

Table 2. Pig Types and Associated Manure Production

The operation on-site can be divided into the following main stages or production:

- Farrowing;
- 1st Stage Weaning;
- 2nd Stage Weaning;
- Service Area;
- Dry Cow;

- Fattening;

The integrated pig production unit comprises the following components:

- Raw material and energy inputs;
- Disinfection/maintenance/disease prevention;
- Outputs
- Waste products
- Site infrastructure;
- Surface water drainage;
- Effluent drainage;
- Water supply;

As part of the groundwater risk assessment, the various possible contamination sources that may pose a risk to the groundwater beneath the site must be identified. A summary of the various components of these is presented in the following sections.

5.5 Raw Materials and Energy Inputs

5.5.1 Feed Stuffs

An automated "wet-feed" system is in operation at the site for all pig stock, apart from 1st stage weaners, which are fed directly with dry feed. The volume of feed given to the 1st stage weaners is less than 2% of the total feed volume on site.

Feed bins set in concrete hardstand at the western end of the site are filled directly from dry feed lorries. The feed is mixed with water in the wet feed mixing unit located in the feed and pump house.

Copper sulphate is added to the meal mixture of growing and finishing pigs. This is stored in the on-site dry store.

Additional pre-extension feed bins are set in concrete hardstand in the western side of the unit. The 25kg feed bags for the 1st stage weaners are stored in a large storage container in the western side of the site.

The liquid feed tanks are bunded and any outflow is diverted into the underground storage tanks. All pig slurry is collected in underground tanks and diverted via slurry collection channels to the existing slurry pit and above ground tank. This is then recovered in accordance with the Nutrient Management Plan.

The storage locations of these products are presented on *Drawing No. IE565-002-A (Appendix A)*.

5.5.2 Site Fuel

The heating oil for the site is stored in 3No. oil tanks, which are set above ground on concrete blocks. The locations of these tanks are shown on *Drawing No. IE565-002-A (Appendix A)*.

The primary heating oil storage tank is located between the offices and the farrowing house in the western edge of the site. The tank is double-skinned with an in-built alarm. It is proposed to decommission the other tanks once the current fill is empty. The on-site heating oil tank will be banded in accordance with the IPPC licence requirements.

5.5.3 Veterinary Supplies/Supplements

The facility is being operated as a minimal disease unit so that there is minimal use of antibiotics or vaccines on the site.

All antibiotics and vaccines, when required, for disease prevention, control and treatment, are stored in the refrigerator in the manager's office and in the dry store. When utilised on-site, the residues of these wastes in the slurry is minimal, particularly in consideration of the dilution effect of the slurry itself. Veterinary waste disposed of by the licenced contractor in accordance with the IPPC licence requirements.

5.5.4 Pig Slurry

Pig manure is analysed for the following parameters: dry matter, nitrate, phosphate ammonia. The pig slurry is comprised of the following major components: nitrate, phosphate, faecal coliforms, BOD and COD.

The slurry is collected directly beneath the pig housing units and diverted to below ground and above ground storage structures.

These are collected from on-site storage containers and recovered in accordance with the Nutrient Management Plan.

5.5.5 Animal Carcasses

Animal carcasses are produced as a result of incidental mortality of production. The carcasses are stored in a skip on a gravel area of the eastern side of the pig unit. The carcasses are collected on a fortnightly basis by a licenced contractor and brought to a licenced rendering plant for processing in accordance with IPPC licence requirements.

5.5.6 Domestic Waste and Recycling

Domestic waste and recyclable products from employees is stored in Cork County Council collection bins and collected by a licenced contractor and transported to an approved facility in accordance with the IPPC licence requirements.

5.6 Contamination History and Spillages Events

There are no records of historical contamination events on the site. Elevated nitrates detected in the site well during the period 16/5/1996 to 8/4/1998 was attributed in the IPPC licence application (P0439-01) to historical agricultural practices.

The water quality data for the site well is discussed in further detail in *Section 6.8*.

6 ENVIRONMENTAL SETTING

6.1 Topography

The pig unit is situated in the townland of Annistown, Killeagh, Co. Cork. The site, which comprises 3.86 Hectares, is shown its regional setting in *Drawing No. IE565-001-A (Appendix A)*.

The site is located at the northern extent of a generally low-lying area which extends southwards towards the coast. The average elevation of the land to east, west and south of the site is 20-30m OD. This low-lying coastal topography is characterised by generally east-west trending hills and valleys. Within the Midleton-Castlemartyr valley to the south, the topography can be described as knolly/hummocky. Immediately north of the site, the land rises into an upland region of north-west/south-east aligned ridges. In a local context, the land immediately north of the site rises to a peak elevation of 149m OD at Drominane (*Drawing No. IE565-001-A, Appendix A*).

Within the site boundary, natural pre-development ground level slopes rapidly from 46m OD to 40m OD in the north-eastern corner of the site boundary. From the north-eastern extent of the pig unit to the southern site boundary, the land slopes more gently from 40m OD to 34m OD.

6.2 Meteorology

The closest operational rainfall gauging station (at a similar elevation) is positioned at an elevation of 27m OD approximately 9km south of the site in the townland of Shanagarry North. The average annual rainfall (AAR) recorded at this gauging station, based on data between 1961-1990, is 990mm/yr. The mean annual potential evapotranspiration (PE) from the nearest synoptic station 36km south-west of the site at Cork Airport, is 513mm/yr (based on data between 1961-1990). The actual evaporation (AE), estimated as 0.90PE, is calculated to be 462mm/yr. Rainfall and evaporation data was obtained from Met Eireann (1996). Using these figures, the Effective Rainfall (E.R.) is taken to be approximately 528mm/year. Table 4 of S.I. No. 101 of 2009 refers to an average net rainfall of 37mm/week during the specified storage period.

6.3 Hydrology

In terms of river basin management planning, the site is located in the South Western River Basin District (SWRBD), within the surface water catchment of the Womanagh River, which is the primary regional surface water feature (*Drawing No. IE565-001-A, Appendix A*). The Dower River (also referred to as the Aughnasassonagh River), a minor tributary of the Womanagh River, originates in the hills north-west of the site. This river flows in a southerly direction approximately 60m west of the site boundary and continues its route southwards until it disappears underground into a swallow hole at Ballyvorisheen, approximately 1.8km downstream of the site. The Dower spring emerges approximately 2km south of the swallow hole. Tracer work undertaken on the Dower Spring has established a link between the sinking stream at Ballyvorisheen and the Dower Spring (*Drawing No. IE565-001-A, Appendix A*).

There are no natural surface water features within the site boundary. A drainage ditch previously used to discharge surface water runoff from the site into the adjacent watercourse (*Drawing No. IE565-003-A, Appendix A*) has been backfilled by the previous owner, Dairygold Farms Ltd. Currently all roof water from the site buildings is collected and diverted to the soakaway in the

southern end of the pig unit. Surface water falling on the hardstand area within the confines of the secured pig unit area is collected via an underground drainage system and diverted to the slurry pit at the south-eastern corner of the site. Along the perimeter of the secured pig unit, within the confines of the site boundary, precipitation is allowed to percolate to ground via a crushed stone ground cover.

6.4 Geology

Reference to the 1:100,000-scale map of the Geology of East Cork-Waterford (Sheet 19) (Geological Survey of Ireland, 1995) indicates that the southeast of Cork is characterised by a series of elongated east-west valleys separated by intervening ridges, formed when the rocks were folded 290 million years ago during the Variscan Orogeny (Sleeman, A.G. and McConnell, B., 1995). The carboniferous limestones are restricted to the synclinal valley and flanked by the anticlinal ridges of the Devonian and early Carboniferous rocks (GES Ltd. Report 99/18/01).

The site is shown to be underlain by both the **Cuskinny Member** and the **Ballysteen Formation**, and possibly the **Gyleen Formation** (Figure 1, Appendix E). The Cuskinny member is described as flaser bedded sandstone and mudstone. The Ballysteen Formation is described as fossiliferous dark-grey muddy limestone. The Gyleen formation is described as sandstone with mudstone and silt.

Both the Cuskinny Member and the Ballysteen Formation were deposited during the Carboniferous period. The Cuskinny Member is described in the Generalised Bedrock Map (Figure 2, Appendix E) as Dinantian Mudstones and Sandstones of the Cork Group (DMSC). The Ballysteen Formation is referred to as Dinantian Lower Impure Limestones (DLIL). The Gyleen Formation was deposited during the Devonian period and forms part of the Devonian Old Red Sandstones (Figure 2, Appendix E).

The rocks have been folded into anticlines and synclines with approximate east-west axes by the Variscan Orogeny. The rock are broken by a system of steeply dipping cross faults running approximately NNW-SSE, roughly at right angles to the fold axes. (GES Ltd. Report 99/18/01).

The bedrock beneath the site and surrounding land youngs from north to south, which is reflective of the position of the site on the northern flank of a regional east-west trending syncline (Figure 2, Appendix E) (GES Ltd. Report 99/18/01).

An inferred regional north-west/south-east trending shear fault is mapped beneath the site along (or within) the eastern site boundary. The lateral extent and the depth of the faulted zone beneath the site cannot be determined without a site-specific investigation. The faulted contact between the sandstone and limestone formations beneath the site has the potential to act as a preferential conduit for groundwater flow in a southerly direction.

6.5 Soils and Subsoils

Reference to the General Soil Map of Ireland (1980) indicates that the soils in the area surrounding the site are described as Acid Brown Earths or Brown Podzolics.

The South Western River Basin District (SWRBD) Soil Map (Teagasc/EPA, 2006) indicates that a boundary between two soil types form at the location of the site. Deep poorly drained mineral soils (AminPD) are mapped as underlying most of the southern portion of the site, where as the northern part of the site is mapped as being underlain by deep well drained mineral soils (AminDW) (Figure 3, Appendix E).

The subsoil is described on the SWRBD Subsoil Map (Teagasc/EPA, 2006) indicates that the subsoil comprises Till derived from Devonian Sandstones (Figure 4, Appendix E). Limited fieldwork undertaken as part of the Groundwater Source Protection Plan for the Dower Spring (Geological Survey of Ireland, 2002) indicates that the Till is described as mainly Sandy Till, generally free-draining and of moderate permeability.

A soil profile of approximately 2.3m depth is exposed along the eastern edge of the site which indicates that, overall, the soil consists of sandy SILT/CLAY. Given the location of the soil profile on the site, it is likely that this profile represents the deep well drained mineral soils (AminDW) north of the site.

A horizontal layer of gravels, cobbles and boulders were noted at a depth of 1m below ground level. According a previous hydrogeological assessment of the spreadlands undertaken by GES Ltd. (Report No. 99/18/01, June 1999) on behalf of Dairygold Farms Ltd., at least 12m of clay soil was encountered at the site.

6.6 Depth to Bedrock

A review of the geotechnical borehole files from the GSI indicated that no geotechnical boreholes, which provide information on the depth at which bedrock is encountered, have been installed in the vicinity of the site.

The Dower Spring Source Protection Report (GSI, 2002) indicates that the depth to bedrock in the upland catchment of the Dower Spring, the setting of the pig unit, is generally between 3m and 10m below ground level, with areas of shallower depth limited to the small, incised valleys of the streams that drain it.

The GSI webmapping well database was also consulted for depth-to-bedrock information in the vicinity of the site. No wells are recorded within a 500m radius of the site.

A depth to bedrock map was presented in a previous hydrogeological assessment report of the spreadlands undertaken by GES Ltd. (Report No. 99/18/01, June 1999) on behalf of Dairygold Farms Ltd. The depth-to-bedrock points are reproduced on *Drawing No. IE565-003-A (Appendix A)*. This information indicates that that the depth to bedrock is variable in the vicinity of the site.

A depth to bedrock of 29m was recorded west of the site, whereas the depth to bedrock south of the site was recorded at 39m below ground level. Depth to bedrock along the road leading south-west of the site was recorded at 12m below ground level (not presented on *Drawing No. IE565-003-A, Appendix A*). The thickness of soil/subsoil material is therefore variable over short distances and irregular in depth.

According to the information in the GES Ltd. report, excavations at the site of the pig unit record a thickness greater than 12m of clay overlying bedrock.

The 6 inch to 1 mile scale geology field maps held by the Geological Survey of Ireland (GSI) are available for the area in which the site is located. These show no information for the low-lying land immediately adjacent to the site. However, outcrops of red and green slates as well as purple sandstone were recorded north of the site. In addition, purplish green sandy shales were recorded along the road south of the hill north of the site (*Drawing No. IE565-003-A, Appendix A*).

6.7 Hydrogeology

6.7.1 Groundwater Body (GWB) Characteristics and Aquifer Classification

The approximate lithological boundary between the Dinantian mudstones and sandstones of the Cuskiny Member and the Dinantian lower impure limestones of the Ballysteen Formation, east and west of the mapped regional fault, also represents the boundary between the Ballinhassig groundwater body to the north and the Middleton groundwater body to the south. Groundwater flow direction is generally from the Ballinhassig groundwater body towards the Middleton groundwater body.

The Ballinhassig groundwater body is comprised of bedrock aquifers that are classified as **LI**, locally important aquifers, moderately productive in local zones or **PI**, poor aquifers which are generally unproductive except for local zones. The key characteristics of this groundwater body have been identified by the GSI as follows:

- Most groundwater flow occurs in the upper 15-20m of the aquifer, in the weathered zone and the interconnected fracture network beneath this;
- Groundwater flow gradients are likely to be in the range 0.01-0.04;
- Transmissivity in the aquifer is low, in the range of 2-10m²/day, with median values towards the lower end of the range. Storativity values are thought to be low;
- The general low permeability characteristics of the aquifer and the high/steep slopes indicate that a high proportion of recharge will discharge rapidly to surface watercourses.
- Groundwater flow paths are expected to be relatively short, typically 30-300m;
- The bedrock units comprise non-carbonate rocks, with alkalinity ranges about 10-300mg/l (as CaCO₃) and conductivities ranging between 125-600µS/cm.

The Middleton groundwater body is comprised of bedrock aquifers that are classified as **LI**, locally important aquifers, moderately productive in local zones or **Rkd**, regionally important karstified aquifer dominated by diffuse flow.

The Dinantian lower impure limestones underlying the site and the area south of the site form part of a narrow area around the margins of the body, which is classified as **LI**. The characteristics of LI section of the groundwater body have been identified by the GSI as follows:

- Most groundwater flow occurs in an upper weathered layer of a few metres and a zone of interconnected fissures often not extending more than 15m from the top of the rock,

although occasional deep inflows associated with major faults can be encountered. Impure limestone is less susceptible to karstification than pure limestones;

- Transmissivity in the aquifer is low, in the range 5-20m²/day but may be higher where karstification has occurred. Storativity is low in the aquifer;
- The sandstone ridges to the north (Ballinhassig GWB) provide abundant runoff which recharges the limestone aquifer in the valley. A small volume of groundwater may cross as throughflow from the sandstone into the groundwater body. Diffuse recharge will occur over the entire GWB via rainfall percolation through the subsoil;
- Regional groundwater flow is towards the rivers draining the valley. Groundwater flow paths can be up to several kilometres long but may be significantly shorter where the water table is very close to the surface;
- The water table elevation is generally within 10m of the surface, except for more elevated parts of limestone aquifers, and the typical annual fluctuation of the water table ranges up to 6 or 7m;
- The groundwater is dominated by calcium and bicarbonate ions. Groundwater alkalinity is high, up to 400µS/cm and typical limestone conductivities are in the order of 500-700µS/cm;
- The major north-south trending shear faults are paralleled by a well-developed system of vertical north-south joints, commonly spaced at 0.5-2m intervals;

The key characteristics of the karstified bedrock south of the site are presented below:

- Transmissivities in the pure bedded limestones can range up to a few thousand m²/day;
- Groundwater gradients are considered to be low, in the range 0.001-0.002.
- Groundwater flow paths can up to several kilometres long, with the groundwater flow direction towards the rivers draining the valleys.

The bedrock units underlying the pig unit are classified as a locally Important aquifer, which is moderately productive in local zones (*Figure 5, Appendix E*). The regionally important karstified aquifer, representative of the Waulsortian Limestones, is mapped approximately 400m south of the site.

6.7.2 **Groundwater Levels, Flow Direction, and Gradient**

There is one water supply well on the site (E197375 N076505), as shown on *Drawing No. IE565-003-A (Appendix A)*. The site well is calculated to abstract approximately 20m³/day in response to the water demand on site. In order to obtain a static groundwater level beneath the site, the pump was switched off at 6pm on the evening before a water level measurement was taken on 14th April 2010. The water level was recorded at 11.515m below the top of the steel casing at 08:53.

Two third party wells (TPW), referred to as TPW1 and TPW 2, had been identified previously as downgradient water quality monitoring points in the Dairygold Farm Ltd. IPPC licence application

(P0438-01). The approximate locations of third party wells in the vicinity of the site are shown on *Drawing No. IE565-003-A (Appendix A)*. It is considered that TPW2 is downgradient of the site. However, given the location of TPW1 in relation to the site, it is likely to be considered along gradient to the site.

Access was not obtained in order to record further static water levels in the vicinity of the site. It is considered that these wells will not be available as future groundwater monitoring points. The groundwater flow gradient beneath the site could not be determined in the absence of water level data.

A summary of previous available static water level monitoring data, for the site well and the closest third party monitoring wells, is presented in *Table 3* below.

Monitoring Point	15/5/98	3/8/98	26/8/98	15/4/10
Site Well	11.7	12.9	13.3	11.51
TPW 1	16.7	-	-	-

Table 3: Available Water Level Data For Site Well and TPW1

In the absence of water level data relative to Ordnance Datum (mOD), it is assumed that the groundwater flow direction is a subdued reflection of the topography. Therefore the groundwater beneath the site is assumed to flow in a southerly and south-westerly direction. On-site boreholes would need to be monitored in order to accurately determine the groundwater levels, gradients and flow direction beneath the site.

Given the groundwater table elevation relative to the elevation of the water in the Dower River, it is unlikely that the groundwater is moving towards the river along the section adjacent to the site.

It is proposed that a detailed survey (including flow and water level monitoring) of the existing site well be undertaken in order to delineate the zone of contribution (ZOC) to the well. The delineated ZOC to the well will inform an appropriate location for additional monitoring points.

These installations will enable site-specific information on depth to bedrock, subsoil and groundwater flow direction to be obtained. Furthermore, these boreholes will serve as monitoring points for the integrity of on-site structures.

6.7.3 Groundwater Vulnerability

Groundwater vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. Where the subsoil thickness is <3m, the vulnerability is rated as Extreme (the highest risk situation). Where the subsoil thickness is >3m, the vulnerability is rated as High, Moderate or Low (depending on the nature and thickness of the subsoil).

The South Western Interim Vulnerability Map for Cork, which was completed as part of GSI's Groundwater Protection Scheme, indicates groundwater beneath the site has been assigned an interim vulnerability rating of **High (H)** along the northern section of the site, whereas the vulnerability of the groundwater beneath the southern section of the site is classified as **Moderate**

(M) (Figure 6, Appendix E). These ratings are based on the assumption that the depth to bedrock beneath the site is greater than 3m.

6.7.4 Dower Spring Source Protection Area

The pig unit is located within the Outer Source Protection Area of the Dower Spring but within 400m of the Inner Source Protection Area (Figure 7, Appendix E). The Dower Spring serves as a public water supply, the abstraction rate for which is approximately 4545m³/day. The minimum discharge from the spring is recorded as 6,820m³/day.

The location of the site within the source protection area of the spring means that groundwater moving beneath the site eventually emerges at the Dower Spring. The site is located within the source protection zone designated as S1/M.

The pig unit is referred to in the Dower Spring Source Protection Plan (GSI, 2002) as an activity with the potential to contaminate the water supply source. It is considered that the proposed new housing and slurry storage structures will serve to reduce any potential impact of the unit on the public water supply. The existing new housing structures are built partially or entirely above ground level. In addition, each of the new housing units has an individual leak detection system, which will be visually inspected monthly and a record of these inspections maintained on-site in accordance with IPPC licence requirements. These measures undertaken serve to reduce the risk that the facility poses to the water supply source.

6.8 Groundwater Quality

6.8.1 Regional Data

As part of the Water Framework Directive (WFD) initial characterisation work, all groundwater bodies in the country were assigned a score based on the likelihood of the groundwater quality achieving good status by 2015. The **Ballinhassig and Midleton** groundwater bodies were assigned a score of **1a** indicating that the **water body is at risk of achieving good status in 2015**.

Water quality data from the Dower Spring Groundwater Protection Report (GSI, 2002) indicates that nitrate levels in the spring, particularly since 1992, have been noted and considered to indicate significant contamination of the spring. The nitrate range, based on 30 samples, was reported as 12-37.5mg/l. Also, levels of ammonia, E. Coli and Total Coliforms have been found to be periodically unsatisfactory, possibly attributable to runoff following heavy rainfall events.

6.8.2 Site Groundwater Quality Information

The analysis results of a groundwater sample taken from the site well on 14th April 2010 is presented in Table 4 below. The Certificate of Analysis is presented in Appendix F. The results were compared with the limits and threshold values set out in the following legislation and guidelines:

- European Communities (Drinking Water)(No. 2) Regulations 2007 (S.I. No. 278 of 2007).
- Environmental Protection Agency Interim Guideline Value (EPA IG) for Groundwater (EPA, 2003).

- European Communities Environmental Objectives (Groundwater) Regulations 2010 (S.I. No. 9 of 2010).

Parameter	Site Well	EPA IGV	Drinking Water Regs 2007	EC (Environmental Objectives) Ground Water Regs 2010
pH	6.93	> =6.5 <=9.5	> =6.5 <=9.5	-
Alkalinity (mg/l as CaCO ₃)	129	-	-	-
Electrical Conductivity (µS/cm)	419	1000	2500	800-1875
Nitrate (mg/l NO ₃)	38.9	25	50	37.5
Nitrite (mg/l NO ₂)	0.066	0.1	0.5	0.375
MRP (mg/l P)	0.06	-	-	0.035
Ammonium (mg/l NH ₄)	<0.02	0.15	0.3	0.065 – 0.175
Calcium (mg/l)	36	200	-	-
Magnesium (mg/l)	18	50	-	-
Manganese (mg/l)	0.012	0.05	0.05	-
Iron (mg/l)	<0.03	0.2	0.2	-
Potassium (mg/l)	2.24	5	-	-
Sodium (mg/l)	15	150	200	150
Sulphate (mg/l)	16	200	250	187.5
Chloride (mg/l)	24	30	250	24-187.5
Total Phosphorous (mg/l P)	0.23	-	-	-
Total Petroleum Hydrocarbons (mg/l)	<0.01	-	-	-
Total Coliforms (cfu/100ml)	<1	-	-	-
Faecal Coliforms (cfu/100ml)	<1	0	0	-
Enterococci (cfu/100ml)	<1	0	0	-

Table 4. Water Quality Data on Site Well on 14th April 2010

The bacteriological quality of the water sample was found to be good. The nitrate concentration of 38.9mg/l was found to be elevated relative to the Groundwater Threshold Value of 37.5mg/l (S.I. No. 9 of 2010). The phosphate concentration at 0.06mg/l was also elevated compared to the groundwater threshold value of 0.035mg/l.

Generally, sources of elevated nitrates and phosphates, apart from pig slurry, are from agricultural activities such as tillage and animal grazing. There were no available upgradient and downgradient water quality monitoring points against which to compare the results. Therefore, the proposed site well survey and monitoring outlined in Section 6.7.2 would provide a framework to assess the integrity of all tanks and pipeline systems on-site.

A summary of all available sampling results for the site well, obtained from previous IPPC Licence applications and planning applications for the site, is presented in Table 5. The available Certificates of Analyses are presented in Appendix F.

Parameter	Date								
	16/5/96	3/6/96	26/6/96	18/1/97	8/4/98	30/5/01	20/9/05	21/3/07	21/9/07
pH	6.5	-	6.5				-	-	-
Nitrate (mg/l NO ₃)	24.6	17.5	21.5	10.2	22.8	70	39.4	18	54.5
Ammonium (mg/l NH ₄)						<0.13	0.09	0	<0.013
COD (mg/l)	5.4	9	3			<10	-	-	-
Total Phosphorous (mg/l P)	0.14		0.05				-		-
Total Coliforms (MPN/100ml)						6	29	0	0
Faecal Coliforms (MPN/100ml)						0	0	0	0

Table 5. Available Historical Monitoring Data

Samples were taken from the nearest third party wells and the site well on 26th June 1996. This information is presented in Table 6 below.

Parameter	Site Well	TPW 1	TPW 2
pH	6.5	6.5	6.5
Nitrate (mg/l NO ₃)	21.5	10.1	11.9
COD (mg/l)	3	<1	<1
Total Phosphorous (mg/l P)	0.05	0.04	0.04

Table 6. Groundwater Monitoring Data on Site Well and Third Party Wells on 26th June 1996

The results above indicate that, historically, the nitrate concentrations in the samples taken from the site well have been elevated. The concentration in the sample taken in September 2005 approximates to the concentration taken in April 2010.

The samples taken on 26th June 1996 indicates also that the nitrate levels in the site well were elevated relative to the concentrations in the closest along gradient and downgradient. The phosphate levels were shown to be relatively consistent in the three wells.

7 GROUNDWATER RISK ASSESMENT AND POTENTIAL CONTAMINATION SOURCES

The concepts of Risk, Risk Assessment and Risk Management have become important tools in the area of environmental protection. The philosophical basis and language of risk is useful in that it provides a logical framework for considering the impact of potentially polluting activities on the environment.

This framework enables a more rigorous systematic approach to decision making. In reality it is putting a recognised framework to what is done intuitively, but by being systematic. In addition, it

is an aid in conceptualising the potential impact of the discharge of effluent on the wider environment.

A **hazard (source)** presents a risk when it is likely to affect something of value (the **target/receptor**), which in this case is groundwater and/or surface water, which in turn may impact on humans. It is the probability of the hazard occurring and its consequences that is the basis of Risk Assessment.

The conventional Source-Pathway-Receptor model for environmental management can be applied to identify potential sources, receptors and pathways, and hence potential pollutant linkages relating to the site.

For a particular contaminant to present a risk to receptors, three components must be present:

- | | |
|------------------|---|
| Source | An entity or action that releases contaminants into the environment |
| Pathway | A mechanism by which receptors can become exposed to contaminants |
| Receptors | The human or ecological component at risk of experiencing an adverse response following exposure to a contaminant |

The qualitative risk assessment presented in *Table 7* below, is based on the hydrogeological information collected to date in relation to the site, and incorporated into previous sections of this report.

For inspection purposes only.
Consent of copyright owner required for any other use.

Source	Pathway	Receptor	Risk	Mitigation
Antibiotics Vaccines for disease Prevention	Crack/joint in building hardstanding. Residues in effluent slurry.	Groundwater beneath the site. Site water supply. Source Protection Area of Dower Spring.	Very low risk in raw form. Very low risk for residues in effluent slurry given the low quantities used and the dilution effect with slurry.	Provision of tank and pipeline assessment proposal to the EPA based on groundwater monitoring
Cleaning products/ Disinfectants.	Crack/joint in hardstanding area. Underground storage tanks. Underground slurry collection system. Underground slurry pit.	Groundwater beneath the site. Site water supply. Source Protection Area of Dower Spring.	Low to moderate risk only if integrity of underground pipe network and in underground sumps breached or compromised.	Provision of tank and pipeline assessment proposal to the EPA based on groundwater monitoring
Pig effluent slurry: Nitrate. Phosphate. Faecal Coliforms. BOD. COD.	Crack/joint in hardstanding area. Underground storage tanks. Underground slurry collection system. Underground slurry pit.	Groundwater beneath the site. Site water supply. Source Protection Area of Dower Spring.	High risk only if integrity of underground pipe network and in underground storage tanks and slurry pit are breached or compromised.	Provision of tank and pipeline assessment proposal to the EPA based on groundwater monitoring

Source	Pathway	Receptor	Risk	Mitigation
Domestic Effluent	Cracks in septic tank chamber. Direct percolation into subsoils from soakaway.	Groundwater beneath the site. Site water supply. Source Protection Area of Dower Spring.	Moderate to High risk only if depth of soakaway and permeability is such that the effluent is not treated sufficiently before reaching the water table.	Provision of tank and pipeline assessment proposal to the EPA based on groundwater monitoring
Heating Oil	Crack/joint in hardstanding area. Seepage through hardcore area.	Groundwater beneath the site. Site water supply. Source Protection Area of Dower Spring	High risk only if spillage occurs on ground during refuelling.	Provision of tank and pipeline assessment proposal to the EPA based on groundwater monitoring
Animal Carcasses	Seepage through hardcore area.	Groundwater beneath the site. Site water supply. Source Protection Area of Dower Spring.	Low risk only if storage container does not leak and if stored on concrete hardstand.	Provision of tank and pipeline assessment proposal to the EPA based on groundwater monitoring

Table 7. Qualitative Risk Assessment

The primary method to reduce the potential risk that a source would have on a receptor is to remove the pathway to the receptor. The measures already implemented at the site to reduce the risk to potential receptors are:

- Leak detection system in new underground tanks and slurry collection system;

The following measures, proposed as part of the expansion of the pig unit, will also reduce the risk to groundwater of the site activities:

- Bunding of site fuel storage tank;
- Installation of slurry basin lined with a geotextile membrane.

8 CONCLUSIONS AND RECOMMENDATIONS

The quality of the groundwater beneath the site and the risk of contamination of groundwater and surface water are primarily dependent on the integrity of the following infrastructure:

- Underground pipework;
- Slurry storage tank beneath the slatted houses;
- Existing slurry pit;
- Soakaway for domestic effluent.

The following measures, some of which are already partially installed, which were proposed as part of the expansion of the pig unit, will reduce the risk to groundwater from site activities. These measures include:

- Leak detection system in new underground tanks and slurry collection system;
- Installation of slurry basin lined with a geotextile membrane;
- Bunding of site fuel storage tanks.

In order to address and monitor all site structures, both old and new, the following monitoring programme is proposed:

- Undertake a detailed survey of the existing site well, which will include the installation of a flow meter and water level monitoring;
- Delineate the Zone of Contribution to the site well in order to determine the proportion of the site structures that are contained within the ZOC or capture zone to the site well.
- The delineated ZOC to the site well will inform the most appropriate locations for additional monitoring wells.
- An additional downgradient monitoring well may be required if it is determined that the capture zone of the site well does not extend beneath the entire facility. A minimum total of 3 No. groundwater monitoring points are required to determine the groundwater flow direction.
- Site-specific information regarding the depth to bedrock, subsoil permeability and composition will be obtained from the installation of on-site monitoring points.

The provision of a wellhead cover and a surface seal around the site well would prevent the entry of surface water, rodents and other surface contaminants into the site water supply.

The suite of parameters for which the groundwater from the site well and other monitoring points is tested will be extended to include for baseline analysis:

- Major cations and anions;

- Indicator parameters for the presence of contaminants from on-site activities that are not already included in the major cations and anions.

It is recommended that the site well tested annually for the suite of parameters set out in the Drinking Water Regulations 2007 (S.I. 278 of 2007) or for a set of parameters to be approved by the EPA.

9 REFERENCES

An Foras Taluntais (1980). "*General Soil Map of Ireland 1:575,000 Scale*". 2nd Edition. An Foras Taluntais.

Environmental Protection Agency (2003). "*Towards Setting Guidelines for the Protection of Groundwater in Ireland*". Environmental Protection Agency, Johnstown Castle, Co. Wexford.

European Communities (Drinking Water)(No. 2) Regulations 2007. S.I. No. 278 of 2007.

European Communities Environmental Objectives (Groundwater) Regulations 2010 (S.I. No. 9 of 2010).

Geological Survey of Ireland (1995) "*Geology of East Cork_Waterford, 1:100,000 Scale Series Map*". Sheet 22.

Geological Survey of Ireland (2002) "*Dower Spring - Groundwater Source Protection Zones*".

Sleeman, A.G. and McConnell, B, 1995. "*Geology of East Cork-Waterford*". Geological Survey of Ireland.

For inspection purposes only.
Consent of copyright owner required for any other use.