Appendix No. 7

Site Characterisation Form

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Date: 05/02/2020

Re: Site Assessment Report including trial hole & percolation test results for Sammy Wilkin at Cornawall, Rockcorry, Co. Monaghan.

1.0 DESK STUDY

A desk study was carried out in accordance with the *E.P.A " Code of Practice: WASTEWATER TREATMENT AND DISPOSAL SYSTEMS SERVING SINGLE HOUSES (p.e. ≤ 10)"*, section 6.1, desk study.

1.1 Aquifer Category:

The Aquifer Category was determined by researching the Geological Survey of Ireland Website for the townland in question. Figure 1 below shows the result. The townland of Cornawall is designated; **P1 – Poor aquifer – Bedrock which is generally unproductive except for local zones**

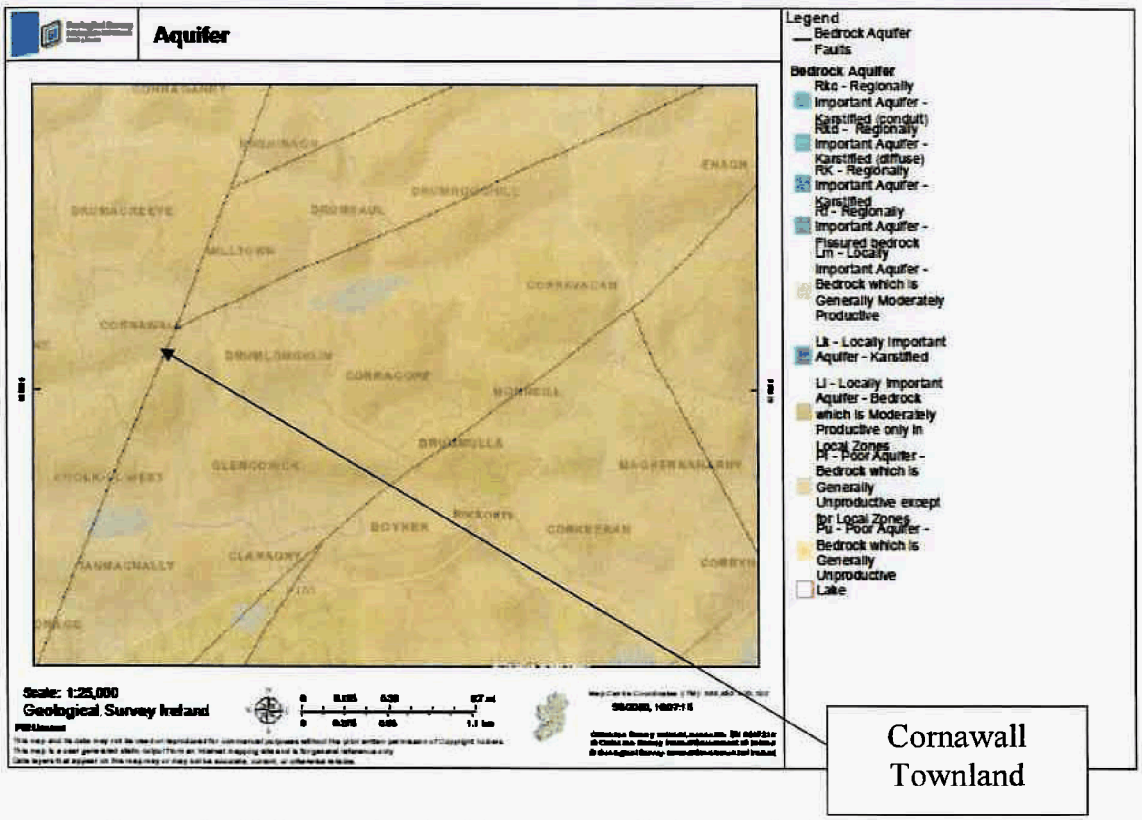


Figure 1 - GSI, townland of Cornawall, designated P1 – Poor Aquifer

1.2 Vulnerability:

The GSI website has a 'Vulnerability' map on display. Reference was made to the townland in question as displayed below. A vulnerability rating of 'L' – Low was designated.

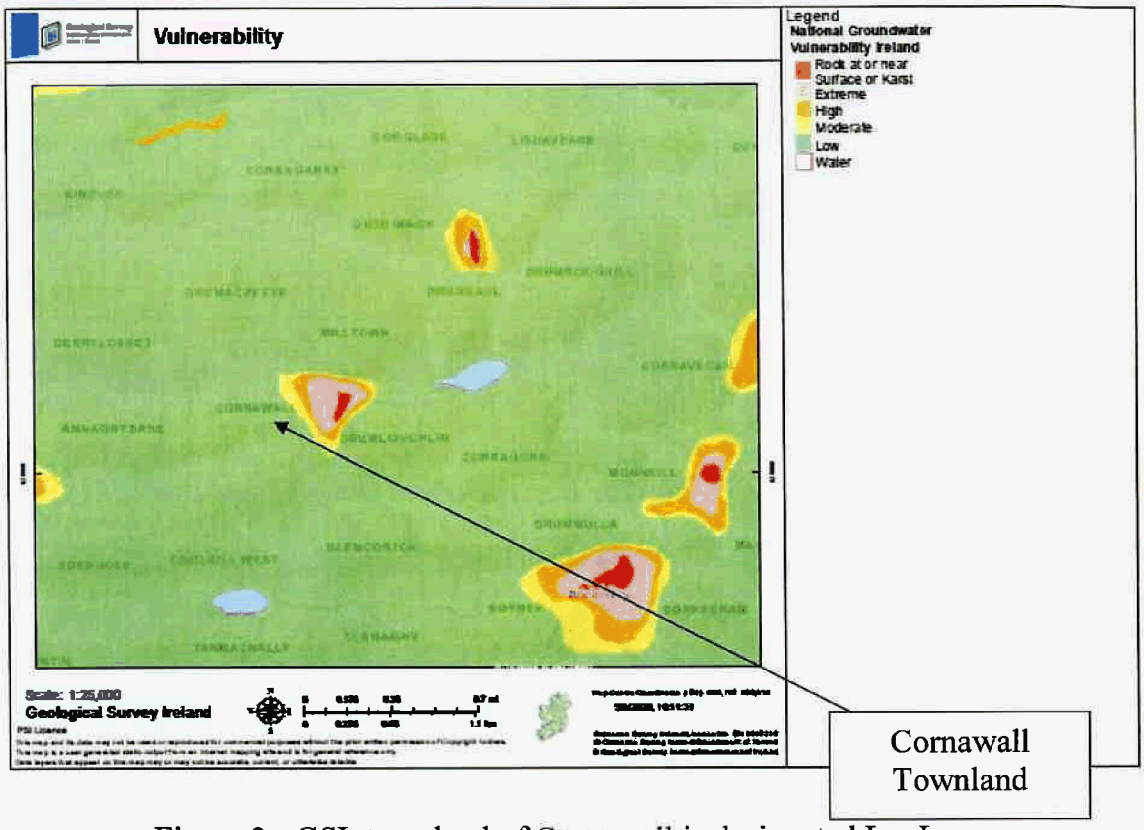


Figure 2 - GSI, townland of Cornawall is designated L – Low

1.3 Groundwater Protection Response:

The Vulnerability rating is recorded as L – Low and the Aquifer category is recorded as P1– Poor Aquifer. The Groundwater Protection Response therefore is recorded as 'R1' – *Acceptable subject to normal good practice i.e. system selection, construction, operation and maintenance in accordance with EPA COP 2009.*

1.4 Soils Map:

To determine the existing soils, reference was made to EPA and GSI mapping. The site is located in the townland of Cornawall. The topsoil in the townland is recorded as AminPD – Mineral Poorly drained (mainly acidic). The subsoil type as described on GSI mapping is classified as TLPSsS - Till derived chiefly from lower palaeozoic sanstones and shales.

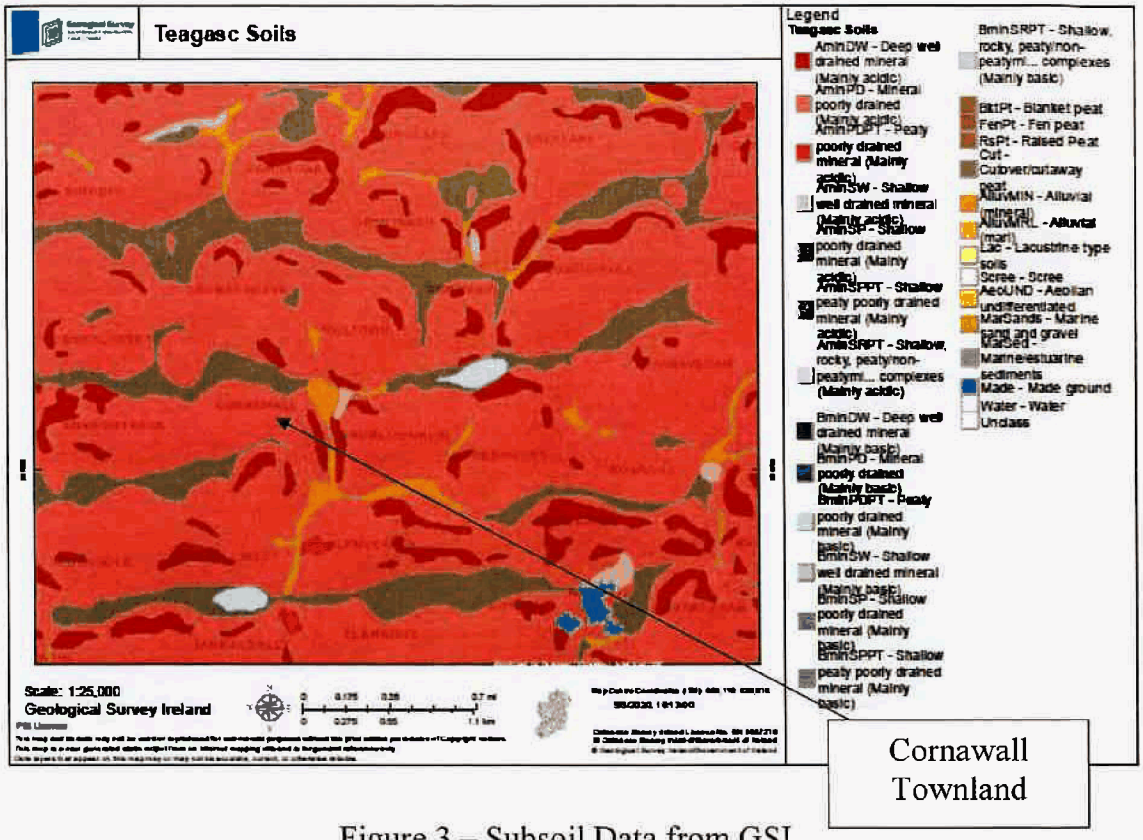


Figure 3 – Subsoil Data from GSI

1.5 Bedrock:

The Bedrock type was determined in the townland of Cornawall and for the site in question. Figure 4 below shows the result, the townland is designated both 'OM' – Ordovician Metasediments and 'SMV' Silurian Metasediments and Volcanics.

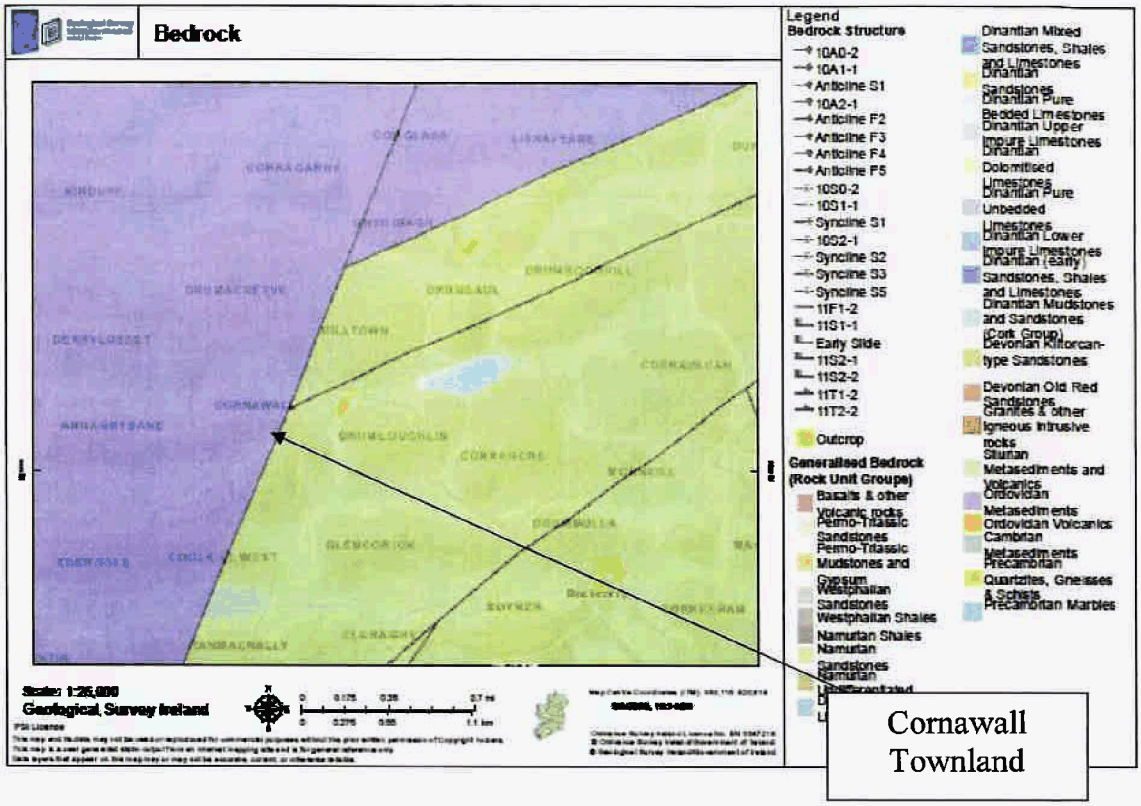


Figure 4 – Bedrock details from GSI

1.6 Karst Features:

Proximity of existing Karst features was determined by researching the Geological Survey of Ireland mapping resources for the townland of Cornawall. Figure 5 below indicates there are no karst features within close proximity of the site.

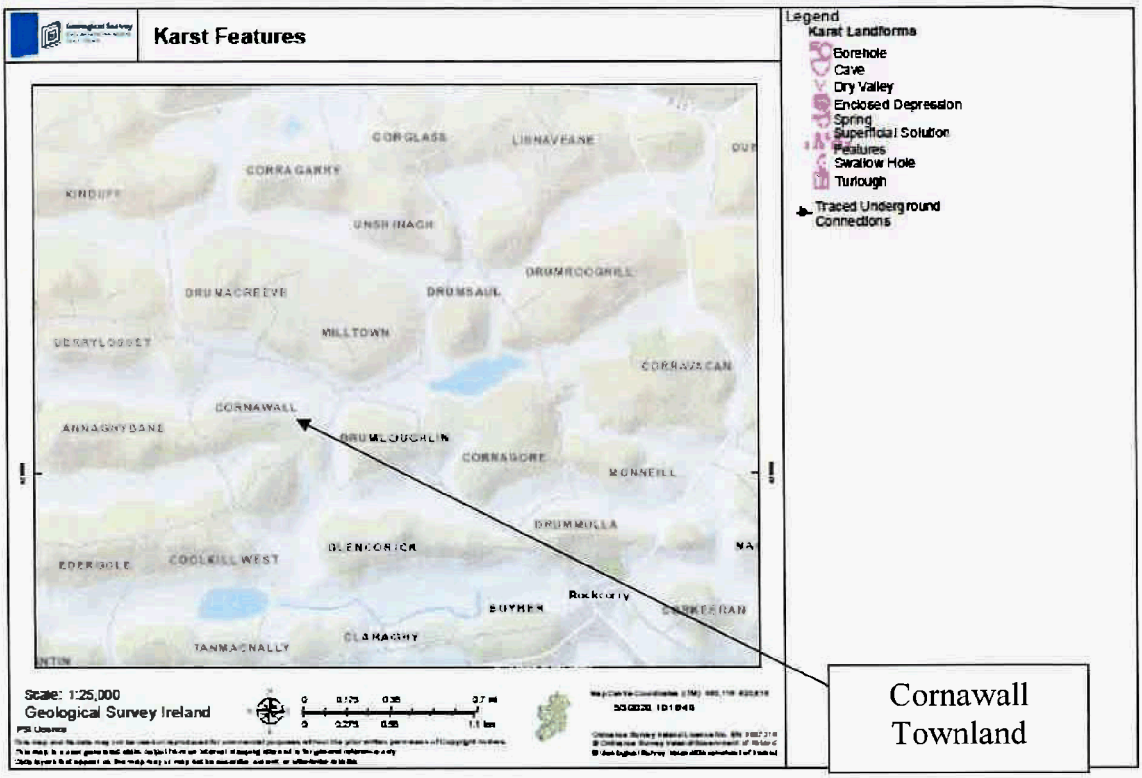


Figure 5 – Karst features (arrow indicates approx. location of site).

1.7 Conclusion of desk top study

The aquifer was designated P1 – poor and the vulnerability rating was found to be classified as L-Low. The soil mapping found the topsoil to be recorded as AminPD – Mineral Poorly drained (mainly acidic). The subsoil type is classified as TLPSsS - Till derived chiefly from lower palaeozoic sanstones and shales. The Groundwater Protection Response therefore is recorded as 'R1' which is acceptable subject to normal good practice i.e. system selection, construction, operation and maintenance in accordance with EPA COP 2009. Bedrock was classified as 'OM' – Ordovician Metasediments and 'SMV' – Silurian Metasediments and Volcanics.
It is concluded possible targets at risk are limited to groundwater and surface water. There are no Karst features within close proximity of the proposed site. The conclusion of the desktop study is positive; so far the site would seem suitable to accommodate a wastewater treatment system.

2.0 VISUAL ASSESMENT

A site inspection was carried out on 28th January 2020. The information recorded from the inspection is detailed in section 3.1 of the EPA Site Characterisation form.

The site of the proposed percolation area was dry under foot. The proposed percolation area location is located in an agricultural field adjacent to an existing poultry unit development. There was no evidence of rock outcrops on the site or karst features. The site is located in an area with gently undulating to level ground and vegetation evident is limited to grass with some rush evident in lower areas and filled areas of the existing field. There are 2 no. existing dwellings located within 250m of the proposed percolation area together with 2 no. farmyards. The dwellings are serviced by existing on-site wastewater treatment systems and mains water supplies, the existing farmyards are serviced by group water scheme mains supplies. In relation to targets at risk, there are no active wells located within 250m of the proposed percolation area. Separation distances are complied with as regards the position of the proposed on-site wastewater treatment system and proposed percolation area. Targets at risk should be limited to ground water. The proposed development is to be served by an existing connection to a group water scheme supply. The existing boundaries immediately surrounding the site are hedgerows with some mature tree planting. Drainage ditches are located surrounding the parent field to the north west, there was between 50mm and 100mm of water evident in these drainage ditched on the day of the visual inspection. A watercourse is located in a south easterly direction and there was 150mm of water evident here on the day of the visual inspection, this watercourse was previously traversing the site in the existing filed but is now diverted.

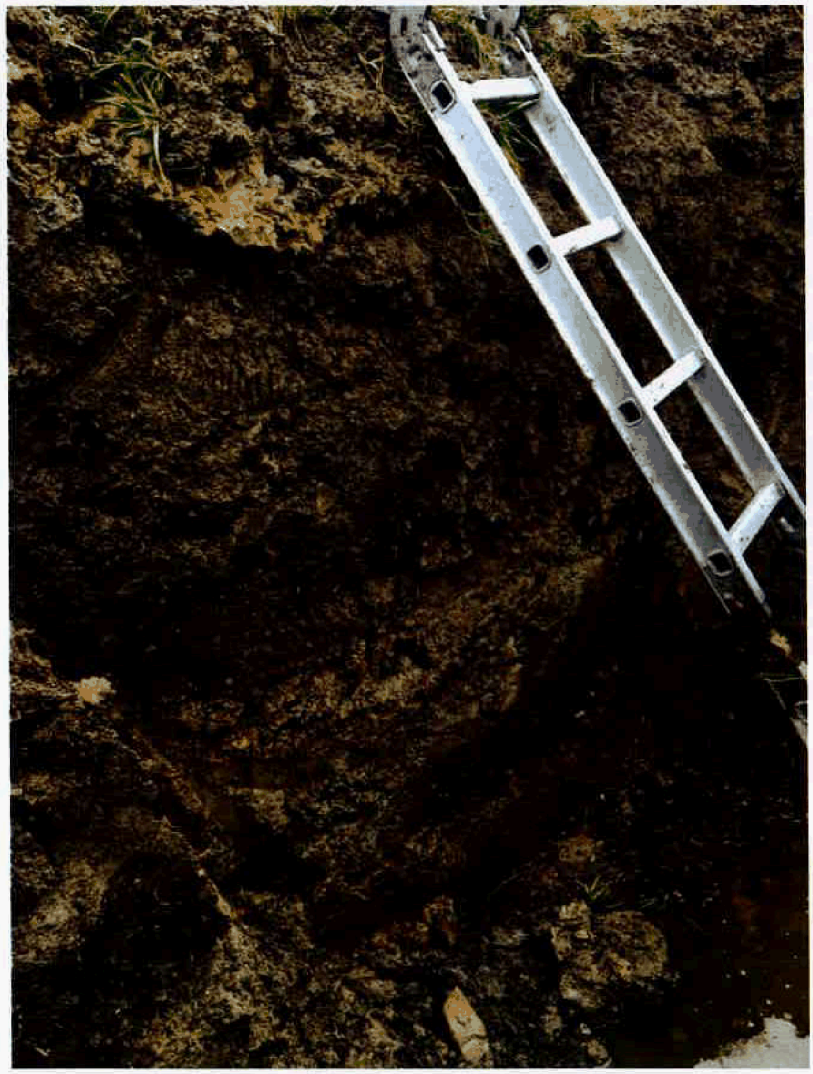
From the visual assessment it is concluded that the site would seem to be suitable for a wastewater treatment system.

Picture 1 – Viewpoint of proposed site facing North West. Proposed location of percolation area indicated by arrow.

Picture 2 – Viewpoint of proposed site facing South East

3.0 TRIAL HOLE TEST

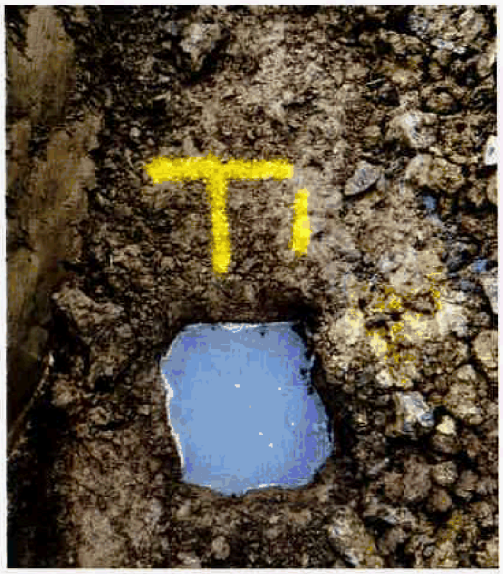
I refer to the above and wish to inform the Planning Department that both the percolation and trial hole test was carried out in accordance with *The E.P.A " Code of Practice: WASTEWATER TREATMENT AND DISPOSAL SYSTEMS SERVING SINGLE HOUSES (p.e. ≤ 10)"*. There was 100mm of water evident mottling in the 2.2m deep trial hole 48 hours after excavation. Bedrock was not encountered at any depth below ground level. Mottling was encountered at a level 1.45m below ground level. The invert of the proposed percolation pipes will need to be 0.9m above the mottling level to achieve a satisfactory depth of unsaturated subsoil.



Picture 2 – 2.2m deep Trial Hole

4.0 PERCOLATION 'T' TEST FOR DEEP SUBSOILS

Three holes were excavated on the 29th of January 2020 on the site of the proposed percolation area. Test was carried out in accordance with *The E.P.A "Code of Practice: WASTEWATER TREATMENT AND DISPOSAL SYSTEMS SERVING SINGLE HOUSES (p.e. ≤ 10)", Annex C 2.3, (Percolation Test 'T' Test procedure).* The test recorded an average 'T' value of 59.32 minutes/25mm.



Picture 3 – 'T' Test 1

Picture 4 – 'T' Test 3

5.0 PERCOLATION 'P' TEST FOR SHALLOW SOILS

To determine the permeability of the topsoil the 'P' test was carried out. Three holes were excavated on the 29th of January 2020 on the site of the proposed percolation area. Test was carried out in accordance with *The E.P.A "Code of Practice: WASTEWATER TREATMENT AND DISPOSAL SYSTEMS SERVING SINGLE HOUSES (p.e. ≤ 10)", Annex C 2.3.* The test passed with an average 'P' value of 56.40 minutes/25mm.

Picture no. 5 – 'P' Test 1

Picture no. 6 – 'P' Test 3

6.0 IMPACT ON WELLS / SPRINGS

Any existing or proposed well must be in line with recommendations advised in table B.3 – 'Recommended minimum distance between a Receptor and a Percolation Area or Polishing Filter' as detailed in document titled "Code of Practice: WASTEWATER TREATMENT AND DISPOSAL SYSTEMS SERVING SINGLE HOUSES (p.e. ≤ 10)". Table B.3 details the following separation distances;

T value >30 and depth of subsoil greater than 2.0m a well can be located as follows:

- Down gradient domestic well 30m from proposed percolation area
- Domestic well alongside 25m from proposed percolation area
- Up-gradient domestic well 15m from proposed percolation area

There are no active wells located within 250m of the proposed percolation area position. Separation distances are complied with as regards the position of the proposed on-site wastewater treatment system.

The wastewater treatment system and percolation area is to be positioned to comply with distances (metres) in table 1 included in Appendix IV of this report. This table is an extract from The E.P.A "Code of Practice: WASTEWATER TREATMENT AND DISPOSAL SYSTEMS SERVING SINGLE HOUSES (p.e. ≤ 10)" 2009.

7.0 DISCUSSION OF RESULTS

Overall the results obtained were positive. From the desktop study the Aquifer category was recorded as P1 and the vulnerability rating was recorded as L-Low. The Groundwater Protection Response therefore is recorded as 'R1' which is acceptable subject to normal good practice i.e. system selection, construction, operation and maintenance in accordance with EPA COP 2009. The top soil in the area is recorded as AminPD – Mineral Poorly drained (mainly acidic). The subsoil type is classified as TLPSsS - Till derived chiefly from lower palaeozoic sanstones and shales. The bedrock is recorded 'OM' – Ordovician Metasediments and 'SMV' – Silurain Metasediments and Volcanics. The visual assessment showed positive signs and absence of any well within the required separation distances from the proposed percolation area location. The site was dry under foot and appeared well drained. There was no evidence of rock outcrops on the site. The trial hole investigation revealed a mottling level 2.1m from ground level. Bedrock was not encountered at any depth in the trial hole. The permeability of the subsoil, 'T' test recorded a value of 59.32 minutes/25mm. The permeability of the topsoil, 'P' test recorded a value of

56.40 minutes/25mm. These values indicate that the existing subsoil and topsoil strata has moderate drainage characteristics.
A raised mound percolation area or polishing filter twinned with an advanced wastewater treatment unit will treat the effluent in a satisfactory manner on this particular site. The invert of the proposed pipes will need to be a minimum of 0.9m above the mottling level encountered.

In conclusion, the site is suitable to accommodate a wastewater treatment system.

8.0 COMMERCIAL TREATMENT SYSTEM DESIGN

Unlike standard domestic houses where there exists an availability of a wide range of standard treatment units by different manufacturers, such a broad range does not exist for commercial systems. Each commercial unit must is designed from first principles taking consideration of site assessment results twinned with variable such as loading factors, usage etc.

8.1 Design Basis

NOTE: EPA Wastewater Treatment Manuals: 'Treatment Systems for Small Communities, Business, Leisure Centres and Hotels' advised in table 3 the following loading for Schools such as 'Office and/or factory without canteen':

- 30 litres / head / day
- 20 BOD_5 grams / head / day

Hydraulic flow: 2 no. staff @ 30 litres / head / day
= 60 litres / day
Organic load: 2 no. staff @ 20 grams / head / day
= 0.04kg / day

8.2 Treatment Unit:

An advanced treatment unit shall be installed comprising of:

- Primary Settlement, Sludge Storage & Flow Balancing
- Secondary Treatment (Aeration)
- Clarification & Sludge Return
- Pump Discharge

The pumping chamber shall send the effluent to a tertiary polishing filter as discussed below in section 8.3. The treatment units and polishing filter shall be positioned in the site to comply with separation distances as per table 6.1, titled – 'Minimum

separation distances' in accordance with The E.P.A "Code of Practice: WASTEWATER TREATMENT AND DISPOSAL SYSTEMS SERVING SINGLE HOUSES (p.e. ≤ 10)" (This table is included in appendix IV of this report titled table 1)

8.3 Percolation area

It is proposed to construct a percolation area filtration system to serve the development. This system will use a pumped distribution layout of pipes to further treat the effluent after primary treatment in the proposed wastewater treatment unit. The actual design breakdown of the percolation area filtration system is as follows:

- Distribution percolation pipes shall be spaced at 2.5 m c/c. The distribution pipes shall have a minimum cover of 750mm from proposed mound finished level. The system is as specified and explained in section 7.2, The E.P.A "Code of Practice: WASTEWATER TREATMENT AND DISPOSAL SYSTEMS SERVING SINGLE HOUSES (p.e. ≤ 10)".

- The site recorded a 'P' Value of 56.40 minutes/25mm. The recommended loading rate for the percolation area as per section 7.1.2, The E.P.A "Code of Practice: WASTEWATER TREATMENT AND DISPOSAL SYSTEMS SERVING SINGLE HOUSES (p.e. ≤ 10)" is 20 litres / m² / day. However given the T-value result, a secondary treatment system will need to be constructed on site reducing the loading rate of the percolation area to 4 litres / m² / day as per table 8.1. The total required surface area of the percolation trenches is calculated as follows:

  $$= \frac{\text{60 litres / day}}{\text{4 litres / m}^2\text{ / day}}$$

  $$= 15.0\ \text{m}^2$$

  → Length of percolation trenches required $= \frac{\text{Trench area required}}{\text{Working trench width}}$

  → Length of percolation trenches required $= \frac{15.0\ \text{m}^2}{0.50\text{m}}$

  → Length of percolation trenches required = 30.0m required (3 no. 10.0m trenches required)

9.0 CONCLUSION

It is concluded the site is suitable. The site complies with the most important criteria for site assessment;

- The effluent will not pond on site, due to the favourable 'P' value of 56.40 mins/25mm.
- The effluent will be suitably treated through the use of a mechanical aeration system and sand polishing filter before it reaches any target.
- All minimum separation distances will be complied with.

10.0 RECCOMMENDATIONS

1 Percolation area / polishing filter construction

The percolation area / polishing filter should be constructed and supervised by an engineer in private practice covered with professional indemnity insurance.

2 Install an advanced waste waster treatment system

The unit shall be positioned within the site to comply with table 6.1, titled – 'Minimum separation distances' in accordance with The E.P.A "Code of Practice: WASTEWATER TREATMENT AND DISPOSAL SYSTEMS SERVING SINGLE HOUSES (p.e. $\leq$ 10)" (This table is included in appendix IV of this report titled table 1)

3 Install a soil polishing filter

A soil polishing filter shall be installed leading from the secondary treatment unit. The soil polishing filter shall be positioned within the site to comply with table 6.1, titled – 'Minimum separation distances' in accordance with The E.P.A "Code of Practice: WASTEWATER TREATMENT AND DISPOSAL SYSTEMS SERVING SINGLE HOUSES (p.e. $\leq$ 10)" (This table is included in appendix IV of this report titled table 1)

4 Install 30m of percolation pipes / trenches

It is recommended to install 30m of percolation pipes/trenches.. The pipes will be placed in percolation trenches to the satisfaction of the supervisory engineer at a level 0.1m from original ground level. The trenches and pipes shall be spaced at 2.5m c/c and will consist of 3 no. 10.0m lengths. Each length of pipework shall be vented. Land drainage pipes are not acceptable for use. The proposed area is designed in accordance with the criteria as set out in section 8.0 of this report.

5 Distrubution box

To ensure even distribution of effluent over the polishing filter, it is recommended to install an Ash-Tech. distribution box with adjustable weirs. A-J's are not acceptable for use as a distribution box.

APPENDIX I

EPA Site Characterisation Form

SITE CHARACTERISATION FORM
COMPLETING THE FORM

Step 1:

Goto Menu Item **File, Save As** and save the file under a reference relating to the client or the planning application reference if available.

Use the **Clear Form** button to clear all information fields.

Notes:

All calculations in this form are automatic.

Where possible information is presented in the form of drop down selection lists to eliminate potential errors.

Variable elements are recorded by tick boxes. In all cases only one tick box should be activated.

All time record fields must be entered in twenty hour format as follows: HH:MM

All date formats are DD/MM/YYYY.

All other data fields are in text entry format.

This form can be printed out fully populated for submission with related documents and for your files. It can also be submitted by email.

Section 3.2

In this section use an underline _____ across all six columns to indicate the depth at which changes in classification / characteristics occur.

Section 3.4

Lists supporting documentation required.

Section 4

Select the treatment systems suitable for this site and the discharge route.

Section 5

Indicate the system type that it is proposed to install.

Section 6

Provide details, as required, on the proposed treatment system.

SITE CHARACTERISATION FORM

File Reference: SW0120

1.0 GENERAL DETAILS (From planning application)

Prefix: Mr. First Name: Sammy Surname: Wilkin

Address: Cornawall, Rockcorry, Co. Monaghan

Site Location and Townland: Townland: Cornawall
Location: N662275, E820106

Telephone No: - Fax No: -

E-Mail: -

Maximum no. of Residents: No. of Double Bedrooms: No. of Single Bedrooms:

Proposed Water Supply: Mains ✓ Private Well/Borehole Group Well/Borehole

2.0 GENERAL DETAILS (From planning application)

Soil Type, (Specify Type): TLPSsS - Till derived chiefly from lower palaeozoic sanstones and shales

Aquifer Category: Regionally Important Locally Important Poor Pl

Vulnerability: Extreme High Moderate Low ✓ High to Low Unknown

Bedrock Type: 'OM' -- Ordovician Metasediments / 'SMV' - Silurian Metasediments and Volcanics

Name of Public/Group Scheme Water Supply within 1 km: Drumkerry Group Water Scheme

Groundwater Protection Scheme (Y/N): Yes Source Protection Area: SI SO

Groundwater Protection Response: R1

Presence of Significant Sites (Archaeological, Natural & Historical): None evident

Past experience in the area: No negative past experience in the area

Comments:

(Integrate the information above in order to comment on: the potential suitability of the site, potential targets at risk, and/or any potential site restrictions).

It is concluded possible targets at risk are limited to groundwater and surface water. There are no Karst features within close proximity of the proposed site. The conclusion of the desktop study is positive, so far the site would seem suitable to accommodate a wastewater treatment system.

Note: Only information available at the desk study stage should be used in this section.

3.0 ON-SITE ASSESSMENT

3.1 Visual Assessment

Landscape Position: Site integrated into drumlin region

Slope: Steep (>1:5) ☐ Shallow (1:5-1:20) ☐ Relatively Flat (<1:20) ☑

Surface Features within a minimum of 250m (Distance To Features Should Be Noted In Metres)

Houses: 2 within 250m

Existing Land Use: Agricultural

Vegetation Indicators: None evident on applicable site area

Groundwater Flow Direction: Varies - as indicated on site layout plan

Ground Condition: Firm

Site Boundaries: Separation distances complied with

Roads: Local road fronting site

Outcrops (Bedrock And/Or Subsoil): No outcrops or karst features are evident within 250m of the proposed site

Surface Water Ponding: No ponding evident

Lakes: No adjacent lakes within 250m

Beaches/Shellfish: N/A in this area

Areas/Wetlands: None evident on site or adjacent to site

Karst Features: None evident within 250m

Watercourse/Stream*: 1 within 250m, 150mm water evident

Drainage Ditches*: Within 250m, 50-100mm water evident

Springs / Wells*: None within 250m

Comments:

(Integrate the information above in order to comment on: the potential suitability of the site, potential targets at risk, the suitability of the site to treat the wastewater and the location of the proposed system within the site).

From the visual assessment it is concluded that the site would seem to be suitable for a wastewater treatment system.

*Note and record water level

3.2 Trial Hole (should be a minimum of 2.1m deep (3m for regionally important aquifers))

To avoid any accidental damage, a trial hole assessment or percolation tests should not be undertaken in areas, which are at or adjacent to significant sites (e.g. NHAs, SACs, SPAs, and/or Archaeological etc.), without prior advice from National Parks and Wildlife Service or the Heritage Service.

Depth of trial hole (m): 2.20

Depth from ground surface to bedrock (m) (if present):

Depth from ground surface to water table (m) (if present): 2.10

Depth of water ingress: 0.10 Rock type (if present): None evident

Date and time of excavation: 28/01/2020 08:00 Date and time of examination: 30/01/2020 08:00

Depth	Depth of P/T Test*	Soil/Subsoil Texture & Classification**	Plasticity and dilatancy***	Soil Structure	Density/ Compactness	Colour****	Preferential flowpaths
0.1 m		Topsoil fill: SILT Threads: 8, 5 & 5	Dilatancy: Yes Ribbons: 70, 80 & 90mm	Crumb	Medium	Brown	None visible
0.2 m							
0.3 m							
0.4 m	P-Test	Topsoil fill / clay loam: SILT Threads: 3,3,5	Dilatancy : Yes Ribbons: 40, 40 & 60mm	Crumb / fine	Firm	Brown	None visible
0.5 m							
0.6 m							
0.7 m							
0.8 m	T-Test						
0.9 m							
1.0 m							
1.1 m							
1.2 m		Stoney clay loam: SILT Threads: 6, 5, & 7	Dilatancy : Yes Ribbons: 50, 50 & 60mm	Blocky	Firm	Light Brown/ Orange	None visible
1.3 m							
1.4 m							
1.5 m		MOTTLING LEVEL	MOTTLING LEVEL	MOTTLING LEVEL	MOTTLING LEVEL	MOTTLING LEVEL	MOTTLING LEVEL
1.6 m							
1.7 m							
1.8 m							
1.9 m							
2.0 m							
2.1 m		WATERLEVEL	WATERLEVEL	WATER LEVEL	WATERLEVEL	WATERLEVEL	WATERLEVEL
2.2 m							
2.3 m							
2.4 m							
2.5 m							
2.6 m							
2.7 m							
2.8 m							
2.9 m							
3.0 m							

Evaluation:

Mottling encountered at a the depth 1.45m BGL in the trial hole. Water ingress was encountered at a depth 2.1m BGL. From examination of the trial hole, it is expected that the T test will have a result greater than 60 minutes/25mm. Bedrock was not encountered at any depth in the trial hole. The invert of the percolation pipes will need to be 0.9m above the mottling level as a minimum.

Likely T value: 90.00

Note: *Depth of percolation test holes should be indicated on log above. (Enter P or T at depts as appropriate).
** See Appendix E for BS 5930 classification.
*** 3 samples to be tested for each horizon and results should be entered above for each horizon.
**** All signs of mottling should be recorded.

3.3(a) Percolation ("T") Test for Deep Subsoils and/or Water Table

Step 1: Test Hole Preparation

Percolation Test Hole	1	2	3
Depth from ground surface to top of hole (mm) (A)	400	400	400
Depth from ground surface to base of hole (mm) (B)	800	800	800
Depth of hole (mm) [B - A]	400	400	400
Dimensions of hole [length x breadth (mm)]	300 x 300	300 x 300	300 x 300

Step 2: Pre-Soaking Test Holes

Date and Time pre-soaking started	29/01/2020	08:00	29/01/2020	08:10	29/01/2020	08:18

Each hole should be pre-soaked twice before the test is carried out. Each hole should be empty before refilling.

Step 3: Measuring T_{100}

Percolation Test Hole No.	1	2	3
Date of test	30/01/2020	30/01/2020	30/01/2020
Time filled to 400 mm	08:00	08:10	08:18
Time water level at 300 mm	11:10	13:11	10:22
Time to drop 100 mm (T_{100})	190.00	301.00	124.00
Average T_{100}			205.00

If T_{100} > 300 minutes then T-value >90 – site unsuitable for discharge to ground
If $T_{100} \leq 210$ minutes then go to Step 4;
If T_{100} > 210 minutes then go to Step 5;

Step 4: Standard Method (where $T_{100} \leq 210$ minutes)

Percolation Test Hole	1			2			3		
Fill no.	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δt (min)	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δt (min)	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δt (min)
1			0.00			0.00			0.00
2			0.00			0.00			0.00
3			0.00			0.00			0.00
Average Δt Value			0.00			0.00			0.00
	Average Δt/4 = [Hole No.1]		0.00 (t_1)	Average Δt/4 = [Hole No.2]		0.00 (t_2)	Average Δt/4 = [Hole No.3]		0.00 (t_3)

Result of Test: T = 0.00 (min/25 mm)

Comments:

Step 5: Modified Method (where $T_{100} > 210$ minutes)

Percolation Test Hole No.	1				2				3			
Fall of water in hole (mm)	Time Factor = T_f	Time of fall (mins) = T_m	$K_{ts} = T_f / T_m$	T – Value = 4.45 / K_{ts}	Time Factor = T_f	Time of fall (mins) = T_m	$K_{ts} = T_f / T_m$	T – Value = 4.45 / K_{ts}	Time Factor = T_f	Time of fall (mins) = T_m	$K_{ts} = T_f / T_m$	T – Value = 4.45 / K_{ts}
300 - 250	8.1	110	0.07	60.43	8.1	149	0.05	81.86	8.1	124	0.07	68.12
250 - 200	9.7	122	0.08	55.97	9.7	155	0.06	71.11	9.7	129	0.08	59.18
200 - 150	11.9	131	0.09	48.99	11.9	167	0.07	62.45	11.9	138	0.09	51.61
150 - 100	14.1	135	0.10	42.61	14.1	192	0.07	60.60	14.1	155	0.09	48.92
Average T- Value	T- Value Hole 1= (t_1)			52.00	T- Value Hole 1= (t_2)			69.00	T- Value Hole 1= (t_3)			56.96

Result of Test: T = 59.32 (min/25 mm)

Comments:

Modified T-Test recorded a value of 59.32 mins/25mm. 'T' test successful. Site is suitable for a secondary treatment system with polishing filter at ground surface or overground. Site not suitable for a conventional septic tank system.

3.3(b) Percolation ("P") Test for Shallow Soil / Subsoils and/or Water Table

Step 1: Test Hole Preparation

Percolation Test Hole	1	2	3
Depth from ground surface to top of hole (mm)	0	0	0
Depth from ground surface to base of hole (mm)	400	400.00	400
Depth of hole (mm)	400	400	400
Dimensions of hole [length x breadth (mm)]	300 x 300	300 x 300	300 x 300

Step 2: Pre-Soaking Test Holes

Date and Time pre-soaking started	29/01/2020	08:35	29/01/2020	08:50	29/01/2020	09:02

Each hole should be pre-soaked twice before the test is carried out. Each hole should be empty before refilling.

Step 3: Measuring P_{100}

Percolation Test Hole No.	1	2	3
Date of test	30/01/2020	30/01/2020	30/01/2020
Time filled to 400 mm	08:35	08:50	09:02
Time water level at 300 mm	12:18	13:01	13:14
Time to drop 100 mm (P_{100})	223.00	251.00	252.00
Average P_{100}			242.00

If P_{100} > 300 minutes then T-value >90 – site unsuitable for discharge to ground
If $P_{100} \leq 210$ minutes then go to Step 4;
If P_{100} > 210 minutes then go to Step 5;

Step 4: Standard Method (where $P_{100} \leq 210$ minutes)

Percolation Test Hole	1			2			3		
Fill no.	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δp (min)	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δp (min)	Start Time (at 300 mm)	Finish Time (at 200 mm)	Δp (min)
1			0.00			0.00			0.00
2			0.00			0.00			0.00
3			0.00			0.00			0.00
Average Δp Value			0.00			0.00			0.00
	Average Δp/4 = [Hole No.1]		0.00 (p_1)	Average Δp/4 = [Hole No.2]		0.00 (p_2)	Average Δp/4 = [Hole No.3]		0.00 (p_3)

Result of Test: P = 0.00 (min/25 mm)

Comments:

Step 5: Modified Method (where $P_{100} > 210$ minutes)

Percolation Test Hole No.	1				2				3			
Fall of water in hole (mm)	Time Factor = T_f	Time of fall (mins) = T_m	K_{ts} = T_f / T_m	P – Value = 4.45 / K_{ts}	Time Factor = T_f	Time of fall (mins) = T_m	K_{ts} = T_f / T_m	P – Value = 4.45 / K_{ts}	Time Factor = T_f	Time of fall (mins) = T_m	K_{ts} = T_f / T_m	P – Value = 4.45 / K_{ts}
300 - 250	8.1	115	0.07	63.18	8.1	130	0.06	71.42	8.1	130	0.06	71.42
250 - 200	9.7	121	0.08	55.51	9.7	134	0.07	61.47	9.7	135	0.07	61.93
200 - 150	11.9	128	0.09	47.87	11.9	147	0.08	54.97	11.9	140	0.09	52.35
150 - 100	14.1	131	0.11	41.34	14.1	154	0.09	48.60	14.1	148	0.10	46.71
Average P- Value	P- Value Hole 1= (p_1)			51.97	P- Value Hole 1= (p_2)			59.12	P- Value Hole 1= (p_3)			58.10

Result of Test: P = 56.40 (min/25 mm)

Comments:

'P' test successful.

3.4 The following associated Maps, Drawings and Photographs should be appended to this site characterisation form.

1. Discovery Series 1:50,000 Map indicating overall drainage, groundwater flow direction and housing density in the area.
2. Supporting maps for vulnerability, aquifer classification, soil, bedrock.
3. North point should always be included.
4. (a) Sketch of site showing measurements to Trial Hole location and
   (b) Percolation Test Hole locations,
   (c) wells and
   (d) direction of groundwater flow (if known),
   (e) proposed house (incl. distances from boundaries)
   (f) adjacent houses,
   (g) watercourses,
   (h) significant sites
   (i) and other relevant features.
5. Cross sectional drawing of the site and the proposed layout[1] should be submitted.
6. Photographs of the trial hole, text holes and site (date and time referenced).

[1] The calculated percolation area or polishing filter area should be set out accurately on the site layout drawing in accordance with the code of practice's requirements.

4.0 CONCLUSION of SITE CHARACTERISATION

Integrate the information from the desk study and on-site assessment (i.e. visual assessment, trial hole and percolation tests) above and conclude the type of system(s) that is (are) appropriate. This information is also used to choose the optimum final disposal route of the treated wastewater.

Not Suitable for Development ☐

Suitable for [1]		**Discharge Route**
1. Septic tank system (septic tank and percolation area)	No	Discharge to Ground Water
2. Secondary Treatment System		
a. septic tank and filter system constructed on-site and polishing filter; or	No	
b. packaged wastewater treatment system and polishing filter	Yes	

5.0 RECOMMENDATION

Propose to install: Packaged wastewater treatment system and polishing filter

and discharge to: Ground Water

Trench Invert level (m): 0.50

Site Specific Conditions (e.g. special works, site improvement works testing etc.

It is proposed to install an advanced wastewater treatment system incorporating the use of a mechanical aeration system, packaged tertiary treatment system and discharge to groundwater by percolation through the topsoil via a raised mound percolation area.

[1] note: more than one option may be suitable for a site and this should be recorded

[2] A discharge of sewage effluent to "waters" (definition includes any or any part of any river, stream, lake, canal, reservoir, aquifer, pond, watercourse or other inland waters, whether natural or artificial) will require a licence under the Water Pollution Acts 1977-90. Refer to Section 2.6.2.

6.0 TREATMENT SYSTEM DETAILS

SYSTEM TYPE: Septic Tank System

Tank Capacity (m^3)		Percolation Area		Mounded Percolation Area	
		No. of Trenches		No. of Trenches	
		Length of Trenches (m)		Length of Trenches (m)	
		Invert Level (m)		Invert Level (m)	

SYSTEM TYPE: Secondary Treatment System

Filter Systems

Media Type	Area (m^2)*	Depth of Filter	Invert Level
Sand/Soil	15.00	1.00	0.50
Soil			
Constructed Wetland			
Other			

Package Treatment Systems

Type	Oakstown BAF 6
Capacity PE	6.00
Sizing of Primary Compartment	4.00 m^3

SYSTEM TYPE: Tertiary Treatment System

Polishing Filter: Surface Area (m^2)*

or **Gravity Fed:**

No. of Trenches

Length of Trenches (m)

Invert Level (m)

Package Treatment System: Capacity (pe) 6.00

Constructed Wetland: Surface Area (m^2)*

DISCHARGE ROUTE:

Groundwater	✓	Hydraulic Loading Rate * ($l/m^2.d$)	4.00
Surface Water **		Discharge Rate (m^3/hr)	

TREATMENT STANDARDS:

Treatment System Performance Standard (mg/l)	BOD	SS	NH_3	Total N	Total P
	10.00	10.00	21.00	21.00	12.50

QUALITY ASSURANCE:

Installation & Commissioning	On-going Maintenance
Installation of wastewater treatment unit and percolation area to be carried out by competent persons. Treatment unit to be commissioned by manufacturer. Percolation area construction to be supervised and certified by a chartered engineer.	By manufacturer, a programme of maintenance will be set out in a maintenance agreement between users of the system and the manufacturer.

*Hydrolic loading rate is determined by the percolation rate of subsoil

** Water Pollution Act discharge licence required

7.0 SITE ASSESSOR DETAILS

Company: Michael Hetherton Architectural and Engineering Services

Prefix: Mr. First Name: Michael Surname: Hetherton

Address: Unit 3, Cavan Street, Oldcastle, Co. Meath.

Qualifications/Experience: B. Eng. C. Eng., MIEI. In independent private practice for 10 years.

Date of Report: 28/08/2016

Phone: 049-8542911 Fax: 049-8550989 e-mail mharch1@yahoo.co.uk

Indemnity Insurance Number: 21118872 LAL

Signature: _____

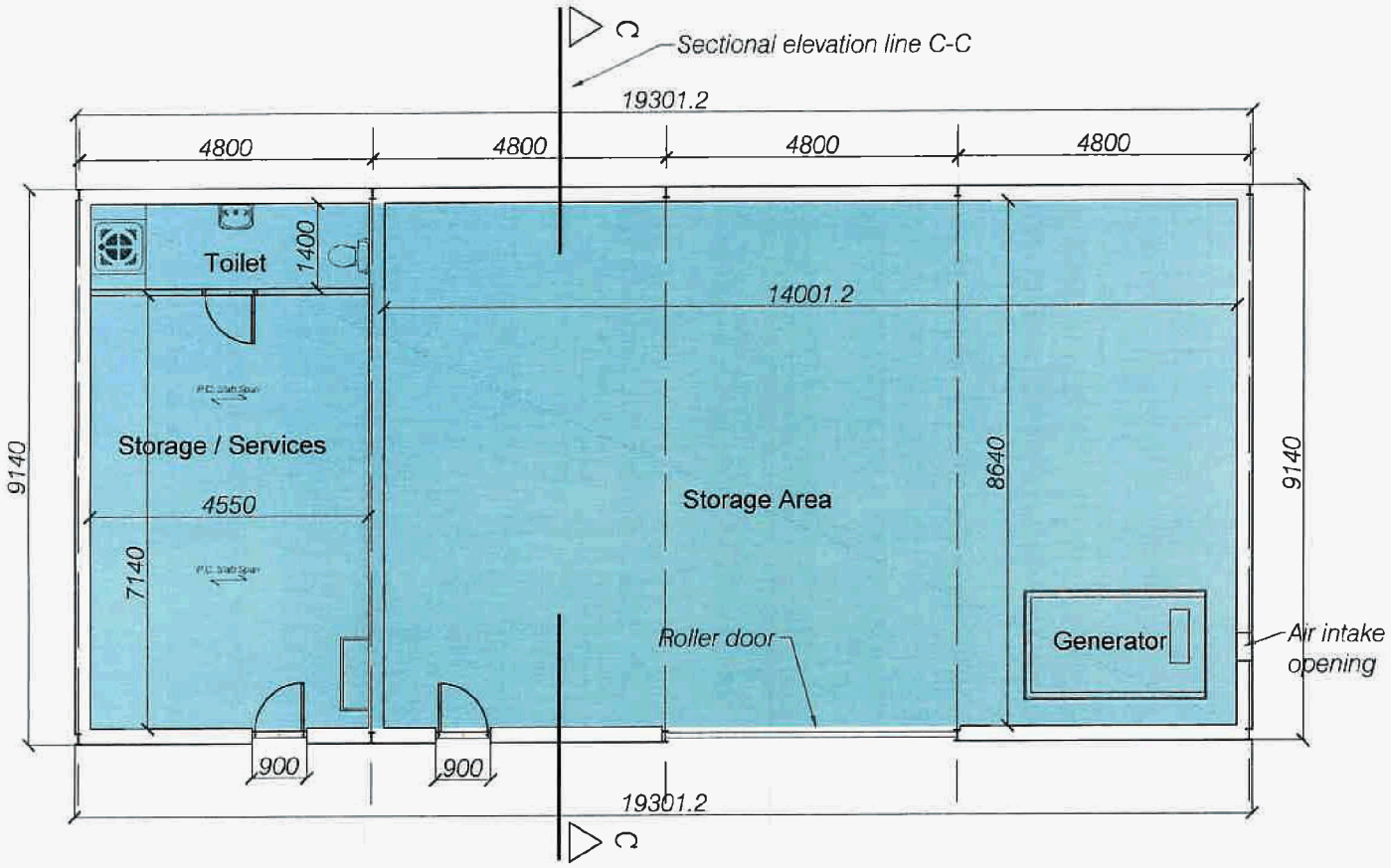
APPENDIX II

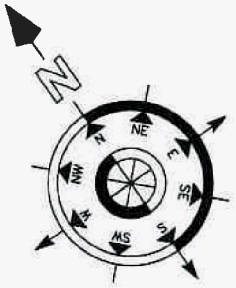
Site Location Map (Scale 1:2500)

APPENDIX III

Site Layout Plan (Scale 1:500)

PROPOSED SITE AREA TO BE FILLED HATCHED ORANGE FINISHED FIELD LEVEL TO RANGE BETWEEN 99.250 TO 101.00
PROPOSED RANGE AREA PADDOCK DIVIDING FENCE LINE
Site section line 1-1
Existing site boundary line
EXISTING POULTRY UNIT
Percolation test hole locations
PROPOSED KLARGESTER SILT TRAP DISCHARGING TO POLISHING FILTER (IN FORM OF 225MM DIA PERFORATED PIPE ON 50MM-75MM GRADE DRAINAGE STONE). ALL YARD SURFACE WATER TO BE TREATED VIA SILT TRAP AND POLISHING FILTER
WATER TANK LOCATION
MEAL BIN LOCATIONS
CONCRETE APRON
EXISTING STORAGE SHED
EXISTING WATER SUPPLY FEED
TURNING CIRCLE
PROPOSED GAS TANK LOCATION
Proposed wastewater treatment unit location
PROPOSED POULTRY UNIT HATCHED PURPLE F.F.L. 101.250
225MM PERFORATED PIPES TO BE PLACED IN INFILTRATION TRENCHES AND EXCESS SURFACE WATER DISCHARGED TO DRAIN
50.0M X 3.0M VISIBILITY SPLAYS SHOWN HATCHED
EXISTING DRAINAGE GULLIES PIPED TO EXISTING DRAIN
SITE NOTICE ON EXISTING FENCE
16.5M HGV TURNING RADIUS TRACKING SHOWN AS THUS
EXISTING DRAINAGE PIPE CUTFALL TO EXISTING DRAIN
EXISTING ENTRANCE 9.6M WIDE FOR HGV ACCESS WITH 11.5M SET BACK FROM ROAD EDGE
WASHINGS STORAGE TANK
EXISTING TIMBER FENCE LINE
EXISTING ROADSIDE KERB LINE
PROPOSED CONCRETE APRON HATCHED PURPLE
50.0M X 3.0M VISIBILITY SPLAYS SHOWN HATCHED
DRAINAGE CHANNEL TO SERVICE PROPOSED YARD AREA
PROPOSED RETAINING WALL
GW FLOW


Sectional elevation line C-C
19301.2
4800
4800
4800
4800
Toilet
1400
14001.2
Storage / Services
4550
7140
Storage Area
8640
9140
9140
Roller door
Generator
Air intake opening
900
900
19301.2


N
NE
E
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S
SW
W
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APPENDIX IV

General Information on Treatment System

1 Required distances for wastewater treatment systems (metres)

The wastewater treatment system and percolation area shall be positioned within the site to comply with table 4, titled – 'Minimum separation distances' in accordance with E.P.A "Code of Practice: WASTEWATER TREATMENT AND DISPOSAL SYSTEMS SERVING SINGLE HOUSES (p.e. ≤ 10)" as indicated below.

Table 1: Required separation distances for wastewater treatment systems (metres)

	Septic tank, intermittent filters, packaged systems, percolation area, polishing filters (m)
Wells[1]	–
Surface water soakaway[2]	5
Watercourse/stream[3]	10
Open drain	10
Heritage features, NHA/SAC[3]	–
Lake or foreshore	50
Any dwelling house	7 septic tank 10 percolation area
Site boundary	3
Trees[4]	3
Road	4
Slope break/cuts	4

[1]See Annex B: *Groundwater Protection Response.*
[2]The soakaway for surface water drainage should be located down gradient of the percolation area or polishing filter and also ensure that this distance is maintained from neighbouring storm water disposal areas or soakaways.
[3]The distances required are dependent on the importance of the feature. Therefore, advice should be sought from the local authority environment and planning sections (conservation officer and heritage officer) and/or from the Department of the Environment, Heritage and Local Government (DoEHLG), specifically the Archive Unit of the National Monuments Section and the National Parks and Wildlife Service. If considering discharging to a watercourse that drains to an NHA/SAC the relevant legislation is Article 63 of the Habitats Directive. (NHA, National Heritage Area; SAC, Special area of Conservation.)
[4]Tree roots may lead to the generation of preferential flow paths. The canopy spread indicates potential root coverage.

2 Typical layout of percolation area leading from secondary treatment unit

The soil polishing filter shall be laid out as shown in figure 1 below. It
Is important to ensure that wastewater is evenly distributed among the pipes. This is best achieved by using distribution boxes with adjustable weirs produced by Ash environmental technologies.

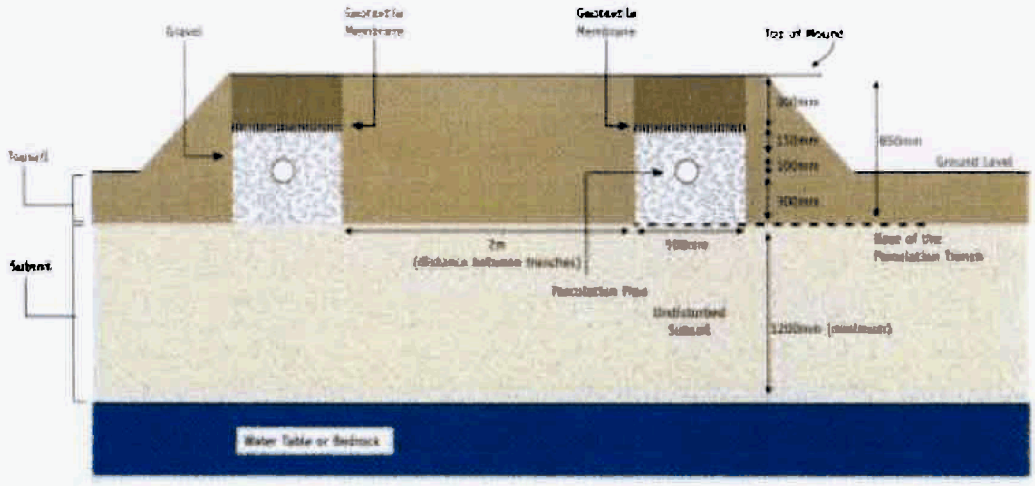

Figure 1: Cross Section of typical mounded percolation trench

3 General recommendations and information

- Under no circumstances should rainwater or surface water enter into the wastewater treatment unit.
- Detergents and disinfectants should first pass through a grease trap, which should be located between the proposed poultry unit and the treatment unit, before entering into the treatment unit.
- The wastewater treatment unit should be located not nearer than 10m from the building being served and should not be nearer than 20m from the nearest point of any other dwelling.
- The drain from the dwelling to the treatment unit should be at least 100mm in diameter uPVC pipe laid to a minimum gradient of 1 in 60 and vented by means of a soil vent pipe above the eaves of the poultry unit building.
- The distribution pipes should be laid to falls of about 1 in 200 and be 110mm diameter, perforated smoothwall, plastic pipes with perforations of 8mm diameter at about 75mm centres along the pipe at about 4, 6 and 8 o'clock. Alternatively 4mm wide saw cuts at 300mm centres along the base of the pipe could also be used to disperse the effluent uniformly to the filter soil.

- The distribution pipes should be laid in trenches as shown in Figure 2 which are at least 500mm wide and bedded on 250mm depth of crushed stone and surrounded on sides and top by 150mm depth of crushed stone which should extend the full width of the trench. The crushed stone should be 20-30mm in size.
- The pipes must have a 90° bend at the end of the percolation trench and ventilated at least 300mm above ground level and suitably capped.
- No water mains or service pipes should be located within the percolation area.
- No access roads, driveways or paved areas should be located within the percolation area.

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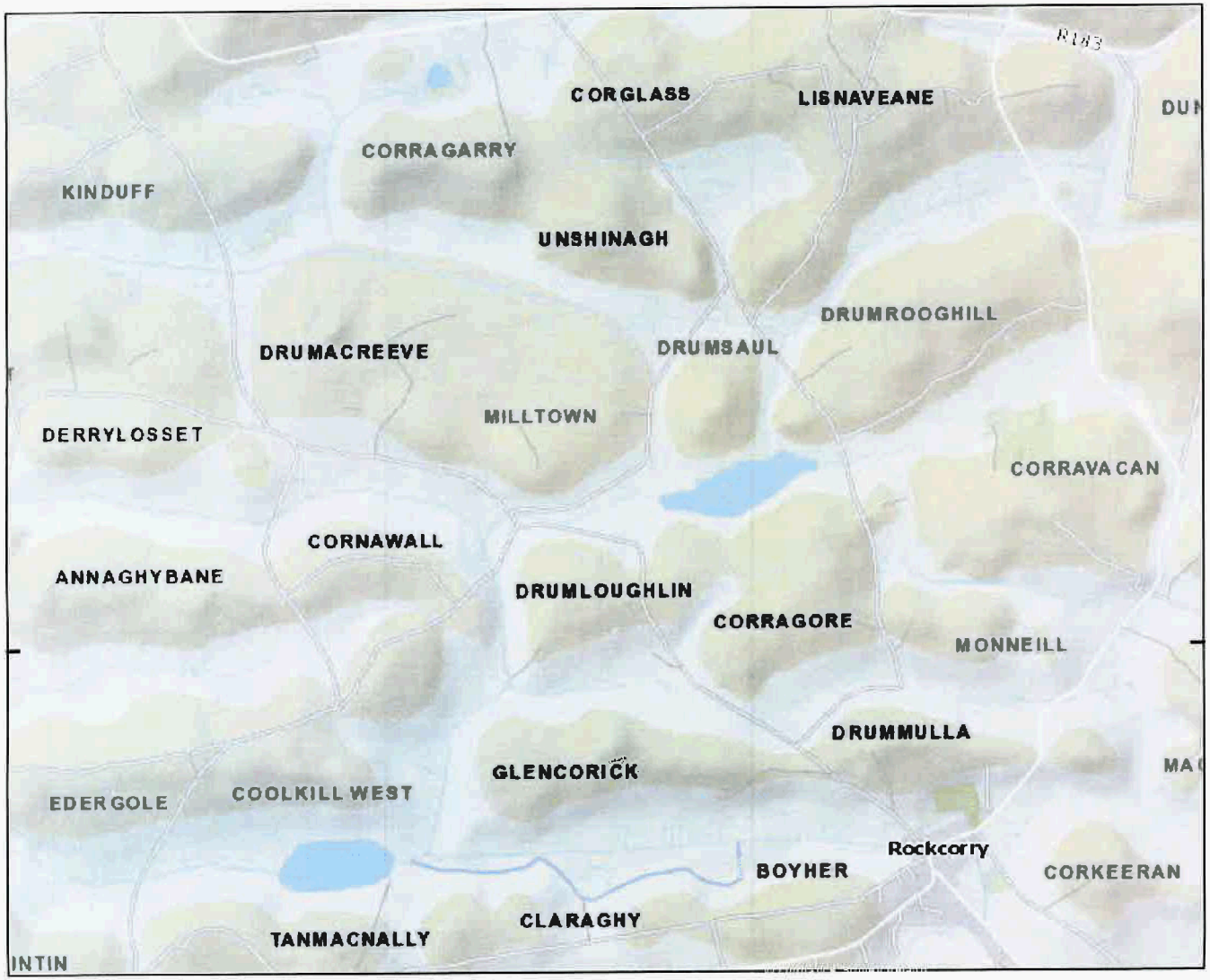
Karst Features



Legend

Karst Landforms

- Borehole
- Cave
- Dry Valley
- Enclosed Depression
- Spring
- Superficial Solution Features
- Swallow Hole
- Turlough

Traced Underground Connections

Scale: 1:25,000

Geological Survey Ireland

PSI Licence

0 0.175 0.35 0.7 mi

0 0.275 0.55 1.1 km

Map Centre Coordinates (ITM) 663,116 820,616

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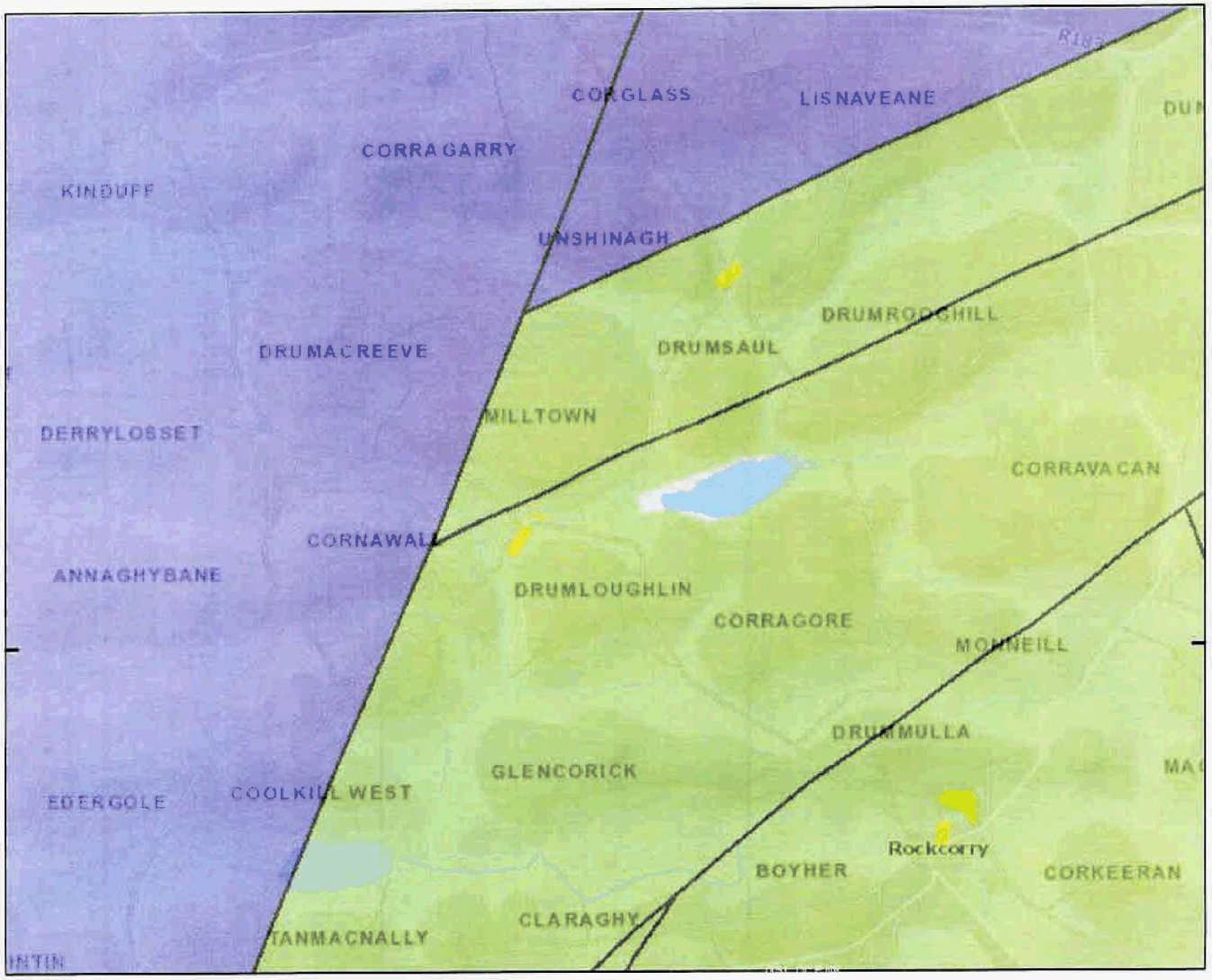
Bedrock



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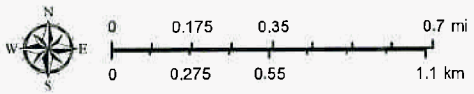

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Legend

Bedrock Structure

- 10A0-2
- 10A1-1
- Anticline S1
- 10A2-1
- Anticline F2
- Anticline F3
- Anticline F4
- Anticline F5
- 10S0-2
- 10S1-1
- Syncline S1
- 10S2-1
- Syncline S2
- Syncline S3
- Syncline S5
- 11F1-2
- 11S1-1
- Early Slide
- 11S2-1
- 11S2-2
- 11T1-2
- 11T2-2

Outcrop

Generalised Bedrock (Rock Unit Groups)

- Basalts & other Volcanic rocks
- Permo-Triassic Sandstones
- Permo-Triassic Mudstones and Gypsum
- Westphalian Sandstones
- Westphalian Shales
- Namurian Shales
- Namurian Sandstones
- Namurian Undifferentiated
- Dinantian Shales and Limestones
- Dinantian Mixed Sandstones, Shales and Limestones
- Dinantian Sandstones
- Dinantian Pure Bedded Limestones
- Dinantian Upper Impure Limestones
- Dinantian Dolomitised Limestones
- Dinantian Pure Unbedded Limestones
- Dinantian Lower Impure Limestones
- Dinantian (early) Sandstones, Shales and Limestones
- Dinantian Mudstones and Sandstones (Cork Group)
- Devonian Kiltorcan-type Sandstones
- Devonian Old Red Sandstones
- Granites & other Igneous Intrusive rocks
- Silurian Metasediments and Volcanics
- Ordovician Metasediments
- Ordovician Volcanics
- Cambrian Metasediments
- Precambrian Quartzites, Gneisses & Schists
- Precambrian Marbles

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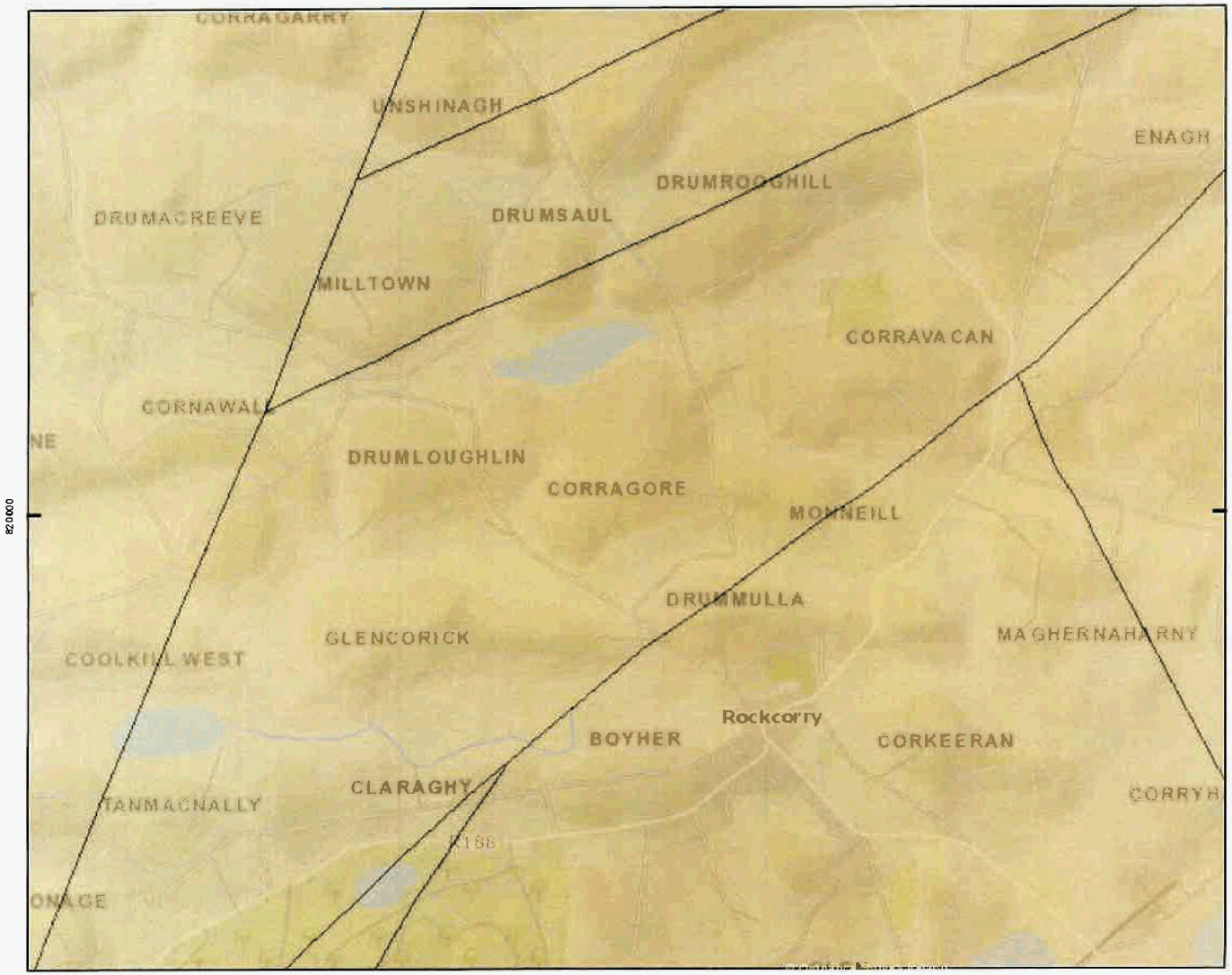
Aquifer



Legend

- Bedrock Aquifer
- Faults

Bedrock Aquifer

- Rkc - Regionally Important Aquifer - Karstified (conduit)
- Rkd - Regionally Important Aquifer - Karstified (diffuse)
- RK - Regionally Important Aquifer - Karstified
- Rf - Regionally Important Aquifer - Fissured bedrock
- Lm - Locally Important Aquifer - Bedrock which is Generally Moderately Productive
- Lk - Locally Important Aquifer - Karstified
- Ll - Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones
- Pl - Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones
- Pu - Poor Aquifer - Bedrock which is Generally Unproductive
- Lake

Scale: 1:25,000

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0 0.175 0.35 0.7 mi

0 0.275 0.55 1.1 km

Map Centre Coordinates (ITM) 663,850 820,100

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