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Site Characterisation Report

By

Dr. Eugene Bolton

Applicant: Ronan Gough

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SECTION THROUGH PERCOLATION AREA ATTACHED

APPENDIX A: SITE CHARACTERISATION FORM

File Reference:

1.0 GENERAL DETAILS (From planning application)

Prefix: First Name: Ronan Surname: Gough

Address:

Site Location and Townland: Lower Castle Road, Glenasmole,Bohernabreena Dublin 24

Number of Bedrooms: 2 Maximum Number of Residents: 4

Comments on population equivalent

Cafe (Snack bar) 35 customers - allow 10 litres & 10 Grams BOD + 1 Staff allow 30 litres & 20 Grams BOD, 10 users of the car park who will use facilities - allow 5 litres and 10 grams BOD giving a total of 430 litres and 470 grams BOD or PE of 3 based on hydraulic Load and 8 PE based on Organic load

Proposed Water Supply:

Mains ☐ Private Well/Borehole ☑ Existing well on-site Group Well/Borehole ☐

2.0 GENERAL DETAILS (From planning application)

Soil Type, (Specify Type): Granite Till

Subsoil, (Specify Type): Till derived from granites

Bedrock Type: Granites & other Igneous Intrusive rock

Aquifer Category: Regionally Important | Locally Important Lm Poor

Vulnerability: Extreme ☐ High ☐ Moderate ☑ Low ☐

Groundwater Body: Dublin Status Good

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

Source Protection Area: ZOC ☐ SI ☐ SO ☐ Groundwater Protection Response: R2,

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

Past experience in the area: Good soakage, High Watertable

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).

Moderate vulnerability groundwater will be at risk
There are wells in the area some of which may be targets at risk.
The treatment of the wste will ned to be based on a PE of 8 while disposal will take account of the hydraulic load which is a PE of 3 or trhe minimum design PEN of 4 based on EPA code of Practice 2021

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: Landscape is Undulating but generally slopes North

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

Slope Comment: Site for percolation is Flat

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

Houses:

House to East on opposite side of road at 150m
House to Northwest at 300m

Existing Land Use:

Car park

Vegetation Indicators:

adjoining fields have isolated patches of rushes but generally not sufficient to suggest poor soakage

Groundwater Flow Direction: North

Ground Condition:

dry

Site Boundaries:

Hedgerow & Post & wire fencing

3.0 ON-SITE ASSESSMENT

3.1 Visual Assessment (contd.)

Roads:

Road to East

Outcrops (Bedrock And/Or Subsoil):

No major outcrops of rock. Some granite in adjoining boundaries

Surface Water Ponding:

None

Lakes:

Bohernabreena Reservoir at 500m North

Beaches/Shellfish Areas:

None

Wetlands:

None

Karst Features:

None

Watercourses/Streams:*

*Note and record water level

3.0 ON-SITE ASSESSMENT

3.1 Visual Assessment (contd.)

Drainage Ditches:*

None bordering site but there is a ditch to North of site

Springs:*

None

Wells:*

Well serving the site is up-gradient by more than 25m, Sitwell serving house to east is also up-gradient and all other wells are in excess og 300m away

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).

Site is close to the Bohernabreena Reservoir and therefore this will be a significant target at risk

***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): 2.2

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

Depth from ground surface to water table (m) (if present): 750

Depth of water ingress:

Rock type (if present):

Date and time of excavation: 29-Nov-2021

Date and time of examination: 30-Nov-2021

Depth of Surface and Subsurface Percolation Tests	Soil/Subsoil Texture & Classification**	Plasticity and dilatancy***	Soil Structure	Density/ Compactness	Colour****	Preferential flowpaths
0.1 m P	Topsoil	Dilatent	Crumb	Firm	Black	Rootlets Few tree roots
0.2 m P						
0.3 m P	Sandy CLAY Low Sand Few cobbles	Not Dilatent Trds =10,11,10 Ribs= 120,110,110	Massive	Soft to Firm	Light Brown	
0.4 m P						
0.5 m T						
0.6 m T						
0.7 m T						None
0.8 m T	CLAY	Poorly Dilatent Trds = 11, 10, 10, Ribs= 120,120,110	Massive	Soft to Firm	Grey/Brown	
0.9 m						
1.0 m						
1.1 m						
1.2 m						
1.3 m	CLAY	Poorly Dilatent Trds = 10, 10, 10, Ribs= 110,110,110	Massive	Firm	Black	
1.4 m						
1.5 m						
1.6 m						
1.7 m						
1.8 m						
1.9 m						
2.0 m						
2.1 m						
2.2 m	Base of Trench					
2.3 m						
2.4 m						
2.5 m						
2.6 m						
2.7 m						
2.8 m						
2.9 m						
3.0 m						
3.1 m						
3.2 m						
3.3 m						
3.4 m						
3.5 m						

Likely Subsurface Percolation Value: 50

Likely Surface Percolation Value: 40

Note: *Depth of percolation test holes should be indicated on log above. ('Enter Surface or Subsurface at depths 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.

3.2 Trial Hole (contd.) Evaluation:

Topsoil is a black clayey loam - likely to have slow soakage
Subsoil is soft to firm with a Massive structure - also likely to have slow soakage. Groundwater will therefore be protected and surface water will be main target at risk
There is a high watertable

3.3(a) Subsurface Percolation Test for Subsoil

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

		1	2	3
Pre-soak start	Date	30-Nov-2021	30-Nov-2021	30-Nov-2021
	Time			
2nd pre-soak start	Date	30-Nov-2021	30-Nov-2021	30-Nov-2021
	Time			

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

Step 3: Measuring T_{100}

Percolation Test Hole No.	1	2	3
Date of test	01-12-2021	01-12-2021	01-12-2021
Time filled to 400 mm	08:14	08:15	08:16
Time water level at 300 mm	09:40	09:38	09:44
Time (min.) to drop 100 mm (T_{100})	86.00	83.00	88.00
Average T_{100}			85.67

If T_{100} > 300 minutes then Subsurface Percolation value >120 – 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	09:40	11:32	112.00	09:38	11:17	99.00	09:44	11:26	102.00
2	11:32	13:34	122.00	11:17	13:19	122.00	11:26	13:33	127.00
3	13:34	16:36	182.00	13:19	16:42	203.00	13:33	16:56	203.00
Average Δt Value			138.67			141.33			144.00
	Average Δt/4 = [Hole No.1]		34.67 (t_1)	Average Δt/4 = [Hole No.2]		35.33 (t_2)	Average Δt/4 = [Hole No.3]		36.00 (t_3)

Result of Test: Subsurface Percolation Value = 35.33 (min/25 mm)

Comments:

Soakage is slow but is within the acceptable range

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

Percolation Test Hole No. 1

Fall of water in hole (mm)	Time Factor = T_f	Start Time hh:mm	Finish Time hh:mm	Time of fall (mins) = T_m	$K_{fs} = T_f / T_m$	T – Value = 4.45 / K_{fs}
300 - 250	8.1			0.00		
250 - 200	9.7			0.00		
200 - 150	11.9			0.00		
150 - 100	14.1			0.00		
Average	T- Value		T- Value Hole 1 = (T_1)			0.00

Percolation Test Hole No. 2

Fall of water in hole (mm)	Time Factor = T_f	Start Time hh:mm	Finish Time hh:mm	Time of fall (mins) = T_m	$K_{fs} = T_f / T_m$	T – Value = 4.45 / K_{fs}
300 - 250	8.1			0.00		
250 - 200	9.7			0.00		
200 - 150	11.9			0.00		
150 - 100	14.1			0.00		
Average	T- Value		T- Value Hole 2 = (T_2)			0.00

Result of Test: Subsurface Percolation Value = 0.00 (min/25 mm)

Percolation Test Hole No. 3

Fall of water in hole (mm)	Time Factor = T_f	Start Time hh:mm	Finish Time hh:mm	Time of fall (mins) = T_m	$K_{fs} = T_f / T_m$	T – Value = 4.45 / K_{fs}
300 - 250	8.1			0.00		
250 - 200	9.7			0.00		
200 - 150	11.9			0.00		
150 - 100	14.1			0.00		
Average	T- Value		T- Value Hole 3 = (T_2)			0.00

Comments:

3.3(b) Surface Percolation Test for Soil

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	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

		1	2	3
Pre-soak start	Date	30-Nov-2021	30-Nov-2021	30-Nov-2021
	Time			
2nd pre-soak start	Date	30-Nov-2021	30-Nov-2021	30-Nov-2021
	Time			

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

Step 3: Measuring T_{100}

Percolation Test Hole No.	1	2	3
Date of test	01-Dec-21	01-Dec-21	01-Dec-2021
Time filled to 400 mm	08:18	08:19	08:20
Time water level at 300 mm	09:35	09:38	09:36
Time to drop 100 mm (T_{100})	77.00	79.00	76.00
Average T_{100}			77.33

If T_{100} > 300 minutes then Surface Percolation 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	09:35	11:08	93.00	09:38	11:14	96.00	09:36	11:08	92.00
2	11:08	13:01	113.00	11:14	13:19	125.00	11:08	13:12	124.00
3	13:00	16:10	190.00	13:19	16:34	195.00	13:12	16:18	186.00
Average ΔT Value			132.00			138.67			134.00
	Average ΔT/4 = [Hole No.1]		33.00 (T_1)	Average ΔT/4 = [Hole No.2]		34.67 (T_2)	Average ΔT/4 = [Hole No.3]		33.50 (T_3)

Result of Test: Surface Percolation Value = 33.72 (min/25 mm)

Comments:

Soakage is within acceptable range

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

Percolation Test Hole No. 1

Fall of water in hole (mm)	Time Factor = T_f	Start Time hh:mm	Finish Time hh:mm	Time of fall (mins) = T_m	$K_{ts} = T_f / T_m$	T – Value = 4.45 / K_{ts}
300 - 250	8.1			0.00		
250 - 200	9.7			0.00		
200 - 150	11.9			0.00		
150 - 100	14.1			0.00		
Average	T- Value		T- Value Hole 1 = (T_1)			0.00

Percolation Test Hole No. 2

Fall of water in hole (mm)	Time Factor = T_f	Start Time hh:mm	Finish Time hh:mm	Time of fall (mins) = T_m	$K_{ts} = T_f / T_m$	T – Value = 4.45 / K_{ts}
300 - 250	8.1			0.00		
250 - 200	9.7			0.00		
200 - 150	11.9			0.00		
150 - 100	14.1			0.00		
Average	T- Value		T- Value Hole 2 = (T_2)			0.00

Result of Test: Surface Percolation Value = 0.00 (min/25 mm)

Percolation Test Hole No. 3

Fall of water in hole (mm)	Time Factor = T_f	Start Time hh:mm	Finish Time hh:mm	Time of fall (mins) = T_m	$K_{ts} = T_f / T_m$	T – Value = 4.45 / K_{ts}
300 - 250	8.1			0.00		
250 - 200	9.7			0.00		
200 - 150	11.9			0.00		
150 - 100	14.1			0.00		
Average	T- Value		T- Value Hole 3 = (T_2)			0.00

Comments:

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.

Slope of proposed infiltration / treatment area: Flat

Are all minimum separation distances met? ✔

Depth of unsaturated soil and/or subsoil beneath invert of gravel (or drip tubing in the case of drip dispersal system) 0.90

Percolation test result: Surface: 34.00 Sub-surface: 35.00

Not Suitable for Development ☐ **Suitable for Development** ✔

Identify all suitable options

1. Septic tank system (septic tank and percolation area) **(Chapter 7)** — No
2. Secondary Treatment System **(Chapters 8 and 9)** and soil polishing filter **(Section 10.1)** — Yes
3. Tertiary Treatment System and Infiltration / treatment area **(Section 10.2)** — Yes

Discharge Route [1]

groundwater

5.0 SELECTED DWWTS

Propose to install: Tertiary Treatment System and Infiltration /treatment area

and discharge to: Ground Water

Invert level of the trench/bed gravel or drip tubing (m) 900.00

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

Install BAF P8 followed by Ecoflo Polishing filter with discharge via a infiltration bed with base of gravel at 200mm above existing ground level. As the watertable is at 750mm bgl this gives in excess of 900mm under infiltration gravel.
The organic load equates to a PE of 8, As the treatment unit will discharge at a 20:30 standard the disposal of the treated effluent is based on the hydraulic load which i a PE of 4 (Minimum as per EPA)
The area should be raised using soil with good soakage (T<30)
The Ecoflo is installed underground with effluent from the Ecoflo collected in a sump and pumped to the Gravel infiltration layer.
4PE - 600 litres load onto Ecoflo modules
Pump discharge to gravel base loaded at 25m2/PE - requires area of 100m2
Ecoflo is underground - effluent is collected in a sump and pumped to the gravel bed

[1] 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 2.4.

6.0 TREATMENT SYSTEM DETAILS

SYSTEM TYPE: Septic Tank Systems (Chapter 7)

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 (Chapters 8 and 9) and polishing filter (Section 10.1)

Secondary Treatment Systems receiving septic tank effluent (Chapter 8)

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

Packaged Secondary Treatment Systems receiving raw wastewater (Chapter 9)

Type: BAF

Capacity PE: 8

Sizing of Primary Compartment: 3.50 m^3

Polishing Filter*: (Section 10.1)

Surface Area (m^2)* [ ]

Option 1 - Direct Discharge
Surface area (m^2) [ ]

Option 2 - Pumped Discharge
Surface area (m^2) [ ]

Option 3 - Gravity Discharge
Trench length (m) [ ]

Option 4 - Low Pressure
Pipe Distribution
Trench length (m) [ ]

Option 5 - Drip Dispersal
Surface area (m^2) [ ]

SYSTEM TYPE: Tertiary Treatment System and infiltration / treatment area (Section 10.2)

Identify purpose of tertiary treatment	Provide performance information demonstrating system will provide required treatment levels	Provide design information
Reduce footprint, increase treatment before discharge to ground	EPA Code of Practice 2021	Treatment based on 8PE 4PE based on Hydraulic load - 600 litres load onto Ecoflo modules Discharge to gravel base loaded at 25m2/PE - requires area of 100m2

DISCHARGE ROUTE:

Groundwater [✔] Hydraulic Loading Rate * ($l/m^2.d$) 6.00 Surface area (m^2) 100.00

Surface Water ** [ ] Discharge Rate (m^3/hr) [ ]

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

** Water Pollution Act discharge licence required

6.0 TREATMENT SYSTEM DETAILS

QUALITY ASSURANCE:

Installation & Commissioning

Install system as specified - Supervised and Certified by Assessor

On-going Maintenance

Anual maintenance by independent maintenance technician

7.0 SITE ASSESSOR DETAILS

Company: Trinity Green

Prefix: Dr First Name: Eugene Surname: Bolton

Address: Clonfert Maynooth, Co. Kildare

Qualifications/Experience: PhD Microbiology, Site Suitability Assessment Course (FETAC)

Date of Report: 17-Dec-2021

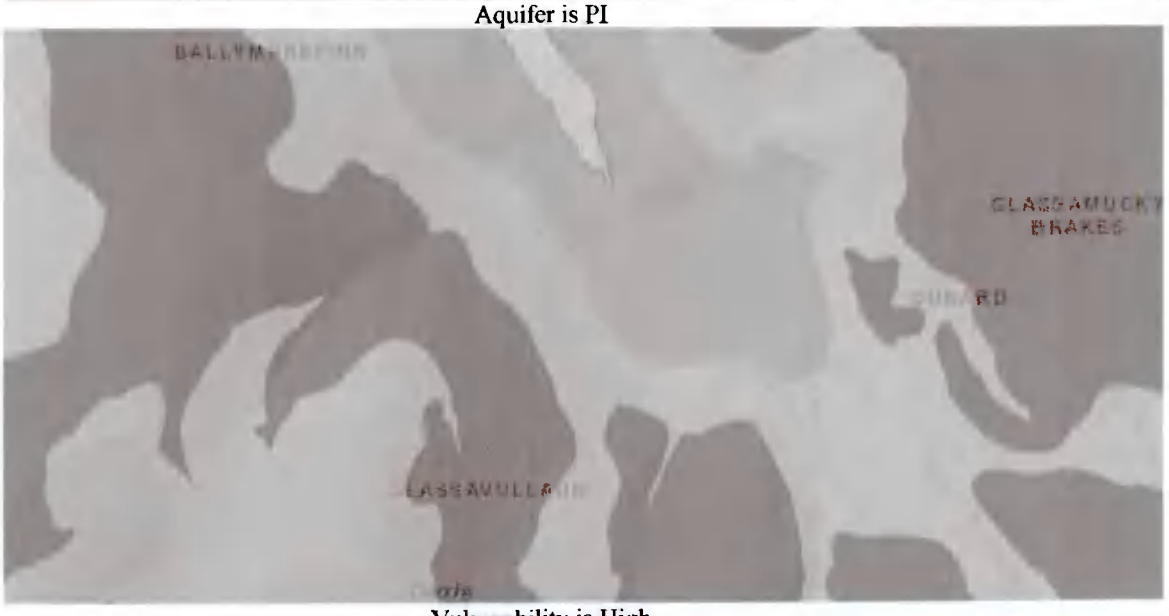
Phone: 0862434828 E-mail info@trinitygreen.ie

Indemnity Insurance Number: PI/C/12453/21/1

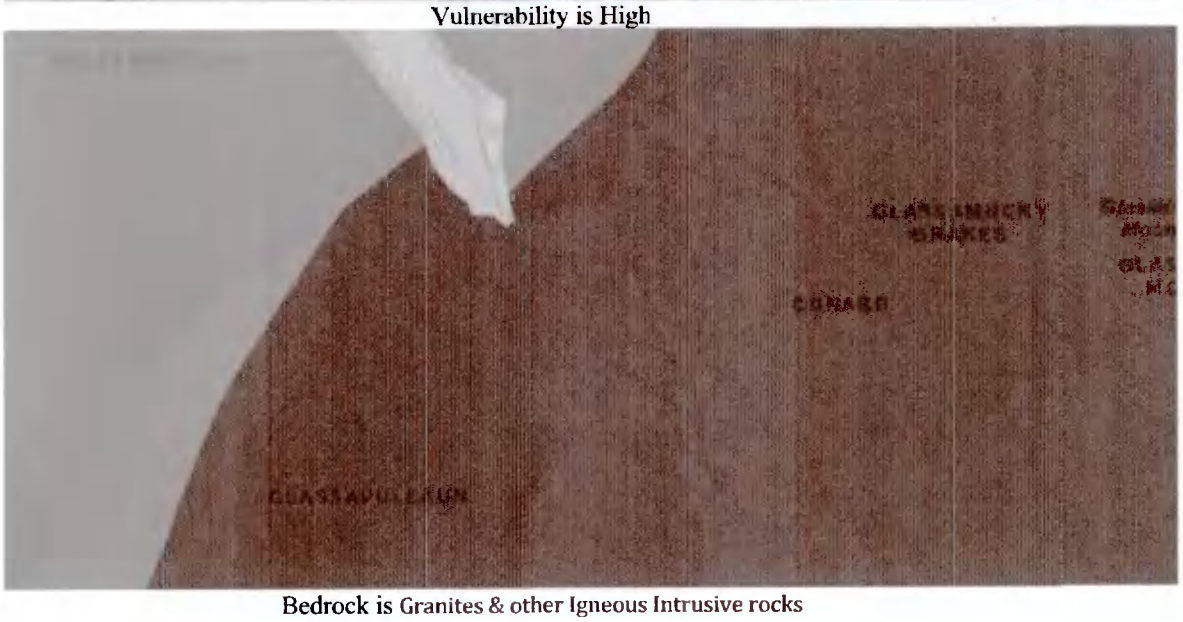
Signature: _____

Maps – Aquifer, Vulnerability, Berdock

Aquifer is PI

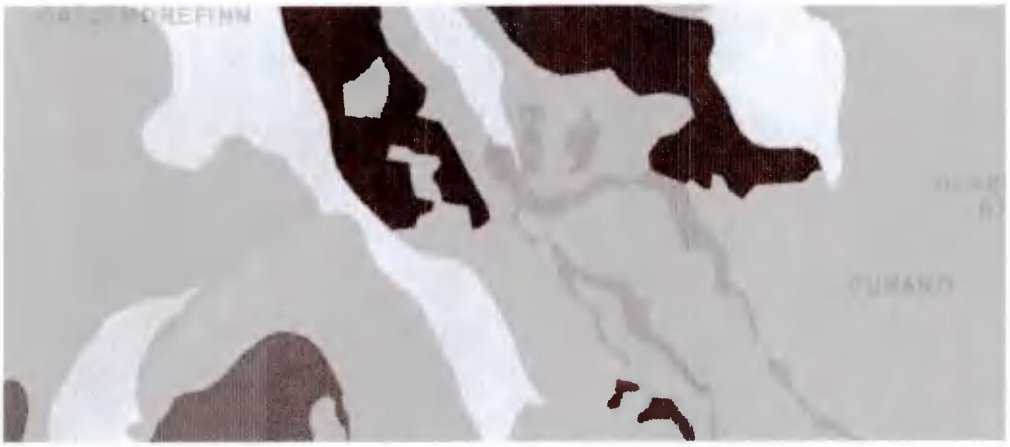


Vulnerability is High



Bedrock is Granites & other Igneous Intrusive rocks

Soil



Parent Material	GGr
Parent Material Name	Glaciofluvial sands and gravels
Parent Material Desciption	Granite sands and gravels
Soil Group	Lithosols, Regosols
IFS Soil Code	AminSW
IFS Soil Description	Derived from mainly non-calcareous parent materials
County	DUBLIN
Category	Shallow well drained mineral (Mainly acidic)
Legend	AminSW - Shallow well drained mineral (Mainly acidic)

-

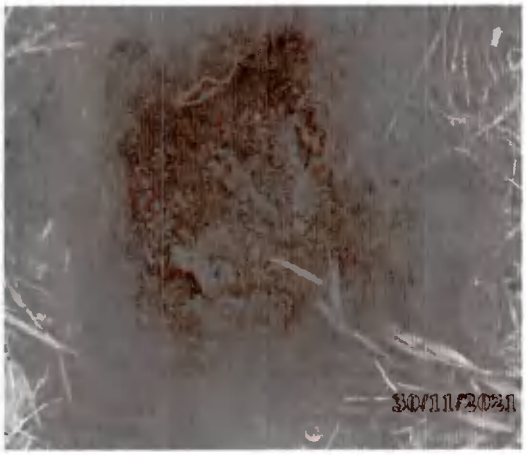
Subsoil

Lithology	Till derived from granites
Quaternary Sediment	TGr

Photos

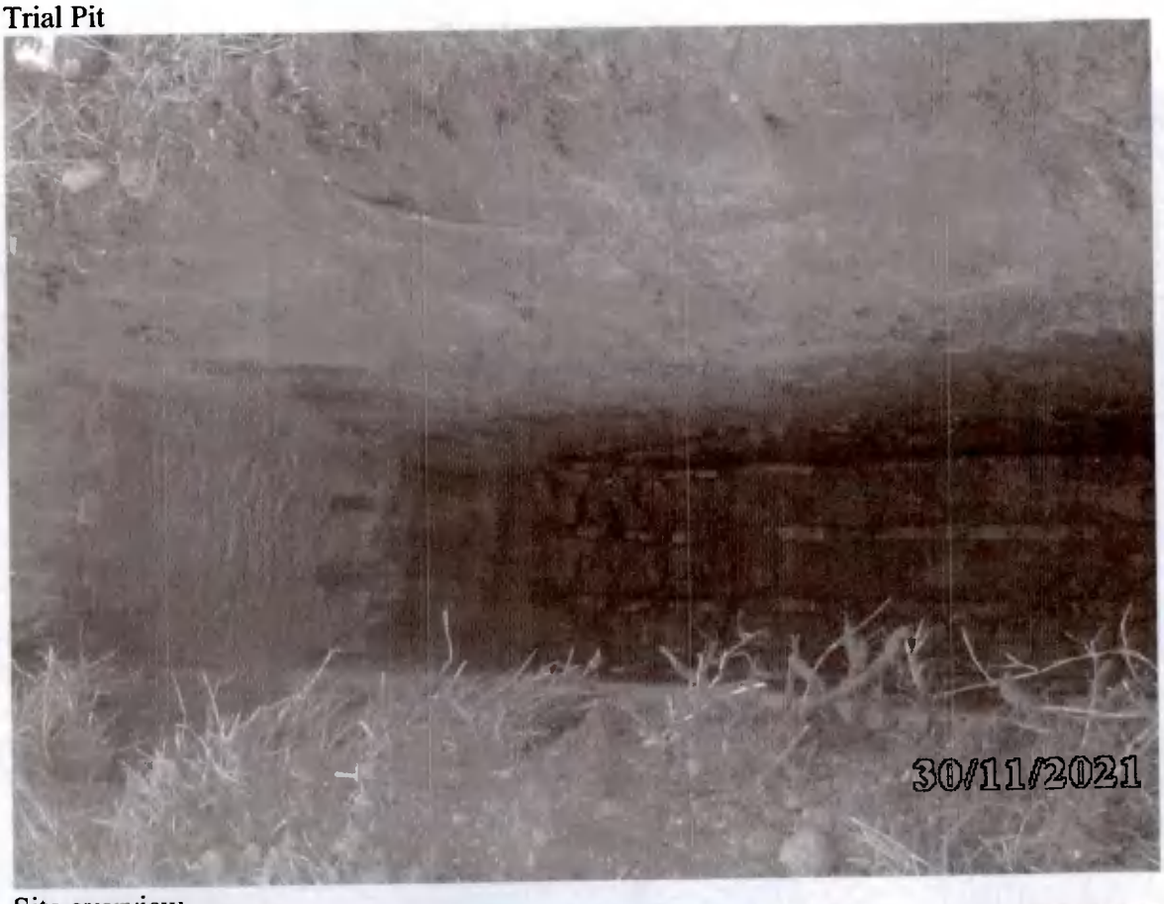
Row 1 - P1, P2

Row 2 - P3, T1



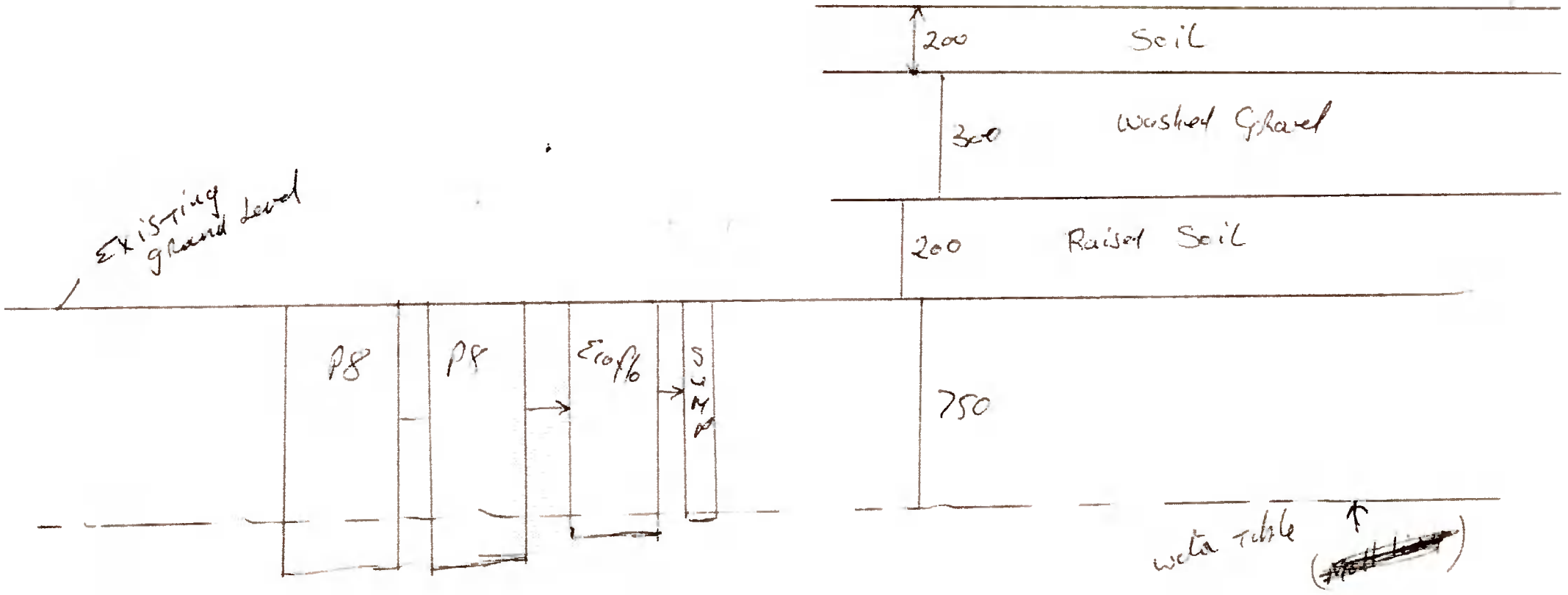
Row 3 - T2, T3

Trial Pit



Site overview

X - Section


200
Soil
300
Washed Gravel
200
Raised Soil
Existing ground level
P8
P8
Eco/6
SUMP
750
water table