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Site Characterisation Report

By

Dr. Eugene Bolton

Applicant:

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APPENDIX A: SITE CHARACTERISATION FORM

File Reference:

1.0 GENERAL DETAILS (From planning application)

Prefix: First Name: JAMIE Surname: GOLDRICK

Address: WINDMILL HILL, RATHCOOLE, Co. DUBLIN

Site Location and Townland: BLACKTHORN HILL, COOLMINE, SAGGART, Co. DUBLIN

Number of Bedrooms: 3 Maximum Number of Residents: 5

Comments on population equivalent

Number of bedrooms plus 2

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): Rock at or near surface

Subsoil, (Specify Type): Till derived from Lower Palaeozoic Sandstones and Shales

Bedrock Type: Silurian Metasediments and Volcanics

Aquifer Category: Regionally Important Locally Important Poor Pl

Vulnerability: Extreme ☑ High ☐ Moderate ☐ Low ☐

Groundwater Body: Kilcullen 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 but Shallow overburden

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).

The groundwater is likely to be at high Risk because of the Extreme vulnerability.

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

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

Houses:

Site borders site to NW West with 3 further house west within 250m, Farm sheds to Northeast > 200m

Existing Land Use:

Residential

Vegetation Indicators:

Nothing to suggest poor soakage

Groundwater Flow Direction: North

Ground Condition:

Dry

Site Boundaries:

Hedge & Post & Wire

3.0 ON-SITE ASSESSMENT

3.1 Visual Assessment (contd.)

Roads:

Road to Southwest

Outcrops (Bedrock And/Or Subsoil):

None but there are some Granite boulders on the surface

Surface Water Ponding:

None

Lakes:

None within 500m

Beaches/Shellfish Areas:

None

Wetlands:

None

Karst Features:

None

Watercourses/Streams:*

None within 500m

*Note and record water level

3.0 ON-SITE ASSESSMENT

3.1 Visual Assessment (contd.)

Drainage Ditches:*

Ditch to East H2O at > 2m

Springs:*

None

Wells:*

Area on Wells - all up-gradient

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).

Ground conditions are dry. Nothing to suggest poor soakage. Existing on-site system serving existing house is a septic tank with very limited percolation but with no evidence of hydraulic failure suggests good soakage.

All wells in the area are up-gradient and over 60m away except well serving existing house to Northwest. Percolation area serving this site should be 60m away from this well

***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):

Depth of water ingress:

Rock type (if present):

Date and time of excavation: 01-May-2021

Date and time of examination: 06-May-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	Top soil - loam Cobbles present	dilatant	Crumb	Firm	Black	Rootlets
0.2 m						
0.3 m	Gravely SILT high content of small cobbles and flags - shale-like	Dilatent Trds= 1,1,3 Ribs=30,30,40	Blocky	Hard	Light Brown	None
0.4 m						
0.5 m						
0.6 m						
0.7 m						
0.8 m						
0.9 m						
1.0 m						
1.1 m						
1.2 m						
1.3 m						
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						
2.3 m						
2.4 m						
2.5 m						
2.6 m						
2.7 m						
2.8 m	Base of trench					
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: 40

Likely Surface Percolation Value: 20

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 likely to have good soakage. Subsoil looks like shale but has high silt and is compacted - Soakage likely to be slow
No evidence of a 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)	500	500	500
Depth from ground surface to base of hole (mm) (B)	900	900	900
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

Pre-soak start	Date	06-May-2021	06-May-2021	06-May-2021
	Time			
2nd pre-soak start	Date	06-May-2021	06-May-2021	06-May-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	07-05-2021	07-05-2021	07-05-2021
Time filled to 400 mm	08:13	08:14	08:15
Time water level at 300 mm	09:09	09:11	09:14
Time (min) to drop 100 mm (T_{100})	56.00	57.00	59.00
Average T_{100}			57.33

If T_{100} > 480 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	09:09	10:14	65.00	09:11	10:22	71.00	09:14	10:36	82.00
2	10:14	11:43	89.00	10:22	11:54	92.00	10:36	12:09	93.00
3	11:43	13:19	96.00	11:54	13:46	112.00	12:09	14:28	139.00
Average Δt Value			83.33			91.67			104.67
	Average Δt/4 = [Hole No.1]		20.83 (t_1)	Average Δt/4 = [Hole No.2]		22.92 (t_2)	Average Δt/4 = [Hole No.3]		26.17 (t_3)

Result of Test: Subsurface Percolation Value = 23.31 (min/25 mm)

Comments:

Soakage is good and well within the required 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

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

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

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	06-May-2021	06-May-2021	06-May-2021
	Time			
2nd pre-soak start	Date	06-May-2021	06-May-2021	06-May-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	06-May-21	06-May-21	06-May-2021
Time filled to 400 mm	08:18	08:19	08:20
Time water level at 300 mm	09:17	09:16	09:16
Time to drop 100 mm (T_{100})	59.00	57.00	56.00
Average T_{100}			57.33

If T_{100} > 480 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	09:17	10:20	63.00	09:16	10:17	61.00	09:16	10:19	63.00
2	10:20	11:36	76.00	10:17	11:31	74.00	10:19	11:36	77.00
3	11:36	12:57	81.00	11:31	12:49	78.00	11:36	12:58	82.00
Average ΔT Value			73.33			71.00			74.00
	Average ΔT/4 = [Hole No.1]		18.33 (T_1)	Average ΔT/4 = [Hole No.2]		17.75 (T_2)	Average ΔT/4 = [Hole No.3]		18.50 (T_3)

Result of Test: Surface Percolation Value = 18.19 (min/25 mm)

Comments:

The P-value 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

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_3)			0.00

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

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: <1:20)

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: 18.00 Sub-surface: 23.00

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

Identify all suitable options

1. Septic tank system (septic tank and percolation area) **(Chapter 7)** — Yes
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: Secondary Treatment System and soil polishing filter

and discharge to: Ground Wate

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

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

Despite shale like structure of the subsoil the percolation is such that there will be good treatment potential and therefore it is recommended to install a Package aeration system and to polish the effluent through a soil polishing filter using a pressurised effluent distribution system. The watertable is in excess of 2.4mbgl. The base of the gravel infiltration layer should be about 500mm bgl. Soil is removed and the area leveled. A layer of 200mm washed gravel is placed on the surface of the prepared area. Distribution system (32mm diameter) is placed on this and covered with100mm gravel. This is covered with geotextile and finished with 200mm soil.
Effluent from the Treatment unit is pumped to the distribution pipework.
The site is sloped but the location of the percolation area is relatively flat

Size of Filter
3-bedroom house - PE is 5 and hydraulic load is 750 litres. The T-value is between 20 and 40 so maximum loading rate is 10 litres/m2. There is therefore a requirement for 75m2 soil polishing filter.

[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	Oakstown BAF
Capacity PE	6
Sizing of Primary Compartment	3.00 m^3

Polishing Filter*: (Section 10.1)

Surface Area (m^2)*		Option 3 - Gravity Discharge Trench length (m)	
Option 1 - Direct Discharge Surface area (m^2)		Option 4 - Low Pressure Pipe Distribution Trench length (m)	
Option 2 - Pumped Discharge Surface area (m^2)	75.00	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

DISCHARGE ROUTE:

Groundwater	✔	Hydraulic Loading Rate * ($l/m^2.d$)	10.00	Surface area (m^2)	75.00
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 as specified & supervised by appropriately qualified person

On-going Maintenance

Regular desludging & Maintenance contract with supplier or installer

7.0 SITE ASSESSOR DETAILS

Company: Trinity Green

Prefix: Dr First Name: Eugene Surname: Bolton

Address: Clonfert, Maynooth, Co. Kildare

Qualifications/Experience: FETAC Site assessor, PhD Microbiology

Date of Report: 04-Apr-2022

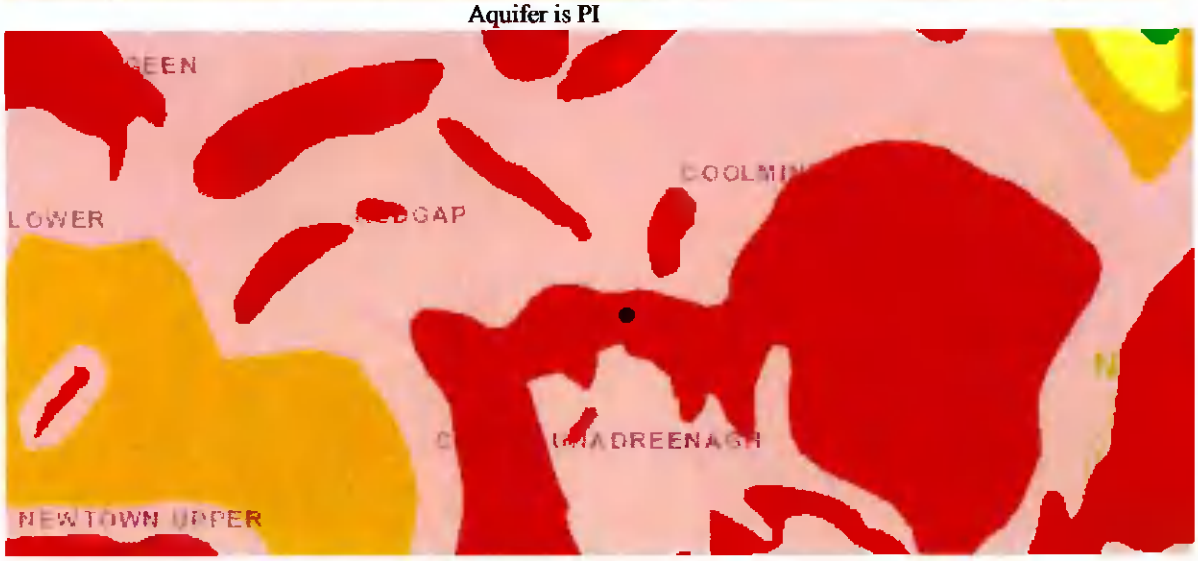
Phone: 0862434828 E-mail info@trinitygreen.ie

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

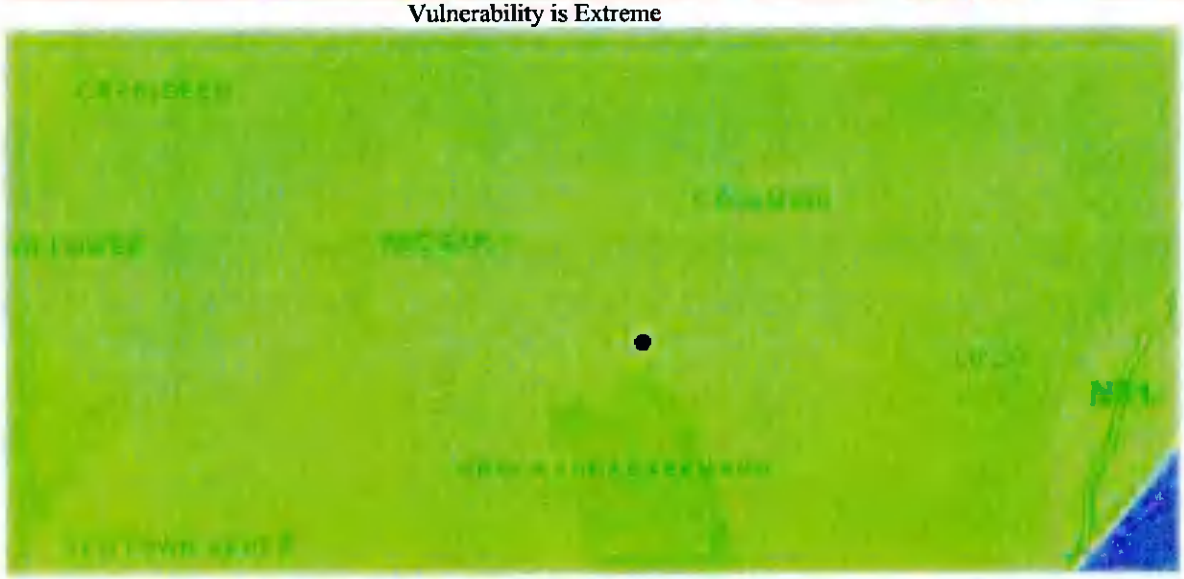
Signature: Eugene Bolton Digitally signed by Eugene Bolton
Date: 2022.01.04 15:17:00 Z

Maps – Aquifer, Vulnerability, Berdock

Aquifer is PI



Vulnerability is Extreme



Bedrock is Silurian Metasediments and Volcanics

Soil

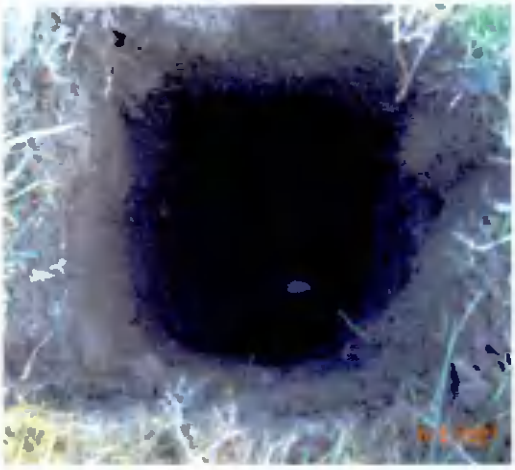
Parent Material	RckNCa
Parent Material Name	Bedrock at surface-Non calcareous
Parent Material Description	Bedrock at surface
Soil Group	Lithosols, Regosols
IFS Soil Code	AminSW
IFS Soil Description	Derived from mainly non-calcareous parent materials
County	DUBLIN
Category	Shallow well drained mineral (Mainly acidic)
Legend	AminSW - Shallow well drained mineral (Mainly acidic)

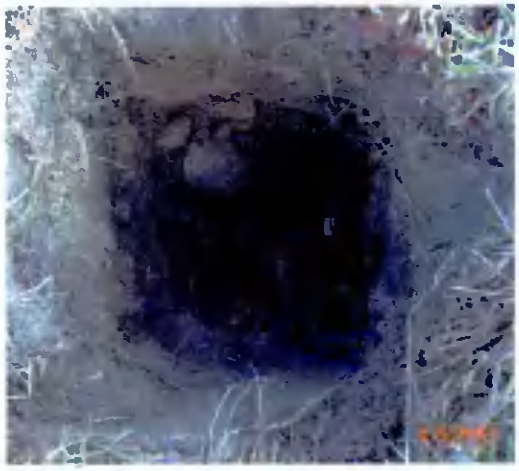
Subsoil

Lithology	Till derived from Lower Palaeozoic sandstones and shales
Quaternary Sediment	TLPSsS

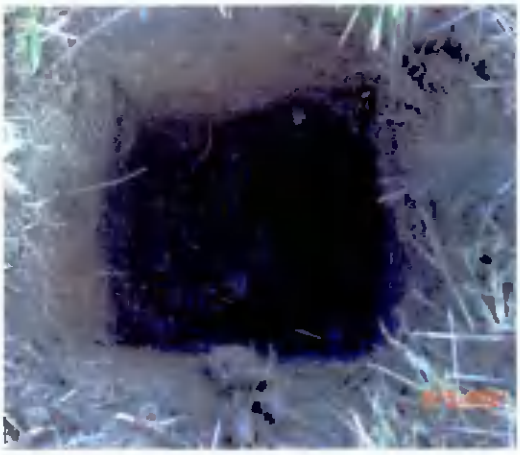
Photos

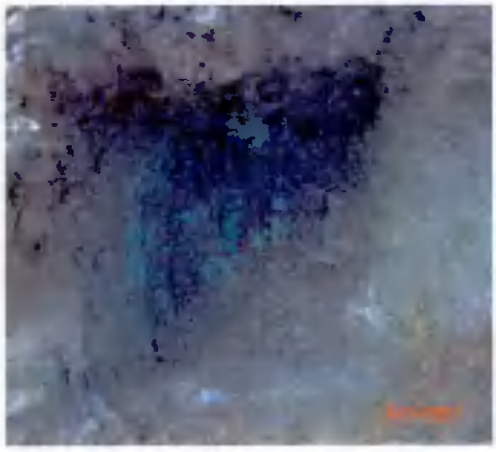
Row 1 - P1, P2





Row 2 - P3, T1





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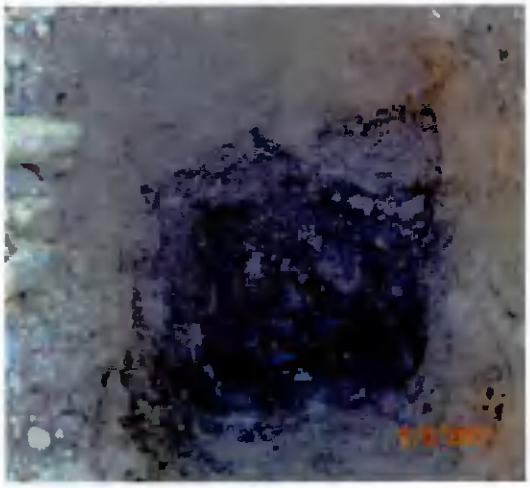

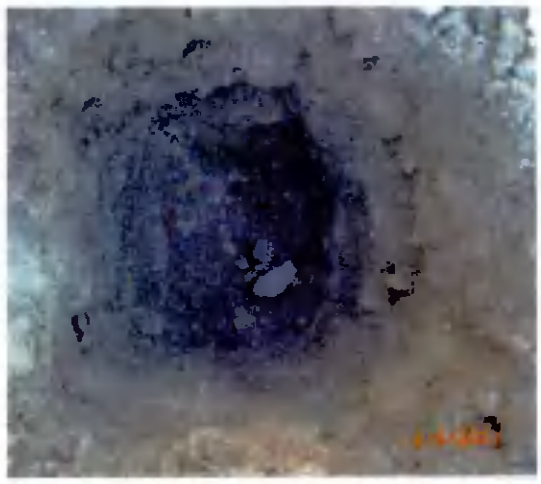

Trial Pit

Site overview

Site Location