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Our ref: 21511/DSS/rca/EP/v1

Your ref:

Date: 11 May, 2023

DRAINAGE STRATEGY STATEMENT FOR PROPOSED RESIDENTIAL DEVELOPMENT AT LAND SOUTH OF CLEGGARS PARK, LAMPHEY, PEMBROKESHIRE, SA71 5JY.

Roger Casey Associates has been instructed by Ateb Group to prepare a Drainage Strategy Statement to support a planning application for the proposed development of 63 new dwellings at the above location. The purpose of this Drainage Strategy Statement is to describe the existing drainage infrastructure and identify a sustainable solution for the proposed foul and surface water drainage serving the development, providing evidence to the Local Planning Authority that the development can be sustainably drained.

Flood Risk

The proposed use of the site, residential, will classify the risk as being a 'Highly Vulnerable Development' (TAN 15, Figure 2). However, in accordance with Natural Resources Wales Flood and Welsh Government TAN 15 Development Advice Maps[1] the site is located within an area designated being Flood Zone A.

In accordance with guidance contained within TAN 15, Figure 1, further flood risks and justification tests are not required to sites located within Zone A and sound drainage design incorporating aspects of Sustainable Urban Drainage Systems (SuDS) is applicable to the development.

Planning Policy and Technical Advice Note (TAN) 15 lists six sources of flooding which need to be considered in the assessment of flood risk and the probability of flooding at the Site Location.

Flooding from Rivers or Fluvial

Not applicable - Flood Zone A as demonstrated on Flood Map[1].

Flooding from the Sea or Tidal Flooding

Not applicable - Flood Zone A as demonstrated on Flood Map[1].

Flooding from Land

The NRW flood risk mapping indicates areas of risk from land within the southeast corner of the development associated with the onsite drainage ditch. To mitigate this risk all development is to be sited above the existing 22.000m contour with no ground raising is to be undertaken below this level. This will also ensure no adverse effect from the proposed development on the surrounding area.

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A further low risk has been identified centrally to the development caused by low point in existing topography. Contributions to this area are from the surrounding greenfield, as the development drainage network will intercept runoff, the area conveyed to this location will be reduced. Proposed external ground formation/levels must form appropriate informal overland flow routes within the landscaping and external area design to safely transfer any flood water away from the proposed buildings and any other existing premises.

Flooding from Groundwater

No ground water was struck within site investigation excavations to a depth of 3m deep below existing ground level. If groundwater is struck during further site investigations and/or construction excavations, suitable measures shall be undertaken to protect proposed and existing premises from this potential flood risk from this source.

Flooding from Sewers

Not applicable due to foul and surface water management within drainage design. Notwithstanding blockage or catastrophic failure of drainage systems within the development site resulting in overland flows not being contained within kerb upstand heights, surface gradients, etc.
Where possible, floor levels will be kept above the level of the relevant adjacent roads and drives.

Flooding from Reservoirs, Canals and Other Artificial Sources

Not applicable due to Site Location and demonstrated on Flood Map[1].

Surface Water Drainage

On 7 January 2019, the Welsh Government implemented Schedule 3 of the Flood and Water Management Act (2010). The new mandatory regulations make the incorporation of sustainable drainage systems (SuDS) compulsory in new developments exceeding 100 m² in order to help reduce flood risk and improve water quality. SuDS on new developments must be designed and built in accordance with the Statutory SuDS Standards published by the Welsh Ministers and schemes must be approved by the Local Authority acting in the role of SuDS Approving Body (SAB) before construction begins.

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With reference to the Statutory Sustainable Drainage Systems Standards:

Standard S1 - Surface water runoff destination

Considering the five priority levels:

Priority Level	Flow Destination
1	Surface water run-off is collected for use;
2	Surface water runoff is infiltrated to ground;
3	Surface water runoff is discharged to a surface water body;
4	Surface water runoff is discharged to a surface water sewer, highway drainage, or another drainage system;
5	Surface water runoff is discharged to a combined sewer.

Following investigations and in response to each of the Priority Levels:
1) Due to the development proposals, capital and long-term maintenance costs of an underground tanked rainwater harvesting system, this option is not considered as a sustainable inclusion into the surface water drainage system prior to destination. The Developer may like to consider the use of a rainwater butt with suitable overflow where appropriate.

2) Soakaway testing was undertaken by Listers Geo on behalf of the Applicant at the site on 18th October 2022[2] (Results of infiltration testing included, a full copy can be provided upon request). The testing results were variable across the proposed development site area. As part of the detail design of the site layout, consideration will have to be given to where soakaways and/or infiltration basins can be located, and the proposed site layout developed around these. This will also inform the SuDS features used for the SAB Application designed.

3) This Priority Level has not been considered further due to the availability of on-site soil infiltration rates suitable to use infiltration.

4) This Priority Level has not been considered further due to the availability of on-site soil infiltration rates suitable to use infiltration.

5) This Priority Level has not been considered further due to the availability of on-site soil infiltration rates suitable to use infiltration.

Standard S2 – Surface water run-off hydraulic control

We envisage the use of permeable surfaces for on plot drives and parking areas, dry swales for highway drainage prior to being conveyed to a infiltration feature located to suit soil strata.

Infiltration devices will be designed to accommodate the peak storm of 6 hour 1:100 year return with an allowance of +40% for climate change. The design will ensure half emptying time is less than 24 hours.

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Hydraulic control will be the naturally occurring soil infiltration rate of the ground strata at the site location.

Standard S3 – Water quality

Water quality will be managed via the passage of surface water run-off through vegetation and clean aggregates before eventual infiltration into the naturally occurring ground strata.

Standard S4 – Amenity

The use of above ground SuDS measures will create a pleasant landscaping feature within the living environment whilst providing a drainage function. Permeable surfaces will create amenity of parking and access to new dwellings. SuDS measure will aim to be multifunctional. Rainwater collection will offer water for reuse for car washing, irrigation, etc.

Standard S5 – Biodiversity

The use of above ground SuDS measures such as swales and infiltration features will create linked blue/green corridors through the proposed development site. Careful landscaping and planting of these will provide a rich opportunity to maximise the biodiversity objectives of the development as a whole.

Standard S6 – Design of drainage for construction, operation and Maintenance and structural integrity

All elements of the surface water drainage system should be designed so that they can be constructed, maintenance and operation can be undertaken (by the relevant responsible body) easily, safely, cost-effectively, in a timely manner, and with the aim of minimising the use of scarce resources and embedded carbon (energy).

The surface water drainage system should be designed to ensure structural integrity of all elements under anticipated loading conditions over the design life of the development site, taking into account the requirement for reasonable levels of maintenance.

Foul Water Drainage

From reviewing Dwr Cymru Welsh Water sewer record maps there is evidence of an existing 150mm sewer within the western extent of the development boundary. An onsite sewer trace was undertaken by DCWW to determine the existing route and depth. The record mapping confirms this length of sewer drains to Lamphey SPS that then discharges to Lamphey Waste Water Treatment Works. Subsequent discussions with DCWW[3] confirm that foul flows from the proposed development can be accommodated in Lamphey WwTW following improvements carried out in 2015.

Dwellings located in the eastern extent of the proposed development will need to be suitably raised above existing ground levels to facilitate a gravity connection to the existing sewer network.

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Summary

This Drainage Strategy Statement concludes that an achievable and sustainable drainage scheme can be designed for both foul and surface water drainage systems:

- All proposed development works are generally located in a low flood risk location considered by TAN 15.
- Surface water flows drained by gravity to onsite infiltration devices via suitable SuDS measures. Infiltration locations will be dependent upon suitable strata locations in accordance with Lister Geo Site investigation report dated 22nd September 2022.
- Foul water flows drained by gravity to the existing public foul water sewer network located adjacent to the western boundary.

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for Roger Casey Associates

Encs:

[1] National Resources Wales Flood Risk Map and Welsh Government TAN 15 Development Advice Map
[2] Lister Geo Infiltration Testing Results extracted from Site Investigation dated 22nd September 2022.
[3] DCWW Correspondence.

Cyfoeth Naturiol Cymru
Natural Resources Wales

Map Perygl Llifogydd / Flood Risk Map - Land South of Cleggars Park, Lamphey, Pembrokeshire SA71 5JY

Allwedd / Map Key

Risk Level Under Review

Flood Risk from Rivers - Extent
- High
- Medium
- Low

Flood Risk from the Sea
- High
- Medium
- Low

Flood Risk from Surface Water & Small Watercourses - Extent
- High
- Medium
- Low

Graddfa / Scale at A3 1: 5,000

Dyddiad / Date
08/09/2022

0.3 0 0.13 0.3

British_National_Grid Kilometers

Cyfoeth Naturiol Cymru
Natural Resources Wales

Map Perygl Llifogydd / Flood Risk Map - Land South of Cleggars Park, Lamphey, Pembrokeshire SA71 5JY

Allwedd / Map Key

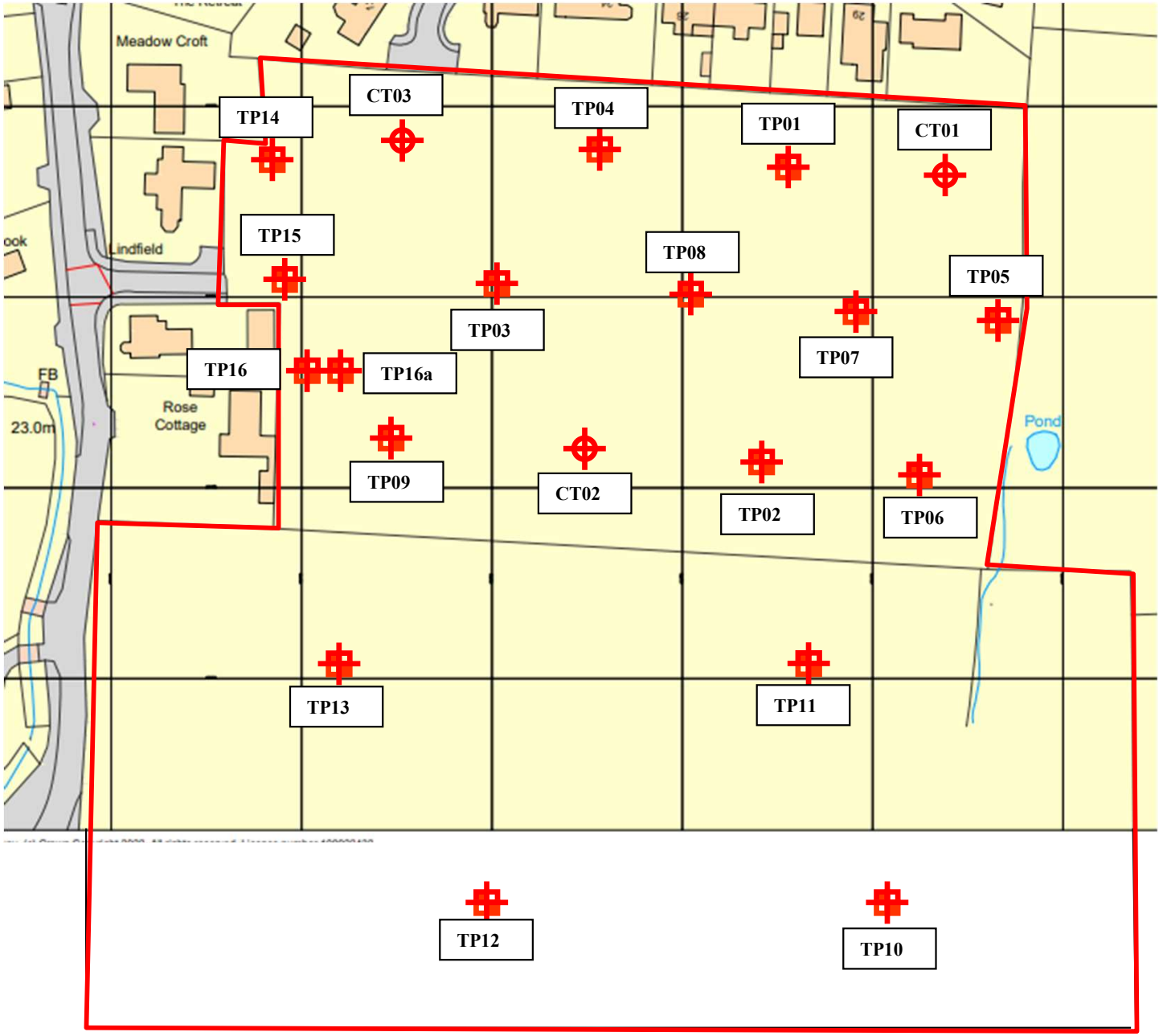
- Zone C1
- Zone C2
- Zone B
- Zone A

Graddfa / Scale at A3 1: 5,000

Dyddiad / Date
08/09/2022

0.3 0 0.13 0.3

British_National_Grid Kilometers



Project Ref: 22.09.023

Approximate locations of boreholes

Approximate locations of trial pits

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Blakesley Road,
Slapton,
Towcester,
Northants,
NN12 8QD
Telephone: (01327) 860060
Email: info@listersgeotechnics.co.uk

Title: Exploratory Hole Location Plan

Site: Cleggars Park
Lamphey, SA71 5JY

Scale: NTS

Drawn by: LC

Date: 12/2022

Dwg No: Fig 2

LISTERS G
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Site: , Cleggars Park, , Lamphey, Pembroke, SA71 5JY

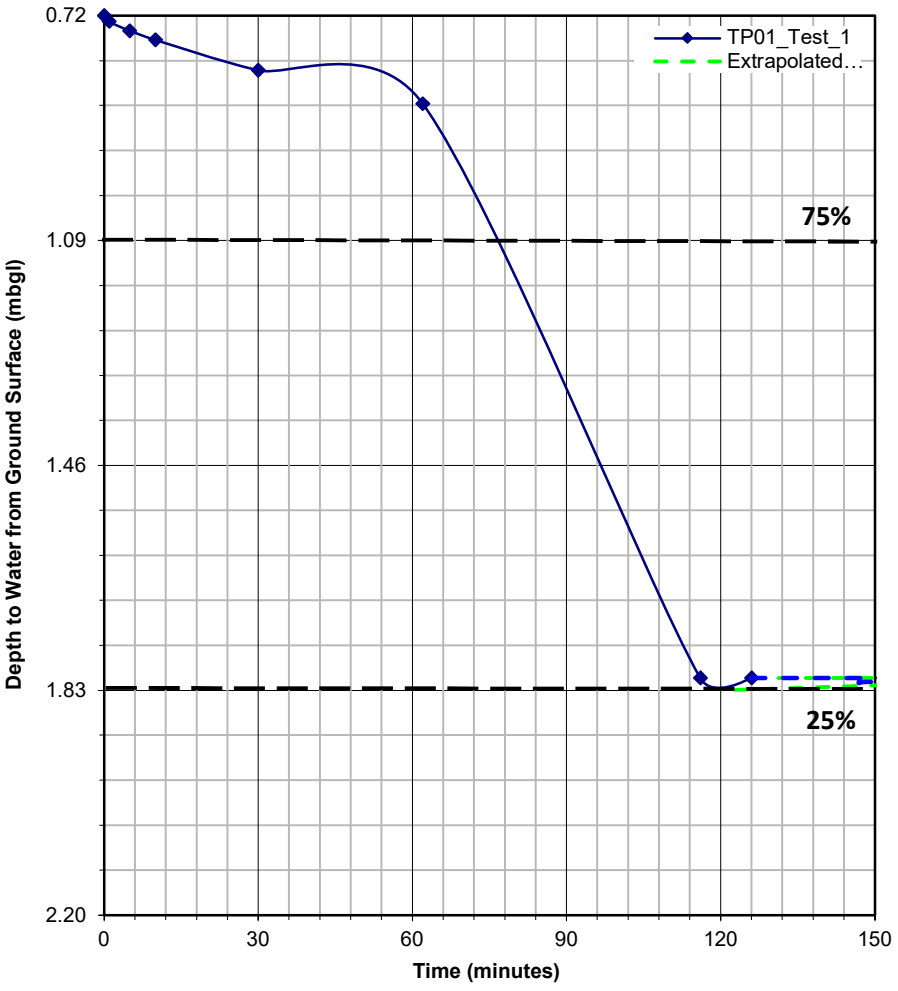
Report No: 22.09.023
Date Tested: 18/10/2022
Test Location: TP01_Test_1
Dimensions: 0.5mWx2.1mLx2.20mD

Groundwater: unknown

Soil Description - test response zone:

0.3m to 1.7m - Brown slightly sandy Clay
1.7m to 1.8m - Fractured grey limestone
1.8m to 2.3m - Brown slightly sandy slightly gravelly clay

Time (mins)	Depth BGL
0	0.72
1	0.73
5	0.75
10	0.76
30	0.81
62	0.87
116	1.81
126	1.81



Water drained to the base of the limestone, indicating an nifiltration rate between 3.69 x 10-5m/s and 6.14 x 10-5m/s

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Site: , Cleggars Park, , Lamphey, Pembroke, SA71 5JY

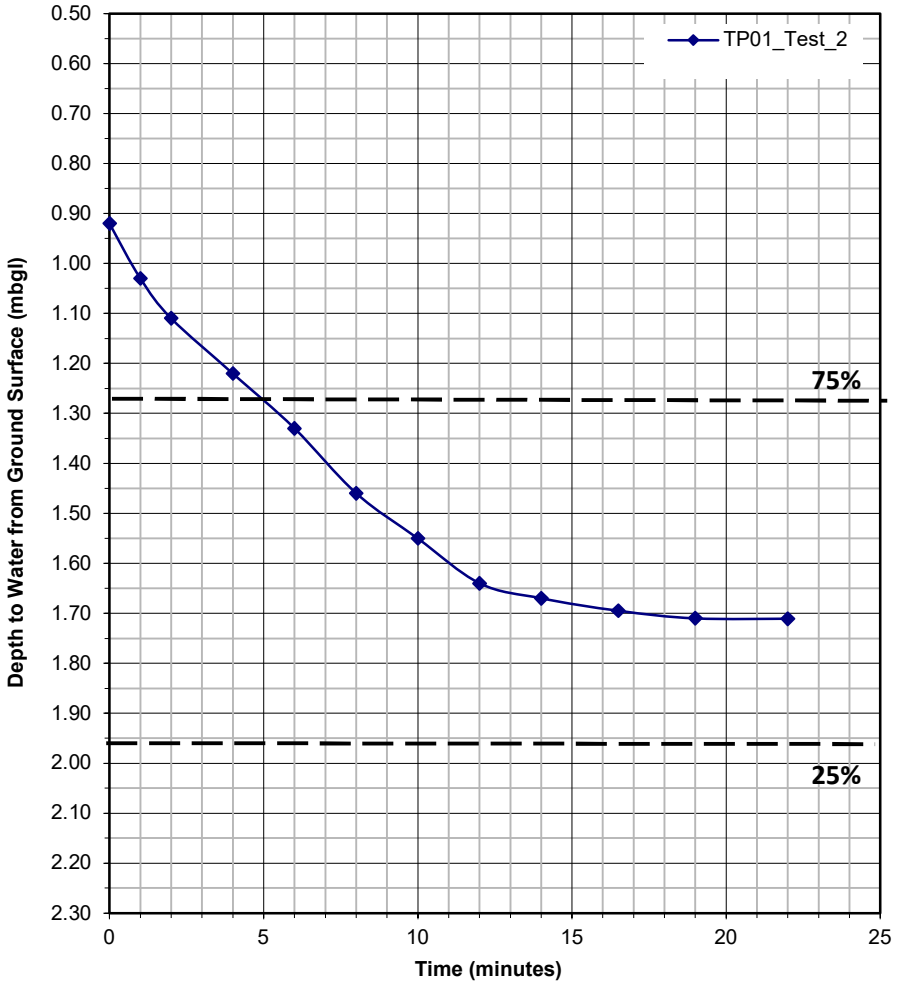
Report No: 22.09.023
Date Tested: 18/10/2022
Test Location: TP01_Test_2
Dimensions: 0.5mWx2.1mLx2.30mD

Groundwater: unknown

Soil Description - test response zone:

0.3m to 1.7m - Brown slightly sandy Clay
1.7m to 1.8m - Fractured grey limestone
1.8m to 2.3m - Brown slightly sandy slightly gravelly clay

Time (mins)	Depth BGL
0	0.92
1	1.03
2	1.11
4	1.22
6	1.33
8	1.46
10	1.55
12	1.64
14	1.67
16.5	1.70
19	1.71
22	1.71



Water drained to the the limestone, indicating an ifiltration rate between 7.6 x 10-5m/s and 1.04 x 10-4m/s

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Site: , Cleggars Park, , Lamphey, Pembroke, SA71 5JY

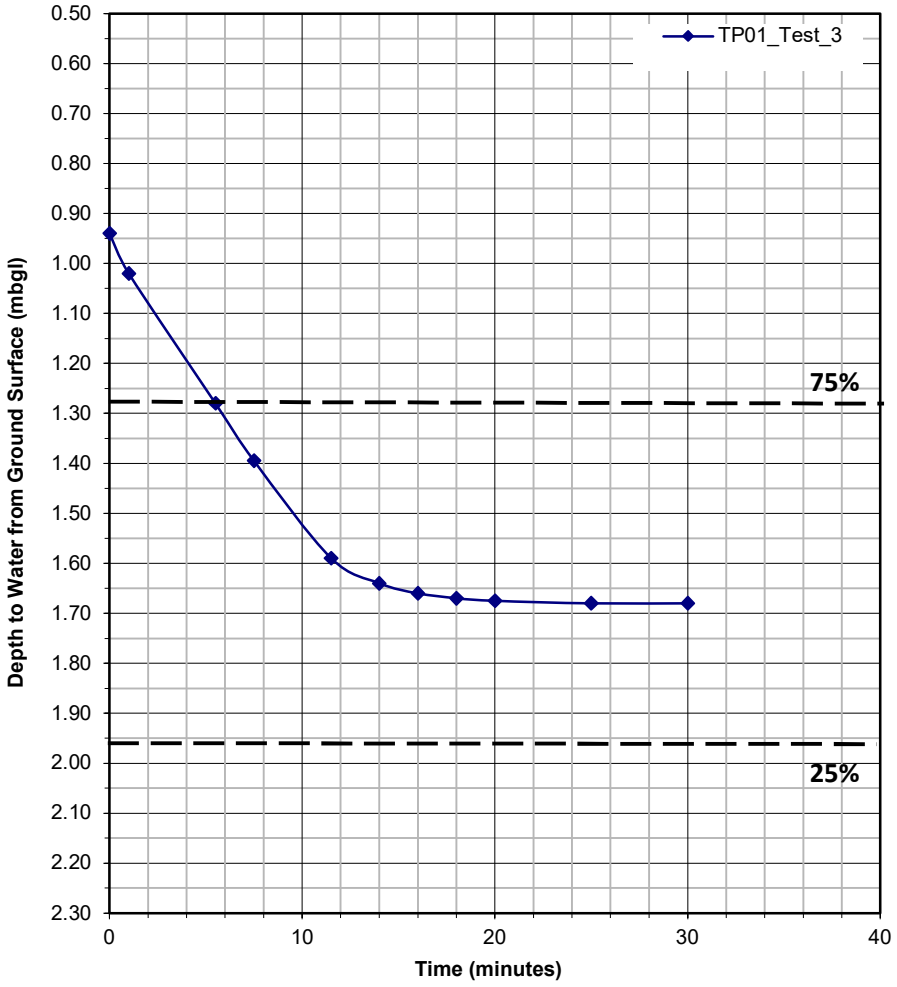
Report No: 22.09.023
Date Tested: 18/10/2022
Test Location: TP01_Test_3
Dimensions: 0.5mWx2.1mLx2.30mD

Groundwater: unknown

Soil Description - test response zone:

0.3m to 1.7m - Brown slightly sandy Clay
1.7m to 1.8m - Fractured grey limestone
1.8m to 2.3m - Brown slightly sandy slightly gravelly clay

Time (mins)	Depth BGL
0	0.94
1	1.02
5.5	1.28
7.5	1.40
11.5	1.59
14	1.64
16	1.66
18	1.67
20	1.68
25	1.68
30	1.68



Water drained to the base of the limestone, indicating an ifiltration rate between 4.4 x 10-6m/s and 3.1 x 10-5m/s

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Site: , Cleggars Park, , Lamphey, Pembroke, SA71 5JY

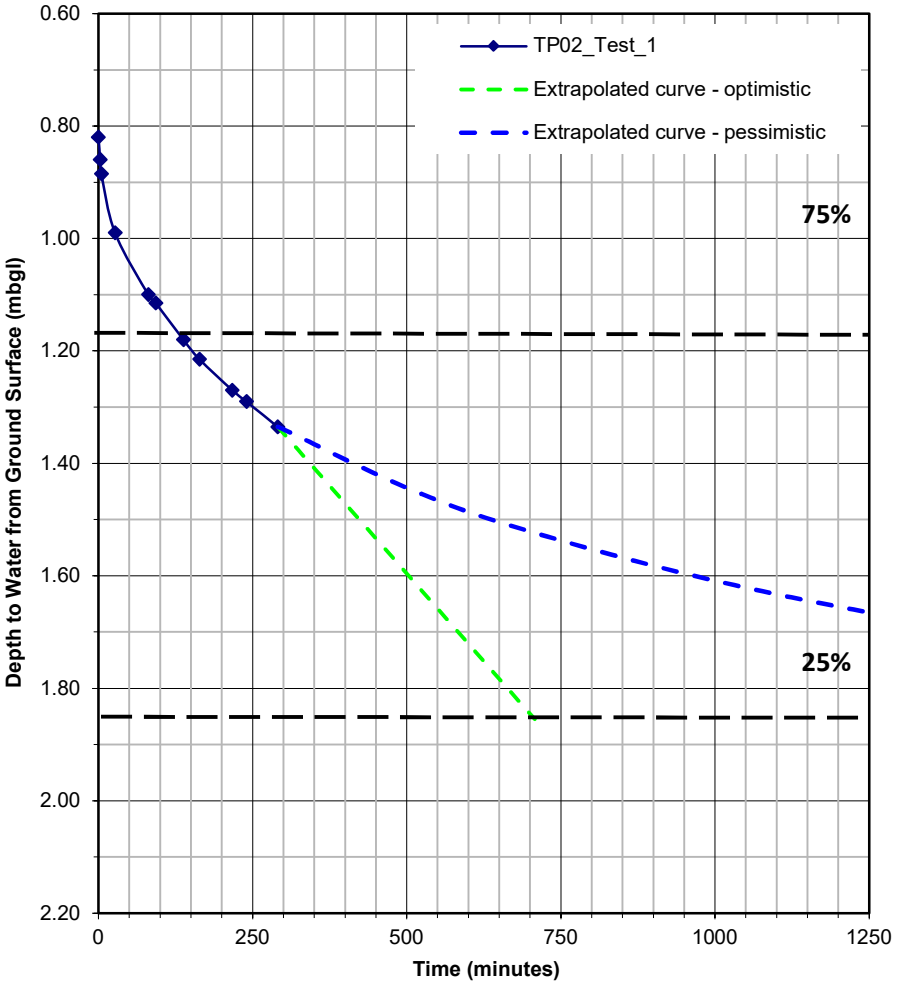
Report No: 22.09.023
Date Tested: 18/10/2022
Test Location: TP02_Test_1
Dimensions: 0.5mWx2.1mLx2.20mD

Groundwater: unknown

Soil Description - test response zone:

0.3m to 2.0m - Slightly sandy clay
2.0m to 2.2m - Fractured limestone

Time (mins)	Depth BGL
0	0.82
3	0.86
5	0.89
27	0.99
81	1.10
93	1.12
138	1.18
164	1.22
217	1.27
240	1.29
291	1.34



Calculated Soil Infiltration Rate, f = 1.1×10^{-6} to 4.5×10^{-6} m/s

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Site: , Cleggars Park, , Lamphey, Pembroke, SA71 5JY

Report No: 22.09.023

Date Tested: 18/10/2022

Test Location: TP03_Test_1

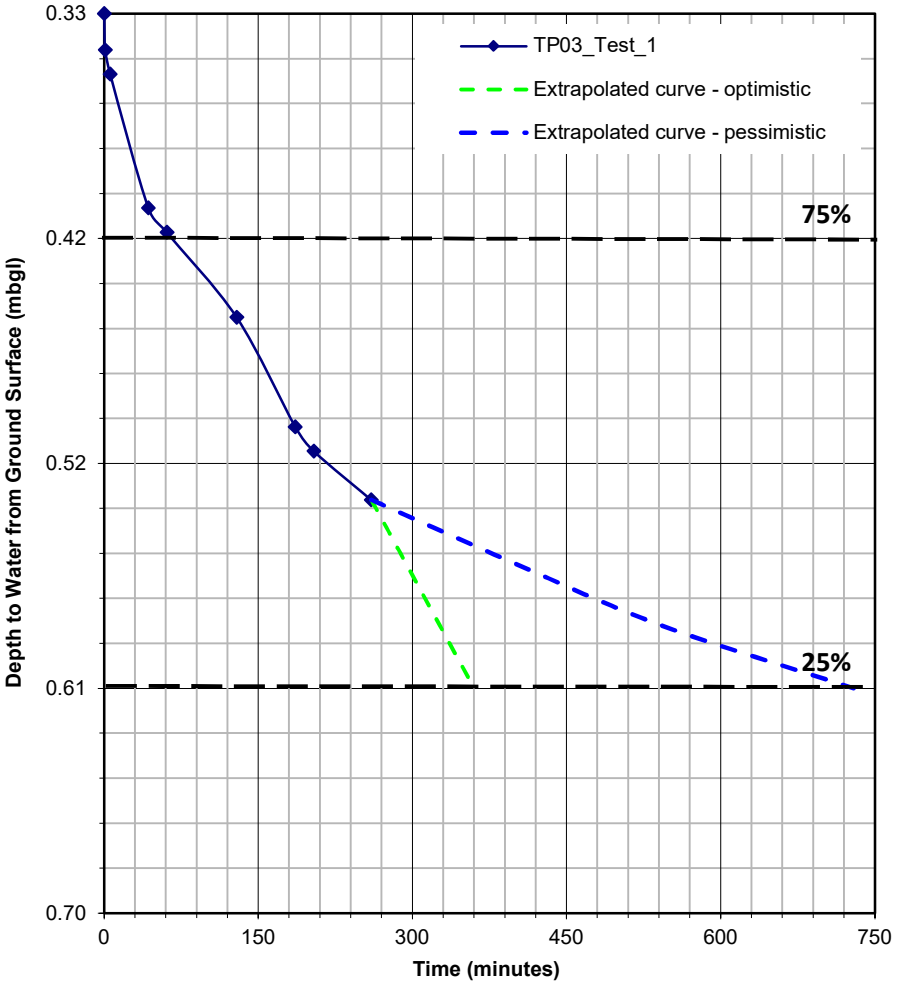
Groundwater: unknown

Dimensions: 0.5mWx1.8mLx0.70mD

Soil Description - test response zone:

0.3m to 0.7m - Slightly sandy clay

Time (mins)	Depth BGL
0	0.33
1	0.35
6	0.36
43	0.41
61	0.42
129	0.46
186	0.50
204	0.51
260	0.53



Calculated Soil Infiltration Rate, f = 2.4x10^{-6} to 5.4x10^{-6} m/s

TRIAL PIT INFILTRATION TESTING to BRE Digest 365	Report: 22.09.023

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Site: , Cleggars Park, , Lamphey, Pembroke, SA71 5JY

Report No: 22.09.023

Date Tested: 18/10/2022

Test Location: TP10_Test_1

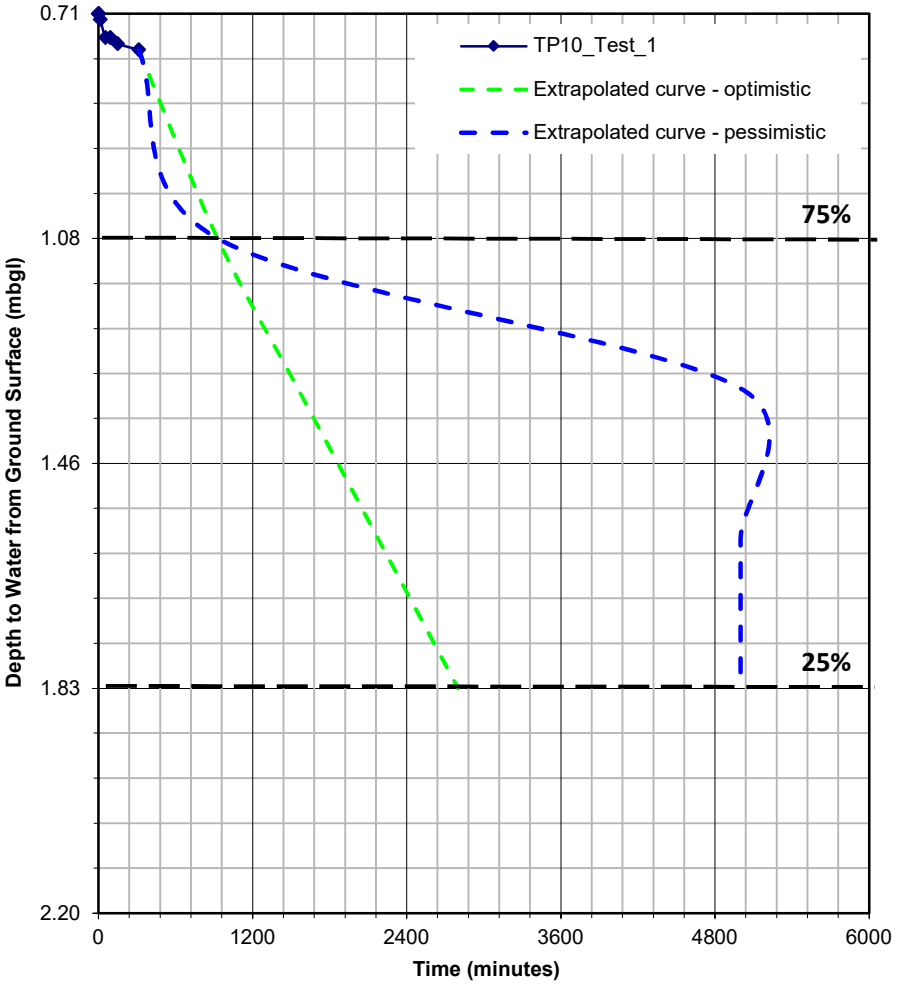
Groundwater: unknown

Dimensions: 0.5mWx2.2mLx2.20mD

Soil Description - test response zone:

0.3m to 2.2m - Slightly sandy clay

Time (mins)	Depth BGL
0	0.71
3	0.71
15	0.72
56	0.75
92	0.75
150	0.76
314	0.77



Calculated Soil Infiltration Rate, f = 6.5×10^{-7} to 1.4×10^{-6} m/s

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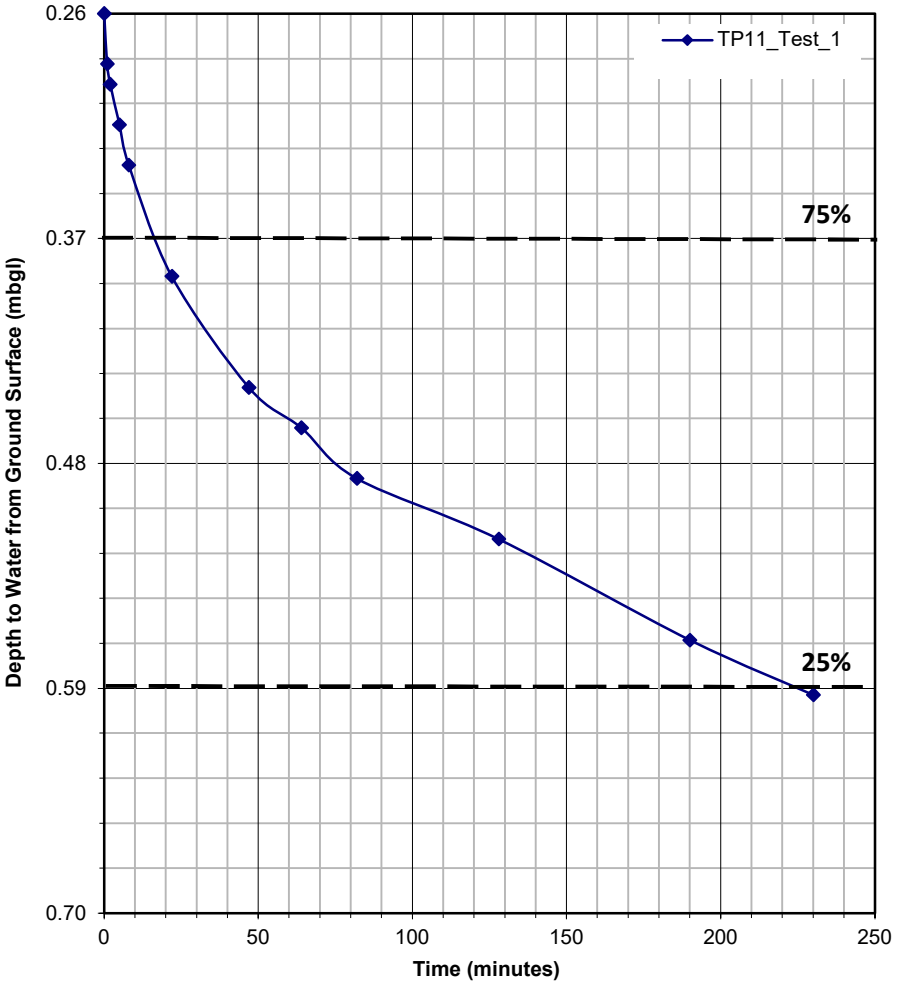
Site: , Cleggars Park, , Lamphey, Pembroke, SA71 5JY

Report No: 22.09.023
Date Tested: 18/10/2022
Test Location: TP11_Test_1
Dimensions: 0.5mWx1.8mLx0.70mD

Groundwater: unknown

Soil Description - test response zone:
0.3m to 0.7m - Slightly sandy clay

Time (mins)	Depth BGL
0	0.26
1	0.28
2	0.29
5	0.31
8	0.33
22	0.39
47	0.44
64	0.46
82	0.49
128	0.52
190	0.57
230	0.59



Calculated Soil Infiltration Rate, f = 8.1x10^{-6} m/s

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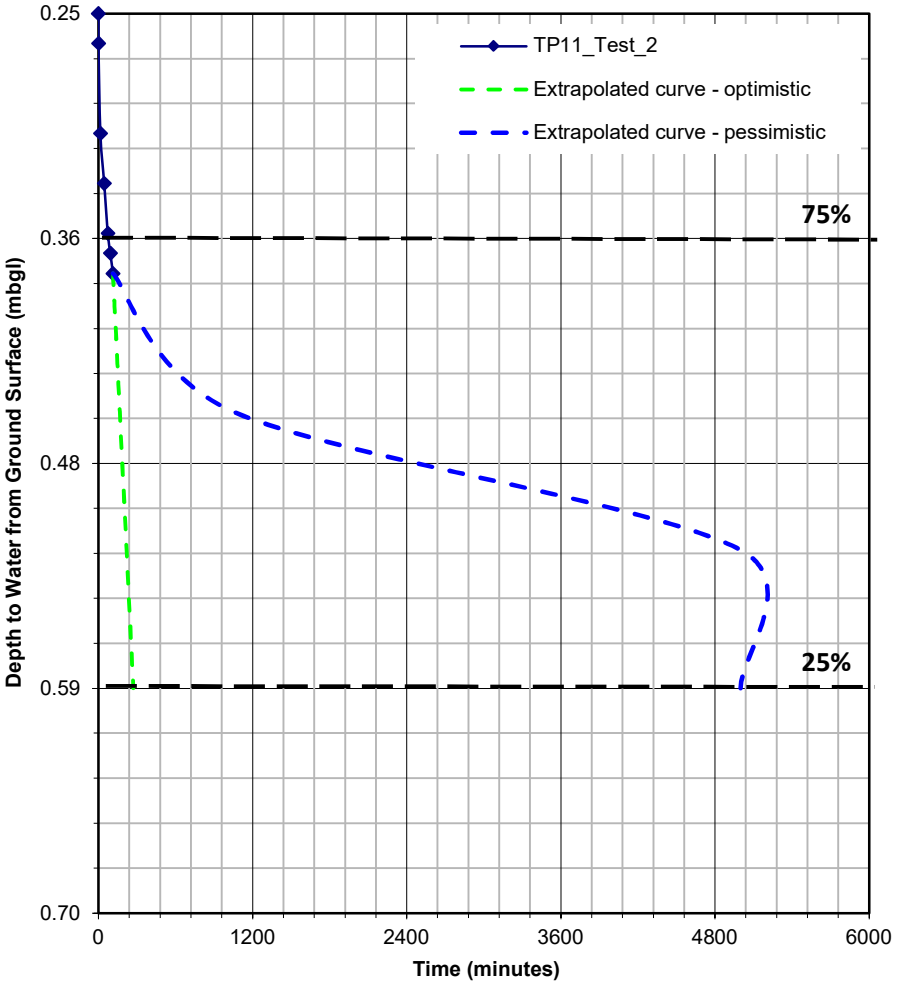
Site: , Cleggars Park, , Lamphey, Pembroke, SA71 5JY

Report No: 22.09.023
Date Tested: 18/10/2022
Test Location: TP11_Test_2
Dimensions: 0.5mWx1.8mLx0.70mD

Groundwater: unknown

Soil Description - test response zone:
0.3m to 0.7m - Slightly sandy clay

Time (mins)	Depth BGL
0	0.25
2	0.27
16	0.31
45	0.34
74	0.36
94	0.37
114	0.38



Calculated Soil Infiltration Rate, f = 0.4x10^{-6} to 8.9x10^{-6} m/s

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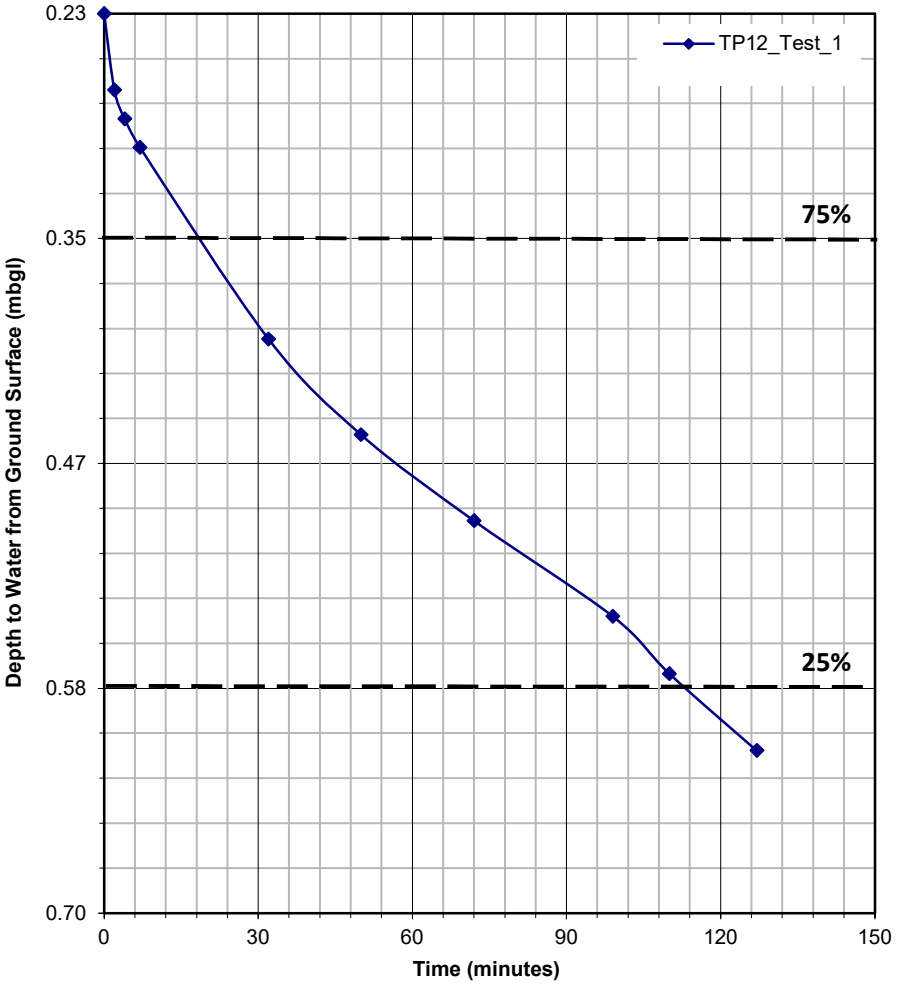
Site: , Cleggars Park, , Lamphey, Pembroke, SA71 5JY

Report No: 22.09.023
Date Tested: 18/10/2022
Test Location: TP12_Test_1
Dimensions: 0.5mWx1.8mLx0.70mD

Groundwater: unknown

Soil Description - test response zone:
0.3m to 0.7m - Slightly sandy clay

Time (mins)	Depth BGL
0	0.23
2	0.27
4	0.29
7	0.30
32	0.40
50	0.45
72	0.50
99	0.55
110	0.58
127	0.62



Calculated Soil Infiltration Rate, f = 1.8x10^{-5} m/s

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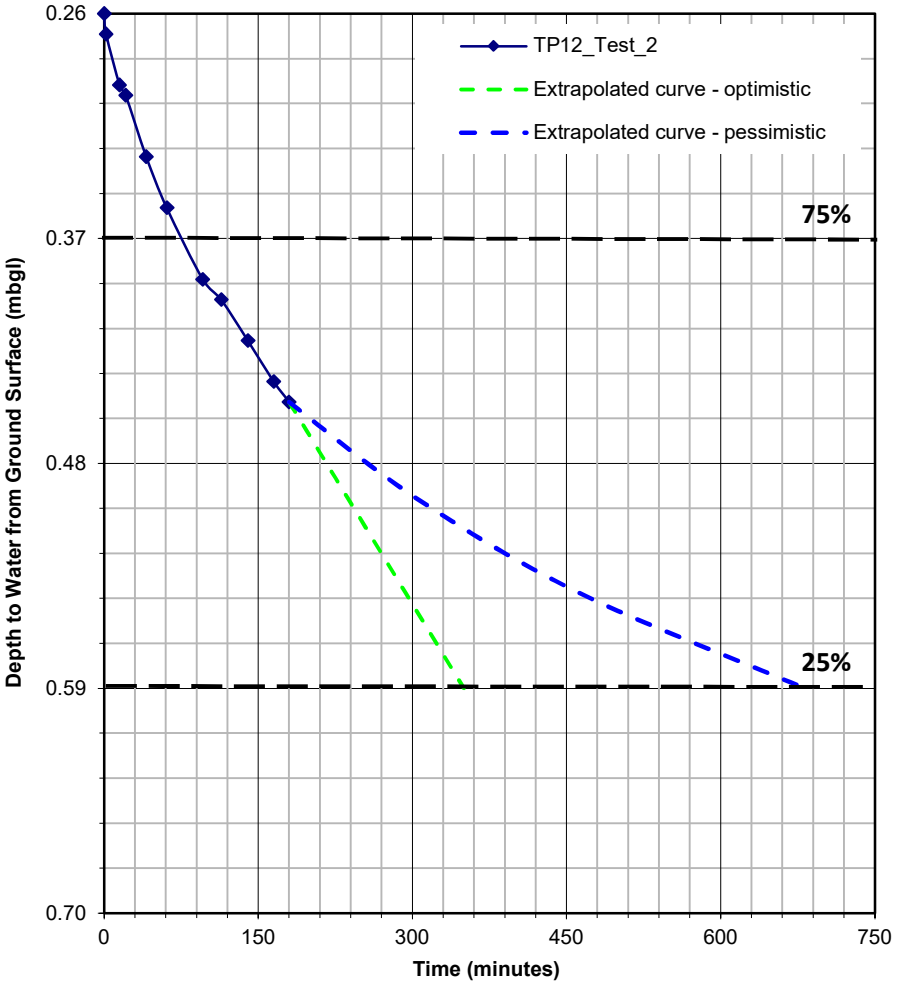
Site: , Cleggars Park, , Lamphey, Pembroke, SA71 5JY

Report No: 22.09.023
Date Tested: 18/10/2022
Test Location: TP12_Test_2
Dimensions: 0.5mWx1.8mLx0.70mD

Groundwater: unknown

Soil Description - test response zone:
0.3m to 0.7m - Slightly sandy clay

Time (mins)	Depth BGL
0	0.26
2	0.27
15	0.30
21	0.30
41	0.33
61	0.36
96	0.39
114	0.40
140	0.42
165	0.44
180	0.45



Calculated Soil Infiltration Rate, f = 2.8×10^{-6} to 6.2×10^{-6} m/s

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Site: , Cleggars Park, , Lamphey, Pembroke, SA71 5JY

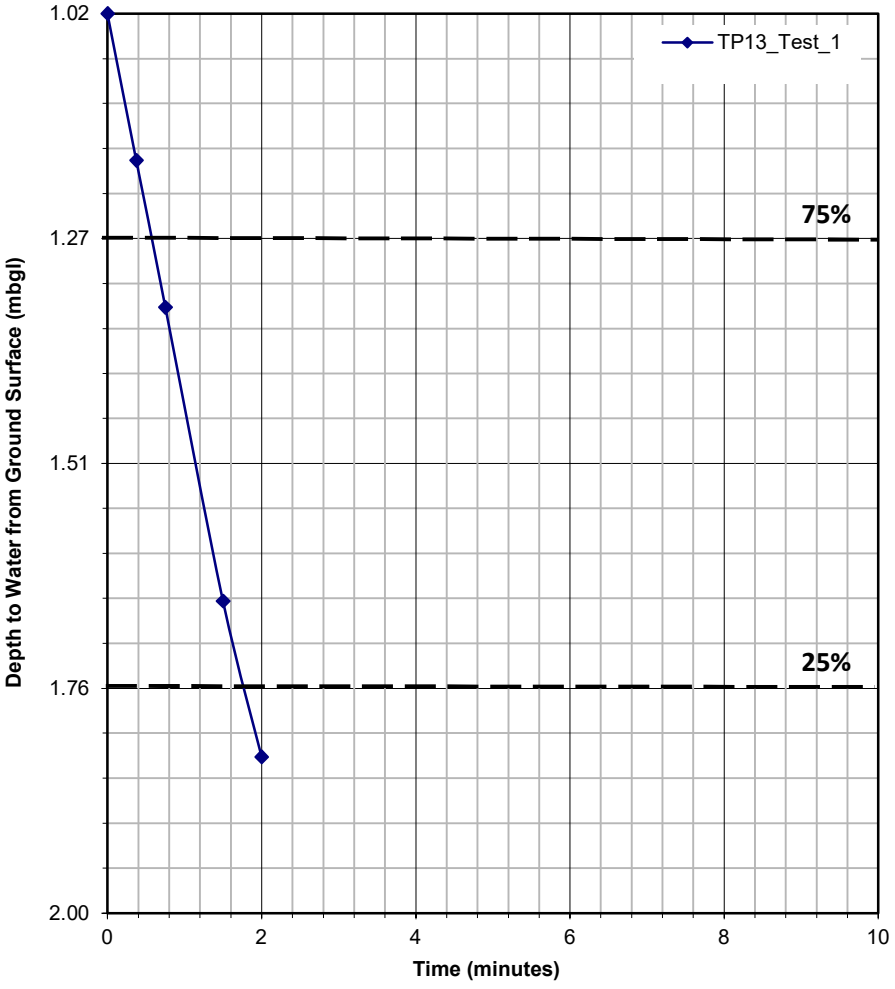
Report No: 22.09.023
Date Tested: 18/10/2022
Test Location: TP13_Test_1
Dimensions: 0.5mWx2.0mLx2.00mD

Groundwater: unknown

Soil Description - test response zone:

0.3m to 2.2m - Slightly sandy clay
2.2m to 2.3m - Fractured limestone

Time (mins)	Depth BGL
0	1.02
0.375	1.18
0.75	1.34
1.5	1.66
2	1.83
0	0.00
0	0.00



Calculated Soil Infiltration Rate, f = 1.9x10^{-3} m/s

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LISTERS G
Geotechnical and Geoenvironmental Con

Site: , Cleggars Park, , Lamphey, Pembroke, SA71 5JY

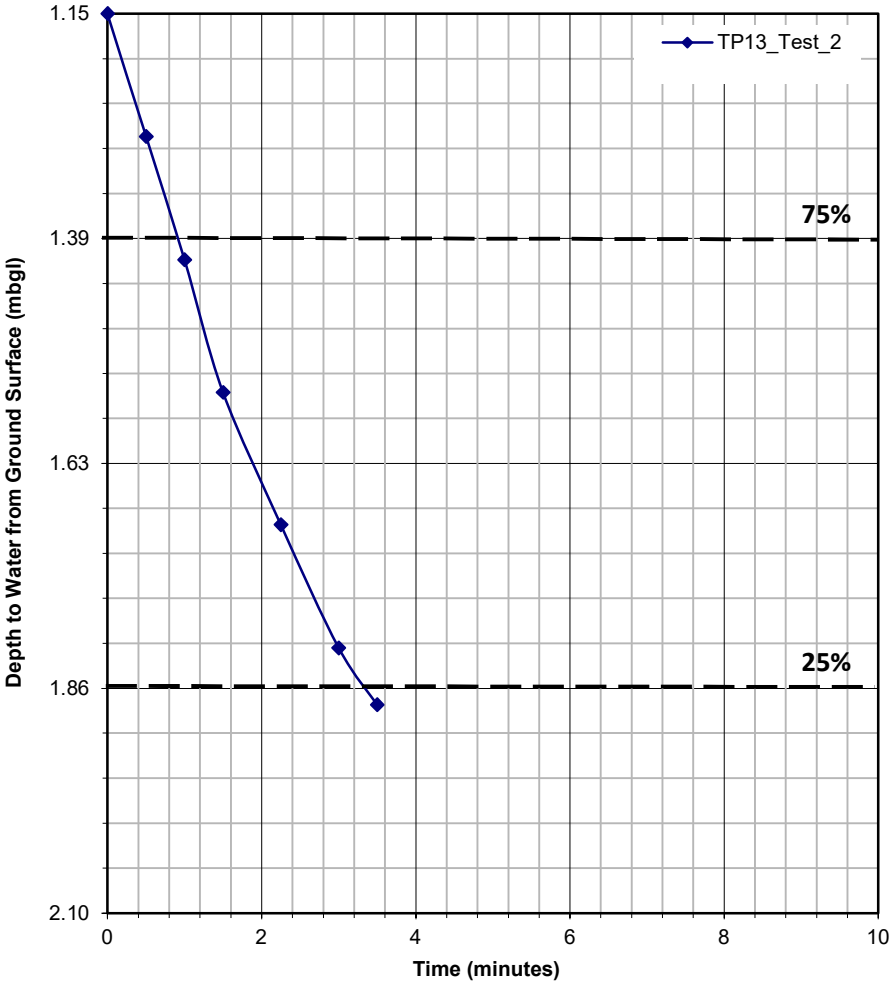
Report No: 22.09.023
Date Tested: 18/10/2022
Test Location: TP13_Test_2
Dimensions: 0.5mWx2.0mLx2.10mD

Groundwater: unknown

Soil Description - test response zone:

0.3m to 2.2m - Slightly sandy clay
2.2m to 2.3m - Fractured limestone

Time (mins)	Depth BGL
0	1.15
0.5	1.28
1	1.41
1.5	1.55
2.25	1.69
3	1.82
3.5	1.88



Calculated Soil Infiltration Rate, f = 1.0x10^{-3} m/s

TRIAL PIT INFILTRATION TESTING to BRE Digest 365	Report: 22.09.023

LISTERS G
Geotechnical and Geoenvironmental Con

Site: , Cleggars Park, , Lamphey, Pembroke, SA71 5JY

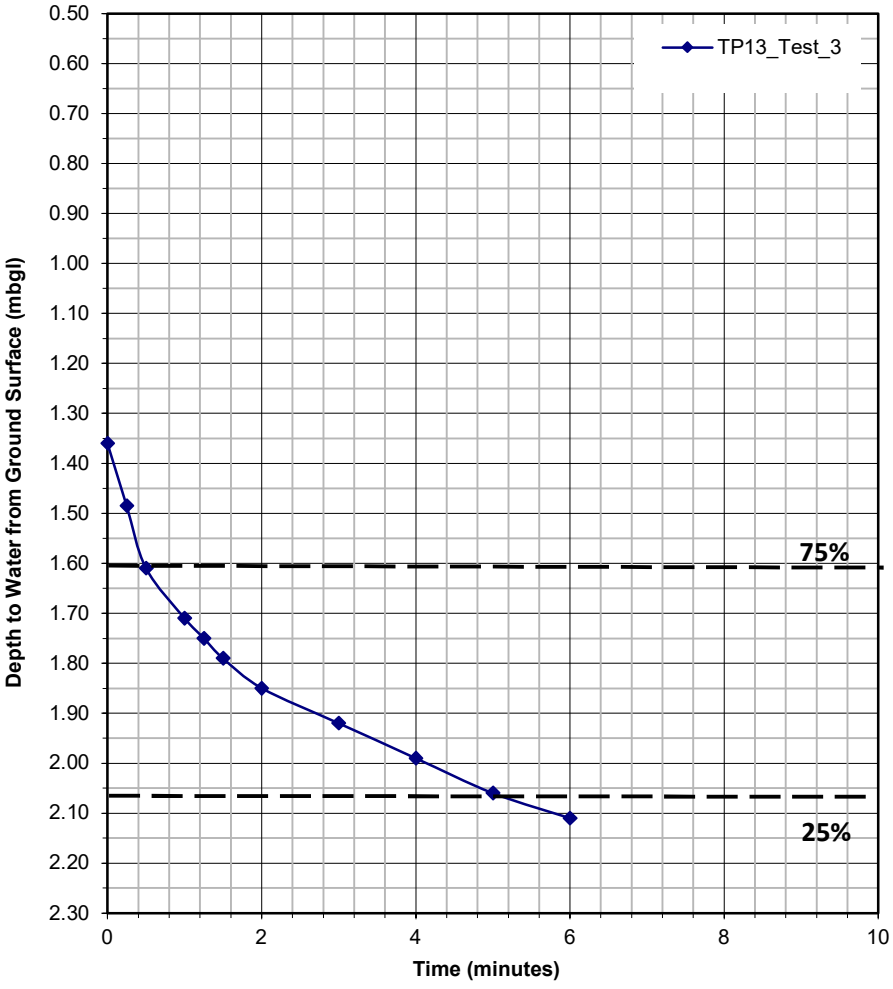
Report No: 22.09.023
Date Tested: 18/10/2022
Test Location: TP13_Test_3
Dimensions: 0.5mWx2.0mLx2.30mD

Groundwater: unknown

Soil Description - test response zone:

0.3m to 2.2m - Slightly sandy clay
2.2m to 2.3m - Fractured limestone

Time (mins)	Depth BGL
0	1.36
0.25	1.49
0.5	1.61
1	1.71
1.25	1.75
1.5	1.79
2	1.85
3	1.92
4	1.99
5	2.06
6	2.11



Calculated Soil Infiltration Rate, f = 5.1x10^{-4} m/s

TRIAL PIT INFILTRATION TESTING to BRE Digest 365	Report: 22.09.023

Edward Powell

From: Clare Powell <Clare.Powell@dwrcymru.com>
Sent: 13 September 2022 14:00
To: Phil Lawrence
Subject: RE: 21511 - Land South of Cleggars Park, Lamphey, Pembrokeshire SA71 5JY

Hi Phil

Thank you for the below email. I can confirm that there were improvements undertaken at the works in 2015 and we can accommodate the foul flows from the proposed development at Lamphey Waste water Treatment Works.

Regards
Clare

Clare Powell
Development Planning Officer | Developer Services
Dŵr Cymru Welsh Water

T: 0800 917 2652 | E: 11379 | M: 07557813144
A: PO Box 3146, Cardiff, CF30 0EH
W: dwrcymru.com
E: developer.services@dwrcymru.com

From: Phil Lawrence <p.lawrence@rca-eng.co.uk>
Sent: 05 September 2022 09:34
To: Clare Powell <Clare.Powell@dwrcymru.com>; Services Developer <developer.services@dwrcymru.com>
Cc: Phillip Stokes <phill@devandtech.co.uk>
Subject: 21511 - Land South of Cleggars Park, Lamphey, Pembrokeshire SA71 5JY

******** External Mail ********
Dear Clare,

We are acting as consulting engineers in relation to the above subject indicated on attached LDP site location plan. Pembrokeshire CC SPG referred to WWTW improvements being required, these were to be delivered by 31/03/2015. Please can you confirm that these works have been undertaken and that DCWW would not object to a forthcoming planning application for the allocated site?

We look forward to hearing from you as soon as possible. Thanks.

Kind Regards,
Phil

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