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Drainage Report,
Recommendations and
Associated Test Certificates

Site: Colliestown Farm,
Torphins,
AB31 4JN

C/O: Gerry Robb Architectural Design
Aboyne

Report Prepared: 30/10/2023,
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Ferguson GeoTechnical Ltd, Failte, Ythanbank, Ellon, AB41 7TH

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Introduction

Following a request from Gerry Robb Architectural Design on behalf of their client a site visit was made to Colliestown Farm, Torphins AB31 4JN.

At the site it is proposed that a new 4 bedroom static caravan will be installed.

Our site visits were carried out in order to perform various ground analyses to determine what the underlying ground build up is and to perform the following:

Percolation Testing – This is to determine the suitability of the ground build-up for the disposal of effluent from a septic tank to the ground via a purpose built soakaway system.

Infiltration Testing – This is to enable the appropriate design of a surface water disposal system.

Site Location & Initial Information

The site given its close proximity to other buildings will have easy access to electricity, water and telephone. Although it should be pointed out that there is no mains drainage available. For further information as to the layout of the premises please see the attached images/drawing.

There is a ditch which runs to the north of the site. This can be seen in the attached visual information.

Site Work – Trial Pits

On the 16th of October 2023, various trial pits were excavated using a tracked digger with a 300mm wide bucket attached in order to allow for analysis of the ground build-up and conditions. Furthermore this was also carried out in the area of the proposed foul and surface water sub-surface soakaways to allow for percolation and infiltration testing to occur adjacent to the trial pits.

The locations of both proposed soakaways can be seen on attached drawing(s).

Percolation Testing

Percolation testing was carried out adjacent to trial pits in accordance with BS6297: 2007+A1:2008 and as described in Section 3.9 of the Scottish Building Standards Technical Handbook (Domestic). The test results are as shown below: -

Average time taken for water to drain 3 times in each sump hole. (middle 150mm)	289 minutes (approx.)
Depth of Water Table below Ground Level (m)	1.2
Average Soil Percolation Values, V_p , s/mm	115.6

Infiltration Testing

Infiltration testing was carried out adjacent to trial pit SWS1 in full accordance with BRE Digest 365. The test results are tabulated below: -

Trial Pit No.	Test Zone Depth (M)	In-Fill	Soil Infiltration Rate, f (m/s)
SWS1	0.5	Open	$f = 2.88 \times 10^{-6}$ m/s

Encountered Ground Conditions

The ground is of poor drainage characteristics. For a full and detailed examination of the encountered ground conditions please refer to the attached trial pit logs showing the various ground conditions encountered and at what depth(s).

Ground Water Observations

The water table was discovered at 1.2m below ground level.

Published Geology

There are various sources of published geology available that cover the area this site is in. An example of which is the British geological survey 1:50,000 maps. However for a more accurate description of the actual site conditions please see the attached trial pit logs.

Drainage Recommendations

Foul Water Discharge

We recommend the installation and use of a packaged sewage treatment plant as the Vp rate calculated is too high for a conventional septic tank and soakaway. Therefore, the PSTP will provide the treatment necessary to the foul water, it will then pass through a partial soakaway which provides additional treatment and attenuation before discharge to the ditch. Any deviation from the use of a PSTP would not be consistent with the recommendations of this report.

Surface Water Disposal

We recommend that for the disposal of the surface water this should pass through a partial soakaway prior to discharge into the ditch. The partial soakaway will provide the element of treatment and attenuation required prior to discharge.

Drainage Layout

Indicative soakaway locations can be seen in the attached drawings at the end of this report. Furthermore, indicative soakaway construction is also shown in the attached drawings at the end of this report.

System Maintenance

The PSTP should be fully maintained and done so in conjunction with the manufacturer's recommendations. Additionally, the system should be inspected on a regular basis by the owner and emptied when needed to prevent a build-up of solids and silts which could prevent the soakaway from working properly.

Regulations

It should also be noted that there a multitude of regulations involving soakaways and effluent disposal. Examples of sources that provide information on this include BS 6297:2007+A1:2008 and BRE Digest 365.

Additional Information

Relevant Insurance

Employees of regulators/public authorities seeking proof of this company's professional indemnity and public liability insurance may do so by contacting the author using the details below. Furthermore, any information/questions about this report can also be answered by the author using the details below.

Author

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BSc (Hons) Architectural Technology, Robert Gordon University

Attachments

Site Location Plan & Satellite Imagery

Indicative Test Location Plan

Indicative Drainage Layout

Trial Pit Logs FWS1 & SWS1

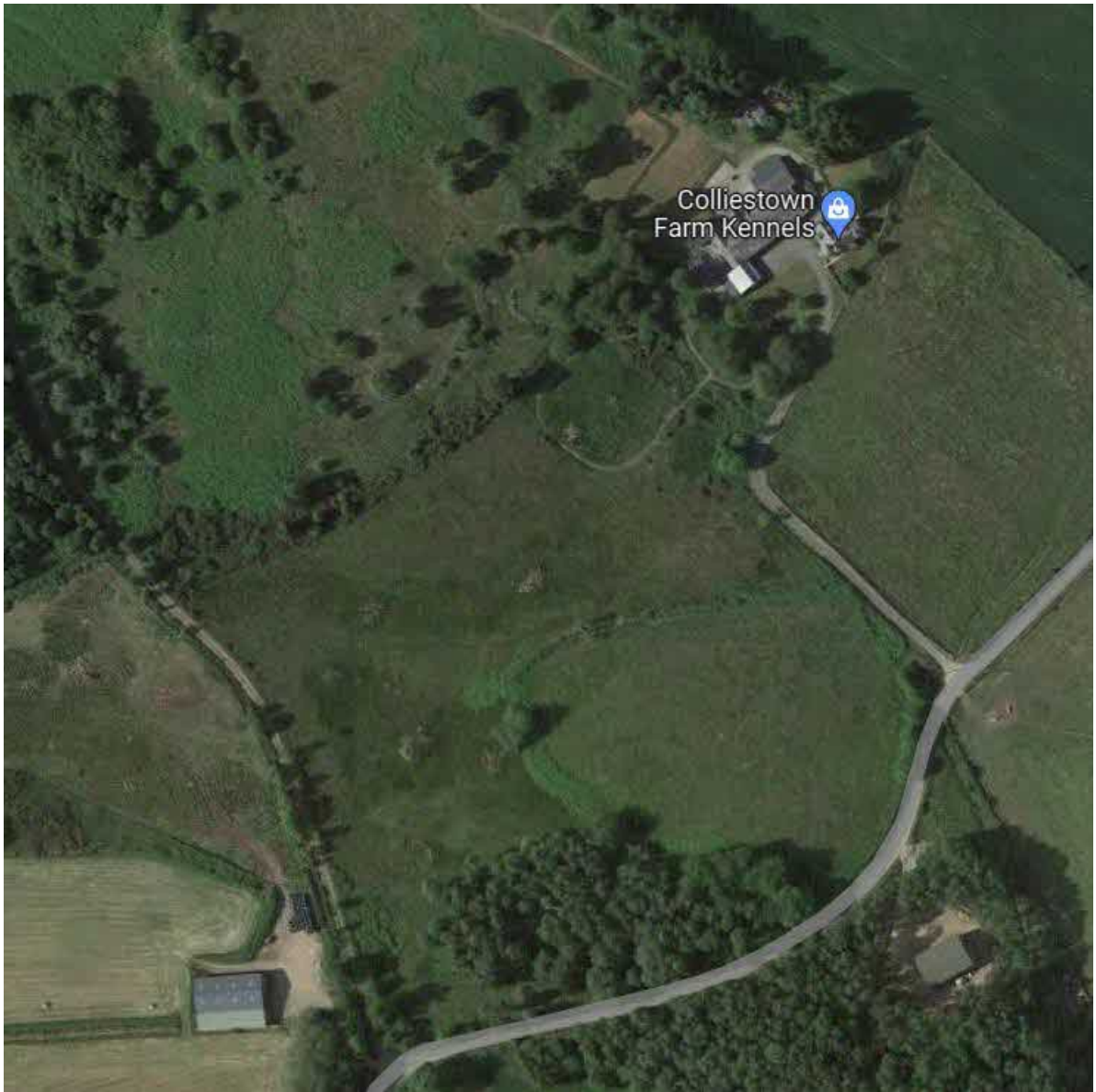
Indicative Sub-Surface Soakaway Construction

Attenuation Calculation

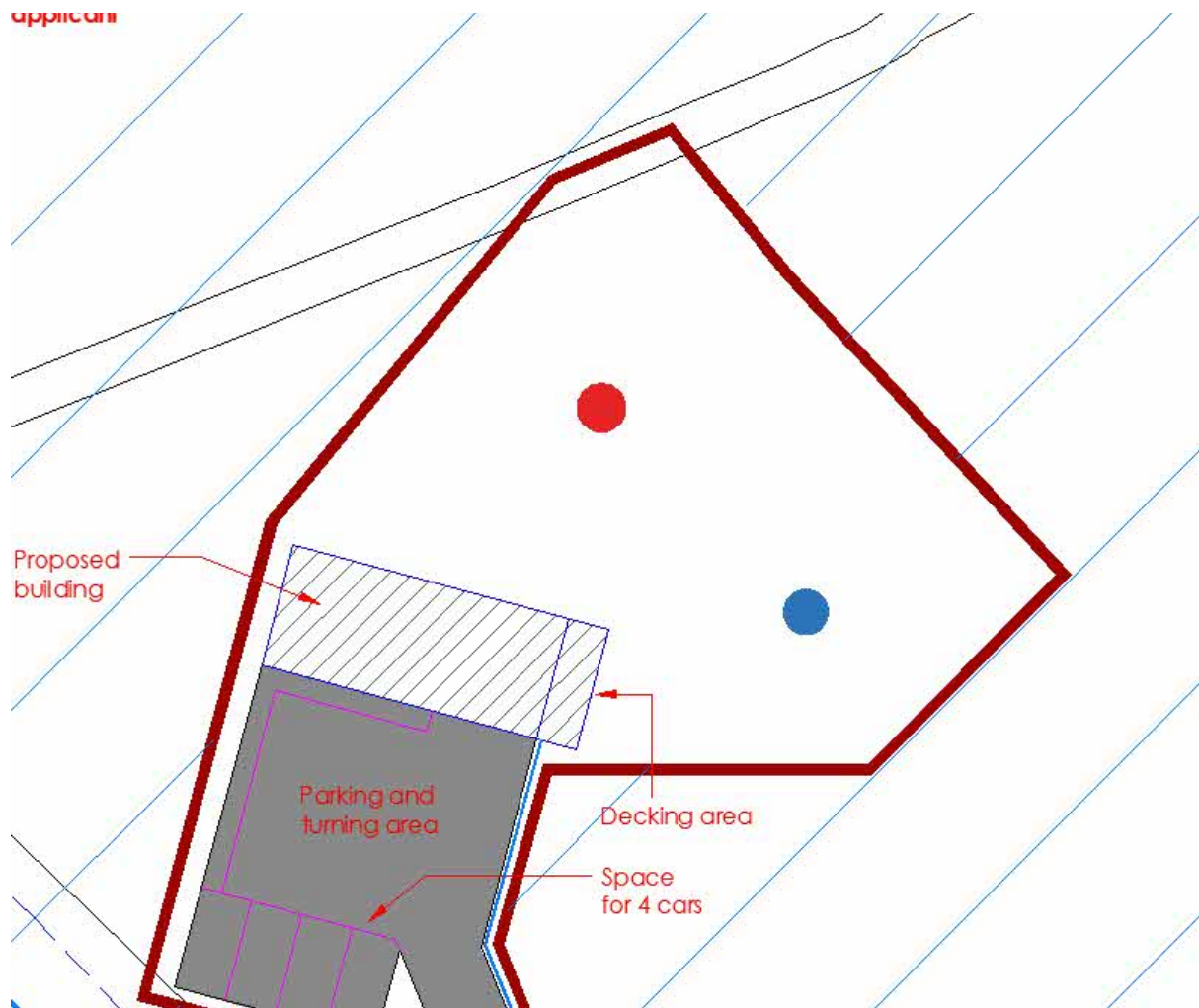
Certificate - Foul Water Soakaway

Certificate - Surface Water Soakaway

Site Location Plan & Satellite Imagery



Indicative Test Location Plan

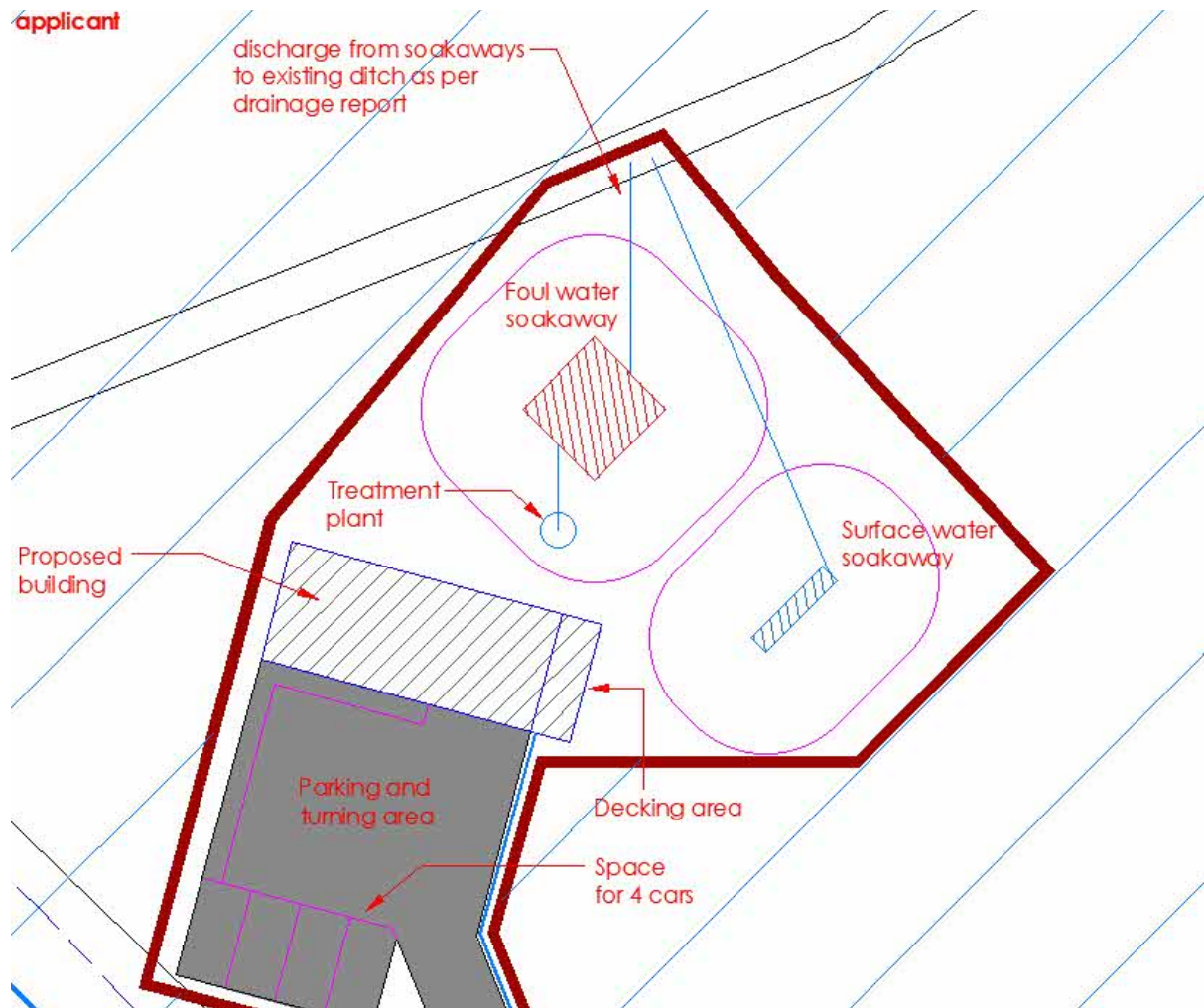


Key

Red Circle – Approximate Foul Water Soakaway Test Location(s) (Trial Pit 1)

Blue Circle – Approximate Surface Water Soakaway Test Location(s) (Trial Pit 2)

Indicative Drainage Layout



Key

Red Area – Proposed Foul Water Partial Soakaway Location.

Blue Area – Proposed Surface Water Partial Soakaway Location.

Please note this is an indicative location plan for the proposed soakaways and should not be used for scaling. Additionally, the minimum sizes specified in the drainage recommendation section of the report should be used.



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Site:
Colliestown
Farm,
Torphins,
AB31 4JN

Trial
Pit No.
Both
Trial
Pits

Excavation Method: Tracked Digger with a 300mm bucket attached.		Dimension: 0.3 x 1.2 m	Dates: 16/10/2023			
		Location: As seen on plan.			Practice: Gerry Robb Architectural Design	Page: 1/1
Depth (m)	Sample/ Tests	Water Depth (m)	Field Records	Thickness (m)	Description	Water
			Testing done. The water table was encountered at 1.2m.	0.3	Top Soil	
				At least 0.9	Clayey Soils	
				Unknown	Water Table	
Comments				Author JF	Scale: Not to Scale.	Date: 16/10/ 2023

Photo of Trial Pit 1 (Trial Pit 2 is Identical)



ATTENUATION DESIGN for M-30

Allowable discharge= **0.5 litres/sec**

Area = **95 sq.m.**

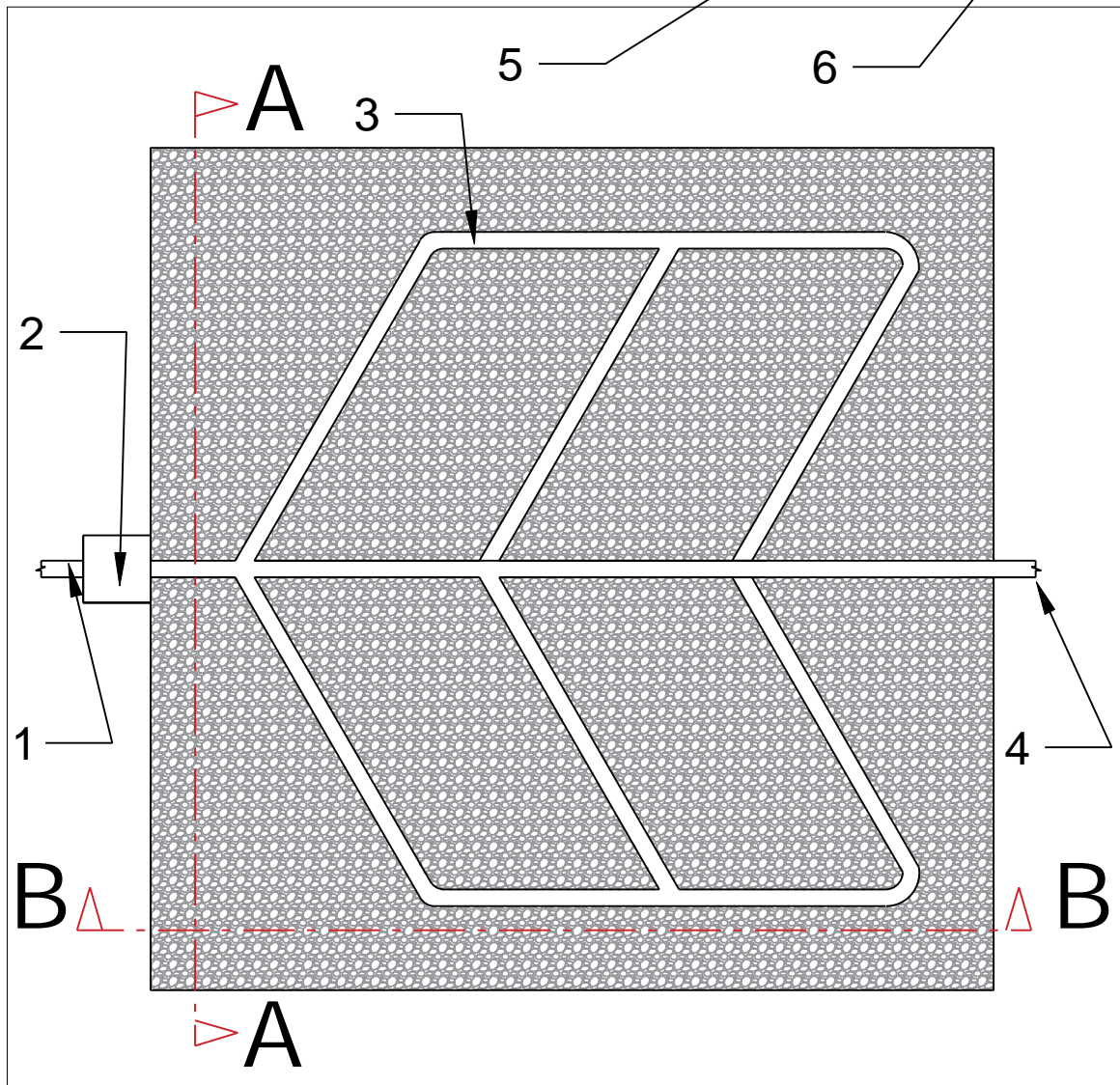
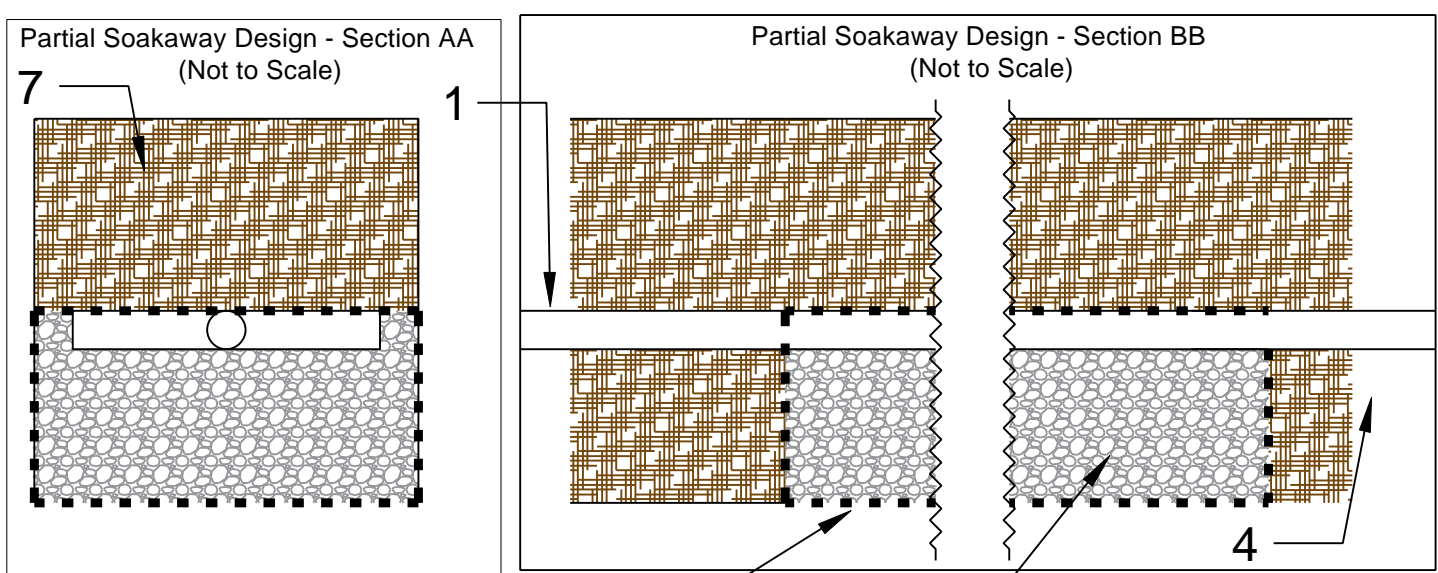
Rainfall Data
 r = 16
 d = 0.25

Duration (min)	M--- (mm)	Inflow (cu.m)	Outflow (cu.m)	Storage (cu.m)
5	6.77	0.64	0.15	0.49
10	10.43	0.99	0.30	0.69
15	13.03	1.24	0.45	0.79
30	18.22	1.73	0.90	0.83
60	24.22	2.30	1.80	0.50
120	31.36	2.98	3.60	-0.62
240	40.03	3.80	7.20	-3.40
360	45.99	4.37	10.80	-6.43
720	58.08	5.52	21.60	-16.08
1440	73.19	6.95	43.20	-36.25
2880	92.01	8.74	86.40	-77.66

Therefore storage required for a M30 return period = **0.83 cu.m.**
 Plus Climate Change Allowance (37%), therefore storage required = **1.14 cu.m.**

CAPACITY CHECK

Partial Soakaway/Attenuated Storage = 1.00m Wide, 0.5m Storage Depth, 5.00m long
 Therefore total storage provided = **2.50 cu.m.**



- 1 - Inflow From PSTP
- 2 - Inspection Chamber
- 3 - Fully Perforated Twin Walled PVC 100mm Pipe
- 4 - Outfall to Discharge
- 5 - Geotextile Membrane
- 6 - Clean Stone Gravel (Distribution Layer)
- 7 - Soil Backfill

Partial Soakaway Design - Plan View



Drawing	Partial Soakaway Design
Scale	Not to Scale
For specific sizes, refer to Soakaway Certificates at the end of this report.	

CERTIFICATE FOR PROPOSED FOUL WATER SUBSURFACE SOAKAWAY

Two tests are normally required to demonstrate the suitability of the proposed drainage scheme:

1. A trial pit must be excavated to a depth of 1 metre below the proposed invert of the drain to establish whether or not the water table will interfere with the operation of the soakaway.
2. A percolation test must be carried out to determine the area of the ground required.

Certificate

Address: c/o Gerry Robb, Architectural Practice
Site address: Colliestown Farm, Torphins, AB31 4JN

.....
Date of test: 30/10/2023 Time: From 10:00AM Weather: Cold, Dry & Sunny

Encountered Ground Conditions

300mm Layer of Topsoil
At least 900mm Layer of Clayey Soils

Ground Water Observations

The water table was discovered at 1.2m depth below ground level.

Wells: No wells for the supply of potable water within 50m of the proposed soakaway locations.

Depth of Drains: 0.5m

Depth of Excavations: 1.2m

Percolation Test

FWS 1

Time Taken (mean of three times)
Soil Percolation Value
Population Equivalent

17340 s
Vp 115.6 s/mm
6

Recommendation

Package Sewage Treatment Plant, discharged into partial soakaway with an outlet pipe to the ditch.
Partial Soakaway to measure 5m long x 5m wide x 0.5m deep. (min. 25m²)

I hereby certify that I have carried out the above tests in accordance with procedures specified in British Standard BS6297:2007+ A1 2008, and in conjunction with the full requirements set out within the Domestic Scottish Building Standards Technical Handbook (Environmental Standard 3.9 Infiltration Systems), the results of which are tabulated above, and that the proposed drainage scheme detailed on the attached plans and report has been designed taking into account the recommendations in the aforementioned standards.

Signed:



Date: 30/10/2023

Name/Company: Ferguson Geotechnical Ltd, Jack Ferguson

Address: Failte, Ythanbank, Ellon, AB41 7TH

Qualification: BSc (Hons) Architectural Technology, Drainage Consultant

CERTIFICATE FOR PROPOSED SURFACE WATER SOAKAWAY

Certificate

Address: c/o Gerry Robb, Architectural Practice
Site address: Colliestown Farm, Torphins, AB31 4JN

.....
Date of Test: 16/10/2023 Time: 10:00AM Weather: Cold, Dry & Sunny

Encountered Ground Conditions

300mm Layer of Topsoil
At least 900mm Layer of Clayey Soils

Ground Water Observations

The water table was discovered at 1.2m depth below ground level.

Wells: No wells for the supply of potable water within 50m of the proposed soakaway locations.

Depth of Drains: 0.5m

Depth of Excavations: 1.2m

Infiltration Test

Infiltration Test Zones
Average Soil Infiltration Rate
Surface Areas of Development

SWS1

0.5m
 $f = 2.88 \times 10^{-6} \text{ m/s}$
95m²

Recommendation: -

Partial Soakaway to provide layer of treatment and attenuation then discharged to the ditch.
Partial Soakaway to measure 1.0m wide x 0.5m deep x 5.00m long as per attenuation calculation.

I hereby certify that I have carried out the above tests and calculations in accordance with BRE Digest 365 and in conjunction with the full requirements set out within the Domestic Scottish Building Standards Technical Handbook. The results of which are tabulated above, and that the proposed drainage scheme detailed within this report has been designed considering the recommendations in the standards.

Signed:



Date: 30/10/2023

Name/Company: Ferguson Geotechnical Ltd, Jack Ferguson

Address: Failte, Ythanbank, Ellon, AB41 7TH

Qualification: BSc (Hons) Architectural Technology, Drainage Consultant