



Tamerlain & Co.

**Drainage Report:  
Proposed Dwelling: Newlands Farmhouse, Newlands Farm,  
Errogie. IV2 6UH**

Prepared for:

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## 1.0 Introduction

Tamerlain & Co. were commissioned to undertake an assessment of surface water and sewage and effluent disposal options for a proposed 3 bed dwelling to be constructed on a site located on Newlands Farm, Errogie. IV2 6UH. Grid Ref: NH 56581 22824. A location plan can be found in Appendix 1.

### 1.1 Introduction to Sewage Treatment

Sewage treatment in a domestic development is controlled by The Building (Scotland) Regulations 2004. Standard 3.7 reproduced below states that:

*Every wastewater drainage system serving a building must be designed and constructed in such a way as to ensure the removal of wastewater from the building without threatening the health and safety of the people in and around the building, and:*

- (a) That facilities for the separation and removal of oil, fat, grease and volatile substances from the system are provided;*
- (b) That discharge is to a public sewer or public wastewater treatment plant, where it is reasonably practicable to do so; and*
- (c) Where discharge is to a public sewer or public wastewater treatment plant is not reasonably practicable that discharge is to a private wastewater treatment plant or septic tank.*

*Limitation Standard 3.7(a) does not apply to a dwelling.*

Due to the rural location of the site, no Scottish Water public sewage disposal options are available. Therefore the preferred option is a septic tank for collection and traditional drainage field for dispersal of waste liquids.

### 1.2 introduction to Surface Water Treatment

Standard 3.6 of, The Building (Scotland) Regulations 2004 Technical Handbook specifies methods of discharging surface water that, if employed, would meet the requirements of the act. The wording is reproduced below.

*Every building and hard surface within the curtilage of a building, must be designed and constructed with a surface water drainage system that will:*

- (a) ensure the disposal of surface water without threatening the building and the health and safety of the people in and around the building; and*

*(b) have facilities for the separation and removal of silt, grit and pollutants.*

The Scottish Environmental Protection Agency (SEPA) outlines its approach to surface water in its General Binding Rule (GBR) 10, The Water Environment (Controlled Activities) (Scotland) Regulations 2011, state that the “provision of a Sustainable Urban Drainage System (SUDS) is required, unless the discharge arises from a single house or if the discharge is made to coastal waters.” GBR 10 and the Rules are reproduced below.

GBR10: Discharge of surface water run-off from a surface water drainage system to the water environment from:

- i. Up to 60 hectares of land used for residential premises;
- ii. Land used for non-residential premises or yards, except where the buildings or yards are in an industrial estate;
- iii. Land used as a motorised vehicle parking area with up to 1,000 parking spaces;
- iv. Metalled roads other than motorways and A roads;
- v. Waterbound roads; or

b) Discharge of water run-off from a construction site to the water environment where the site, including any constructed access tracks does not:

- i. Exceed 4 hectares;
- ii. Contain a road or track length in excess of 5 km; or
- iii. Including any area of more than 1 hectare or any length of more than 500 meters on ground with a slope in excess of 25°.

Rules: d) the discharge must not contain any water run-off from any built developments, the construction of which is completed on or after 01 April 2007, or from construction sites operated on or after 01 April 2007, unless:

- i. during construction those developments are drained by a SUD system or equivalent systems equipped to avoid pollution of the water environment;
- ii. following construction those developments are drained by a SUD system equipped to avoid pollution of the water environment; iii. the run-off is from a development that is a single dwelling and its curtilage; or
- iv. the discharge is to coastal water.

(Source; SEPA: The Water Environment (Controlled Activities) (Scotland) Regulations 2011 - A Practical Guide)

## 2.0 Site Profile and Ground Assessment

This section of the report will explore ground conditions at the site that will inform the appropriate solutions for surface water, sewage and effluent disposal. The Building (Scotland) Regulations 2004, Technical Handbook, clause 3.9.1 details the necessary ground assessment and then percolation tests that should be carried out to assess suitability of the site and inform the final system selection and design.

### 2.1 Topography and Local Drainage

The proposed site for the development is located on Newlands Farm, Errogie. IV2 6UH. Grid Ref: NH 566565 22823.

The site is accessed from an unclassified road. The unclassified road is the first turning on the left outside Errogie heading to Inverness. The site entrance is located approximately 175m up the unclassified road heading in a northerly direction.

The site has a gentle slope away from the proposed house location any drainage field or soak away would be behind the proposed house location, utilizing the gentle slope of the site.

The SEPA Flood Map shows the site at being at no specific risk of flooding from rivers, costal or surface water.

### 2.2 Geology and Groundwater

The British Geological Survey mapping indicates Till Diamicton deposits in the area. These deposits were encountered underlying the soil cover during the test hole investigation at the site.

A two meter deep trial hole was dug during the site investigations (see section 2.5 for further details) the trial hole was left covered for a period of 48 hours as detailed in The Building (Scotland) Regulations 2004, Technical Handbook, clause 3.9.1.

Ground water was encountered in the bottom of the trial hole this settled at a level of 365mm from the bottom of the trial hole, displaying the level of the water table.

Therefore the water table is in excess of 1m below the level of any proposed distribution pipes and as such allowed the testing to continue to percolation tests.

## 2.3 Location of Services

There are currently no services within the proposed site boundary. Services will be run to avoid planned treatment system locations.

## 2.4 Other Implications Plot size, Trees, Vegetation

The Building (Scotland) Regulations 2004, Technical Handbook states:

Clause 3.8.4:

any infiltration system and any treatment plant must also be located:

- a. at least 5m from a building, and
- b. at least 5m from a boundary.

Clause 3.8.6:

A private wastewater treatment plant and septic tank should be provided with an access for desludging. The desludging tanker should be provided with access to a working area that:

- will provide a clear route for the suction hose from the tanker to the tank, and
- is not more than 25 m from the tank where it is not more than 4 m higher than the invert level of the tank, and
- is sufficient to support a vehicle axle load of 14 tonnes

Clause 3.9.4:

- a. at least 50 m from any spring, well or borehole used as a drinking water supply,
- b. at least 10 m horizontally from any watercourse (including any inland or coastal waters), permeable drain, road or railway.

The proposed location on the site plan for the septic tank, drainage field and soak away, are located away from any trees or vegetation. Care should be taken to avoid any future over planting that may disrupt operation of the septic tank, drainage field or soak away.

## 2.5 Percolation Testing

Percolation testing was undertaken by Tamerlain and Co on the site on the 9<sup>th</sup> February 2024 the test procedure follows that outlined in The Building (Scotland) Regulations 2004, Technical Handbook, Standard 3.9: Private Wastewater Systems – Infiltration Systems, Clause 3.9.1 Assessing the Suitability of the Ground.

The weather was overcast but dry on the days of the tests with temperatures of approximately 5 degrees in the daytime. It is noted that the period leading up to the test had seen large storm events and heavy rainfall.

Following the guidance of Clause 3.9.1

A 2 meter deep test pit was dug centrally in the area of the site proposed for the septic tank and drainage field. This pit was then covered and left for 48 hours. Ground water was encountered in the bottom of the trial hole after the 48 hour period had elapsed, this settled at a level of 365mm from the bottom of the trial hole, displaying the level of the water table.

Therefore the water table is in excess of 1m below the level of any proposed distribution pipes and as such allowed the testing to continue to percolation tests.

A further three test holes were dug and tested in line with the guidance of, Clause 3.9.1. The results of these tests can be seen below.

### Test Hole 1

Test 1:	118:32	Minutes : Seconds
Test 2:	121:15	Minutes : Seconds
Test 3:	129:45	Minutes : Seconds
Total:	369:32	Minutes : Seconds

### Test Hole 2

Test 1:	96:28	Minutes : Seconds
Test 2:	102:36	Minutes : Seconds
Test 3:	105:15	Minutes : Seconds
Total:	322:19	Minutes : Seconds



Test Hole 3

Test 1:	92:21	Minutes : Seconds
Test 2:	98:29	Minutes : Seconds
Test 3:	107:55	Minutes : Seconds
Total:	298:45	Minutes : Seconds

Averages for Test Holes

Test Hole: 1	123:10	Minutes : Seconds
Test Hole: 2	107:35	Minutes : Seconds
Test Hole: 3	99:15	Minutes : Seconds

Averages Test Holes Seconds

Test Hole: 1	7390	Seconds
Test Hole: 2	6420	Seconds
Test Hole: 3	5941	Seconds
Total:	19720	Seconds

Average of all Test Holes: 6573s

Percolation Calculation Vp  $6573s \div 150 = 43.82Vp$

## 3.0 Sewage Treatment

The Building (Scotland) Regulations 2004, Technical Handbook, Standards: 3.8 Private wastewater treatment systems – treatment plants, 3.9 Private wastewater treatment systems – infiltration systems outline the requirements for sewage treatment in a single dwelling. Below options and recommendations for treatment in this instance are explored.

### 3.1 Recommendations Sewage and Effluent

The results for Vp of 43.82 secs/mm from the percolation testing fall within the normal percolation rate as stated in Clause 3.9.2 “more than 15 secs/mm, but no more than 100 secs/mm”. It is therefore recommended that the proposed site can support a traditional septic tank and drainage field. The minimum requirements are outlined below.

### 3.2 Minimum System Requirements – Septic Tank

The septic tank size has been calculated as laid out in the code of practice Flows and Loads.

For a single dwelling up to 3 bedrooms a population of 5P.

$$5 \times 150L = 750L$$

$$750L + 2000L = 2750L \text{ minimum tank size}$$

### 3.3 Minimum System Requirements – Drainage Field

Floor area of trench calculation  $A = P \times V_p \times 0.25$

$$5 \times 43.82 \times 0.25 = 54.77\text{m}^2 \text{ (A)}$$

Total floor area of sub surface drainage trench (A) = 55 m<sup>2</sup>

Drainage field linear length (m) calculation

600mm trench length per m<sup>2</sup> = 1.66m

$$55 \times 1.66\text{m} = 91.3\text{m}$$

**Drainage field linear length                      91.3m**

See Site Plan Appendix 1 for layout of drainage field.

## 4.0 Surface Water

To comply with Standard 3.6 of the Building (Scotland) Regulations 2004, Clause 3.6.3 of the Technical Handbook specifies methods of discharging surface water that, if employed, would meet the requirements of the act:

- (a) a SUD system designed and constructed in accordance with clause 3.6.4;
- (b) a soakaway constructed in accordance with: clause 3.6.5; the guidance in BRE Digest 365, 'Soak away Design', or National Annex NG 2 of BS EN 752-4: 1998;
- (c) A public sewer provided under the Sewerage (Scotland) Act 1968;
- (d) An outfall to a watercourse, such as a river, stream or loch or coastal waters, that complies with any notice and/or consent by SEPA, or
- (e) If the surface water is from a dwelling, to a storage container with an overflow discharging to either of the 4 options above.

The area to be drained consists of the roof of the dwelling and associated hard standings.

## 4.1 Investigation, Results and Recommendations

The results for Vp of 43.82 secs/mm from the percolation testing fall within the normal percolation rate as stated in Clause 3.9.2 "more than 15 secs/mm, but no more than 100 secs/mm. It is therefore recommended that the proposed site can support a traditional soakaway for surface and roof water to comply with Building Regulations Clause 3.6.3.

RWG down pipes on the proposed building should utilize a trap arrangement to comply with: Standard 3.6 (a)

Hard standing and parking area to fall towards the west side with a French drain running along this edge to collect surface water with sump at the lower end to collect sediment. The sump will then feed into the underground pipes to the soakaway. To comply with Building Regulations Clause 3.6.3.

## 4.2 Soakaway Size Calculation

The results for  $V_p$  of 43.82 secs/mm from the percolation testing fall within the normal percolation rate as stated in Clause 3.9.2 “more than 15 secs/mm, but no more than 100 secs/mm. a Traditional soakaway can be utilized. The minimum requirements are outlined below.

Vollume of Soakaway =  $A \times (\text{rainfall rate} / 3000)$

Roof Area	205 m <sup>2</sup>
Parking Area	180 m <sup>2</sup>

Total Area	386 m <sup>2</sup>
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$386\text{m}^2 \times (50/300) = \text{Vol}$

$386\text{m}^2 \times 0.0167 = 6.44 \text{ m}^2$  (minimum)

Recommended soakaway size to aid construction and allow for extreme weather

Soakaway area 8 m<sup>2</sup>

See Site Plan Appendix 1 for proposed location of soak away.

## 5.0 References

Building (Scotland) Regulations 2004

The Scottish Building Standards: Technical Handbook 2024: Domestic

British Standard BS6297:2007 Code of Good Practice for the Design and Installation of Drainage Fields for use in Wastewater Treatment

British Water Code of Practice: Flows and Loads 4 - Sizing Criteria, Treatment Capacity for Wastewater Treatment Systems, 2013

The Water Environment (Controlled Activities) (Scotland) Regulations 2011

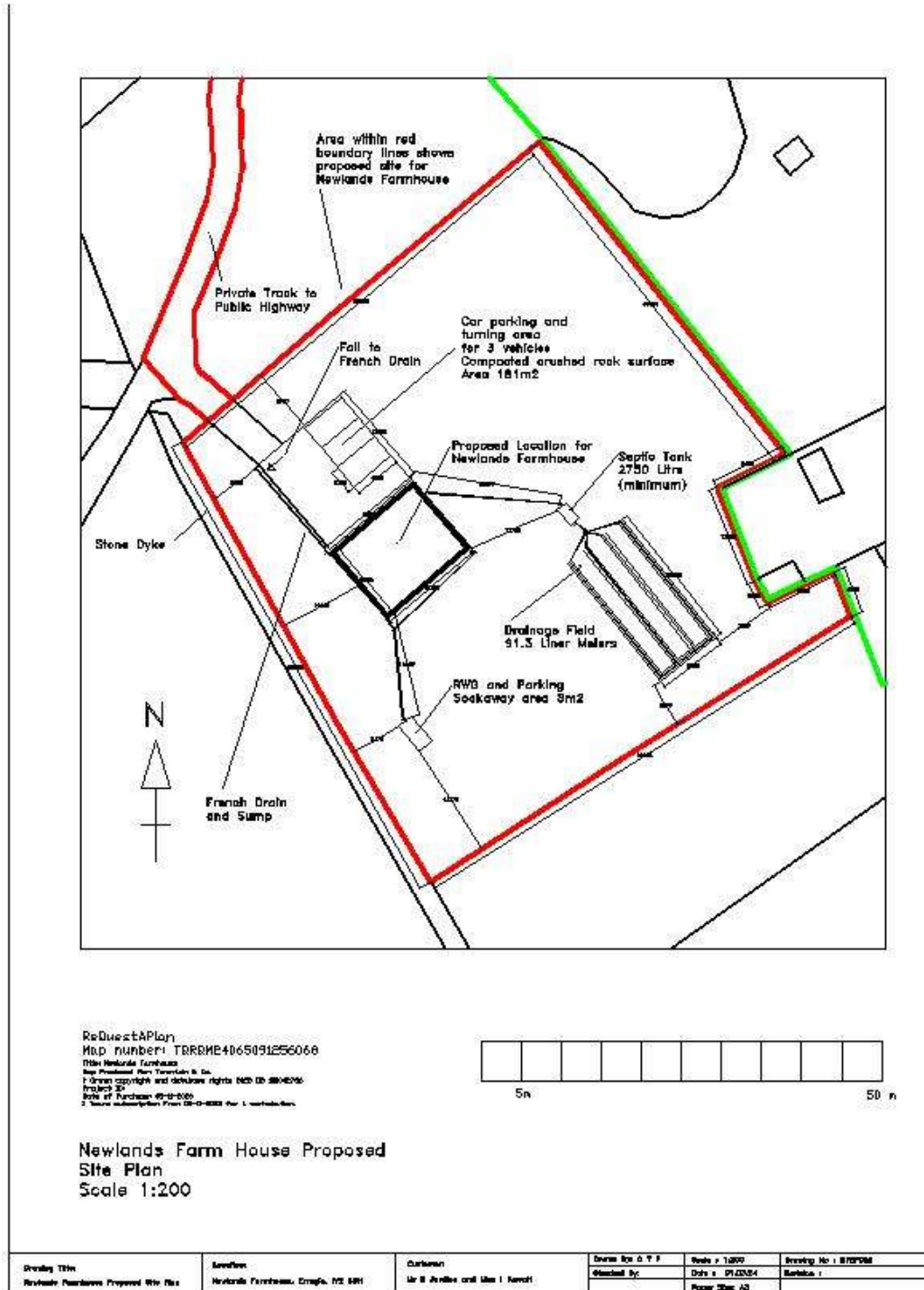
SEPA: The Water Environment (Controlled Activities) (Scotland) Regulations 2011 - A Practical Guide) Version 9.3, June 2023.

SEPA: Regulatory Method WAT-RM-03: Regulation of Sewage Discharges to Surface Water.

SEPA: Regulatory Method WAT-RM-04 Regulation of Indirect Sewage Discharges to Groundwater.

Environment Act 1995.

# Appendix 1: Site Plan



## Appendix 2: Photographs



Photo 1 Showing Test Pit



Photo 2 Showing digging of Test Pit





Photo 2 Showing Percolation Testing



Photo 3 Showing Percolation Testing