



Springfield Properties Plc

# Drainage Statement

**Plot 301**  
**Drakies Phase 3**  
**Inverness**

August 2023 (original Issue)

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## 1.0 Site Description

The site is located on Culcabock Avenue, Inverness on Ordnance Survey Grid Reference NH 68166 44356. The proposal involves building a single detached 4-bedroomed house and associated infrastructure on a plot of ground approximately 0.23 acres. Drakies House is located adjacent and to the north of the plot with Phase 1 of the Springfield Properties PLC development to the adjacent east. The plot is relatively flat with existing mature trees and bushes.

## 2.0 Existing Drainage

Scottish Water records confirmed that there is an existing foul Water sewer located on the nearside of the site on Culcabock Avenue as show below.



## 3.0 Drainage Strategy

### Foul

We propose to connect the foul water drainage via a disconnecting manhole into the existing Scottish Water foul sewer.

### Surface Water

As per the strategy of the previous phases of Springfield Properties PLC developments we propose to connect the surface water run-off into a soakaway manhole located in the rear garden. Details of the soil conditions are in Section 4.

#### 4.0 Soil Conditions

A site investigation was carried out July 2022 by Johnson Poole and Bloomer Consultants to assess the current ground conditions and conduct percolation tests. Ground conditions in the vicinity of the site comprised 700-800mm of topsoil overlying very gravelly sand at least up to 3m in depth.

#### 5.0 Percolation Testing

Percolation rates in the underlying soils were undertaken in the spirit of BRE Digest 365 which recommends calculation of the infiltration rate from the time taken for the water volume to fall from 75% to 25% of the effective storage of the pit. Test HP10 confirmed an infiltration rate of  $3.119 \times 10^{-5}$  to  $3.743 \times 10^{-5}$  (**Appendix A**). The onsite investigations confirmed that the underlying soils are suitable for a soakaway as a surface water drainage solution.

#### 6.0 Soakaway Sizing

Impermeable Area = 140m<sup>2</sup> (0.014ha)

Infiltration Rate =  $3.119 \times 10^{-5}$  m/s (1.04 m/hr)

Using Flow Drainage Design Software and basing it on a 1:200-year event with a 42% allowance for climate change (as per the SEPA Climate change allowances for flood risk assessment) we concluded that 1-6m<sup>3</sup> of estimated storage is required for the plot as below.

Storage Estimate	
Return Period (years)	200
Climate Change (%)	42
Impermeable Area (ha)	0.014
Peak Discharge (l/s)	0.500
Infiltration Coefficient (m/hr) (leave blank if no infiltration)	1.04000
Required Storage (m <sup>3</sup> )	Calc
from	7
to	10
With infiltration (m <sup>3</sup> )	
from	1
to	6

Buttons: OK, Cancel, Update, Calc

We propose to use a soakaway manhole 2100mm in diameter 1.75m deep (below invert) to provide 6m<sup>3</sup> of storage within a soakaway manhole.

The Drainage & Levels Layout can also be found in **Appendix B**.

# APPENDIX A

## Soakaway Results



## 8.5 Percolation Testing

JPB was required to assess percolation rates in the underlying soils at fifteen locations in the general spirit of BRE Digest 365. Trial pits SA01 and SA02 and hand pits HP02 to HP14 were located at positions to test the suitability of the soils for soakaway trenches. Percolation testing was undertaken in the pits (Appendix 11).

Assessment of the percolation rates in the underlying soils at two locations at the site was undertaken in the general spirit of BRE Digest 365 which recommends calculation of infiltration rate from the time taken for the water volume to fall from 75% to 25% of the effective storage depth of the pit. Trial pits and hand pits were located at positions to test the suitability of the soils for soakaway trenches. Percolation testing was undertaken in Trial pits SA01 and SA02 and hand pits HP02 to HP14.

It should be noted that in the majority of the trial pits full infiltration did not occur and only one infiltration cycle was completed in many cases. Therefore, as a result, the following values should be utilised with caution.

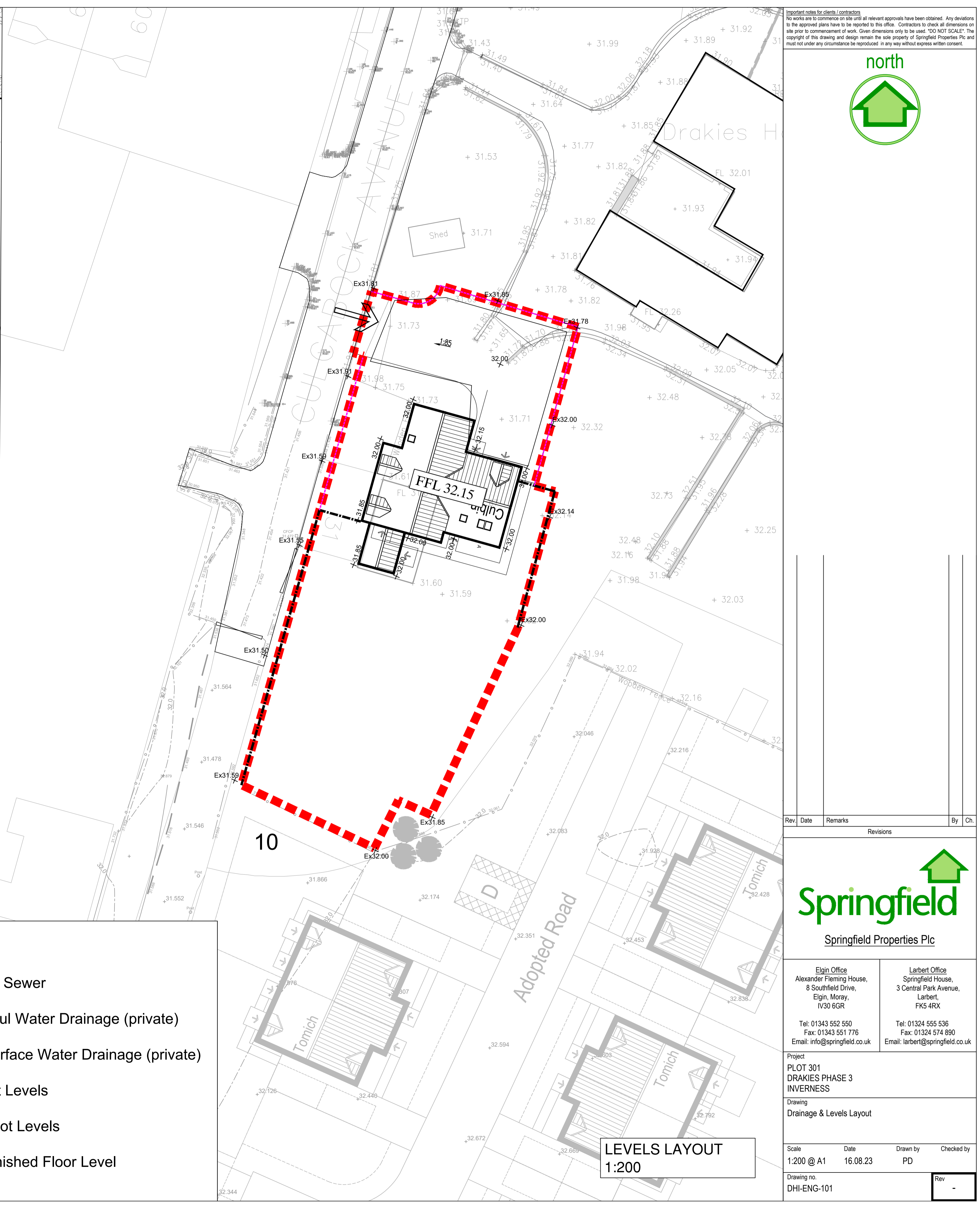
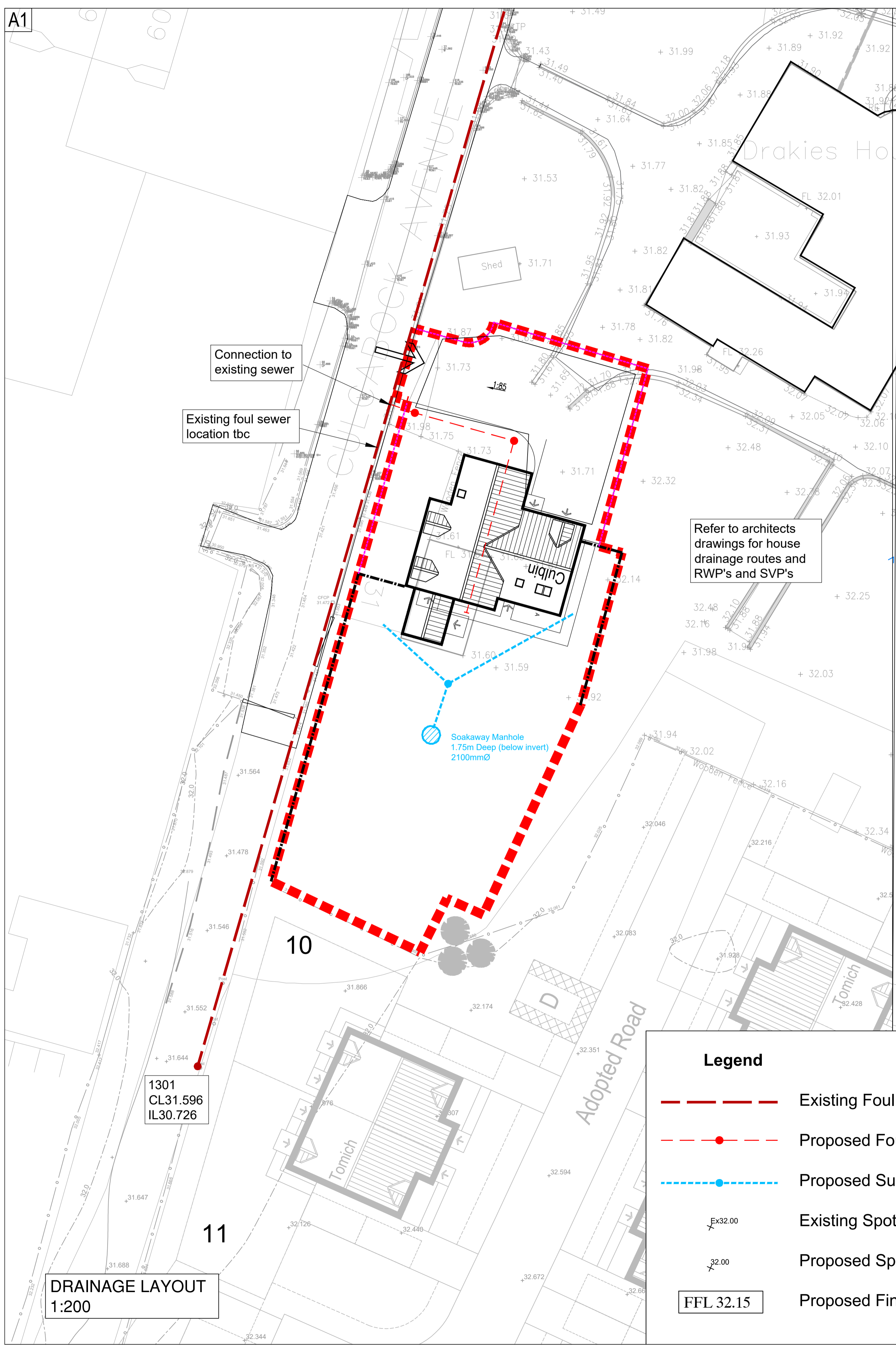
Trial Pit	Recorded Range(s) of Infiltration Rates (m/s)	Additional Remarks
SA01	$2.88 \times 10^{-5}$ to $1.32 \times 10^{-4}$	-
SA02	$2.65 \times 10^{-5}$ to $4.31 \times 10^{-5}$	-

Hand Pit	Recorded Range(s) of Infiltration Rates (m/s)	Additional Remarks
HP02	$4.539 \times 10^{-5}$ to $6.008 \times 10^{-5}$	-
HP03	$3.103 \times 10^{-5}$ to $4.441 \times 10^{-5}$	-
HP04	$5.642 \times 10^{-5}$ to $6.571 \times 10^{-5}$	-
HP05	$5.000 \times 10^{-5}$ to $6.667 \times 10^{-5}$	-
HP06	$5.107 \times 10^{-5}$ to $5.882 \times 10^{-5}$	-
HP07	$3.550 \times 10^{-5}$ to $1.1438 \times 10^{-4}$	-
HP08	$3.321 \times 10^{-5}$ to $4.118 \times 10^{-5}$	-
HP09	$1.481 \times 10^{-5}$ to $2.214 \times 10^{-5}$	-
HP10	$3.119 \times 10^{-5}$ to $3.743 \times 10^{-5}$	-
HP11	$1.702 \times 10^{-5}$ to $3.762 \times 10^{-5}$	-
HP12	$2.900 \times 10^{-5}$ to $6.348 \times 10^{-5}$	-
HP13	$3.073 \times 10^{-5}$ to $5.820 \times 10^{-5}$	-
HP14	$4.189 \times 10^{-5}$ to $5.469 \times 10^{-5}$	-

# APPENDIX B

## Drainage & Levels Layout

Important notes for clients / contractors  
 No works are to commence on site until all relevant approvals have been obtained. Any deviations to the approved plans have to be reported to the office. Contractors to check all dimensions on site prior to commencement of work. Given dimensions only to be used. "DO NOT SCALE". The copyright of this drawing and design remain the sole property of Springfield Properties Plc and must not be reproduced in any way without express written consent.



Legend	
	Existing Foul Sewer
	Proposed Foul Water Drainage (private)
	Proposed Surface Water Drainage (private)
	Existing Spot Levels
	Proposed Spot Levels
	Proposed Finished Floor Level

Rev	Date	Remarks	By	Ch.
Revisions				



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Project  
 PLOT 301  
 DRAKIES PHASE 3  
 INVERNESS

Drawing  
 Drainage & Levels Layout

Scale	Date	Drawn by	Checked by
1:200 @ A1	16.08.23	PD	

Drawing no.	Rev
DHI-ENG-101	-