

Drainage Optioneering and Design Report

Plot 1 Fleatham Farm, CA27 0BY

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1 Introduction

This report sets out the proposed SW drainage design for the development at "Plot 1, Fleatham Farm" taking into account an assessment of each drainage option in order of hierarchy. It will provide conclusions as to the most suitable and sustainable way forward taking into account the constraints of the site and provide a proposed layout for the scheme.

The SW drainage requirements for the scheme need to allow for approximately 191m² of impermeable surface area from the proposed development. However, if the scheme requires use of the existing SW drain (running across the site to the North of the development), it must be noted that this is already assumed to take SW run off from all of the impermeable surfaces within the adjacent property (an additional surface area of approximately 125m²), "Arenisca, Fleatham Farm"

The existing site, which was on an incline of approximately 1 in 10 from East to West, has been flattened to approximately 1.5m above the lowest point and approximately 1.4m below the adjacent property to provide a flat finished ground level across the majority of the site.

Trial pits and the site clearance to date have indicated a clay loam type soil extending at least 1.4m beneath the proposed finished ground level (this depth is suspected to be substantially greater in some areas).

2 SuDS Selection

2.1 Infiltration (Soakaways)

A suitable location for a Percolation Test cannot be identified within the boundary of the site (i.e. more than 5m away from any foundation) without encroaching on the boundary or potentially undermining adjacent structures. In place of a trial a desk top study using generic infiltration rates for the identified soil type has been undertaken and assessed in line with BRE Digest 365. The calculations associated with this study are located in Appendix A of this document. For the purposes of this study a value for 'f' (soil infiltration rate) of 2.7 x10⁻⁵ m/s has been assumed (in reality it is likely to be much lower than this)

It should be noted that taking into account the varying levels across the site and the proximity requirements for Soakaways to building foundations (minimum 5m) that there are also no suitable areas for locating a Soakaway on this site. For the purposes of this study a maximum plan size of a soakaway of 1m x 1m has been assumed. This means that the only variable when calculating the required volume of the Soakaway is the effective depth (below invert level).

The calculations for this are provided in Appendix B. These show that the required volume of Soakaway (S) to meet the required run off volume for this surface area (O) would be around 8.3m³ (including an increase of 30% to take account of climate change – as suggested by BIRA Digest 365). Given the plan constraints above, this would require a Soakaway effective depth of approximately 8.3m

2.2 Discharge to a Surface Water Body

There are no surface water bodies local enough to the site to develop a realistic and suitable scheme and therefore this option is discounted.

2.3 Discharge to a Surface Water Drainage System

Discussion with United Utilities has confirmed that the drainage system (surface water sewer) in High House Road (most local system to the site) is a combined surface water and foul system and therefore this option is discounted.

2.4 Discharge in to a Combined Sewer (via an existing SW drain)

As noted the existing surface water drain already takes run off from the impermeable surface area of the adjacent property (Arenisca, Fleatham Farm). This means that the total potential impermeable surface area draining through the existing SW drain following completion of the new development at Plot 1, Fleatham Farm would be circa 315.8m². Appendix A shows calculations that indicate this existing SW drain would be suitable for this total volume of run off.

This assumes a maximum gradient of 1 in 40 within the newly proposed scheme. Note that investigation of inspection chamber invert levels and associated ground levels indicates that drainage gradients within the adjacent property boundary are likely to be similar or less. The only exception is a backdrop at the boundary between the adjacent property to the newly proposed development of around 1.4m (to allow for the change in level between the two finished ground levels).

3 Conclusion and Recommendations

Utilising infiltration for all run off from impermeable surfaces within this proposed development and associated surface water drainage scheme is impractical due to the limited space and soil type.

Therefore, it is proposed that the only viable means of drainage for the run off associated with this scheme is to utilise the existing surface water drain to the north of the development which runs into the combined sewer on High House Road.

Furthermore, and to address the requested restriction of discharge rate for the scheme into the proposed sewer, it should be highlighted that due to the size of this stand alone scheme, the associated maximum flow rate will only go above 4litres/second during 10-15min 1 in 100 year storm (as well as potentially a variety of 1 in 500 or 1 in 1000 year storms that have not been assessed as part of this report). Given the probability, lack of alternative options and the limited overall impact it would create, it is proposed that there should be no restriction of discharge implemented for this scheme.