MOMENTUM
structural engineers

File note

Project	Date	By	Reference
Meadows Hall	12 June 23	RH	4821_FNT

Title

planning application 22/3112/FUL - Meadows Hall, Church Road, Richmond TW10 6LN - Surface Water

Introduction

This file note has been prepared to respond to further comments on the below ground drainage raised via the planning case officer for proposed residential redevelopment at Meadows Hall in Richmond.

Comments received

Drainage hierarchy:

"PASS – The applicant has provided a pre-planning enquiry made to Thames Water which had confirmed that there is sufficient capacity within the receiving sewer network.

MORE INFORMATION REQUIRED – The applicant has stated that water butts, permeable paving, green roofs, raised beds and tree pits will be included within the development. Sufficient justification for not including soakaways has been provided. The applicant should confirm how much attenuation storage has been provided within the permeable paving, green roofs, raised beds and tree pits and why this can't be more."

Runoff rate:

"MORE INFORMATION REQUIRED – the existing (brownfield) runoff rate needs to be calculated and supplied using the full site area (1000m2). This is to sufficiently demonstrate the betterment in runoff rates for the full site.

MORE INFORMATION REQUIRED – The applicant has stated additional smaller SuDS features will be included within the site. It should be justified why additional attenuation cannot be provided by the use of these features."

Attenuation volume:

"MORE INFORMATION REQUIRED – calculations which support the values given for the volume of attenuation required to achieve the proposed runoff rates need to be provided using the whole site area as the modelled area rather than the 430m^2 that has been used. This is to demonstrate the storage capacity required for the full site for the instance where soft landscaping were to be fully saturated during a worst-case storm event. Also for the other hardstanding areas or demonstrate how the runoff for these will be managed."

Responses

Drainage hierarchy:

The permeable paving, green roofs, raised beds and tree pits are not used as part of the attenuation volume.

Adequate infiltration storage will be included within the scheme to allow all surface water not falling on the main roofs to the development to infiltrate to the ground below. Infiltration testing has been carried out and it can be seen that even with an average of 150mm of Type 3 hardcore with 25% voids below these areas, there is sufficient local storage.

These volumes can not be used as part of the main attenuation as this will potentially increase the area then connected to the sewer.

Runoff rate:

As noted above it is not intended to drain the whole site to the sewer and therefore there is no need to demonstrate betterment for the whole site.

The smaller SuDS features are not part of the attenuation for the site. Instead these features provide infiltration storage allowing surface water not falling on roofs to infiltrate the underlying ground.

Attenuation volume:

As noted above, the calculations already submitted show the required volume to attenuate flows from the 430m^2 of impermeable roof area.

We attach further calculations to justify that the remaining 570m^2 of the site can infiltrate directly to ground in combination with local infiltration storage equivalent to 150mm Type 3 with 25% voids. This calculation uses the infiltration rates for the site given in the original report.

Project

Meadows Hall

MOMENTUM structural engineers

Title	Date	By	Reference
Rectangular Soakaway (CIRIA)	**06/06/2023**	**0**	**4821 0**

Design Parameters

Return Period (Yrs)	30
r =	0.4
M5_60 (mm)	20
P Climate (%)	40
f (m/s)	0.00003700
Impermeable Area (m^2)	570

Soakway Dimensions

Pit depth below invert (mm)	150
Pit width (mm)	23780
Pit length (mm)	23870
Free volume (%)	25
Ab (mm^2)	567628600
P (mm)	95300

Soakaway Design

Duration min	Growth Factor Z1	M5 Rainfall mm	Growth Factor Z2	Return Period Rainfall mm	Rainfall Intensity mm/hr	a mm	b hr^{-1}	Min. depth required mm
5	0.37	10.45	1.49	15.61	187.36	-2456.87	0.089	18.25
10	0.52	14.65	1.53	22.38	134.27	-73.10	0.089	1.08
15	0.63	17.73	1.54	27.23	108.92	1065.56	0.089	-23.56
30	0.80	22.49	1.54	34.53	69.06	2855.43	0.089	-124.90
60	1.00	28.00	1.52	42.50	42.50	4047.66	0.089	-346.35
120	1.21	33.79	1.49	50.38	25.19	4825.16	0.089	-790.43
240	1.45	40.51	1.46	59.06	14.76	5293.26	0.089	-1592.18
360	1.60	44.89	1.44	64.67	10.78	5472.28	0.089	-2272.83
600	1.79	50.21	1.42	71.27	7.13	5636.19	0.089	-3332.11
1,440	2.24	62.72	1.38	86.83	3.62	5793.78	0.089	-5116.77

Depth required	0.018 m	
Depth applied	0.150 m	Adequate Depth

Time to Empty to 50% Capacity

t50	61.502 Seconds	
	01:02 Minutes:sec	Adequate Time to Drain

Currently set up for England and Wales Only