

Our ref: 30481/4024/AH/EE/DIA

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Attn: Ben Hatt

Dear Ben

RE: 38 & 40 EAST STREET/35 FITZALAN ROAD, LITTLEHAMPTON BN17 6AN – DRAINAGE IMPACT ASSESSMENT

We are writing to outline the proposed surface water drainage arrangements for the proposed development at the above site in Littlehampton.

It is proposed to demolish nos. 38 and 40 East Street, and no. 35 Fitzalan Road, and construct a block of retirement apartments as shown on the attached plan.

Existing Site Information

The site is 0.32ha in area and currently consists of 3 residential dwellings with associated driveways and gardens. The existing impermeable area is taken as 0.13ha. Information on the location of any on-site drainage arrangements and public sewers is not currently available.

The existing ground levels are shown on the attached plan and range from 6.85m AOD in the south-eastern corner to 4.95m AOD in the north-eastern corner. Manhole covers have been identified on the survey however further details on the services that they correspond to are not available.

The online British Geological Survey (BGS) information indicates that the site is underlain by River Terrace Deposits over the Lewes Nodular Chalk Formation. Boreholes in the area show that the local ground conditions consist of stiff clay and sand to a depth of 25 ft. (7.6m) below ground level and chalk below this strata.

NPPF and Building Regulations Hierarchy

The NPPF recognises that flood risk and other environmental damage can be managed by minimising changes in the volume and rate of surface water runoff from development sites, and recommends that priority is given to the use of Sustainable Drainage Systems (SuDs) in new development, this being complementary to the control of development in the floodplain.

The Building Regulations Requirement H3 stipulates that rainwater from roofs and paved areas is carried away from the surface to discharge to one of the following, listed in order of priority:

- a) an adequate soakaway or some other adequate infiltration system;



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- b) a watercourse, or where that is not practicable;
- c) a sewer.

The above hierarchy is considered below in relation to the site.

Infiltration Drainage

The Desk Study Appraisal (Jan '16) indicates the presence of river terrace deposits with low to very low permeability, which may make infiltration drainage unfeasible, subject to confirmation through a site investigation including infiltration testing and groundwater monitoring.

Discharge to Watercourse

If infiltration drainage is not found to be feasible at the site, the next preferred option in accordance with the Building Regulations hierarchy is to discharge to a watercourse. There are no watercourses in the immediate vicinity for discharge via this method.

Discharge to Sewer

It would therefore be proposed to discharge surface water to the public sewer network if infiltration drainage was not found to be feasible at the site.

Runoff Rate Assessment

The proposed impermeable area will consist of the roof area of the retirement apartment block, pathways and a car park/vehicle access, and is taken as 0.18ha.

The existing brownfield runoff rates have been calculated using the Modified Rational Method and the equivalent greenfield runoff rates for the whole site have been calculated using MicroDrainage (see attached and Table 1 below).

Table 1: Existing Brownfield and Equivalent Greenfield Runoff Rates

Return Period	Equivalent Greenfield Runoff Rate (0.32ha)	Brownfield Runoff Rate (0.13ha)
1 in 1 Year	0.5 l/s	18.4 l/s
1 in 2 Year/ $Q_{2\text{AEN}}$	0.6 l/s	23.4 l/s
1 in 30 Year	1.4 l/s	42.9 l/s
1 in 100 Year	1.9 l/s	56.5 l/s

The DEFRA 'Non-statutory technical standards' S3 states that:

"for developments which were previously developed, the peak runoff rate from the development to any drain, sewer or surface water body for the 1 in 1 year event and the 1 in 100 year rainfall event should be as close as is reasonably practicable to the greenfield runoff rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event."

The equivalent greenfield runoff rates for the site in Table 1 above are lower than the rate that is considered acceptable under current best practice whilst satisfactorily managing the risk of blockage (ref. EA/DEFRA 'Preliminary Rainfall Runoff Management for Developments Rev E' report).



The minimum runoff rate considered under best practice to be achievable whilst managing the risk of blockage of the flow control device to an acceptable level is 5.0 l/s. The runoff rate from the proposed development will be restricted to a minimum of 5.0 l/s but will not exceed the existing brownfield runoff rates as outlined above.

DEFRA Standards S5 and S6 state:

"S5. Where reasonably practicable, for developments which have been previously developed, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event must be constrained to a value as close as is reasonably practicable to the greenfield runoff volume for the same event, but should never exceed the runoff volume from the development site prior to redevelopment for that event.

S6. Where it is not reasonably practicable to constrain the volume of runoff to any drain, sewer or surface water body in accordance with....S5 above, the runoff volume must be discharged at a rate that does not adversely affect flood risk."

If infiltration drainage is found to be feasible at the site, the additional volume of runoff from the additional impermeable area will be infiltrated to the ground. If infiltration drainage is not found to be feasible, the additional runoff volume will be attenuated within appropriate SuDs attenuation features, designed to attenuate up to the 1 in 100 (1.0%) annual probability plus allowance for climate change rainfall event in accordance with DEFRA Standards S7 and S8.

The EA released the 'Flood risk assessment – climate change allowances' guidance in February 2016, which requires that a range of allowances are considered for peak rainfall intensity for surface water drainage design. The allowance for peak rainfall intensity for a development lifetime of 100 years is between +20% and +40%.

Based on a Quick Storage Estimate within the Source Control module of MicroDrainage, and as a conservative estimate, up to 105m³ of storage should be provided if infiltration is found to be not appropriate. This is based on a maximum restriction of the proposed runoff rate to 5.0 l/s for the 1 in 100 (1.0%) annual probability +40% allowance for climate change rainfall event. There is sufficient space within the development area to provide this storage. This will be confirmed during detailed design and could be a matter of condition.

The attached plan shows that the finished floor level of the proposed development will be set at 5.94m AOD which provides a minimum 200mm freeboard above the surrounding landscaped and amenity areas to mitigate against the residual risk of surface water flooding in rainfall events in exceedance of the design event (ref. DEFRA Standard S9).

In conclusion, the proposed surface water drainage arrangements will ensure that surface water flood risk is not increased at the site or elsewhere.

Yours sincerely

Amy Hensler
For and on behalf of
PETER BRETT ASSOCIATES LLP

Encls: Site Layout Plan by Planning Issues ref. 20065LH_RF02
Runoff Rate calculations

