

# FOUL SEWAGE AND SURFACE WATER DRAINAGE ASSESSMENT

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|--------------------------|-----------------------------------------------------------------------------------------------------|
| <b>Site</b>              | The White House Stables, The White House, Brantridge Lane,<br>Haywards Heath, West Sussex, RH17 6JP |
| <b>Proposal</b>          | Conversion of stables to a four-bedroom dwelling                                                    |
| <b>Foul system</b>       | GRAF One2Clean 7 PE packaged treatment plant                                                        |
| <b>Surface water</b>     | Onsite soakaway system                                                                              |
| <b>Project reference</b> | 1523                                                                                                |

## 1. Introduction

This Drainage Assessment supports the Full Planning Application for conversion of the existing building at White House, Bantridge Lane, Staplefield, RH17 6JP into a four-bedroom dwelling. The proposed accommodation includes four bathrooms, a kitchen, a utility/wet room, living and dining accommodation, a home office and associated domestic facilities.

The assessment sets out the foul sewage and surface water drainage strategy with reference to the Building Regulations 2010, Approved Document H, including Requirements H1, H2, H3 and H5; BS EN 12566 requirements for small wastewater treatment systems; and the Environment Agency requirements applicable to non-mains drainage.

The site is in a rural location where connection to a public foul sewer is understood not to be reasonably practicable. Foul sewage will therefore be treated by a GRAF One2Clean 7 Population Equivalent packaged wastewater treatment plant. Rainwater and clean surface water runoff will be managed separately using a new onsite soakaway system.

## 2. Proposed Development and Design Basis

The development comprises one domestic dwelling with four bedrooms and four bathrooms, together with a kitchen, utility/wet room and normal domestic living accommodation. The site and proposed layout are shown on drawings 1523-001 and 1523-004 A.

## 3. Foul Water Drainage Strategy

### 3.1 Drainage hierarchy

As a connection to a public or qualifying private sewer is understood not to be reasonably practicable, foul sewage from the dwelling will be conveyed by a separate gravity drainage system to the proposed private wastewater treatment arrangement.

### 3.2 Proposed One2Clean 7 PE treatment plant

The foul drainage system will discharge to a GRAF One2Clean 7 PE packaged wastewater treatment plant. The manufacturer identifies the 7 PE model as having a maximum daily flow of 1,050 litres, a maximum organic load of 0.42 kg BOD5 per day and a total tank volume of 4,800 litres. The system uses a fully biological sequencing batch reactor process and is stated to conform to EN 12566-3.

The manufacturer reports treatment performance of:

- Biochemical Oxygen Demand (BOD5): 7 mg/l
- Suspended Solids: 14 mg/l
- Ammonia: 0.5 mg/l
- Total nitrogen / nitrate figure stated by the manufacturer: 7.9 mg/l
- Phosphate: 1.6 mg/l

The manufacturer reports treatment performance of 7 mg/l BOD5, 14 mg/l suspended solids, 0.5 mg/l ammonia, 7.9 mg/l total nitrogen and 1.6 mg/l phosphate. Final suitability for the proposed occupancy and loading will be confirmed by the manufacturer before installation.

### **3.3 Foul drainage pipework**

The below-ground foul drainage will be kept simple, with changes of direction and gradient minimised. Drains carrying WC discharge will have an internal diameter of at least 100 mm and will be laid to suitable even gradients. Access will be provided at the head of runs, bends, changes of gradient or pipe size, and junctions where required for clearing blockages.

Pipe materials, joints, bedding, backfilling, protection and testing will accord with Approved Document H1 and the relevant British Standards. Foul and surface water connections will be checked to confirm correct separation.

### **3.4 Siting, treated effluent and maintenance**

The treatment plant will be positioned to avoid prejudice to health, nuisance, flooding and contamination of groundwater, water supplies or watercourses. It will be watertight, ventilated and accessible for routine servicing, desludging and emergency attendance. A safe route will be maintained for maintenance equipment and tanker access.

The treated-effluent outfall will be a suitably designed drainage field or other lawful infiltration arrangement, subject to trial-hole observations and percolation testing. It will be kept adequately separated from the rainwater soakaway system so that the overall infiltration capacity of the ground is not exceeded.

The plant will be commissioned, serviced and maintained in accordance with the manufacturer's instructions. A durable maintenance notice will be displayed within the dwelling in accordance with Requirement H2.

## **4. Rainwater and Surface Water Drainage Strategy**

### **4.1 Separate drainage system**

Rainwater and surface water will be managed through a dedicated system that is fully separate from the foul drainage and the One2Clean treatment plant, in accordance with Requirements H3 and H5. No roof water, paved-area runoff or land drainage will enter the foul drainage system.

### **4.2 Proposed soakaway system**

Rainwater from the roof and clean surface water runoff from hardstanding will discharge to a new onsite soakaway system. The soakaway will provide infiltration to ground in accordance with the surface water hierarchy in Approved Document H3.

The soakaway system will be sized using BRE Digest 365 or an equivalent current design method. Its capacity and location will be based on site-specific infiltration testing, seasonal groundwater conditions, the contributing impermeable area and the required design rainfall event.

The soakaway will be located at least 5 m from buildings and roads, clear of unstable ground, and with its base above the highest seasonal groundwater level. It will also be sufficiently separated from the treated-

effluent drainage field and any other infiltration feature so that the ground's overall soakage capacity is not exceeded.

#### 4.3 Roof and paved-area drainage

Roof water will be collected by appropriately sized gutters and rainwater downpipes and conveyed through a sealed surface water network to the soakaway. Gutters and outlets will be sized for the effective roof area and local design rainfall, with overflow routes directed clear of the dwelling.

Paved areas will be graded away from the dwelling. Permeable finishes will be used where appropriate, and any channels or gullies will incorporate suitable silt control and maintenance access before discharging to the soakaway system.

#### 4.4 Flood risk and surface water considerations

Published flood risk guidance for the wider Haywards Heath and Mid Sussex area identifies surface water runoff as an important local consideration, particularly where intense rainfall falls on roofs, roads and clay-rich or saturated ground. Regional geology is variable and includes sands, siltstones and clays, meaning that infiltration performance must be demonstrated by testing rather than assumed.

The Environment Agency long-term flood risk service provides property-area screening for flooding from rivers and the sea, surface water, reservoirs and groundwater, and it states that the area is at very low risk of flooding; moreover, the location is outside of a groundwater flood alert area and flooding from reservoirs is unlikely in this area.

The surface water drainage strategy will therefore take account of existing levels, overland flow routes, site access, seasonal groundwater and the relationship between the rainwater soakaway and the treated-effluent drainage field. Existing flow routes will be maintained where practicable, and runoff will not be intentionally directed towards the dwelling, adjoining land, the highway or neighbouring buildings.

Finished external levels will provide positive falls away from entrances. Where practicable, finished floor levels will be above surrounding external levels. Exceedance runoff arising during rainfall beyond the drainage system design event will be directed towards a safe landscaped route without increasing flood risk elsewhere.

### 5. Conclusion

The proposal will be served by a private foul drainage system based on a GRAF One2Clean 7 PE packaged wastewater treatment plant. The selected unit has a stated design capacity of seven persons and a maximum daily flow of 1,050 litres and is suitable in principle for the anticipated domestic use, subject to manufacturer confirmation.

Rainwater and clean surface water runoff will be managed separately and discharged to a new onsite soakaway system. The soakaway will be sized and located following site-specific infiltration testing, groundwater observations and detailed drainage calculations. No rainwater or surface water will enter the foul drainage system.