

**Ref che/22/000852/ful**  
**New Bungalow 366 Brimington road Chesterfield S41 0TF**

**Flood Risk Assessment (FRA), Sustainable Drainage (SuDS), Bin location and Parking and Manoeuvring**

**Introduction**

This report covers the sustainable drainage systems on site, foul and surface water as well as provision for waste bin location and parking and manoeuvring on site.

According to Condition 07 associated with the approved planning application, the site shall be developed with separate systems of drainage for foul and surface water on and off site.

According to condition 08. There shall be no piped discharge of surface water from the development prior to the completion of surface water drainage works, details of which will have been submitted to and approved by the Local Planning Authority. If discharge to public sewer is proposed, the information shall include, but not be exclusive to:

- i) evidence that other means of surface water drainage have been properly considered and why they have been discounted; and
- ii) the means of discharging to the public sewer network at a maximum rate of 3.5 litres per second.

According to condition 10. The premises, the subject of the application, shall not be occupied until space has been provided within the site curtilage for the parking and manoeuvring of residents and delivery vehicles, located, designed, laid out and constructed all as agreed in writing with the Local Planning Authority and maintained throughout the life of the development free from any impediment to its designated use. Existing off-street parking levels for No 366 Brimington Road shall be maintained, any displaced off-street parking shall be replaced accordingly.

According to Condition 011 associated with the approved planning application, no part of the development shall be occupied until details of arrangements for storage of bins and collection of waste have been submitted to and approved by the Local Planning Authority. The development shall be carried out in accordance with the agreed details and the facilities retained for their designated purposes at all times thereafter.

According to Condition 18 associated with the approved planning application, the development shall not commence above floor-slab/D.P.C level until details of a sustainable drainage scheme have been submitted to the Local Planning Authority for consideration and those details, or any amendments to those details as may be required, have received the written approval of the Local Planning Authority. This shall include the calculations of soakaway rates on site, and it should be designed to be in accordance with BRE Digest 365 and to not flood during a 1 in 30 year rainfall event or allow flooding of properties during a 1 in 100 year rainfall event, including an allowance for climate change.

**Flood Risk Assessment (FRA),**

The government has placed increasing priority on the need to take full account of the risks associated with flooding at all stages of the planning and development process. This seeks to reduce the future damage to the property and the risk to life from incidents of flooding. Their expectations relating to flooding are contained in the National Planning Policy Framework February 2019, which identify how the issue of flooding is dealt with in the drafting of planning

policy and the consideration of planning applications by avoiding inappropriate development in areas at risk from flooding.

The Environment Agencies flood maps show areas that are at risk, from fluvial and tidal flooding. These maps show the limits of the flood plain of the area which could be affected by flood events, over topping or breaching of flood defences. They are based on the approximate extent of floods with a 1% annual probability of exceedance (1 in 100-year flood) for rivers and 0.5% annual probability of exceedance (1 in 200-year flood) for coastal areas under present expectations or the highest known flood. However, they do not take into account of the presence of defences or the likelihood that flood return intervals will be reduced by climate change.

This details below outline the potential flood risk to the site, 366 Brimington Road, the impact of the proposed development on flood risk elsewhere, and the proposed measures which could be incorporated to mitigate the identified risk. This report considers the risk of flooding from fluvial and tidal sources. It also considers the risks of localised flooding due to inadequate foul and surface water sewers, failures of reservoirs, water main pipe bursts, sewer blockages, pump failures or high ground water table etc.

### **Application Site**

The site forms part of the rear garden curtilage of no.366 Brimington Road, which is to the west side of the dwelling. The plot at No 366 is 58m long and 27m wide and includes a dormer bungalow to the front of the site. The site is sloping from South to North and East to West. The site would be classed as Non-Major Development consisting of a 3 bedroom self-build detached dormer bungalow.

### **Flood Zone Classification**

The national Planning Policy Framework Technical Guidance (NPPF) defines 4 levels of flood risk depending on the annual probability of fluvial flooding occurring.

- Zone 1 - low probability – (<0.1%)
- Zone 2 - medium probability – (0.1% - 1%)
- Zone 3a - high probability – (<1%)
- Zone 3b - The Functional Floodplain.

Based on the flood-map-for-planning.service.gov.uk the risk of flooding for the proposed site is flood zone 1 which is a Low Probability (Shown as 'clear' on the Flood Map for Planning – all land outside Zones 2, 3a and 3b)

**Surface Water - Very low risk** - This flood risk summary reports the highest risk from surface water within a 15 metre radius of this property.

Very low risk means that this area has a chance of flooding of less than 0.1% each year.

### **Groundwater - Flooding from groundwater is unlikely in this area.**

Flooding caused by groundwater happens when water underground that is usually held in the rocks and soil (known as the water table) gets so high that it flows above the surface.

### **Reservoirs - Flooding from reservoirs is unlikely in this area**

Flooding from reservoirs is extremely unlikely. An area is considered at risk if peoples' lives could be threatened by an uncontrolled release of water from a reservoir.

## **Rivers and sea – Very low risk**

The flood risk summary is not property specific and takes into account any flood defences

### **Drainage Authorities**

The following potential sources of flooding affecting the development site have been identified as:

- River Rother within >500m to the East of the site.

### **Environment Agency**

The Environment Agency is responsible for reducing the risk of flooding from designated main rivers and from the sea.

The Flood Zone Maps identify river catchment areas over 3sq. km. These maps are a theoretical estimate of areas that could be inundated should no defence exist. In practice current standards of protection would result in flood envelopes substantially less than those shown by these maps, the maps make no allowance for local, site specific features.

The flood zone maps indicate that the proposed development is not considered at risk of flooding.

The risk of flooding from rivers and sea flood map shows that the proposed site is at Very Low risk of flooding. Very Low means each year, this area has a chance of flooding between 1 in 1000 year event(0.1%). This takes into account the effect of any flood defences that may be in this area.

It will therefore not be necessary to take measures to protect the development against a 1 in 1000 year event. Further, as the site is sloping from South to North, the development is not at risk of flooding.

### **Sources of flooding and probability**

The nearest watercourse is the River Rother which is located over 500m of the development. The River Devon flows North in this location. Other water courses in the area include the chesterfield canal which is located within >700m of the proposed site and flows in a northerly direction.

Fluvial flooding could occur if the River Rother overtopped its banks during or following an extreme rainfall event. A review of the local topography and the EA flood map for planning Rivers and Sea indicates that any potential flooding to the proposed site would not occur due to the local topography.

The area is not known to suffer from any groundwater issues.

Overloaded sewers could cause flooding if they are overloaded during heavy rainfall as a result of blockages or incapacity etc. However, there have not been any cases and therefore sewers are not considered to be of any significance regarding flood risk. The proposed sewer drain to the site will not take any surface water and therefore will not cause flooding to the site. All surface water will go into a culvert which runs from South to North on the site (see figure 1).

Flooding of the land could occur during heavy rainfall, however, due to the natural topography and no high ground around the site, there is very minimal chance of flooding and therefore land flooding is not considered to be of any significance regarding flood risk.

Reservoirs, lakes and canals where water is stored could cause flooding if the structure is overtopped or fails, however, there are no known facilities close by which would affect the site. The proposed site is located approximately 111m above sea level and is significantly above sea level, therefore there is no risk from tidal flooding.

### **Mitigation**

The proposed development is shown to be flood free during all events up to and including the <0.1% AEP (1 in 1000 year) event.

Taking the above into consideration and the topography of the site, mitigation measures will not be required.

There will be no soakaways on site as there is a man made culvert going through the site from South to North which will take all the rain and surface water from the site

### **Impact on flood risk elsewhere**

The proposed site is not considered to be within the floodplain and is only shown at risk during extreme events including the <0.1% AEP (1 in 1000 year) event. The final building footprint is expected to be around 150m<sup>2</sup> and will have minimal impact on the surrounding area flood risk considering the wider flood zone extent.

### **Sequential Test**

When applying the sequential approach for flood risk assessment in accordance with NPPF the proposed site would fall into Zone 1 (very low risk probability). Therefore the test is not required.

## **Sustainable Drainage (SuDS)**

### **Assessment of Suitable Sustainable Drainage (SuDS) Features**

According to Condition 18 associated with the approved planning application, the development shall not commence above floor-slab/D.P.C level until details of a sustainable drainage scheme have been submitted to the Local Planning Authority for consideration and those details, or any amendments to those details as may be required, have received the written approval of the Local Planning Authority. This shall include the calculations of soakaway rates on site, and it should be designed to be in accordance with BRE Digest 365 and to not flood during a 1 in 30 year rainfall event or allow flooding of properties during a 1 in 100 year rainfall event, including an allowance for climate change.

SuDS are a new environmentally friendly approach to managing rainfall that where possible uses landscape features to deal with surface water. SuDS are designed to manage stormwater runoff locally (as close its source as possible) in a way that is both environmentally friendly and effective and to mimic natural drainage and encourage its infiltration, attenuation and passive treatment allowing water to drain into the ground, evaporate away, or be stored again for later use, rather than immediately diverted into traditional drainage systems. But for these systems to work properly, they need to be designed with the right components.

The following will be implemented at the site to manage rainwater and surface water runoff in a more sustainable and environmentally friendly manner.

### **Permeable Surfaces**

SuDS promote the use of permeable materials for surfaces like roads, pavements, and driveways. An advantage of using permeable surfacing is that it can typically drain double its area, allowing for more water to be stored and infiltrated than directly entering the watercourse. If the surface has a good aggregate sub-base then it can also provide benefits for water quality treatment as well.

*Permeable surfaces such as porous Asphalt will be used for the driveway to the site and any water that does run off will flow into the French drains and planted areas of free draining soils that allow rain to percolate through the surface into underlying drainage layers. Regular Maintenance will be carried out which includes:*

- *Brushing regularly and removing sweepings from all hard surfaces:*
- *Brushing and jet washing surfaces once a year to prevent silt blockage and enhance design life.*

### **Rainwater Harvesting: Water Butts and Rain Planters**

Water storage methods can be either at or below the surface. Water can be stored in tanks or water butts on a property and can often be reused again. Rainwater can be collected from the roof of a building and be released slowly into the ground once a storm is over, allowing for natural drainage to take place. This reduces the risk of flooding as water is retained and slowly drains away rather than quickly overwhelming drainage systems. An overflow is required to prevent the water butt from flooding and to create capacity for the next storm event.

Any overflow from the water butts can be redirected away from the combined sewer and instead connected to a geocellular structure and plastic crates beneath the ground or in Rain planters which can be used for storing rainwater. They can then be used to convey and infiltrate the water back into the ground to reduce peak flows by allowing natural drainage.

As well as reducing flood risk, rainwater harvesting has many other benefits. Firstly, the equipment is easy to maintain and reduces water wastage as the harvested water can be reused again within the property, for example for watering gardens, as rainwater is often free of chemicals so will not harm plants. In turn, this then has a positive effect by reducing water bills as families reuse the harvested water instead of using more.

*In relation to the property 4 x 220 litre water butts will be connected to the roof downpipes providing a source control of rainwater. Any overflow will be diverted to a 1m<sup>3</sup> geocellular structure located in a rain planter which will also create an area for seasonal planting.*

### **Tree Pits**

These are a popular and effective SuDS intervention, especially in urban areas where space may be limited. They combine the benefits of stormwater management, water quality improvement, urban cooling, and ecological enhancement, making them a valuable addition to sustainable drainage strategies.

*Tree pits will be placed around new tree planting.*

### **French Drain**

French drains are used as a form of land drainage which are a pit in the ground into which rainwater drainage flows. French drains are used to prevent water logging and an excess of

surface water. They consist of a trench dug, at a gradient, into the ground, lined with membrane, filled with aggregate.

The idea behind French drains is that rather than sit around on the surface of the ground, water will seep down into these trenches to be taken away to a drainage area.

*French drains will be located at the side of the porous driveway to remove any excess water in the event of a storm.*

## **Raingardens**

A raingarden is a shallow, planted depression designed to capture, infiltrate, and treat rainwater from impervious surfaces such as roofs, driveways, and roads, designed to be both functional and aesthetically pleasing.

*The property garden will have a raingarden consisting of several 'thirsty' shrubs, trees (willow) and a natural lawn as this will help to encourage surface water to drain away naturally.*

## **Foul and Surface Water Drainage**

According to Condition 07 associated with the approved planning application, the site shall be developed with separate systems of drainage for foul and surface water on and off site.

According to condition 08. There shall be no piped discharge of surface water from the development prior to the completion of surface water drainage works, details of which will have been submitted to and approved by the Local Planning Authority. If discharge to public sewer is proposed, the information shall include, but not be exclusive to:

- i) evidence that other means of surface water drainage have been properly considered and why they have been discounted; and
- ii) the means of discharging to the public sewer network at a maximum rate of 3.5 litres per second.

Surface and waste foul water will be disposed separately on site (see figure 1). The waste foul water will be connected to an existing sewer at the rear of 366 Brimington Road. Surface and rain water will be disposed of through on site SuDS measures as described above and where appropriate the man made culvert which runs from South to North. There are no soakaways to be located on the site.

## **Culverts**

Culverts can be a key component of sustainable drainage systems because they:

- Allow water to flow freely, which can prevent flooding and water damage to infrastructure.
- Help manage the flow of water by transporting it away from more populated areas and into retention basins or other storage areas.

*There is a surface water culvert on site running from south to North across the front of the site.*

## **Bin Location**

According to condition 11. No part of the development shall be occupied until details of arrangements for storage of bins and collection of waste have been submitted to and approved by the Local Planning Authority. The development shall be carried out in accordance with the agreed details and the facilities retained for their designated purposes at all times thereafter.

*A location for waste bins has been identified on site and provision will be made for their location adjacent to the driveway at the front of the site (see figure 2).*

## **Parking and Manoeuvring**

According to condition 10. The premises, the subject of the application, shall not be occupied until space has been provided within the site curtilage for the parking and manoeuvring of residents and delivery vehicles, located, designed, laid out and constructed all as agreed in writing with the Local Planning Authority and maintained throughout the life of the development free from any impediment to its designated use. Existing off-street parking levels for No 366 Brimington Road shall be maintained, any displaced off-street parking shall be replaced accordingly.

*Parking will be provided on site for 3 vehicles as well as manoeuvring of residents and delivery vehicles as agreed with the Highways department and the previously submitted plans. A copy of the landscape plan below in figure 3 shows the residents parking as well as space on the driveway for manoeuvring of residents and delivery vehicles.*

## **Conclusion**

The site is considered to be at very low risk of flooding and complies with the requirements of the NPPF for flood risk and drainage.

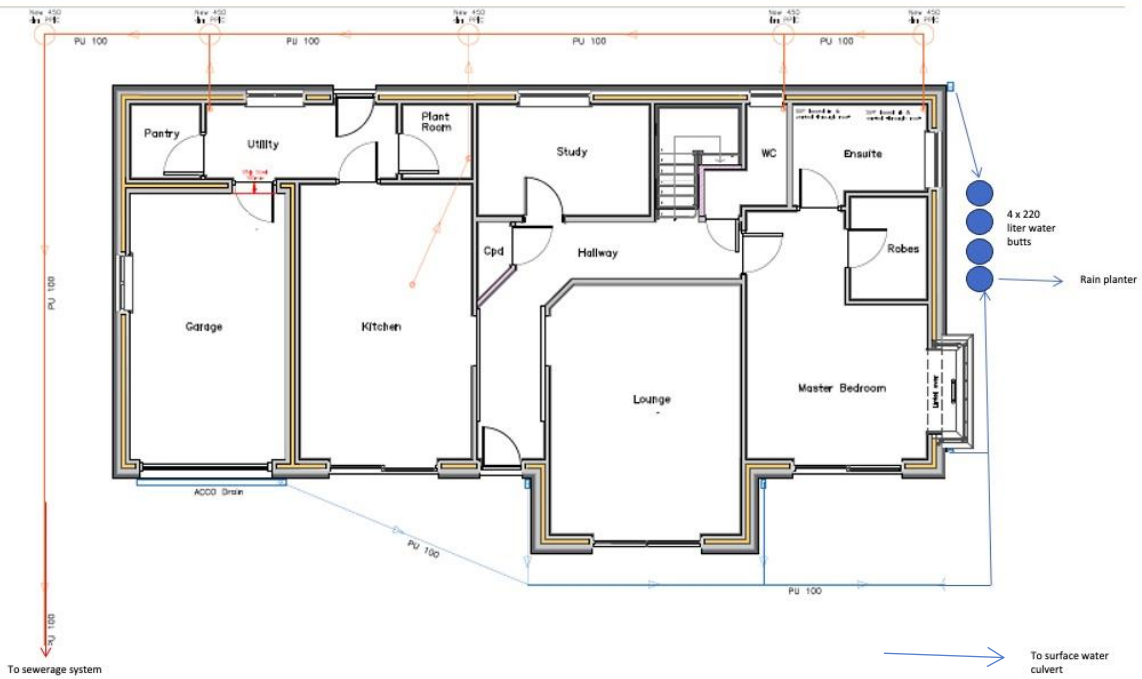
This FRA and SuDS report has been prepared in accordance with the planning conditions attached to the proposed development from a flood risk and sustainable drainage point of view. The site sits in Flood Zone 1 and the development is shown to be flood free during all events up to and including the <0.1% AEP (1 in 1000 year) event. The flood risk from all sources has been assessed and was found to be very low. The Sequential Test is not applicable.

The SUDS Hierarchy was used to determine the most sustainable surface water drainage strategy for the site. Surface water attenuation will be provided in the form of porous Asphalt driveway surface, Separate systems for surface and foul water, Tree pits around new tree planting, French drains, Water butts, A 1m<sup>3</sup> geocellular structure located in a rain planter, a Rain garden with large grassed areas to front and rear of the property and a Surface water culvert.

Waste bins will be located at the front of the property.

Parking will be provided on site for 3 vehicles as well as manoeuvring of residents and delivery vehicles as agreed with the Highways department.

**Figure 1- Surface and Foul Water**



**Figure 2 - Location of Waste Bins**





Figure 3 - Resident parking including manoeuvring of residents and delivery vehicles

