

**COMMERCIAL DEVELOPMENT
WOODGATE CENTRE
WESTERGATE
WEST SUSSEX**

**SITE SPECIFIC FLOOD RISK ASSESSMENT
LEVEL 1**



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Issue No.	Copies	Distribution	Format	Date	Status
1	1	Paul Collins PPC Planning & Property Consultants	By email: [REDACTED]	03 June 2011	For comment

1.0 INTRODUCTION

1.1 Archibald Shaw was commissioned by Builtform Developments Ltd to undertake a Level 1 Flood Risk Assessment [FRA] in accordance with Planning Policy Statement 25 [PPS 25] on the parcel of land shown in figure 1 – herein known as ‘the site’.

1.1.2 This area of land totals some 1.2ha and lies in the hamlet of Woodgate, to the east of Lidsey Road.

1.1.3 This report has been written in support of an outline planning application for a commercial development.

1.2 Terms of Reference

1.2.1 This report comprises a Level 1 Flood Risk Assessment in accordance with the requirements and guidance of:

- Planning Policy Statement 25 – Development and Flood Risk;
- Planning Statement 25 – Development and Flood Risk ‘A Practice Guide’;
- Flooding – Engineering Resilience, ICE;
- Flood Risks to People – FD2321/TR2 defra

1.3 Proposed Development

1.3.1 It is anticipated that vehicular and pedestrian access to the development would be from Oak Tree Lane.

1.3.2 According to the current Environment Agency Flood Mapping, accessible from the internet, the proposed commercial area lies within an area of a low chance of flooding: less than 0.1% [1 in 1000] annual probability of flooding. The eastern part of the site close to the Lidsey Rife lies within Flood Zones 2 and 3.

1.4 Summary of Brief

1.4.1 In accordance with the Client's specific objectives, the purpose of this report is primarily:

- (i) To provide a contemporary record of current flood risks affecting the site and future proposals.
- (ii) To advise on exceptional flooding events that may have an influence on developing the site.
- (iii) To advise on potential methods of mitigating flood risks on site.
- (iv) To form the basis of site based drainage strategy.



Aerial view of site

2.0 SOURCES OF INFORMATION

2.1 Desk Top and Site Based Research

2.1.1 The flood risk assessment research comprised:

Site Information	YES	NO
Review of information supplied by the Client	✓	
Site walkover	✓	
Preliminary discussion with owner/occupier		✓

Public Domain Information	YES	NO
Geological mapping	✓	
Statutory services information	✓	
Local Authority enquiry	N/A	
Strategic Flood Risk Assessment	✓	
Topographic site survey	✓	
Internet data	✓	
Anecdotal flooding information		✓
Aerial photographs	✓	
LIDAR Survey		✓
Historic mapping		✓

Key: NA = Not applicable
 NR = No records available
 AR = Awaiting response

2.2 Response to Enquiries

2.2.1 Water Authority

- 2.2.1.1 Southern Water's drainage records are shown within appendix B. This shows there is a foul water sewer adjacent to the site. With reference to a third party report this sewer discharges sub-catchment flows from Woodgate into the main Westergate to Lidsey Water Treatment Works trunk sewer. See figure 2.

2.2.2 Environment Agency

2.2.2.1 To the east of the site lies Lidsy Rife. The Rife lies at a level of 1.0m AOD approximately. The proposed commercial development area has existing ground levels ranging from 8.75m AOD to the west through to 7.0m AOD in the east.



Eastern view of stability and garage units

3.0 SITE DETAILS

3.1 Site Location

3.1.1 The site is located within a brownfield area to the east of the residential area of Woodgate Road and Woodgate Close, which lies to the east of Lidsey Road in Woodgate. The National Grid Reference for the site is 49430; 10420 approximately.

3.2 Site Description

3.2.1 The site covers an area of 1.2ha approximately. Ground levels vary from between 8.75m AOD in the west through to 1.0m AOD contiguous with the Lidsey Rife.

3.3 Local Topography and Geology

3.3.1 The main body of the site is essentially flat with a gentle gradient from west to east of 1 in 500 approximately. The remaining eastern third of the site gently rolls over into a shallow but pronounced v-shaped valley within which runs the Lidsey Rife. The average gradient of the valley slope is 1 in 26.

3.3.2 With reference to British Geological Survey Sheet 317/332. The site is underlain by solid geology formed of London Clay [silty clays and sands]. To the west and main body of the site there are superficial deposits of Brickearth. Towards the east [Lidsey Rife] Brickearth gives way to superficial deposits of Raised Beach [sands and gravels]. There is a narrow band contiguous with the Rife where there are no superficial deposits.

3.3.3 A hundred metres or so south of the site lies the Chichester syncline. This is the lower part of a fold in the solid geology.

4.0 POTENTIAL FLOOD HAZARDS

4.1 Flooding from Rivers

4.1.1 Rivers flood out of bank when the amount of water in them exceeds the flow capacity of the river channel. Flooding can also result when culverts, trash screens and bridges are partially or fully blocked by debris and washload.

4.1.2 The Environment Agency's flood map shows areas contiguous with the Lidsey Rife to be within Flood Zones 2 and 3. It is proposed to provide a woodland amenity area to the east of the commercial site and to the boundary of the Rife. See figure 3.

4.1.3 The design of the woodland area should be undertaken with due care to prevent out of bank flows adversely affecting the woodland area. A clear flood path through the woodland zone should be incorporated within any design which manages flood waters in order to minimise afflux and damage to wildlife.

4.1.4 It is considered that the new commercial development proposals would be at a low risk from river flooding, subject to the point made under 4.1.3.

4.2 Flooding from the Sea

4.2.1 The site is located some 2 miles from the sea.

4.2.2 With reference to Arun District Council's SFRA and the Environment Agency's flood map. It is considered there is a low risk of flooding from the sea.

4.3 Flooding from Land

4.3.1 Intense rainfall of short duration, that is unable to soak into the ground or enter drainage systems can run off land in sheet flows resulting in local flooding.

4.3.2 Given the local topography and superficial geology significant overland flows from the residential area are not anticipated.

4.3.3 It is considered that the risk of flooding from the land is low.

4.4 Flooding from Groundwater

4.4.1 No on site geotechnical investigation has been undertaken at this stage.

4.4.2 Given the land form it is most likely that groundwater issues will not be significant on this site. However, in times of prolonged out of bank flows, local soils close to the Rife will become saturated at depth.

4.4.3 It is considered that flooding from groundwater is considered to be low.

4.5 Flooding from Sewers

4.5.1 Flooding can result when a sewer is overwhelmed by heavy rainfall, groundwater becomes blocked or is of inadequate capacity.

4.5.2 The local foul water sewer is shown in figure 2.

4.5.3 It is understood that the villages of Barnham, Yapton, Slindon, Fontwell and Walberton have been identified as potential high groundwater infiltration sites which has caused overloading of the Lidsey Wastewater Treatment Works. Whilst the sub-catchment of Woodgate discharges into this system I am not aware that the Woodgate area has been identified as having a high groundwater infiltration problem.

4.5.4 Given the west – east gradient of the site which reflects the attitude of the local adopted sewer which lies close to the site - it is considered there is a low risk of above ground flooding from this sewer.

4.6 Flooding from Reservoirs, Canals other Manmade Sources

4.6.1 Reservoir or canal flooding may occur as a result of the structure being overwhelmed, or as a result of dam and bank failure.

4.6.2 There are no such manmade features local to the site that could result in flooding of the site.

5.0 SURFACE WATER RUN-OFF ASSESSMENT

5.1 General

5.1.1 The total site area is 12000m² approximately with the proposed developable area being 5400m².

5.1.2 There appears to be little or no positive surface water drainage system serving existing buildings and hardstandings. All rainwater flows would appear to discharge into local soils by default.

5.1.3 The commercial development area is proposed to cater for all surface water run-off through the use of local soakaways. This will maintain a similar regime as present though with a greater capacity to cater for intense rainfall.

5.1.4 The recommended peak offsite discharge of surface water flows from the new commercial area would therefore be zero. Only run-off from the proposed woodland area would occur but only during prolonged wet weather.

5.2 Design Criteria and Allowances for Climate Change

5.2.1 Sewers for adoption 6th edition requires that surface water drainage systems for new developments should be designed to prevent pipe surcharging during a 1 in 2 year storm event. The system should also accommodate a 1 in 30 year event without surface flooding. During extreme wet weather events, it should be demonstrated that flood waters would be routed away from buildings, and not cause a nuisance elsewhere.

5.2.2 It is proposed that the new commercial area is designed to prevent flooding above ground level during a 1 in 100 year storm event with an additional allowance for climate change to the year 2115.

5.4 Applicability of SuDs

5.4.1 Current guidance and advice recommends that surface water run-off shall discharge to one of the following, listed in order of priority:

- a) an adequate soakaway or some other adequate infiltration system, or where that is not reasonably practicable,
- b) a watercourse, or, where that is not reasonably practicable,
- c) a sewer.

5.4.2 A SuDs scheme therefore will be required to control discharge to an acceptable level. SuDs can incorporate some or all of the following:

- source control measures including rainwater recycling, green roofs and permeable pavements;
- wetlands providing both stormwater attenuation and treatment;
- infiltration devices to allow water to soak into the ground, that can include individual soakaways and communal facilities;
- swales, which are vegetated features that hold and drain water downhill mimicking natural drainage patterns;
- filtration, through vegetation, shallow landscaped depressions and a sand bed providing high pollutant removal; and
- detention basins to hold excess water after rainfall which allow controlled discharge to avoid flooding.

5.4.3 In accordance with CIRIA C697 The SuDs Manual – Chapter 5 SuDs Selection, the application of these options is outlined below.

- (i) The use of infiltration SuDs such as trenches, basins and soakaways are likely to be acceptable throughout the site. Details would be subject to a geotechnical investigation and infiltrating testing.
- (ii) Source control methods such as rainwater harvesting could be acceptable as part of the development and permeable pavements could be utilized on car parks, courtyards and local roadways.

(iii) The use of swales, wetlands, and ponds are likely to be feasible if lined with an impermeable membrane or puddle clay particularly if contamination is encountered or space below the shallow water table is required. However these features could also utilize natural groundwater, especially within the woodland amenity area and where founded in London Clay.

(iv) Extra storage could also be provided in source control techniques such as geocellular modular system lined with impermeable membrane and oversized pipes.

5.5 Outline Surface Water Strategy

5.5.1 It is proposed to reduce current peak surface water discharge rates to zero from within the proposed commercial area. This can be achieved through a combination of methods discussed under 5.4.

5.6 Outline Foul Water Strategy

5.7 Future foul water flows from this site would be subject to a detailed assessment at design stage. However a preliminary assessment indicates that peak dry weather flows would be in the order of 0.5ls. Such flows are considered low and would be managed in agreement with Southern Water.

6.0 CONCLUSIONS AND RECOMMENDATIONS

- 6.1 It appears from this study and the Environment Agency's flood mapping that the commercial development part of the site lies in a low flood risk area; Zone 1.
- 6.2 All surface water flows generated by the site can, subject to geotechnical investigation, be managed on site by use of soakaways and other devices discussed in section 5.4 of this report.
- 6.3 The proposed woodland amenity area would act as a buffer between the commercial area and Flood Zones 2 and 3 which lie close to the Lidsey Rife. The woodland area should be designed with due care in order to control the risk from the Rife on new planting and establishing wild life.

Prepared by Eur Ing Vincent Carpenter BSc CEng MICE CWEM FC IWEM MIHTMIoD

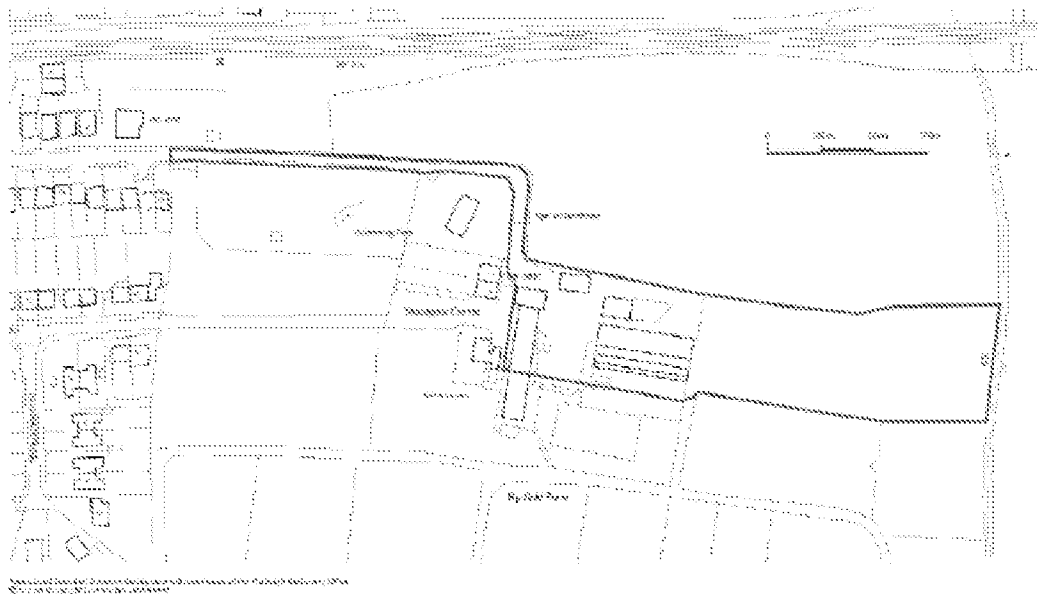
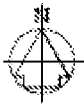
Date 03 June 2011

APPENDICES

Figure 1 – Location Plan

Figure 2 – Foul Water Sewer Record

Figure 3 – Flood Map



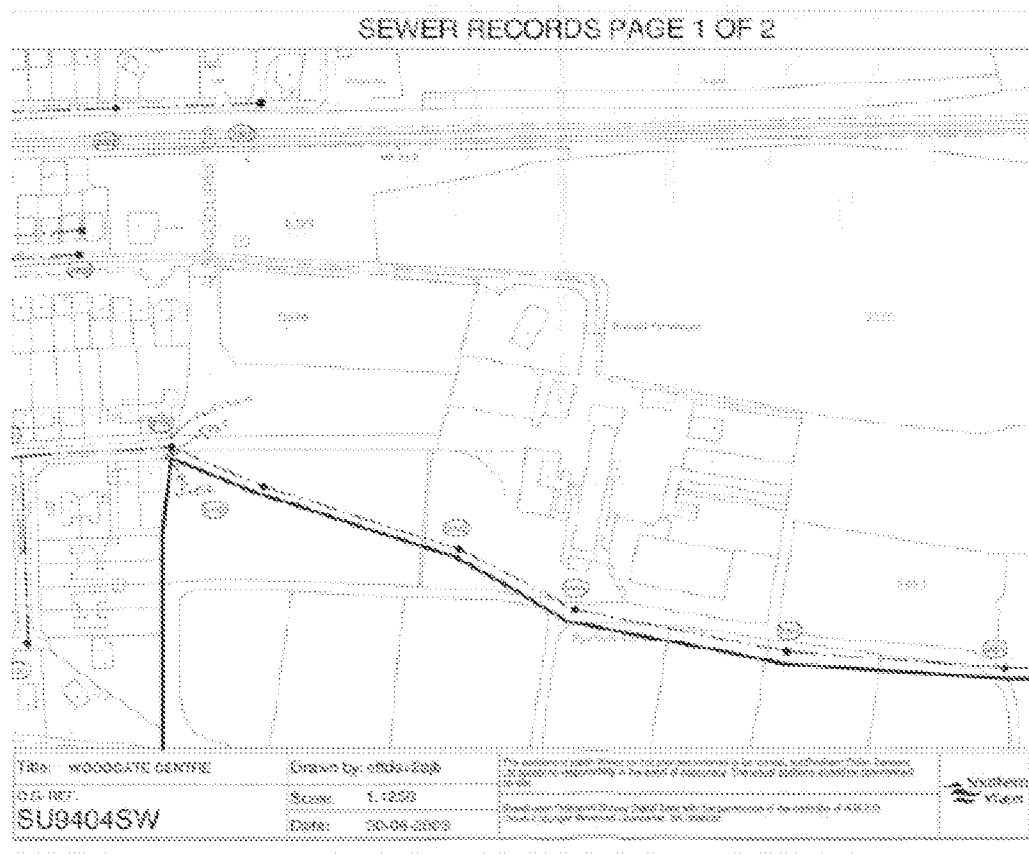
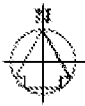
Not to be used for any other purpose without the written consent of Archibald Shaw

PROPERTY OF ARCHIBALD SHAW, WOODGATE CENTRE, WESTGATE
 for Blenheim Developments Limited
 LOCATION PLAN

DATE: 11/11/10 BY: A. SHAW
 THIS PLAN IS FOR INFORMATION ONLY AND DOES NOT CONSTITUTE A CONTRACT
 FOR THE SALE OF LAND. THE LAND IS NOT TO BE USED FOR ANY OTHER PURPOSE
 WITHOUT THE WRITTEN CONSENT OF ARCHIBALD SHAW



REV	DESCRIPTION	DATE
01	Initial Design	11/11/10
02	Revised Design	11/11/10
03	Final Design	11/11/10
04	As Built	11/11/10
05	As Built	11/11/10
06	As Built	11/11/10
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