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**GULL POINT SUITES, THE BEACHCROFT HOTEL  
CLYDE ROAD  
FELPHAM  
WEST SUSSEX**

**FLOOD RISK ASSESSMENT  
LEVEL 2**

**ISSUE 2**



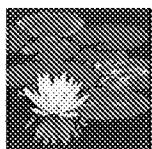
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## APPENDICES

- A: Architect's Drawings
- B: Flood Plain Data
- C: Site Photographs
- D: Preliminary Surface Water Drainage Appraisal



## REFERENCES

- A: Site Geotechnical Report by Southern Testing

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| 2         | 1      | J Blumer Esq | By email: <a href="mailto:studio@vonblumerarchitects.com">studio@vonblumerarchitects.com</a> | 18 October 2017 | Final   |

## **1.0 INTRODUCTION**

- 1.1 Archibald Shaw was commissioned by Ivon Blumer Architects on behalf of the Client to undertake a Level 2 Flood Risk Assessment [FRA] in accordance with The National Planning Policy Framework on the parcel of land shown overleaf – herein known as 'The Site'.
- 1.1.2 The proposed development footprint totals some 232m<sup>2</sup> and lies within the residential area of Clyde Road, Felpham. The local postcode is PO22 7AH.
- 1.1.3 This report has been written in support of an outline planning application for a new hotel with undercroft parking.

## **1.2 Terms of Reference**

- 1.2.1 This report comprises a Level 2 Flood Risk Assessment in accordance with the requirements and guidance of:
- National Planning Policy Framework
  - National Planning Practice Guidance
  - Flooding – Engineering Resilience, ICE;
  - Flood Risks to People – FD2321/TR2 defra
- 1.2.2 Nothing in this report confers or purports to confer on any third party, any benefit or any right to enforce any term of this report pursuant to the Contract [Rights of Third Parties] Act 1999.

## **1.3 Proposed Development**

- 1.3.1 It is the intention that existing pavings are removed to accommodate the proposed development, outline details of which are shown within appendix B. The scheme provides a 9 bedroom hotel with undercroft parking for 9 cars within a site area of 400m<sup>2</sup>.
- 1.3.2 Vehicular and pedestrian access to the development would be from Clyde Road.
- 1.3.3 According to the Environment Agency's flood mapping [appendix B] the area of proposed development lies within Flood Zone 3. This is an area with a high risk of flooding from the sea.

## 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         |     | ✓  |
| Strategic Flood Risk Assessment | ✓   |    |
| Topographic site survey         | ✓   |    |
| Internet data                   | ✓   |    |
| Anecdotal flooding information  |     | ✓  |
| Aerial photographs              | ✓   |    |
| LIDAR Survey                    |     | ✓  |
| Historic mapping                | ✓   |    |

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

**2.2 Environment Agency**

2.2.1 Flood mapping data obtained from the Environment Agency's Worthing office records the site lying within a high risk of flooding from the sea; Flood Zone 3.

2.2.2 The predicted worst case flood level within the site is 4.94m AOD. This assumes a 0.5% Annual Exceedance Probability [1 in 200 year] flood event occurring in the year 2115. With reference to the existing site this would indicate a flood depth of 0.1m approximately close to the promenade and 0.6m approximately close to the site's western boundary.

### **3.0 SITE DETAILS**

#### **3.1 Site Location**

- 3.1.1 The site is situated on the southern side of Clyde Road and contiguous with the elevated promenade which forms a sea defence. The National Grid Reference for the site is 494892; 099310 approximately.

#### **3.2 Site Description**

- 3.2.1 The site covers an area of 400m<sup>2</sup> approximately.
- 3.2.3 The site is presently occupied by a small greenhouse with concrete and grassed surfaces.

#### **3.3 Local Topography and Geology**

- 3.3.1 The topography of the surrounding built environment is relatively flat with the landform rising gently eastwards towards the promenade.
- 3.3.2 Site ground levels vary from 4.3m AOD close to the western boundary rising gently eastwards towards the promenade which has surface levels in the order of 5.3m AOD.
- 3.3.3 With reference to the British Geological Survey the site is shown to be underlain by superficial geology of River Terrace Deposits and Bedrock geology of the Lambeth Group.

##### **River Terrace Deposits**

These superficial deposits of sand, silt and clay were laid down some 3 million years ago in the Quaternary Period in an estuarine environment.

##### **Lambeth Group**

This sedimentary bedrock geology comprising clay, silt and sand was formed some 56 to 66 million years ago in the Paleogene Period in an environment dominated by swamps periodically inundated by the sea.

#### **4.0 POTENTIAL FLOOD HAZARDS**

##### **4.1 Flooding from the Sea**

- 4.1.1 The site is located adjacent to Felpham Beach.
- 4.1.2 It is considered that flood risk from the sea is high in the absence of existing sea defences. Predicted 0.5% AEP 2115 undefended sea levels would flood the site to an average depth of 0.35m approximately. Allowing for the presence of existing sea defences would reduce the flood risk to low.

##### **4.2 Flooding from the Land**

- 4.2.1 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.
- 4.2.2 Given the local topography and superficial geology significant over land flows are not anticipated.
- 4.2.3 It is considered that the risk of flooding from the land is low.

##### **4.3 Flooding from Groundwater**

- 4.3.1 On site geotechnical investigations undertaken by Southern Testing indicate the water table lies at a depth of 2.7m below the site. Groundwater levels will be monitored by data logger over the winter period in order to account for winter rainfall and influences from tidal flows.
- 4.3.2 Subject to investigations [4.3.1] and implementation of the drainage strategy given in 5.4 it is considered that flood risk from groundwater is low.

##### **4.4 Flooding from Sewers**

- 4.4.1 Flooding can result when a sewer is overwhelmed by heavy rainfall, groundwater becomes blocked or is of inadequate capacity.
- 4.4.2 It may be noted that local foul and surface water drainage provision beneath Clyde Road would most probably be inundated during a severe flooding event from the sea. It is most unlikely this would induce a flooding event within the habitable areas of the proposed hotel given the lowest habitable floor will lie some 3.5m above local sewer levels.

#### **4.5 Flooding from Reservoirs, Canals and other Manmade Sources**

- 4.5.1 Reservoir or canal flooding may occur as a result of the structure being overwhelmed, or as a result of dam and bank failure.
- 4.5.2 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 400m<sup>2</sup> approximately.
- 5.1.2 The proposed development comprises a hotel with three habitable floors over undercroft car parking. The undercroft car park level is set at 4.15m AOD with the first floor level set at 6.95m AOD.

### **5.2 Design Criteria and Allowances for Climate Change**

- 5.2.1 Sewers for adoption 7<sup>th</sup> 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 this development is designed to prevent surface water flooding above ground level during a 1 in 100 year storm event with an additional allowance for climate change to the year 2115.

### **5.3 Applicability of SuDs**

- 5.3.1 Current guidance and advice recommends that surface water run-off shall discharge to one of the following, listed in order of priority:
- an adequate soakaway or some other adequate infiltration system, or where that is not reasonably practicable,
  - a watercourse, or, where that is not reasonably practicable,
  - a sewer.
- 5.3.2 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.

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

#### **5.4 Outline Surface Water Strategy**

5.4.1 It is proposed to form the undercroft car parking area of porous block paving overlying a plate soakaway. The design will accommodate site driven surface waters in excess of a design frequency of M100 + 40% allowance for climate change.

5.4.2 A preliminary design based upon a site recorded <sup>A</sup> infiltration rate of 2.72E<sup>-4</sup> m/s, site plan area of 400 m<sup>2</sup>, and undercroft paved area of 232m<sup>2</sup> confirms site surface waters can be managed on site in accordance with National Planning Policy Guidelines. Outline design data is included within Appendix D.

#### **5.5 Outline Foul Water Strategy**

5.5.1 A preliminary assessment based upon British Water's CoP, flows and loads -3, indicates average dry weather flow [DWF] would be in the order of 0.05 l/s. Such flows are considered low and would be discharged into the local foul water sewer which lies beneath Clyde Road.

## **6.0 DISCUSSION AND CONCLUSIONS**

- 6.1 The site's primary flood risk is from tidal flooding. The Environment Agency's flood model indicates 0.5% AEP (1 in 200 year event) undefended flood levels within the site in the year 2115 lie in the region of 4.94m AOD. Proposed undercroft car park levels lie at 4.15m AOD which during such a flood event would yield flood depths in the order of 0.8m. The first floor level is proposed to be no lower than 6.95m AOD which would offer a freeboard of 2.0m above this undefended tidal flood event.
- 6.2 Given the proximity and extent of the undefended flood plain to this proposed hotel, the most likely course of action to be taken by residents during such an event would be to sit out the flood which would be expected to last no longer than 12 hours.
- 6.3 Whilst this report appraises the 'worst case' undefended 0.5% AEP tidal flood risk, it may be noted that the modelled defended site flood levels are some 400mm lower at 4.51m AOD, which represents a predicted developed on site flood depth of 360mm.

### **6.4 Conclusion**

- 6.4.1 The first floor level of this proposed hotel lies some 2.0m above undefended tidal flood levels predicted for the year 2115. Therefore all of the hotel rooms to be considered reasonably safe from flooding.
- 6.4.2 All site driven surface waters can be managed on site to accommodate a worst case M100 + 40% storm event.

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