



Flood Risk Assessment

Proposed Residential Development at

South Site, Newgate Lane, Fareham

On behalf of

Bargate Homes Ltd

October 2019

Document History and Status

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1 Non Technical Summary

- 1.1 This Flood Risk Assessment has been undertaken in accordance with the National Planning Policy Framework on behalf of Bargate Homes Ltd in support of an Outline Planning Application for the development of up to 115 dwellings, open space, vehicular access points from Newgate Lane and associated ancillary infrastructure. With all matters except access to be reserved on land between Newgate Lane and Newgate Lane East, Fareham.
- 1.2 This Assessment is to be read in conjunction with all planning, architectural and other reports that accompany the Outline Planning Application for the proposed development.
- 1.3 The site is bisected by the River Alver. The area of the site to the east of the river is located predominantly in Flood Zone 1 and that to the west is located predominantly in Flood Zone 3.
- 1.4 The residential development proposed is classified as More Vulnerable and suitable in Flood Zones 1 and 2.
- 1.5 All development and surface water storage will be outside the 1:100 + 45% climate change fluvial floodplain to ensure the development remains safe and operable throughout its lifetime.
- 1.6 The proposed development will incorporate a sustainable drainage system which will discharge surface water at the existing greenfield runoff rate into the existing onsite ordinary watercourses.
- 1.7 Sufficient storage can be provided on site to cater for all storm return periods up to and including the 1:100 year rainfall event with a 40% allowance for climate change.
- 1.8 The exact nature of the storage will be confirmed at detailed design stage but can be accommodated using a variety of methods such as permeable paving, voided subbase and cellular tanks.
- 1.9 Foul drainage will be discharged via a foul pumping station into the existing public foul sewer beneath Newgate Lane.
- 1.10 This report concludes that the proposed development is suitable at this location and there are no significant flooding or drainage risks in the proposed location of the residential dwellings.

2 Planning Policy Context

2.1 National Planning Policy Framework

2.1.1 The National Planning Policy Framework was updated in February 2019.

2.1.2 With regard to planning and flood risk the policy framework states that *‘when determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment.*

Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:

- a) within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;*
- b) the development is appropriately flood resistant and resilient;*
- c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;*
- d) any residual risk can be safely managed; and*
- e) safe access and escape routes are included where appropriate, as part of an agreed emergency plan.’*

2.1.3 With regard to minor developments the NPPF states that *‘applications for some minor development and changes of use (reference footnote 51) should not be subject to the sequential or exception tests but should still meet the requirements for site-specific flood risk assessments set out in footnote 50.’*

2.1.4 Footnote 50 reads *‘a site-specific flood risk assessment should be provided for all development in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.’*

2.1.5 Footnote 51 reads *‘this includes householder development, small non-residential extensions (with a footprint of less than 250m²) and changes of use; except for changes of use to a caravan, camping or chalet site, or to a mobile home or park home site, where the sequential and exception tests should be applied as appropriate.’*

2.1.6 With regard to major developments the NPPF states that *'major developments should incorporate sustainable drainage systems unless there is clear evidence that this would be inappropriate. The systems used should:*

- a) take account of advice from the lead local flood authority;*
- b) have appropriate proposed minimum operational standards;*
- c) have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development; and*
- d) where possible, provide multifunctional benefits'*

2.1.7 Major development is defined as follows:

'For housing, development where 10 or more homes will be provided, or the site has an area of 0.5 hectares or more. For non-residential development it means additional floorspace of 1,000m² or more, or a site of 1 hectare or more, or as otherwise provided in the Town and Country Planning (Development Management Procedure) (England) Order 2015.'

2.2 Lead Local Flood Authority

2.2.1 Hampshire County Council became a Lead Local Flood Authority under the Flood and Water Management Act 2010 and was given a series of new responsibilities to coordinate the management of local flood risk.

2.2.2 As part of their role Hampshire County Council have produced the following documents

- Local Flood Risk Management Strategy dated July 2013
- Preliminary Flood Risk Assessment dated April 2011

2.2.3 All documents have been reviewed in the preparation of this report.

2.3 Fareham Council

2.3.1 Fareham Borough Council issued a Strategic Flood Risk Assessment (SFRA) as part of the Partnership for Urban South Hampshire dated February 2016.

2.4 Local Planning Policy

2.4.1 Fareham Borough Council adopted the Local Plan Core Strategy in August 2011 and the Local Plan 2015-2026 on 8 June 2015.

2.4.2 The following policies are of specific relevance to the Flood Risk Assessment.

2.4.3 **Policy CS15** Sustainable Development and Climate Change states that 'The Borough Council will promote and secure sustainable development by directing development to locations with sustainable transport options, access to local services, where there is a minimum negative impact on the environment or opportunities for environmental enhancement. Development must not prejudice the development of a larger site.

This will be achieved by:

- *Ensuring that the scale and density of the proposal makes an efficient use of land. With a minimum of 60dph within areas with high multi-modal transport accessibility and good access to a range of social, environmental and economic infrastructure, taking account of the character of the location.*
- *Ensuring that there is sufficient capacity available, or will be made available, in existing infrastructure to meet the needs of the new development including adequate land and funding for waste management. Avoiding unacceptable levels of flood risk and proactively managing surface water through the promotion of sustainable drainage techniques.'*

2.4.4 **Policy DSP2** Environmental Impact states that 'development proposals should not, individually, or cumulatively, have a significant adverse impact, either on neighbouring development, adjoining land, or the wider environment, by reason of noise, heat, liquids, vibration, light or air pollution (including dust, smoke, fumes or odour).

Development should provide for the satisfactory disposal of surface and waste water and should not be detrimental to the management and protection of water resources.'

3 Existing Site

3.1 Site Location

3.1.1 The development site is located on land to the east of Newgate Lane, Fareham at Ordnance Survey reference SU 571 031. The nearest postcode is PO14 1BA.



Image 1: Site Location

3.1.2 The site is bounded on its north and east by agricultural land, to the west by Newgate Lane, and to the south by Woodcote Lane and Brookers Lane.

3.1.3 A copy of the site location plan is located in Appendix 1 at the rear of this report.

3.2 Site Description

3.2.1 The site is approximately 6ha in area and currently undeveloped.

3.2.2 Existing ground levels are at their highest at approximately 9.6m AOD at the north eastern site boundary and their lowest at approximately 7.8m AOD at the southwest site boundary.

3.2.3 The River Alver passes through the western part of the site. There are also two minor existing watercourses/ditches that pass through the site one orientated east to west and one north to south. At detailed design stage if required these watercourses/ditches can be realigned to maintain flow paths.

3.2.4 The River Alver is classified as Main River.

3.2.5 A copy of the existing site layout plan is located in Appendix 2 at the rear of this report.

3.3 Existing Drainage


3.3.1 The site is currently in agricultural use and has no positive surface water drainage infrastructure.

3.3.2 Rainfall currently discharges via overland flow routes directly into the existing watercourses on the site.

3.3.3 The existing greenfield runoff rate has been established using The HR Wallingford tool for Greenfield runoff estimation.

3.3.4 Q_{bar} has been established at 18.1l/s and the 1:100 year peak runoff 57.8l/s

3.3.5 The equivalent greenfield runoff rates are 3l/s/ha and 9.6l/s/ha respectively.



HR Wallingford
Working with water

Greenfield runoff estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:

Site name:

Site location:

Site coordinates

Latitude:

Longitude:

This is an estimation of the greenfield runoff rate limits that are needed to meet normal best practice criteria in line with Environment Agency guidance "Preliminary rainfall runoff management for developments", W5-074/A/TR1/1 rev. E (2012) and the SuDS Manual, C753 (Ciria, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Reference:

Date:

Methodology	IH124
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Site characteristics	
Total site area (ha)	6
Methodology	
Qbar estimation method	Calculate from SPR and SAAR
SPR estimation method	Calculate from SOIL type
	Default Edited
SOIL type	3 3
HOST class	--- ---
SPR/SPRHOST	0.37 0.37
Hydrological characteristics	
	Default Edited
SAAR (mm)	731 731
Hydrological region	7 7
Growth curve factor: 1 year	0.85 0.85
Growth curve factor: 30 year	2.3 2.3
Growth curve factor: 100 year	3.19 3.19

Greenfield runoff rates		
	Default	Edited
Qbar (l/s)	18.13	18.13
1 in 1 year (l/s)	15.41	15.41
1 in 30 years (l/s)	41.71	41.71
1 in 100 years (l/s)	57.84	57.84

Notes:

(1) Is $Q_{BAR} < 2.0$ l/s/ha?
(2) Are flow rates < 5.0 l/s?
(3) Is SPR/SPRHOST ≤ 0.3 ?

Image 2: Greenfield Runoff Calculation

3.3.6 There is a 225mm diameter public foul sewer located approximately 3m beneath Newgate Lane adjacent to the western site boundary and a foul rising main located within the site adjacent to the southern site boundary and within the southwest corner of the site.

3.3.7 A copy of the sewer records is located in Appendix 3 at the rear of this report.

3.4 Geology and Groundwater

3.4.1 The British Geological Survey borehole log data confirms clay substrata.

3.4.2 Water strikes were recorded at between 1m and 5m below ground level and are likely to be perched water tables within the clay substrata.

3.4.3 The “Magic Map” available from DEFRA confirms that the site is located above a minor aquifer classified as having high vulnerability.

3.4.4 A copy of the geological borehole data is located in Appendix 4 at the rear of this report.

4 Flood Zone and Flood History

4.1 Flood Zone

4.1.1 The site is bisected by the River Alver.

4.1.2 The Environment Agency's Product 4 mapping confirms that the area of the site to the east of the river is located predominantly in Flood Zone 1 and that to the west is located predominantly in Flood Zone 3.

4.1.3 JFLOW levels provided by the Environment Agency confirm the 1:100 year plus 45% climate change predicted flood levels are anticipated to be between 8.36m AOD at the north and 8.04m AOD at the south of the site.

4.1.4 Copies of the Environment Agency's Product 4 maps and data are located in Appendix 5 at the rear of this report.

4.2 Flood History

4.2.1 Environment Agency

4.2.1.1 The Environment Agency map of historic flood incidents does not identify any historic flooding recorded at or in the wider vicinity of the proposed development site.

4.2.1 Hampshire County Council

4.2.1.1 Neither the Preliminary Flood Risk Assessment (PFRA) dated June 2011 nor the Local Flood Risk Management Strategy dated July 2013 identify any specific flood incidents in the immediate vicinity of the site.

4.2.2 Fareham Borough Council

4.2.2.1 The Strategic Flood Risk Assessment (SFRA) as part of the Partnership for Urban South Hampshire dated February 2016 does not identify any specific flood incidents within the vicinity of the site.

5 Flooding Potential

5.1 Tidal Flooding

5.1.1 The site is located 3.3km from the coast and is not at risk of tidal flooding.

5.2 Fluvial Flooding

5.2.1 The area to the east of the River Alver is located predominantly in Flood Zone 1 and not at risk of fluvial flooding from anything less extreme than a 1:1,000 year flood event.

5.2.2 The area to the west of the river is located predominantly in Flood Zone 3 and during a 1:100 year +45% climate change flood event is predicted to flood to an estimated depth of between 110mm and 410mm along the alignment of the river.

5.3 Groundwater Flooding

5.3.1 The British Geological Survey borehole logs hosted on the British Geological Survey website confirm that groundwater has been recorded between 2m and 5m below ground level.

5.3.2 Figure 7 in the Hampshire Groundwater Management Plan shows the site to be within a 1km square grid having between 25-50% probability of being affected by groundwater flooding.

5.3.3 There is no indication in the Preliminary Flood Risk Assessment or other available flood maps of groundwater flooding affecting the site.

5.4 Overland Flow

5.4.1 The surface water flood map provided by the Environment Agency confirms that the vast majority of the site is at very low risk of flooding from overland flows.

5.4.2 There are areas along the western section of the site along the alignment of the River Alver which are indicated as being at low, medium, and to a lesser extent, high risk of flooding from surface water.

5.4.3 There are however no records of any overland surface water flow affecting the site.

5.4.4 Copies of the available flood maps are located in Appendix 5 at the rear of this report.

5.5 Flood Routing

5.5.1 The natural route for flood waters to dissipate should any ever occur on the site is towards the River Alver which is located adjacent to the western boundary and flows through the western side of the site.

5.5.2 There is no associated flood risk to the downstream catchment area.

5.5.3 A plan showing the existing flow paths is located in Appendix 6 at the rear of this report.



Image 3: Local Topography

6 Development Proposals

6.1 Description

- 6.1.1 The development proposals are for the development of up to 115 dwellings, open space, vehicular access from Newgate Lane and associated ancillary infrastructure.
- 6.1.2 No residential dwellings or associated infrastructure are proposed within the Flood Zone 3 areas of the site, or within the 1:100 + 45% climate change adjusted floodplain.
- 6.1.3 The combined roof area of the buildings and external hard standing areas is anticipated to be approximately 30% of the total site area at approximately 1.8ha.
- 6.1.4 A copy of the Illustrative Master Plan is located in Appendix 7 at the rear of this report.
- 6.1.5 A copy of the flood extents plan is located in Appendix 8 at the rear of this report.

6.2 Drainage Strategy

- 6.2.1 There are short sections of public surface water sewers to the west of Newgate Lane. These discharge into the River Alver.
- 6.2.2 Based upon the clay geology of the area it is anticipated that discharge of surface water runoff by infiltration will not be sufficient to meet current guidance and National Planning Policy Framework.
- 6.2.3 For the purposes of the Outline Planning Application a drainage strategy based on a restricted discharge to the onsite watercourses has been progressed with confirmation that suitable storage can be provided on site.
- 6.2.4 The surface water drainage system will be designed to comply with National Planning Policy Framework and its supporting guidance documents including the Non Statutory Technical Standards for SuDS.
- 6.2.5 As previously noted the Q_{bar} greenfield runoff rate for the site is 3l/s/ha. With an impermeable area of approximately 1.8ha this equates to an equivalent Q_{bar} greenfield runoff rate for the developed area of approximately 5.4l/s.
- 6.2.6 Preliminary calculations have been prepared in order to establish the required storage for a 1:100 year storm including an additional 40% increase in rainfall intensity to account for future climate change.
- 6.2.7 In accordance with the guidance document supporting the Non Statutory Technical Standards for SuDS an allowance for Urban Creep of 10% for increase

to impermeable area has also been included in the preliminary design for the drainage system. This is based on the proposed residential development density of 22 dwellings per hectare.

6.2.8 A total volume of approximately 1,700m³ will be required to store the surface water runoff generated by the development with a restricted discharge rate of 5.4l/s.

6.2.9 The proposed surface water drainage strategy will incorporate the combined use of sustainable drainage techniques such as swales and shallow landscaped depressions or filter strips and French drains.

6.2.10 Sufficient storage can be provided on site to cater for all storm return periods up to and including the 1:100 year rainfall event with a 40% allowance for climate change with all storage outside the 1:100 +45% climate change adjusted fluvial floodplain.

6.2.11 The exact nature of the storage will be confirmed at detailed design stage but can be accommodated using a variety of methods such as permeable paving, voided subbase, cellular tanks and swales.

6.2.12 The drainage proposals will be further clarified at detailed design stage subject to further site investigations and testing and will be designed to comply with National Planning Policy Framework and its supporting guidance documents including the Non Statutory Technical Standards for SuDS.

6.2.13 A copy of the preliminary surface water storage calculations is located in Appendix 9 at the rear of this report.

6.3 Foul Water

6.3.1 Foul drainage will be discharged via a foul pumping station into the existing public foul sewer beneath Newgate Lane.

6.3.2 There is a Southern Water foul rising main within the site adjacent to the southern site boundary and within the southwest corner of the site. The exact location of the rising main will need to be confirmed at detailed design stage but does not appear at this stage to require any diversion works to accommodate the proposed development.

6.4 Water Quality

6.4.1 The proposed development is for residential use only. In accordance with CIRIA SuDS Manual 2015 (Report C753) the pollution hazard level for such types of development are considered low. Where surface water runoff is to be discharged

into watercourses the SuDS components are only required to control potential contaminants for the frequent low intensity rainfall events as the natural high volume of flows within the receiving water body during a high intensity rainfall event is likely to dilute any contaminants within the water body.

- 6.4.2 The surface water drainage scheme will include mitigation to ensure water quality before the discharge point will be treated and any pollution risk mitigated prior to its discharge to the receiving water body.
- 6.4.3 Table 26.2 in Chapter 26 of CIRIA report C753 The SuDS Manual provides Pollution Hazard Indices for varying land types and uses and defines runoff from roofs to be at very low-risk potential for pollution.
- 6.4.4 Runoff from individual properties driveways, low-trafficked roads and residential parking are considered to be at low-risk potential for pollution.
- 6.4.5 Table 1 summarises the anticipated pollution index from the proposed development.

Land Use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro-carbons
Residential roofs	Very Low	0.2	0.2	0.05
Individual property driveways, residential car park, low-traffic roads	Low	0.5	0.4	0.4

Table 1: Pollution Hazard Indices

- 6.4.6 Where multiple drainage components are used in series the individual mitigation index of secondary and tertiary components is lowered by 50% due to reduced performance associated with primary treatment.

SuDS Type	Total suspended solids (TSS)	Metals	Hydro-carbons
Filter strip	0.4	0.4	0.5
Swale	0.5	0.6	0.6
Permeable pavement	0.7	0.6	0.7
Detention basin	0.5	0.5	0.6
Pond	0.7	0.7	0.5
Wetland	0.8	0.8	0.8

Table 2: Pollution Mitigation Indices

- 6.4.7 The proposed drainage strategy will incorporate measures to meet or exceed the water quality target requirements and therefore complies with the Water Framework Directives for discharge of runoff into controlled waters.
- 6.4.8 An outline drainage maintenance schedule is located in Appendix 10 at the rear of this report.

7 Safe Development

7.1 Flood Zone Compatibility

7.1.1 The area of the site to the east of the River Alver is located predominantly within Flood Zone 1 and will remain so for the foreseeable future.

7.1.2 With reference to the Technical Guidance to the National Planning Policy Framework:

- Table 2: Flood Risk Vulnerability Classification

The type of residential development is classified as More Vulnerable

- Table 3: Flood Risk Vulnerability and Flood Zone Compatibility

More Vulnerable development is appropriate in Flood Zones 1 and 2

7.1.3 All residential development and associated infrastructure in Flood Zone 2 will be located outside the 1:100 + 45% climate change adjusted fluvial floodplain to ensure that the development remains safe throughout its lifetime.

7.2 Risk to Others

7.2.1 The proposed surface water drainage system will be designed to current standards incorporating SuDS elements providing treatment, attenuation and storage which will minimise runoff leaving the site during times of heavy rain.

7.2.2 Allowance has been made for 40% increase in rainfall intensities which is in accordance with the latest figures published by the Environment Agency and in accordance with the requirements under the National Planning Policy Framework.

7.2.3 Allowance has been made for Urban Creep accounting for future property owners extending their houses or adding to the impermeable areas.

7.2.4 The proposed drainage system will incorporate treatment prior to final discharge destination thus mitigating the risk of pollution from the site.

7.2.5 Foul flows from the residential development will be discharged to the public sewer beneath Newgate Lane subject to negotiation with Southern Water.

7.2.6 The risk of flooding to others due to the development proposals is negligible.

8 Conclusions

- 8.1 The site is bisected by the River Alver. The area of the site to the east of the river is located predominantly in Flood Zone 1 and that to the west is located predominantly in Flood Zone 3.
- 8.2 The residential development proposed is classified as More Vulnerable and suitable in Flood Zones 1 and 2.
- 8.3 The site is not at risk of flooding from tidal sources or at significant risk of flooding from ground water.
- 8.4 There are areas within the western section of the site along the alignment of the River Alver which are indicated as being at low, medium and to a lesser extent high, risk of flooding from surface water.
- 8.5 The site layout master plan includes public open spaces in the vicinity of the River Alver. No residential dwellings or associated infrastructure are proposed within the 1:100 + 45% climate change fluvial floodplain to ensure the development remains safe and operable throughout its lifetime.
- 8.6 There are no recorded instances of historic flooding at or in the wider vicinity of the proposed development site.
- 8.7 Surface water runoff generated by the proposed development can be attenuated onsite for all rainfall events up to the 1:100 year event including an allowance for climate change and an additional allowance for future increase in impermeable areas.
- 8.8 Foul drainage will be discharged via a foul pumping station into the existing public foul sewer beneath Newgate Lane.
- 8.9 In terms of flood risk planning the proposed development is safe and the proposed location of the residential dwellings suitable.

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