

37 Stockhay Lane Flood Risk Assessment

Final Report

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Contract

This report describes work commissioned by CT Planning Ltd, on behalf of Mrs A Burford, by an email dated 13 November 2017. CT Planning’s representative for the contract was Philippa Kreuser. Tamsin Jones and Hannah Burgess of JBA Consulting carried out this work.

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Purpose

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Acknowledgements

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 Environment Agency Fradley Office

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Executive summary

Introduction

JBA Consulting was commissioned by CT Planning to undertake a Flood Risk Assessment (FRA) for 2 proposed residential developments at Stockhay Lane, Burntwood, WS7 0JE.

The site is approximately 0.15ha in size and is a brownfield site, currently occupied by a brick building and portacabin. The proposal is for the conversion of these in to 2 residential dwellings of similar size. The proposed site is placed to the east of the residential house off Stockhay Lane, Hammerwich, Burntwood. There is currently a brick built building known as the "hairdressers" and an adjacent portacabin with current use as a dance school. Current access to the site is from a single use track to Stockhay Lane which also serves the existing residential site. The access to the site will be as per existing scenario.

The flood risk to the site has been determined from hydraulic modelling, publicly available data, an assessment of site topography, in accordance with the National Planning Policy Framework (NPPF) and associated Planning Practice Guidance (PPG). The report also considers potential risk of flooding elsewhere as a result of the proposed development at the site.

Planning and flood risk

The site is currently considered as being partially located in Flood Zone 2 and 3 along the track used as access to the site location. Therefore, a flood risk assessment is required as the NPPF classifies the proposed development as being 'More Vulnerable' to flooding. Development in Flood Zones 1, 2 and 3 is accepted subject to passing the Exception and Sequential Test, as necessary.

JBA has carried out improved fluvial modelling work using the 2D model JFlow in the Hammerwich area. This work was carried out for the Environment Agency (EA) and in these updated maps the site location is considered to be wholly within Flood Zone 1.

The proposed site is considered partially as being at 'medium' risk of flooding from surface waters in line with EA mapping. Therefore, appropriate mitigation methods are recommended to reduce surface water flooding to the site. Surface water flooding from the site is not considered to increase due to no increase in the impermeable area at the site location.

The site is not expected to be vulnerable to groundwater flooding.

The EA's Flood Map shows that the site is not at risk of flooding during a reservoir failure.

The site is not considered to be at risk of sewer flooding in accordance with South Staffordshire's SFRA.

Safe access and egress can be maintained during the extreme fluvial and surface water flood events.

Mitigation

The following mitigation methods are recommended:

- The FFL and openings (e.g. air bricks) are recommended to be set to 450mm above surrounding ground levels to prevent ingress of surface water flows resulting from overloaded drainage and localised surface runoff.
- Dwellings are to be positioned where current buildings are with ground levels set to route any overland flows away from the dwellings and towards formal drainage systems or less vulnerable areas like roads and open spaces.

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Abbreviations

AEP	Annual Exceedance Probability
EA	Environment Agency
FFL	Finished Floor Level
FRA	Flood Risk Assessment
HA	hectares
JBA	Jeremy Benn Associates Ltd
LLFA	Lead Local Flood Authority
LPA	Lead Planning Authority
NPPF	National Planning Policy Framework
SFRA	Strategic Flood Risk Assessment

1 Introduction

1.1 Terms of reference

JBA Consulting was commissioned by CT Planning Ltd to undertake a Flood Risk Assessment (FRA) for 2 residential developments proposed at Stockhay Lane, Burntwood.

This FRA provides information on the nature of flood risk at the site and follows government guidance with regards to development and flood risk. This is done in accordance to the National Planning Policy Framework (NPPF) and associated Planning Practice Guidance (PPG). Flood mitigation specific to the proposed development and identified risk is included.

The flood risk at the site has been determined from publicly available information, data obtained from the Environment Agency and Lead Local Flood Authority and a review of site topography.

1.2 FRA requirements

It is a requirement for development applications to consider the potential risk of flooding from various sources to a proposed development over its lifetime and any possible impacts on flood risk elsewhere as a result of the development.

Where appropriate, the following aspects of flood risk should be addressed in all planning applications within flood risk areas:

- The nature and expected lifetime of the development and the extent to which the development is designed to deal with flood risk;
- The area liable to flooding from various sources;
- The probability of current and future flood risk;
- The extent and standard of existing flood defences and their effectiveness over time;
- The nature and expected lifetime of the development proposed and the extent to which is designed to deal with flood risk;
- The likely depth of flooding;
- The rates of predicted flows;
- The likelihood of impacts on other areas, properties and habitats;

Although the site is less than 1 hectare (ha) it is located partially within Flood Zones 2 and 3. Therefore a site-specific FRA considering all potential sources of flooding including coastal, fluvial (river), pluvial (surface runoff/surcharging sewers), groundwater, reservoirs and any other artificial sources is required.

The NPPF recommends a risk-based approach to flood risk management in terms of appraising, managing and reducing consequences of flooding both to and from a development site. The flood risk for the site has been assessed in line with EA requirements and in conjunction with the Client. The primary objectives of this FRA are to determine the following:

- Whether the site is at significant risk from any form of flooding;
- If the site is at risk of flooding, determine if safe access to and from the site can be achieved and maintained; and,
- Mitigation measures to alleviate flood risk on the site.

2 Site Details

2.1 Site Description

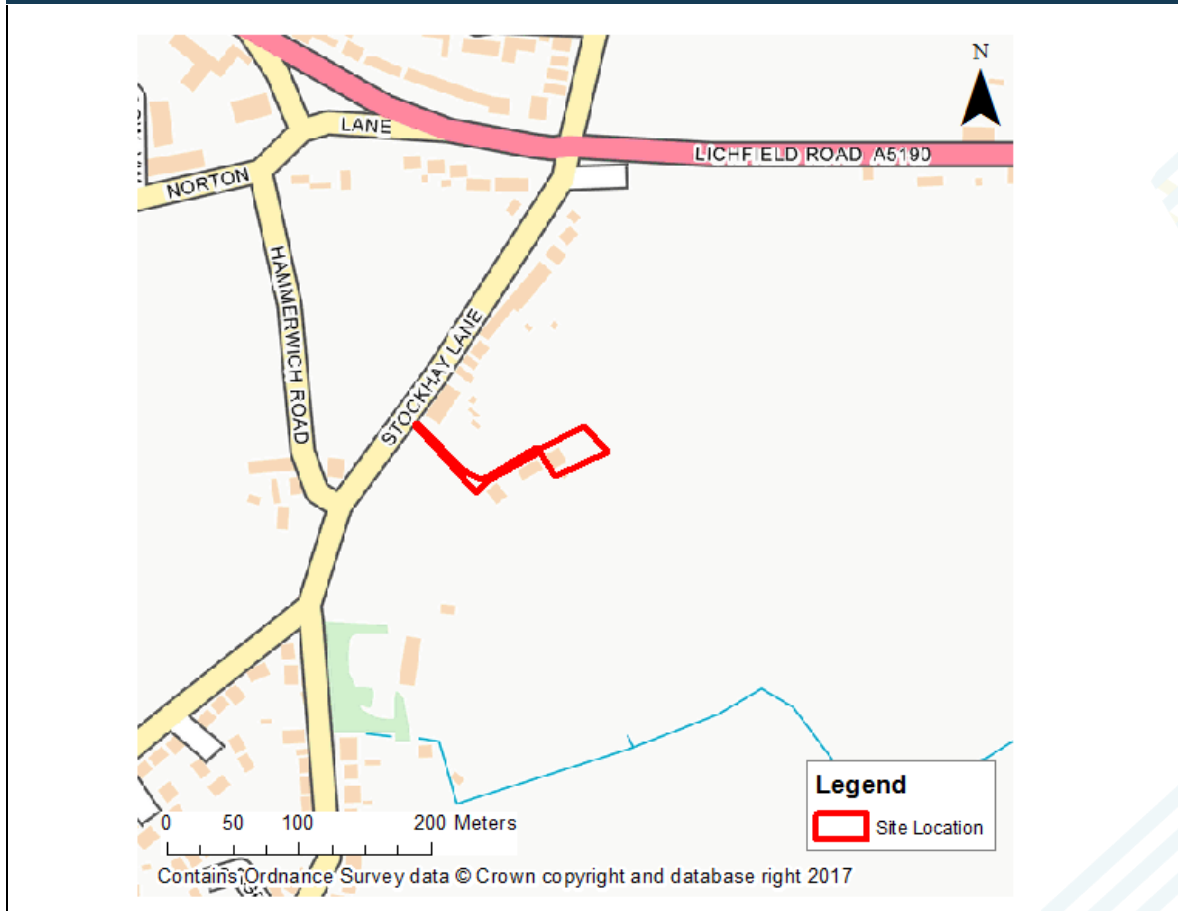
The site is approximately 0.15 hectares (ha) in size and currently occupied by a brick building known as the 'hairdressers' and adjacent to this a portacabin with current use as a dance studio. These current buildings are located to the North-East of a residential home off Stockhay Lane. The site is surrounded by agricultural farmland, however there are some residential properties within proximity to the site location.

The existing site access is via a single track leading from Stockhay Lane to the site.

A summary of the site details is presented in Table 2-1.

Table 2-1 Summary of Site Details	
Site name	Residential development at Stockhay Lane
Site area	0.15 (approximate)
Existing land-use	Brownfield, Brick building and portacabin
Purpose of development	Residential
Site name	Stockhay Lane, Burntwood
Site area	0.15ha
Existing land-use	Brownfield
Purpose of development	Residential
OS NGR	SK069084
County	Staffordshire
Country	England
Local Planning Authorities	Lichfield District Council
Lead Local Flood Authority	Staffordshire County Council

Table 2-1 Summary of Site Details



2.2 Proposed development

The proposal is for the demolition and replacement of 2 buildings at the site; an existing portacabin and brick building and to replace these with a residential building and garage of similar size. The impervious area is expected to remain the same at the site location.

The proposed site layout and relevant elevation plans are included in the Appendix A.

2.3 Topography of the site and the surrounding area

A topographical survey of the site and the surrounding area was prepared by Beacon Land Surveys in January 2018 (drawing no. 18-007-01) and is provided in Appendix B, dated January 2018.

The survey shows that ground elevations slope from the main access track (126.04m AOD) towards the for the proposed development site (122.7m AOD).

2.4 Watercourses

The nearest watercourse to the site location is located South of the site and is an unnamed tributary of the Crane Brook at Hammerwich, approximately 190m South of the site location.

2.5 Existing Drainage Network

As the existing drainage system has performed adequately in the past, it is proposed to connect the proposed units to the existing drainage system on-site. This is suitable given the location of the proposed units and the footprint size of buildings. The new connection should ensure that potential interactions with existing surface water overland flow routes are kept to a minimum.

2.6 Existing hydrogeological conditions

No intrusive ground investigation has been carried out on site to date. Undertaking an assessment of geological conditions was preliminarily achieved using available data by 'Geology of Britain' tool to identify local surface geology. The British Geological Survey (BGS) maps show that the underlying bedrock is Helsby Sandstone Formation. No superficial deposits have been recorded at the proposed site location.

The EA groundwater map shows the site to be located within the catchment for groundwater source protection (Total Catchment Zone 3) in line with EA mapping.

3 Planning policy and flood risk

3.1 Planning context

3.1.1 Applicable planning policy

The NPPF was introduced by the Department for Communities and Local Government in March 2012, replacing the subsequent Planning Policy Statement 25 (PPS25, 2006). Its technical guidance relates to development planning and flood risk using a sequential characterisation of risk based on planning zones and the EA Flood map, and minerals policy. The NPPF is further supported by the Planning Practice Guidance (PPG), March 2014, giving further information on the flood risk assessment. The main study requirement is to identify the flood zones and vulnerability classification relevant to the proposed development, based on an assessment of current and future conditions.

3.2 NPPF Flood Zones

Table 3-1 shows how the Flood Zones are related to a sequential planning response. The advisory notes for this type of development are detailed in Table 3-2. The details of Sequential and Exception Tests are provided in Table 3-3.

Table 3-1: NPPF Flood Zones

Zone 1: Low Probability	
Land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% – 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% – 0.1%) in any year.	<p>Appropriate uses The water-compatible, less vulnerable and more vulnerable uses of land and essential infrastructure are appropriate in this zone. Highly vulnerable uses are only appropriate in this zone if the Exception Test is passed.</p> <p>FRA requirements All proposals in this zone should be accompanied by a FRA.</p> <p>Policy aims Developers and local authorities should seek opportunities to reduce the overall level of flood risk through the layout and form of the development, and the appropriate application of sustainable drainage techniques.</p>
Zone 2: Medium Probability	
Land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% – 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% – 0.1%) in any year	<p>Appropriate uses</p> <ul style="list-style-type: none"> • The water-compatible, less vulnerable and more vulnerable uses of land and essential infrastructure are appropriate in this zone. • Highly vulnerable uses are only appropriate in this zone if the Exception Test is passed. <p>FRA requirements All proposals in this zone should be accompanied by a FRA.</p> <p>Policy aims Developers and local authorities should seek opportunities to reduce the overall level of flood risk through the layout and form of the development, and the appropriate application of sustainable drainage techniques.</p>
Zone 3a: High Probability	
Land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability	<p>Appropriate uses The water-compatible and less vulnerable uses of land are appropriate in this zone. The highly vulnerable uses should not be permitted in this zone.</p>

of flooding from the sea (>0.5%) in any year.

The more vulnerable and essential infrastructure uses should only be permitted in this zone if the Exception Test is passed.

FRA requirements

All proposals in this zone should be accompanied by a FRA.

Policy aims

Developers and local authorities should seek opportunities to:

- reduce the overall level of flood risk through the layout and form of the development and the appropriate application of sustainable drainage techniques;
- relocate existing development to land with a lower probability of flooding;
- create space for flooding to occur by allocating and safeguarding open space for flood storage.

Zone 3b: Functional Floodplain

Land where water has to flow or be stored in times of flood.

Local Planning Authorities should identify in their SFRAs areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters.

But land which would flood with an annual probability of 1 in 20 (5%) or greater in any year, or is designated to flood in an extreme (0.1%) flood, should provide a starting point for consideration and discussions to identify functional floodplain.

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But land which would flood with an annual probability of 1 in 20 (5%) or greater in any year, or is designated to flood in an extreme (0.1%) flood, should provide a starting point for consideration and discussions to identify functional floodplain.

Source: Table 1, NPPF Planning Practice Guidance

Table 3-2: Flood Risk Vulnerability Classification

Essential Infrastructure

- **Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk.**
- **Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity generating power stations and grid and primary substations; and water treatment works that need to remain operational in times of flood.**
- **Wind turbines.**

Highly Vulnerable

- **Police stations, Ambulance stations and Fire stations and Command Centres and telecommunications installations required to be operational during flooding.**
- **Emergency dispersal points.**

	<ul style="list-style-type: none"> • Basement dwellings. • Caravans, mobile homes and park homes intended for permanent residential use (Sequential and Exception Tests required for any change of land use to these sites). • Installations requiring hazardous substances consent (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as “Essential Infrastructure”).
<p>More Vulnerable</p>	<ul style="list-style-type: none"> • Hospitals. • Residential institutions such as residential care homes, children’s homes, social services homes, prisons and hostels. • Buildings used for: dwelling houses; student halls of residence; drinking establishments; nightclubs; and hotels • Non-residential uses for health services, nurseries and educational establishments • Landfill and sites used for waste management facilities for hazardous waste. • Sites used for holiday or short-let caravan and camping, <i>subject to a specific warning and evacuation plan.</i>
<p>Less Vulnerable</p>	<ul style="list-style-type: none"> • Police, ambulance and fire stations which are <i>not</i> required to be operation during flooding. • Buildings used for: shops; financial, professional and other services; restaurants and cafes; hot food takeaways; offices; general industry; storage and distribution; non-residential institutions not included in ‘more vulnerable’; and assembly and leisure. • Land and buildings used for agriculture and forestry. • Waste treatment (except landfill and hazardous waste facilities). • Minerals working and processing (except for sand and gravel working). • Water treatment works and which do <i>not</i> need to remain operation during times of flood. • Sewerage treatment works (if adequate measures to control pollution and manage sewage during flooding events are in place).
<p>Water-compatible Development</p>	<ul style="list-style-type: none"> • Flood control infrastructure. • Water transmission infrastructure and pumping stations. • Sewage transmission infrastructure and pumping stations. • Sand and gravel workings. • Docks, marinas and wharves. • Navigation facilities. • MOD defence installations. • Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location.

- Water-based recreation (excluding sleeping accommodation).
- Lifeguard and coastguard stations.
- Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms
- Essential ancillary sleeping or residential accommodation for staff required by uses in this category, *subject to a specific warning and evacuation plan.*

Source: Table 2, NPPF Planning Practice Guidance

Notes:

- 1. This classification is based partly on Defra/EA research on Flood Risks to People (FD2321/TR2) and also on the need of some uses to keep functioning during flooding.*
- 2. Buildings that combine a mixture of uses should be placed into the higher of the relevant classes of flood risk sensitivity. Developments that allow uses to be distributed over the site may fall within several classes of flood risk sensitivity.*
- 3. The impact of a flood on the particular uses identified within this flood risk vulnerability classification will vary within each vulnerability class. Therefore, the flood risk management infrastructure and other risk mitigation measures needed to ensure the development is safe may differ between uses within a particular vulnerability classification.*

3.3 Sequential and Exception tests

The NPPF requires that the Sequential and Exception tests should be applied when choosing the location of new development and the layout of the development site. The Sequential Test aims to promote development in low flood risk areas. The Exception Test is used where no suitable development areas can be found in low risk zones.

When planning a development, a sequential approach should be applied to identify suitable sites which are at minimal risk from fluvial flooding, avoiding Flood Zones 2 and 3 where possible. If no suitable areas can be identified in Flood Zone 1 then sites with the lowest flood risk should be considered next. If development is necessary within a medium or high-risk zone an exception test may be required to demonstrate the need for the development in that location and plans to mitigate the flood risk.

The development site is for 2 residential dwellings classified by the NPPF as 'More Vulnerable.' Therefore, their construction is permitted in Flood Zone 1 and 2 and in Flood Zone 3a provided that a Sequential and Exception Test is passed, see Table 3-3.

Table 3-3: Sequential and Exception Test

Vulnerability Classification (Table 2)	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone (Table 1) Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	✓	Exception Test	✓	✓
Zone 3a	Exception Test	✓	✗	Exception Test	✓
Zone 3b	Exception Test	✓	✗	✗	✗

Source: Table 3, NPPF Planning Practice Guidance

- ✓ Development is appropriate
- ✗ Development should not be permitted

The above table does not show:

1. The application of the sequential test which guides development to Flood Zone 1 first, then Zone 2, and then Zone 3;
2. Flood risk assessment requirements;
3. The policy aims for each flood zone.

The location of the buildings are within Flood Zone 1 based on the most up to date fluvial mapping and therefore development is appropriate.

Pluvial flood risk should also be considered at the site layout planning stage, ensuring that the new development is positioned away from low lying areas and surface water conveyance routes.

3.4 Policy and guidance review

3.4.1 Level 1 Strategic Flood Risk Assessment, 2014

Flood related information for the South Staffordshire Council Strategic Flood Risk Assessment was released in 2014.

The main objective of the SFRA is to give an overview of local flood risk within the area based on a review of available flood and model data (at the time the SFRA was prepared). The SFRA considers sources of local flood risk (surface water, ordinary watercourses and groundwater) and outlines a strategy for the management of such risk. In the SFRA flood map, the site is shown to be partially located within Flood Zone 2 and 3. However this is based upon old flood modelling from before modelling was updated.

The level 1 SFRA also states that any planning applications for sites within Flood Zones 2, 3a or 3b or over 1ha in size will require a site-specific FRA. This FRA should consider the risk to the development from all sources of flooding.

3.5 Environment Agency Climate Change Allowances (2016)

NPPF and supporting planning practice guidance on Flood Risk and Coastal Change explain when and how flood risk assessments should be used. This includes demonstrating how flood risk will be managed now and over the development's lifetime, taking climate change into account.

On 19 February 2016, the Environment Agency released new guidance on climate change allowances to support the NPPF (<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>). This has been revised in February 2017. The climate changes allowances are predications of anticipated changes for the following:

- Peak river flow allowances for each river basin district
- Peak rainfall intensity
- Sea level rise
- Offshore wind speed and extreme wave height.

The guidance provides advice on which peak river flow allowances should be used for flood risk assessments, for sites in Flood Zones 1, 2, 3a and/or 3b.

In Flood Zone 1 the central allowance for essential infrastructure, highly vulnerable, more vulnerable and less vulnerable developments should be used.

The results of the 2017 updated modelling for Hammerwich, show that the site will not be affected in a future 1 in 100 year flood event, given an allowance for climate change.

4 Assessment of Flood Risk

All new developments must comply with the flood risk guidance set out in the NPPF. The NPPF advocates a risk-based approach to flood risk management in terms of appraising, managing and reducing the consequences of flooding both to and from a development site.

Other sources of flooding to the proposed development site are assessed in this study as well as the risk of flooding from third party land as a result of the proposed development, as well as how these risks should be managed.

The approach to assessing flood risk at the development site was informed by the requirements of the NPPF in conjunction with the client and the EA requirements. The primary objectives of this FRA are as follows:

- Determine whether the site is at significant risk from any forms of flooding.
- Identify and assess the risks of all forms of flooding to and from the development, and demonstrate how these flood risks will be managed so that the development remains safe throughout its lifetime, taking climate change into account.
- If the site is at risk of flooding, determine if safe access to and from the site will be maintained during an extreme flood event.
- Assess the impact of the development on flood risk to other sites, with focus on the effects of surface water from the site and changes in the fluvial flooding as a result of the development.

4.1 Historical flooding

The EA Historic Flood Map shows that the proposed development site is not located within any historic and recorded flood extents from the main fluvial River sources.

South Staffordshire's Strategic Flood Risk Assessment (SFRA) further highlights that there are no recorded instances of historical flooding at or near the development site. Recorded instances of flooding have taken place within the Lichfield district at Alrewas, however this is a large distance from the site location and has had no impact here.

4.2 Fluvial Flood Risk

The nearest watercourse to the site is an un-named tributary of the Crane Brook, which is approximately 190m South of the site location.

The EA Flood Map for Planning, shown in Figure 4-1, indicates that the site is almost entirely within Flood Zone 1 (0.01% AEP). However, part of the access site is located within Flood Zone 2 and 3. From this site location there appears to be some irregularities in the data set, suggesting that the LiDAR used to produce results has had an impact on the outcome of the result at this site. There is a lack of understanding surrounding the un-named tributary of the Crane Brook at Hammerwich.

Approval was received from the Environment Agency in February 2018 for the use of the JFlow modelling work carried out by JBA in 2017 for the area. This model refined the flood extents for the un-named tributary and is expected that the Flood Map for Planning will be updated in due course.

The output for improved modelling of fluvial flood risk using JBA's produced JFlow is shown in Figure 4-2. The runoff flow is shown as it comes from the upstream catchment and floods on to Stockhay Lane. The site location itself is located far from this flooding extent. A 25-year event does not reach the location of the site in the modelling of these events. From this improved study it is assumed that development is suitable within this location, considering that the change in size of the property is minimal.

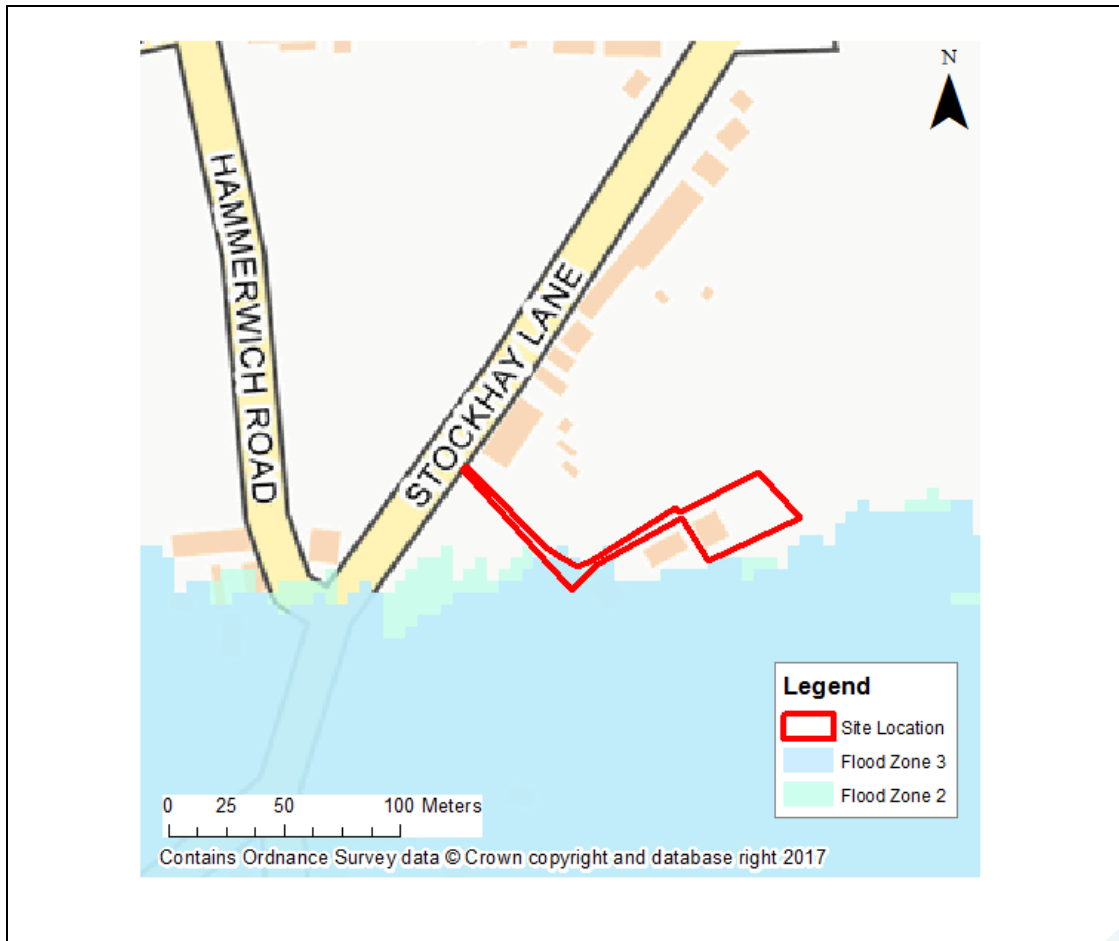


Figure 4-1 EA map for planning

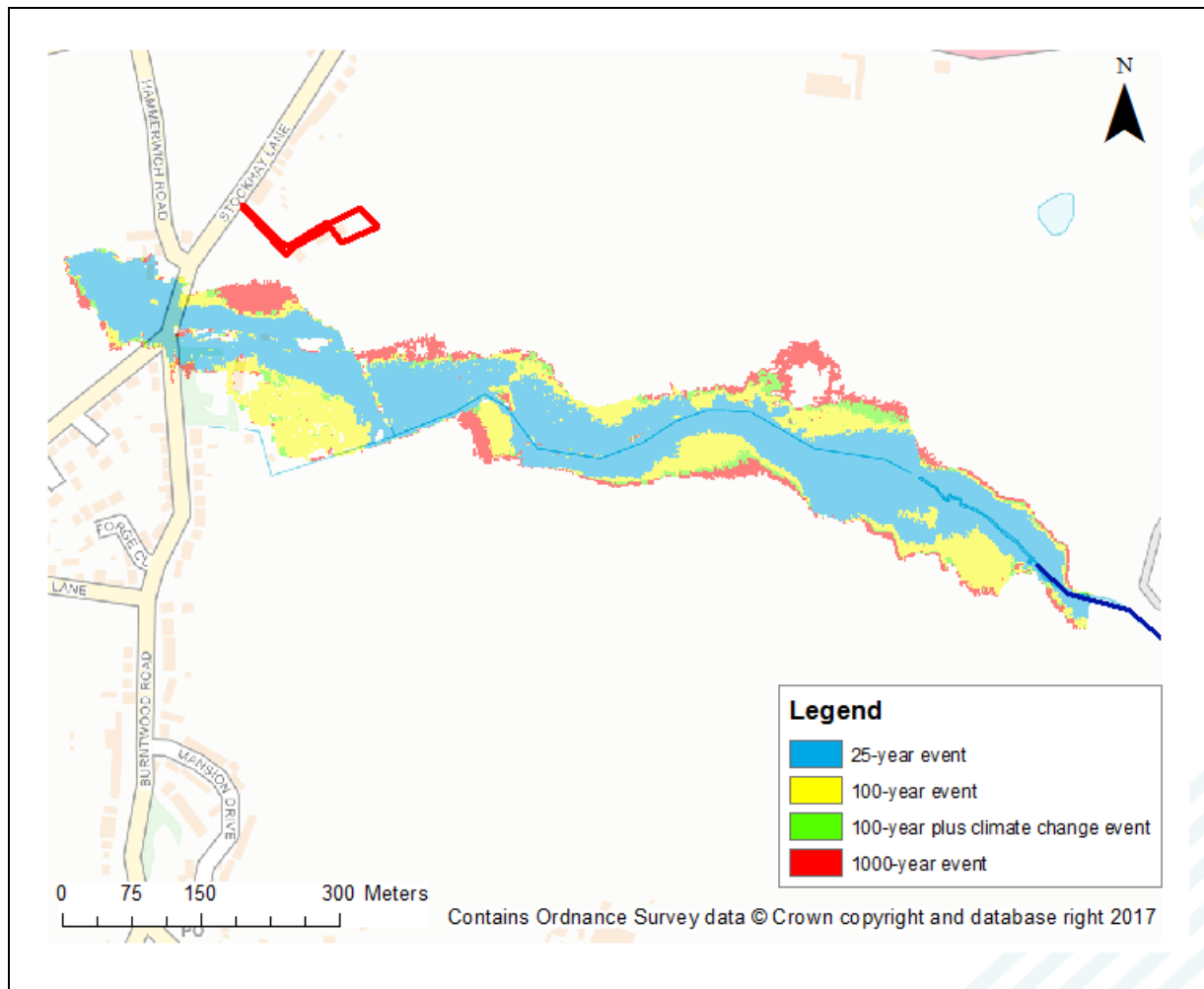


Figure 4-2 JBA's updated map using JFlow

4.3 Surface water flooding

4.3.1. To the site

Surface water flood risk to the site has been assessed using the EA's Risk of Flooding from Surface Water Map which identifies areas that pose a risk. Classification is divided in to one of four categories. These categories are detailed below:

- High – an area has a chance of flooding of greater than 1 in 30 (3.3%) each year
- Medium – an area has a chance of flooding of between 1 in 30 (3.3%) and 1 in 100 (1%) each year
- Low – an area has a chance of flooding between 1 in 1,000 (0.1%) and 1 in 100 (1%) each year
- Very low – an area has a chance of flooding of less than 1 in 1,000 (0.1%) each year

As shown in Figure 4-3, the site location is located partially within 'low' risk of surface water flooding.

The main access and egress to/from the site will not be compromised by surface water flooding as it is located within a 'very low' risk of flooding. A safe passage to and from the site will be possible at all times.

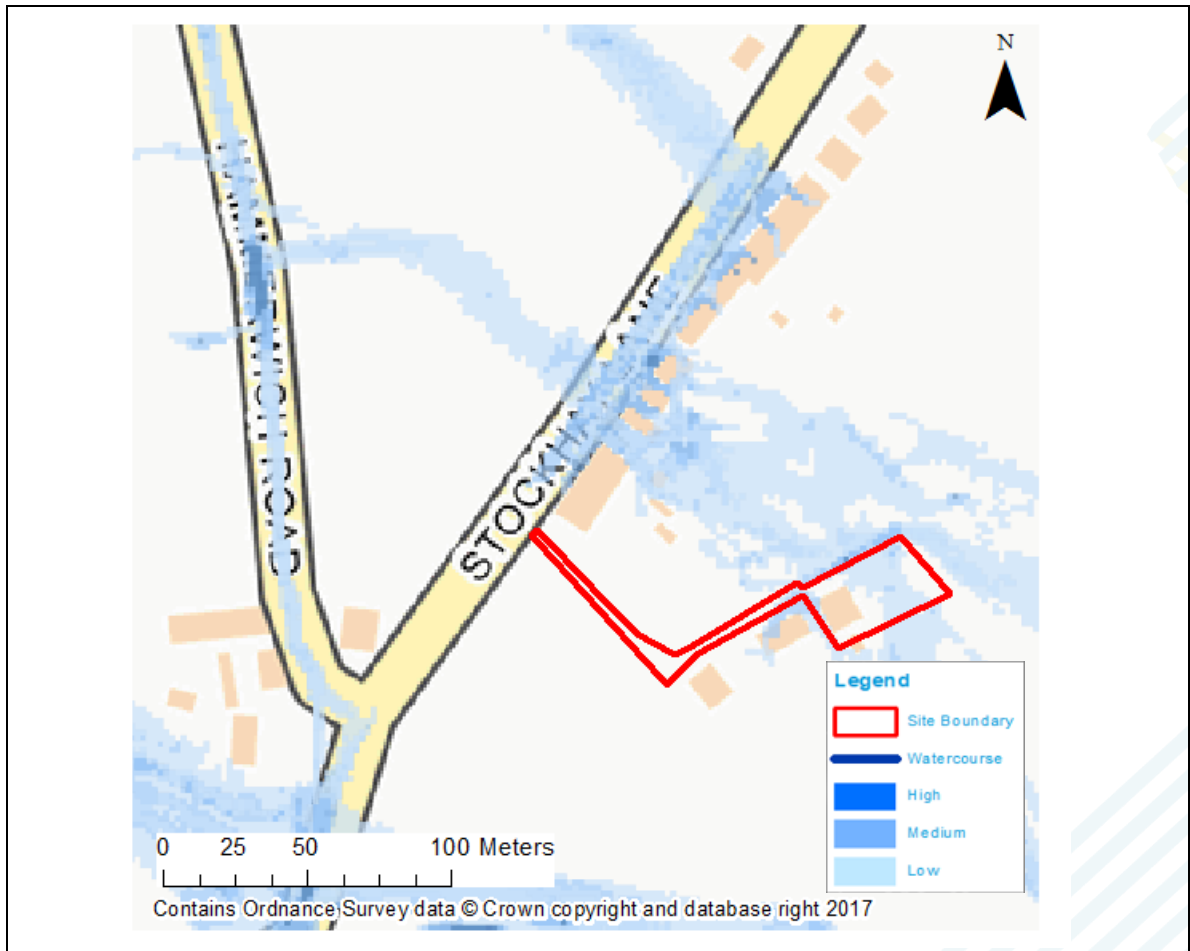


Figure 4-3 EA map for surface water

4.3.2 From the site

Impervious surfaces increase surface runoff rates and volumes. As the impervious area of the site should not increase, there should be no impact on offsite surface water flood risk. In line with the South Staffordshire County Council's SFRA:

"The surface water drainage arrangements for any development site should be such that the volumes and peak flow rates of surface water leaving a developed site are no greater than rates prior to the proposed development, unless specific off-site arrangements are made and result in the same net effect."

In accordance with this it is expected that the changes in surface water flooding following the new developments will be minimal on current drainage. However, it is best practice to utilise appropriate sustainable drainage techniques where possible to better the existing scenario. It is recommended that small scale rainwater harvesting or other sustainable drainage methods can be utilised to reduce risk of flooding to surrounding areas.

4.4 Groundwater Flood Risk

Groundwater flooding occurs when the water table rises above ground level, especially after prolonged rainfall. This is most likely to occur in low-lying areas,

underlain by permeable bedrock and superficial geology. Unlike other forms of flooding groundwater does not pose significant risk to life, however can cause serious damage to property.

The SFRA classifies the site as being in a 1km square grid which is classed as 'A' in terms of groundwater susceptibility. This indicates the site has limited potential for groundwater flooding to occur. This is based on the rock type and estimated groundwater level during periods of extended intense rainfall. The site has underlying Mercia Mudstone Group Deposits; sand and gravelly deposits, which are known to hold extensive groundwater resources.

4.5 Risk of Flooding from Reservoirs

The site is not shown to be at a risk of inundation from reservoirs in line with the EA 'Flood risk from reservoirs' mapping. Therefore, the risk of reservoir flooding to the site location is considered negligible.

4.6 Risk from sewer flooding

Historical instances of sewer flooding are recorded by Severn Trent Water, the SFRA for South Staffordshire County Council shows all instances of flooding from artificial sources for each postcode area. This is recorded on the DG5 register, there are 15 postcode areas identified at risk of flooding from artificial drainage systems and surface water runoff. The site location is not included in this and therefore does not have any recorded instances of properties at risk of flooding for the postcode area.

4.7 Safe Access and Egress

Updated models of fluvial flooding show that the site included the access to the site is in Flood Zone 1. Surface water flooding is shown to be 'very low' in the current site access. Therefore, safe access and egress following minimal change from development is expected to be maintained. No special mitigation measures are therefore required in this respect.

5 Flood Risk Mitigation

In accordance with the NPPF and the associated PPG, it must be demonstrated that the proposed development will be safe for its lifetime taking account of vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall. Based on the analysis in Section 4, the new update of fluvial flood risk model shows that the site is considered at low risk of fluvial, groundwater and sewer flooding. Surface water flooding is at 'very low' and 'low' risk.' Appropriate measures should therefore be implemented to reduce the risk of surface water flooding to the site.

5.1 Finished Floor Levels

It is recommended that, in line with the part H of the Building Regulations, the finished floor levels (FFL) and openings (e.g. air bricks) of the proposed residential dwellings are set to a minimum of 150mm above the surrounding ground levels within the proposed development area.

Given the low risk of surface water flooding at the site, we recommend that FFL are set 450mm above ground levels to allow for surface water to flow around properties on site. Such an event is only expected on a very rare occasion. Due to constraints with a public footpath and possible off-site impacts on displacing the surface water flow path, raising the entire development platform to this level is not recommended.

6 Construction (Design and Management) Review

Under the Construction (Design and Management) Regulations 2015 (CDM 2015) it is the designer's duty to:

- eliminate foreseeable health and safety risks to anyone affected by the project
- take steps to reduce or control any risks that cannot be eliminated
- communicate, cooperate and coordinate with the client, other designers and contractors involved in the project so that designs are compatible and health and safety risks accounted for during the project and beyond

As such minimum floor levels have been recommended to protect the development against potential flooding.

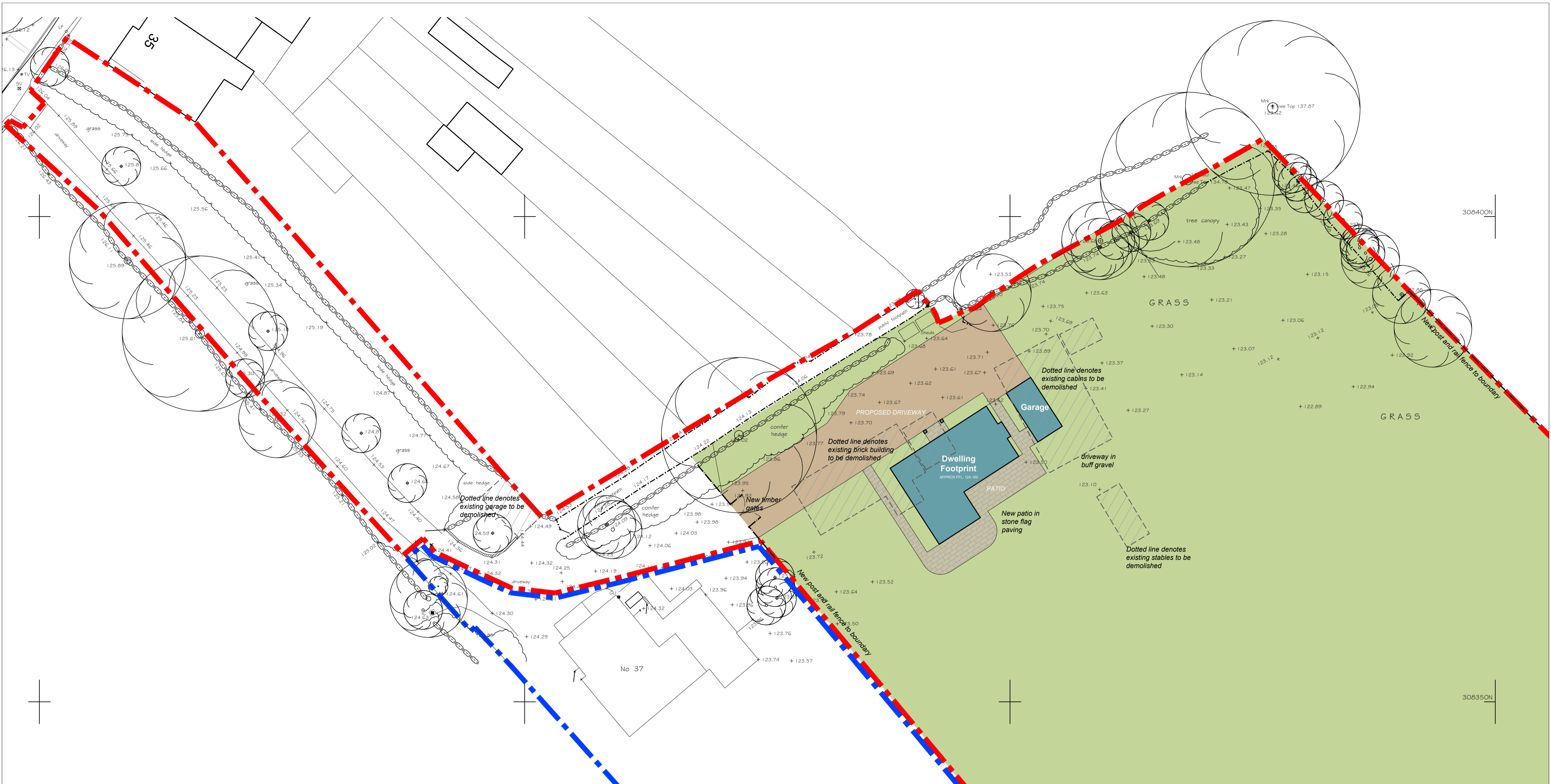
7 Conclusions and Recommendations

- JBA Consulting was commissioned by CT Planning, on behalf of A Burford, to undertake a Flood Risk Assessment (FRA) for a proposed residential development at 37 Stockhay Lane, Burntwood, WS7 0JE.
- The site is approximately 0.15ha in size. The proposal is for the removal of 2 existing buildings and replacing them with 2 dwellings. The existing greenfield site and access track will remain, the impermeable area is expected to be of similar size.
- The FRA report provides information on the nature of flood risk at the site and follows Government's guidance with regards to development and flood risk, as set out in the NPPF.
- There is no evidence of historic flooding at the site.
- In line with updated model outputs undertaken by JBA using JFlow the site is located wholly within Flood Zone 1.
- Based on the review of flood levels and the site's topography, the development area is considered to be at low risk of fluvial flooding. Furthermore, no fluvial floodplain storage will be lost as a result of the proposed development, therefore, there is no increase in fluvial flood risk downstream.
- The proposed development is at low risk of surface water flooding in accordance with EA mapping.
- The site is not considered to have high susceptibility to groundwater flooding in accordance with the Strategic Flood Risk Assessment
- Raised floor levels have been suggested to be set at 450mm above surrounding ground levels to prevent the ingress of surface water flows resulting from overloaded drainage.

Appendices

A Appendix A – Proposed Site Layout





Proposed Site Plan
scale 1:200@A1

Rev	Date	Note
D	29-01-19	Gate position amended.
C	09-01-19	Boundaries amended to suit client comments
B	07-12-18	Garage position amended.
A	29-11-18	Minor revisions to dwelling position.

Status:
PLANNING

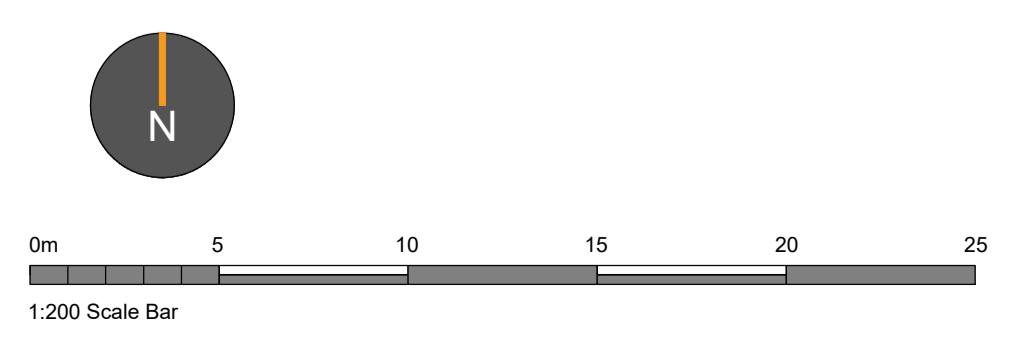
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Project:
**Proposed Dwelling
37 Stockhay Lane, Burntwood**

Drawing title:
**Proposed
Site Plan**

Drawing number:	Date of first issue:
309-101	24-08-18
Revision:	Scale / Paper size:
D	1:200 / A1
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B Appendix B – Topographical Survey





Existing Site Survey

scale 1:200@A1

A 09-01-19 Boundaries revised to suit client comments
 Rev Date Note

Status:
 PLANNING

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Project:
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Drawing title:
 Existing Site
 Survey

Drawing number:
 309-100

Date of first issue:
 24-08-18

Revision:
 A

Scale / Paper size:
 1:200 / A1

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