Steve Gilman Design Ltd

Consulting Structural & Civil Engineers

Torgate Lane,

Bassingham

Flood Risk Assessment

Project No. 7597 – Revision B (25/01/2022)

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Registered Office: Lych Gate Barn, Church Lane, Carlton Le Moorland, Lincoln, LN5 9HS
Tel: 01522 788000 - **Email:** mail@stevegilmandesign.co.uk - **Web:** www.stevegilmandesign.co.uk
Directors: S.Gilman B.Eng, C.Eng, M.I.Struct.E. **A.M.Foottit** I.Eng, A.M.I.Struct.E.
Company Secretary: H.L.Gilman B.A.(Hons).
Registered in England. Registration Number: 5337463 V.A.T. Registration Number: 852 7676 88

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Introduction

This Flood Risk Assessment (FRA) has been produced for the proposed residential development at Torgate Lane, Bassingham.

This report is an assessment of all sources of flood risk associated with the proposed development.

The information presented and conclusions drawn are based on statistical data and are for guidance purposes only.

This Flood Risk Assessment (FRA) has been carried put in accordance with the requirements of the National Planning Policy Framework (NPPF) and the associated Planning Practice Guidance (PPG). This report is an assessment of all sources of flood risk associated with the proposed development.

This FRA is based on the following information:

- Environment Agency online Flood Maps for Planning (Rivers and Sea),
- Environment Agency online Flood Maps (Flood Risk from Surface Water),
- Environment Agency online Risk of Flooding from Reservoirs,
- Environment Agency Product 4 data,
- British Geological Survey maps,
- LiDAR data.

The Environment Agency (EA) Flood Maps for Planning suggests the majority of the site is located within Flood Zone 1, which is defined in the Technical Guidance that accompanies the National Planning Policy Framework as having a “Low” risk of flooding from rivers or sea.

The site is currently arable agricultural land and is situated on the south side of Torgate Lane, on the south-eastern periphery of the village of Bassingham in Lincolnshire.

The site layout plans included as **Appendix 1** confirms that the proposed development will be located entirely within the Flood Zone 1 extents.

The Environment Agency (EA) Pluvial Flood Maps suggests the site is generally at low risk of pluvial flooding, however there is an area at medium risk of pluvial flooding within the site.

Given the stringent conditions and requirements for inspections and maintenance of reservoirs capable

of holding over 25,000m^3 of water above natural ground level, combined with the estimated flood velocities, the likelihood and consequence of a reservoir breach is deemed to be low.

The potential flood risks posed by sewers and groundwater sources are also considered to be low.

This report demonstrates that the proposed development is not at significant flood risk subject to the flood mitigation measure recommended within this report.

This FRA has taken into account the current understanding of the impacts of climate change and has demonstrated that the development will remain safe and operational from all sources of flood risk and will not increase flood risk elsewhere throughout the lifetime of the development and is therefore compliant with the requirements of the National Planning Policy Framework (NPPF) and the Planning Practice Guidance (PPG) to the NPPF.

This FRA has been prepared using our best engineering judgement, however, there are levels of uncertainty implicit in the historical data and methods of analysis. Subsequently, this report provides no guarantee against flooding of the study site or elsewhere, nor as to the absolute accuracy of water levels, flow rates and associated probabilities quoted.

Site Location, Description and Development Details

Table 1 provides a summary of the sites salient features.

Site Address	Land off Torgate Lane, Bassingham
Approximate National Grid Reference	SK 91308 59592
Existing Development	Arable Agricultural Land
Proposed Development	23 no. residential units
Flood Zone	The site is considered to be located entirely within Flood Zone 1.
Surface Water Flooding	The site is considered to be at low to medium risk of pluvial flooding.

Table 1 – Site Summary

The available topographical information indicates that the land levels generally fall towards the centre of the site from a height of approximately 14.5mAOD to 13.96mAOD as shown in Figure 1.

National Planning Policy Framework (NPPF)

The National Planning Policy Framework (NPPF) clearly identifies flood risk as a specific material consideration in the Planning Process and in the allocation and release of sites for development or re-development.

The NPPF expects the Local Planning Authority to adopt a risk-based approach at all levels of planning, through the application of the Sequential Test.

The aim of the sequential test is to steer new development to areas with the lowest probability of flooding. Development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower probability of flooding.

The Strategic Flood Risk Assessment will provide the basis for applying this test. A sequential approach should be used in areas known to be at risk from any form of flooding.

Requirements of a Flood Risk Assessment

Paragraph 30 of the Planning Practice Guidance to the National Planning Policy Framework (PPG to the NPPF) states:

> *"A site-specific flood risk assessment is carried out by (or on behalf of) a developer to assess the flood risk to and from a development site. Where necessary (see footnote 20 in the National PlanningPolicy Framework), the assessment should accompany a planning application submitted to the local planning authority. The assessment should demonstrate to the decision-maker how flood risk will be managed now and over the development's lifetime, taking climate change into account, and with regard to the vulnerability of its users (see Table 2 – Flood Risk Vulnerability)."*

Footnote 20 of the National Planning Policy Framework (NPPF) states:

> *"A site-specific flood risk assessment is required for proposals of 1 hectare or greater in Flood Zone 1; all proposals for new development (including minor development and change of use) in Flood Zones 2 and 3, or in an area within Flood Zone 1 which has critical drainage problems (as notified to the local planning authority by the Environment Agency); and where proposed development or a change of use to a more vulnerable class may be subject to other sources of flooding."*

The objectives of a site-specific flood risk assessment are to establish:

- "whether a proposed development is likely to be affected by current or future
- flooding from any source;
- whether it will increase flood risk elsewhere;
- whether the measures proposed to deal with these effects and risks are appropriate;
- the evidence for the local planning authority to apply (if necessary) the Sequential Test, and,
- whether the development will be safe and pass the Exception Test, if applicable."

Paragraph 31 of the PPG to the NPPF states:

> *"The information provided in the flood risk assessment should be credible and fit for purpose. Site- specific flood risk assessments should always be proportionate to the degree of flood risk and make optimum use of information already available, including information in a Strategic Flood Risk Assessment for the area, and the* interactive flood risk maps *available on the Environment Agency's web site.*
>
> *A flood risk assessment should also be appropriate to the scale, nature and location of the development. For example, where the development is an extension to an existing house (for which planning permission is required) which would not significantly increasethe number of people present in an area at risk of flooding, the local planning authoritywould generally need a less detailed assessment to be able to reach an informed decision on the planning application. For a new development comprising a greater number of houses in a similar location, or one where the flood risk is greater, the local planning authority would need a more detailed assessment."*

Table 2 on the following page is a copy of Table 2: 'Flood Risk Vulnerability Classification' taken from of the PPG to the NPPF.

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 powerstations and grid and primary substations; and

water treatment works that need to remain operational in times of flood.
- Wind turbines.

HIGHLY VULNERABLE

- Police and ambulance stations; fire stations and command centres; telecommunications installations required to be operational duringflooding.
- Emergency dispersal points.
- Basement dwellings.
- Caravans, mobile homes, and park homes intended for permanent residential use.
- Installations requiring hazardous substances consent.

MORE VULNERABLE

- 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 caravans and camping, subject to a specific warning and evacuation plan.

LESS VULNERABLE

- Police, ambulance and fire stations which are not required to be operational during flooding.
- Buildings used for shops; financial, professional and other services; restaurants, cafes and hot food takeaways; offices; general industry,storage and distribution; non-residential institutions not included in the 'More Vulnerable' class; 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 which do not need to remain operational during times of flood.
- Sewage treatment works, if adequate measures to control pollution and manage sewage during flooding events are in place.

WATER-COMPATIBLE DEVELOPMENT

- Flood control infrastructure.
- Water transmission infrastructure and pumping stations.
- Sewage transmission infrastructure and pumping stations.
- Sand and gravel working.
- Docks, marinas and wharves.
- Navigation facilities.
- Ministry of 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.

With reference to Table 2, it is evident that the proposed residential development is classified as 'More Vulnerable'.

With reference to **Table 3** below which is a copy of Table 3: 'Flood Risk Vulnerability and flood zone compatibility' taken from of the PPG to the NPPF. It is evident that the proposed development is compatible with the sites Flood Risk Vulnerability.

Flood Zones	**Flood Risk Vulnerability Classification**				
	Essential Infrastructure	**Highly Vulnerable**	**More Vulnerable**	**Less Vulnerable**	**Water Compatible**
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception test required	✓	✓	✓
Zone 3a †	Exception test required	×	Exception test required	✓	✓
Zone 3b *	Exception test required	×	×	×	✓

Table 3 – Flood Risk Vulnerability and flood zone compatibility

Key:

✓ Development is appropriate
× Development should not be permitted

Potential Sources of Flood Risk

Table 4 below identifies all the potential sources of flood risk which may pose a flood risk to the site and the surrounding catchment.

Each source of flood risk is discussed in greater detail in the relevant section of this report and where necessary,appropriate flood risk mitigation measures may be recommended to minimise the likelihood and consequence of flooding and to facilitate a quicker recovery in the event of a flood.

Source of Flood Risk	Risk Potential					Justification
	High	Medium	Low	V. Low	None	
Fluvial – Main River			✓			
Pluvial – Surface Water		✓				Proposed levels will direct flow routes towards the proposed attenuation
Reservoirs and Artificial Water Bodies					✓	
Sewers				✓		
Groundwater	✓					Raised levels
Tidal/CoastalFlooding			✓			

Table 4 – Sources of Flood Risk

Fluvial Flood Risk

Fluvial flooding occurs when the flows exceed the capacity of the channel, or where a restrictive structure is encountered, which leads to water overtopping the banks into the floodplain. This process can be exacerbated when debris is mobilised by high flows and accumulates at structures.

The Environment Agency Flood Maps for Planning refer to 'Flood Zones' which show the extent of the natural floodplain and ignores the presence of flood defences, man-made structures and channel improvements.

Table 5 details the Environment Agency Flood Map Descriptions:

Annotation	Description
Dark blue shading **(Flood Zone 3)**	Flood Zone 3 comprises of two elements; Flood Zone 3A and Flood Zone 3B where: FloodZone3A shows the area of land that could be affected by flooding from rivers during a 1.0 per cent (1 in 100 year event) and from the sea during a 0.5 per cent(1 in 200 year event). Flood Zone 3B denotes the area of land where water has to flow or be stored in times of a flood. It is typically defined as an area of land that has a 5.0percent (1 in 20 year) or greater chance of occurring each year.

Light blue shading	Flood Zone 2 Shows the areas which are likely to be affected by a major flood, with up to a 0.1 per cent (1 in 1000 year) chance of occurring each year.
No blue shading	Flood Zone 1 Shows the area of land where flooding from rivers and the sea is extremely unlikely and is defined as land having a less than 0.1 percent (1 in 1,000 year) chance of occurring each year.
Dark blue line	Main rivers These are usually larger streams and rivers.
Purple Line (Flood Defences)	The purple line shows all flood defences built since 2010 with a standard of protectionequal to or greater than 1.0 percent for rivers and 0.5 percent from the sea. Older defences or defences that provide lower standard of protection may not be shown.
HatchedAreas	The hatched areas identify both the areas of land which are afforded protection from fluvial flooding up to and including the 1 per cent (1 in 100 year) chance of occurring each year or flooding from the sea in a 0.5 percent (1 in 200 year) chance of occurring each year.

Table 5 – Environment Agency Flood Map Description

Figure 1 sourced from the Environment Agency online Flood Map for Planning website indicates that this site is located within Flood Zone 1.

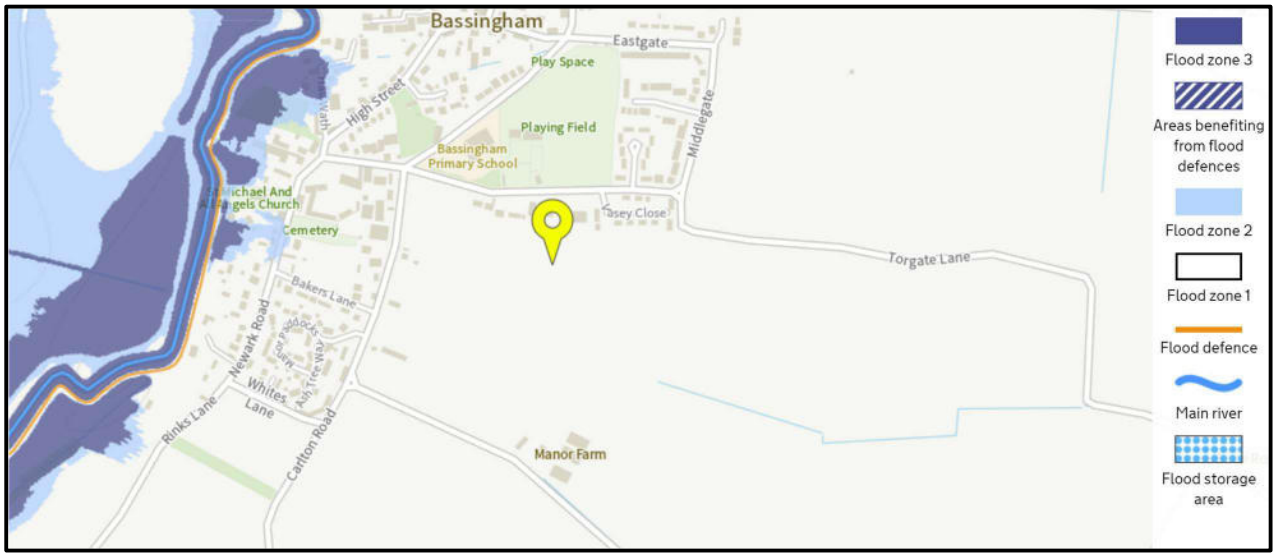

Figure 1 – EA Flood Map for Planning (Rivers and Sea)

The site layout plan included confirms the proposed development will be located entirely within the