Moult Walker

GROVE COTTAGE, BISHOP'S STORTFORD

Flood Risk Assessment and Drainage Strategy

FRA001
JULY 2022

CONFIDENTIAL

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PROJECT NO. 70040186

OUR REF. NO. FRA001

DATE: JULY 2022

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Flood Risk Assessment and Drainage Strategy

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Appendices

EXECUTIVE SUMMARY

	ITEM	COMMENT
1	Development Description	Non-Residential Institution Development
2	Location	Easting – 549244 Northing – 220227
3	Scale of Development	Approx. 0.05 Ha
4	Current Land Use	Non-residential institution building, a single outbuilding, hardstanding areas.
5	Type of Application	Detailed Planning Application
6	Flood Zone Classification	Based on EA flood level data a small part of the north eastern corner of the site falls within EA flood zones 2 and 3a.
7	Site Level	The site falls from south west to north east from approx. 56.1mAOD to approx. 55.3mAOD
8	Allowance for Climate Change	Rainfall: 100 Year + 40% Climate Change Flood from rivers: 100 + 10% Climate Change
9	Safe Access and Egress	via London Road
10	Surface Water Drainage	Attenuated discharge to existing Thames Water sewer in Twyford Raod.
11	Foul Water Drainage	Discharge to existing Thames Water sewer in Twyford Road

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INTRODUCTION

1. INTRODUCTION

1.1. APPOINTMENT AND BRIEF

1.1.1. WSP have undertaken a Flood Risk Assessment and Drainage Strategy to support the detailed planning application for a proposed Non-Residential Institution Redevelopment at Grove Cottage, Bishop's Stortford. A Site Location Plan in provided in **Appendix A**.

1.1.2. Development Proposals:

- To demolish existing institution building; and
- To construct a new institution building on the same site.

Refer to **Appendix B** for the Proposed Site Plan.

1.2. REPORT SCOPE

1.2.1. The National Planning Policy Framework (NPPF) Section 14 '*Meeting the Challenge of climate change, flooding and coastal change*' requires a planning application to be accompanied by a site specific FRA. This report sets out the proposed drainage strategy for the scheme including design considerations and constraints that have been applied in order for key consultee's such as the Environment Agency (EA) and Suffolk County Council (SCC), acting as Lead Local Flood Authority, to comment/approve in principle prior to planning submission.

1.2.2. This report is a holistic risk based assessment of potential flooding from possible sources, including fluvial, tidal, groundwater and surface water run-off. It also identifies and examines the residual flood risk to the proposed development and third party land.

1.2.3. Whilst completing the assessment, consideration has been given to the National Planning Policy Framework (NPPF), Planning Practice Guidance, British Standard 8533:2017, Assessing and Managing Flood Risk in Development, and British Standard 8582:2013 Code of Practice for Surface Water Management for Development Sites.

1.3. LIMITATIONS

1.3.1. This report is based on the interpretation and assessment of data provided by third parties. WSP cannot be held responsible for the accuracy of the third party data and the conclusions and findings of this report may change if the data is amended or updated after the date of consultation.

1.4. CONSTRUCTION (DESIGN AND MANAGEMENT) REGULATIONS

The revised Construction (Design and Management) Regulations 2015 (CDM Regulations) came into force on April 2015 to update certain duties on all parties involved in a construction project, including those promoting the development. One of the designer's responsibilities under clause 9 (1) is to ensure that the client organisation, in this instance Moult Walker, is made aware of their duties under the CDM Regulations.

2

POLICY CONTEXT

2. POLICY CONTEXT

2.1. NATIONAL PLANNING POLICY FRAMEWORK (NPPF)

2.1.1. 1.1.1. Chapter 14 of The National Planning Policy Framework (NPPF) ensures that flood risk is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding and to direct development away from areas of highest flood risk.

2.1.2. 1.1.2. Where new development is exceptionally necessary in such areas, policy aims to make it safe without increasing flood risk elsewhere and, where possible, reducing flood risk overall. This report has been written particularly in respect of paragraphs 167 (avoiding increasing flood risk elsewhere) and 169 (inclusion of SuDS).

2.1.3. 1.1.3. As of 20 July 2021, an updated NPPF was issued. Changes centred around the inclusion of Flood Risk Vulnerability Classification in paragraph 163 (previously 159), which grades development vulnerability from essential infrastructure to water-compatible development, and how an exception test should be applied dependant on the vulnerability of the development. Changes have also been made to paragraph 167b (previously 163b) on the importance of providing flood resilient development.

2.2. TECHNICAL GUIDANCE TO THE NATIONAL PLANNING POLICY FRAMEWORK

2.2.1. The NPPF Technical Guidance includes Flood Zone definitions and flood risk vulnerability classifications for different land uses.

2.2.2. The assessment of flood risk is based on the definitions in Table 1 of the Technical Guidance of the NPPF. Table 1 include the following:-

Table 2-1 – Flood Zone Definitions

Flood Zone 1	▪ As that which has a "Low Probability" of flooding. The definition provided in Table 1 is: *"This zone comprises land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%)."*
Flood Zone 2	▪ As that which has a "Medium Probability" of flooding. The definition provided in Table 1 is: *"This zone comprises 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."*
Flood Zone 3a	▪ As that which has a "High Probability" of flooding. The definition provided in Table 1 is: *"This zone comprises 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 of flooding from the sea (>0.5%) in any year."*
Flood Zone 3b	▪ As "the functional floodplain". The definition provided in Table 1 is: *"This zone comprises land where water has to flow or be stored in times of flood."*

2.2.3. Included within the "Policy aims" of Table 1 for Flood Zone 3a is reference to flood storage. This is not required in Flood Zone 2 but for Flood Zone 3a it is stated as follows:

> *"In this zone, developers and local authorities should seek opportunities to:*
>
> *...*
>
> ▪ *create space for flooding to occur by restoring functional floodplain and flood flow pathways and by identifying, allocating and safeguarding open space for flood storage."*

2.2.4. The Environment Agency will often refer to this as "*flood compensation storage*" and require that the existing flood storage in the development area is maintained on a "*level-for-level"* basis. Typically they will ask for evidence that the volume available for flooding is the same at every 200mm vertical

slice post-development as it was pre-development up to the level of the 1 in 100 year flood, i.e. the extent of Flood Zone 3a.

2.2.5. The NPPF classifies the Flood Risk Vulnerability of various land uses in Table 2 (reproduced below). The More Vulnerable Classification encompasses usages such as hospitals and buildings used for dwellings. Less Vulnerable applies to buildings used for general industry, storage and distribution.

Table 2-2 – 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. ▪ Basement dwellings. ▪ Caravans, mobile homes and park homes intended for permanent residential use. ▪ 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”)
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 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 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 deveopment	▪ 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.

2.2.6. The overall aim is to steer new development to Flood Zone 1. Where there are no reasonably available sites within Flood Zone 1, local planning authorities allocating land in local plans or determining planning applications for development at any particular location should take into account the flood risk vulnerability of land uses and consider reasonably available sites in Flood Zone 2, applying the Exception Test if required (see table below). Following review of Table 2.2: Flood Risk Vulnerability Classification the proposed development would be classified as Less Vulnerable.

Table 2-3 - Flood Risk Vulnerability and Flood Zone 'Compatibility'

FLOOD RISK VULNERABILITY CLASSIFICATION		ESSENTIAL INFRASTRUCTURE	WATER COMPATIBLE	HIGHLY VULNERABLE	MORE VULNERABLE	LESS VULNERABLE
Flood Zone	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test Required	✓	✓
	Zone 3a	Exception Test Required	✓	✘	Exception Test Required	✓
	Zone 3b	Exception Test Required	✓	✘	✘	✘

✓ Development is appropriate

✘ Development should not be permitted

2.3. HERTFORDSHIRE COUNTY COUNCIL – PRELIMINARY FLOOD RISK ASSESSMENT (PFRA) 2011

2.3.1. This report gives an overview of local flood risk in Hertfordshire based on a review of historic records of flooding and data derived from modelling of potential future flooding. It has been prepared by Hertfordshire County Council as part of a submission to meet the requirements of the Flood Risk Regulations (2009). The Regulations together with the related Flood Risk Management Act 2010 identify Hertfordshire County Council as Lead Local Flood Authority (LLFA) and require the council to develop a Preliminary Flood Risk Assessment (of sources of local flood risk - surface water, ordinary watercourses and groundwater) and subsequently a strategy for the management of local flood risk.

2.3.2. Records were reviewed that had been collated from a range of sources including water companies, district councils, the Highways Agency and local authorities. They showed that flooding has occurred in Hertfordshire from a range of sources, at various times and at locations across the county. However as there has been no standardised methodology for recording information about flooding it is not possible to map flood extents or determine the consequences of the majority of the past events.

2.3.3. Data provided by the Environment Agency, produced to a national methodology determined by Defra, was used to assess future flood risk and for the review and identification of Flood Risk areas.

2.3.4. The PFRA is a high-level screening exercise and must therefore consider floods which have significant harmful consequences for human health, economic activity, the environment and cultural heritage. The PFRA identifies such areas and if they are considered to be nationally significant, as defined by Defra, they are highlighted as ‘Flood Risk Areas’. Flood Risk Areas warrant further examination and management through the production of flood risk and flood hazard maps and flood risk management plans.

2.3.5. The aim of this PFRA is to develop a strategic assessment of local flood risk across Hertfordshire based on information from past floods and modelling of the potential impact of future flooding. The process will inform the development of a strategy for the management of local flood risk.

- Records of historic flooding from surface runoff, groundwater and ordinary watercourses will be collated and assessed to help with understanding past forms of flooding.
- Data sources that will help with mapping potential future flood risk will be identified.
- A PFRA report which satisfies the requirements of the Flood Risk Regulations 2009 will be produced.
- The national assessment of indicative Flood Risk Areas will be reviewed and if applicable additions and amendments will be suggested and justified in the light of local circumstances.

2.3.6. The Local Flood Risk Management Strategy should collate and consolidate information from the PFRA and the Strategic Flood Risk Assessments (SFRA) to cover flood risks from all sources of flooding and establish a methodology for managing the risks within the partnership framework.

2.4. EAST HERTFORDSHIRE DISTRICT COUNCIL STRATEGIC FLOOD RISK ASSESSMENT (SFRA) 2016

2.4.1. The council is required to carry out a Strategic Flood Risk Assessment (SFRA) for its area, which assesses the risk of flooding from all sources, now and in the future, taking account of the impacts of climate change.

2.4.2. In August 2016 East Hertfordshire District Council commissioned JBA Consulting to produce a Level 1 and 2 Strategic Flood Risk Assessment (SFRA) in accordance with Planning Policy Statement 25 (PPS25) to replace the existing Level 1 SFRA published by East Hertfordshire District Council in November 2008. Using readily available information, the principle aim of the SFRA is to map all forms of flood risk and use this as an evidence base to locate new development primarily in low flood risk areas.

2.4.3. The core objectives of this SFRA are to:

- To take into account most recent policy and legislation in the National Planning Policy Framework;
- To take into account the latest available flood risk information and data;
- To investigate and identify the extent and severity of flood risk from all sources presently and in the future within the local planning authority area of East Hertfordshire District Council;
- To provide a comprehensive set of maps presenting flood risk from all sources that can be used as evidence base for use in the emerging District Plan;
- To provide individual flood risk analysis, for potential development sites identified by the Council, through a Level Two SFRA.

2.4.4. Flood history shows that East Hertfordshire has been subject to flooding from several sources of flood risk.

2.4.5. One of the most significant flood risks in East Hertfordshire comes from the River Lea and the River Stort corridors. The floodplain associated with the tributaries of the River Lea network are generally narrow until reaching the urban areas and/or towards the confluences with the River Lea network. There are seven records of the River Stort overtopping its banks, the majority caused by heavy rainfall.

2.4.6. Several sites across East Hertfordshire have been identified as being at risk from surface water flooding. This list included Bishop's Stortford, and most notably the employment land within the town located near the River Stort.

2.4.7. The outputs from the SFRA will enable East Hertfordshire District Council to:

- Prepare appropriate policies for the management of flood risk;
- Inform the sustainability appraisal so that flood risk is taken account of, when considering options and in the preparation of strategic land use policies;
- Identify the level of detail required for site-specific Flood Risk Assessments (FRAs);
- Determine the acceptability of flood risk in relation to emergency planning capability.

2.5. HERTFORDSHIRE LOCAL FLOOD RISK MANAGEMENT STRATEGY 2013-2016

2.5.1. Following flooding in 2007, the government commissioned a review (The Pitt Review, 2008), which recommended urgent changes in the way the country is adapting to the increased risk of flooding. A principal change was to establish greater clarity in the roles and responsibilities and an increased focus on addressing surface water flood risk through the enactment of the Flood and Water Management Act (2010).

2.5.2. As Lead Local Authority (LLFA), Hertfordshire County Council has to "develop, maintain, apply and monitor" a Local Flood Risk Management Strategy for Hertfordshire. The Strategy will be produced in consultation with local partners and will focus on local sources of flooding from surface runoff, groundwater and ordinary watercourses. Interactions between different forms of flooding will be done in conjunction with the Environment Agency which has responsibility for managing flood risk from main rivers, reservoirs and the sea.

2.5.3. The Strategy will be the means by which the LLFA will discharge its general duty to provide leadership and to co-ordinate Flood Risk Management (FRM) on a day to day basis. The Strategy will be the focal point for integrating a range of flood risk related actions across Hertfordshire.

2.5.4. The strategy must:-

- Set out the roles and responsibilities of the various Risk Management Authorities (RMAs) in the area;
- Define what is considered to be 'locally significant' flood risk;
- Specify the objectives for managing local flood risk;
- Identify and describe the measures (actions) proposed to deliver the objectives;
- Where relevant, provide details of the costs and benefits related to any actions, and identify a means or process as to how these may be paid for;
- Identify how the Strategy will contribute to wider environmental objectives;
- Describe and establish a review process and timetable for the Strategy.

2.5.5. The Strategy must assess and define what locally significant flood risk is. This will require the development of criteria to ensure that significance will need to be assessed on a number of different ways depending on the situation, for example through the setting of thresholds that will trigger investigations, the assessment of the effect that structures ad features have on flood risk and how potential flood risk management schemes will be prioritised for funding.

2.5.6. High level objectives proposed in the Strategy include:-

- To reduce the potential impact and costs of flooding in the country;
- To better understand local flood risk and make best use of available information;
- To develop greater personal involvement in flood risk management amongst residents of Hertfordshire;

- To secure improvements to the water environment of Hertfordshire through the undertaking of actions associated with flood risk management.

2.5.7. Previously developed sites should aim to discharge at the original predevelopment greenfield rate for the whole site area where possible. If not, a significant reduction in the current rate of discharge should be achieved and evidence provided as to why greenfield rates are not viable.

2.5.8. The volume of attenuation storage that would be required for the site should be based on the 1 in 100 year critical storm duration with an allowance for climate change and the allowable discharge rate.

2.5.9. Flooding must not occur on any part of the site for a 1 in 30 year rainfall event except in areas that are designed to hold and convey water.

2.5.10. During a 1 in 100 year plus climate change rainfall event no flooding should occur in any part of a building (including a basement); utility plant susceptible to water (e.g. pumping station or electrical sub-station) or on neighbouring sites.

3

EXISTING SITE

3. EXISTING SITE

3.1. SITE LOCATION

3.1.1. The site is located at Grove Cottage on London Road, Bishop's Stortford. An approximate postcode is CM23 3JX and approximate OS coordinates are 549244, 220227.

3.1.2. The existing site consists of a non-residential institution building, a single outbuilding and hardstanding areas. A Site Location Plan can be found in **Appendix A**.

3.1.3. A proposed Site Plan can be found in **Appendix B.**

3.2. SITE DESCRIPTION

3.2.1. Table 3-1 describes the general site characteristics.

Table 3-1 – Characteristics of the Site

Characteristic		Description
Area		The site area is approximately 0.05 ha.
General Topography		The site falls from south west to north east from approx. 56.1mAOD to approx. 55.3mAOD
Boundaries	**North**	London Road (B1383)
	South	Residential Dwellings
	East	Twyford Road
	West	Residential Dwellings
Access		Vehicular access to the site is via Twyford Road

3.3. EXISTING WATERBODIES

3.3.1. The nearest watercourse to the site is the River Stort, which is considered a Main River by the EA, is located approximately 30m to the east of the eastern border of the site. The River Stort is a tributary of the River Lea, which subsequently feeds into the River Thames near Canning Town.

3.3.2. Details of the flood defences in place throughout Bishop's Stortford with relation to the River Stort can be found in **Appendix C**.

3.3.3. A tributary of the River Stort (which is also classified as a Main River by the EA) flows under properties on the south side of Salisbury Close and Rhodes Avenue (approx. 470m west of the site) eventually

flowing under South Road and Southmill Road into the River Stort. This main river is most likely culverted under these roads and properties prior to being discharged into the River Stort.

3.4. GEOLOGY AND HYDROGEOLOGY

3.4.1. The British Geological Survey (BGS) online Geology of Britain Viewer indicates the site is underlain by Lewes Nodular Chalk Formation and Seaford Chalk Formation (Chalk with superficial deposits of Head (Clay, Silt, Sand and Gravel). Due to the presence of clays in the superficial deposits down to approx. 5.49m based upon the BGS borehole logs, it is unlikely that infiltration will be viable on the site.

3.4.2. The BGS mapping is supported by borehole logs obtained from the BGS website for location 450m south and 610m northwest of the Site. Groundwater was encountered between 2.60m and 3.76m below ground level. Refer to **Appendix D** for BGS borehole logs. **Table 3-2** and **Table 3-3** below show a summarised version of the borehole log data for the site.

3.4.3. The site does not fall within a Groundwater Source Protection Zone but does fall within a primary aquifer related to the bedrock. See **Figure 3-1** for the EA groundwater source protection zones map of the area.

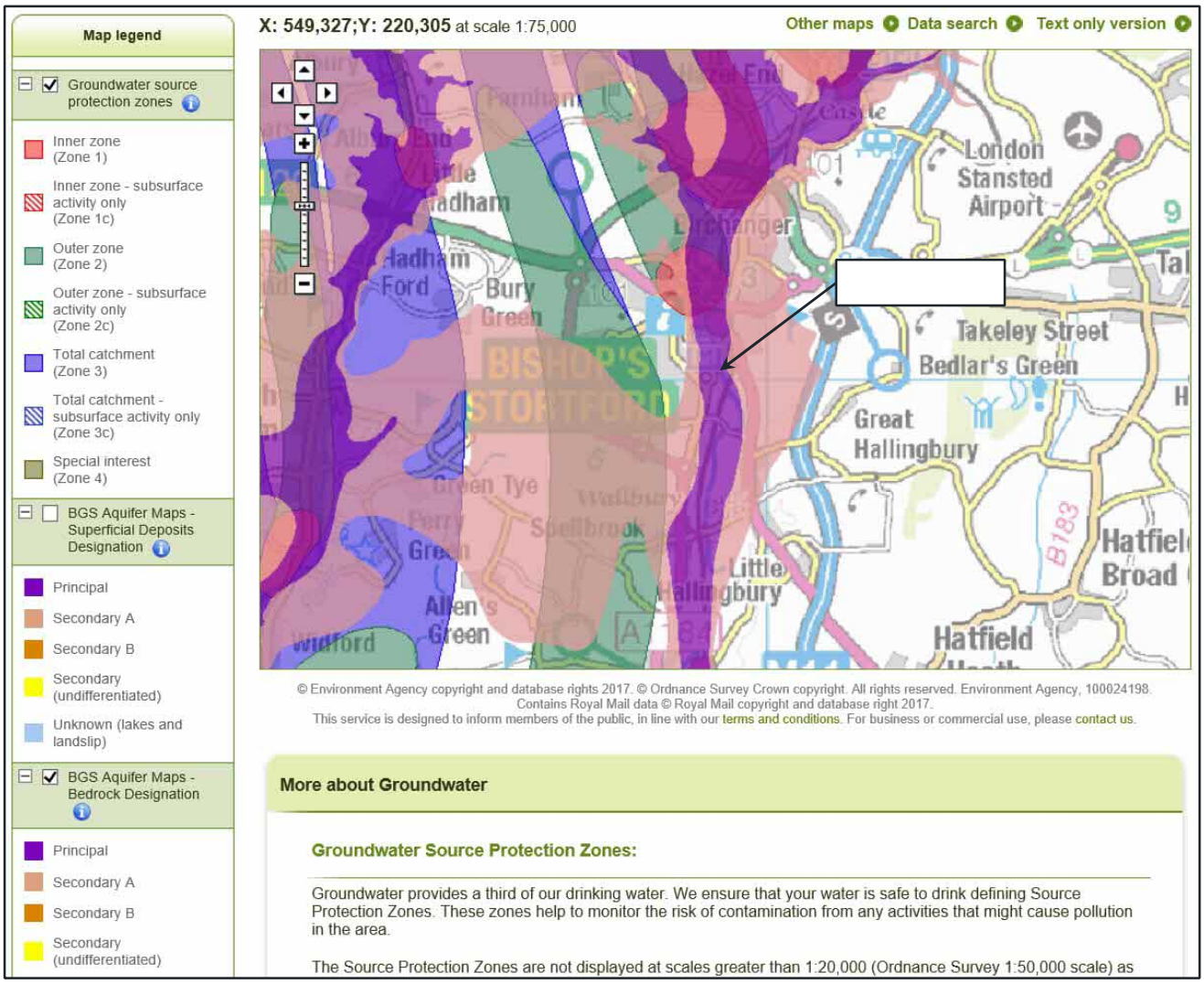
Table 3-2 - BGS Borehole Log - Ref: TL41NE1 – 450m south of the site next to council building (220m from the bank of the River Stort)

Depth (m)	Stratum Description and Observations
Ground Level – 1.32	Stoney TOPSOIL
1.32 – 3.10	Brown sandy CLAY with sand and gravel
3.10 – 4.52	Brown silty CLAY with grey loamy sand
4.52 – 4.88	Grey silty CLAY
4.88 – 5.49	Brown sandy CLAY with sand and gravel
5.49 – 5.87	GRAVEL with sand traces
5.87 – 6.55	GRAVEL
6.55 – 8.28	SAND and GRAVEL
8.28 – 9.75	Grey loamy CLAY
9.75 – 10.67	Loamy SAND with brown loamy clay partings
End of Trial Pit at 10.67m (Ground water level at 3.76m)	

Table 3-3 – BGS Borehole Log - Ref: TL42SE178 – 610m northwest of the site at the end of Stort Road (30m from bank of the River Stort)

Depth (m)	Stratum Description and Observations
Ground Level – 1.70	Made ground
1.70 – 2.90	Soft grey and green silty organic CLAY
2.90 – 3.30	Soft grey green very silty CLAY
3.30 – 3.80	Dark brown fibrous PEAT
3.80 – 4.10	Soft grey and brown mottled silty sandy CLAY
4.10 – 4.60	Green silty fine grained SAND
4.60 – 4.80	Slightly gravelly coarse grained SAND
4.80 – 5.40	Firm brown organic SILT with large decayed roots
5.40 – 6.10	Firm light grey brown silty CLAY with decayed vegetation
6.10 – 6.20	Orange brown slightly gravelly silty CLAY
6.20 – 8.80	Dense brown and white flint and chalk sandy brown and white rounded and subangular chalk GRAVEL
8.80 – 13.2	Medium dense brown and white flint and chalk sandy brown and white rounded and subangular chalk GRAVEL
13.2 – 15.0	Medium dense brown slightly gravelly chalk SAND
End of Trial Pit at 15.0m (Ground water level at 2.60m)	

Figure 4-1 - Environment Agency Groundwater Source Protection Zone Map



4

SOURCES OF FLOOD RISK

4. SOURCES OF FLOOD RISK

4.1.1. This chapter assesses the risk of flooding to the site from all current and future potential sources of flooding.

4.1.2. **Table 4-1** summarises the findings of the assessment. A more detailed explanation of the flood risk issues on the site and determination of flood risk ratings are presented in sections 4.2 to 4.6 below.

Table 4-1 - Degree of risk from each source of Flooding Source Risk

Source	Risk
Fluvial	High Risk
Ground Water	Low
Surface Water	Possible
Sewer	Low
Other – Reservoir	N/A
Other – Canals	N/A
Other – Culverts	Negligible

4.2. FLUVIAL FLOOD RISK

4.2.1. The Environment Agency's (EA) Flood Map for Planning indicates that the site is partially located within Flood Zone 2 (medium probability); see **Figure 4-1** overleaf. This means the site is assessed as having between a 1 in 1,000 and 1 in 100 annual probability of river or sea flooding (0.1%-1.0%). See **Appendix C** for EA correspondence.

4.2.2. The East Hertfordshire District Council SFRA (2016) highlights that fluvial flooding is of concern in Bishop's Stortford but there is no record of flooding on this particular site.

4.2.3. The EA have shown via their correspondence that the section of the River Stort closest to Grove Cottage has natural earth defences in place which protect the surrounding land from floods up to the 1 in 20 year storm.

4.2.4. The EA have one recorded incident of fluvial flooding on the site which occurred in 1968. The Stort has also burst its banks in Bishop's Stortford five other time in 1947, 1974, 1978, 1993, and 2001, although none of these incidents affected the land within the site boundary.

4.2.5. Product 4 information has been received for the site from the EA. This includes details on the modelled flood levels, Node MSN042 has been assessed as the critical node nearest to the site. A review has been undertaken to apply the latest allowances for climate change to the 1:100 year event. As the site falls within Flood Zone 2 an allowance of 10% for the Upper Lee Management Catchment peak river flow allowance should be applied.

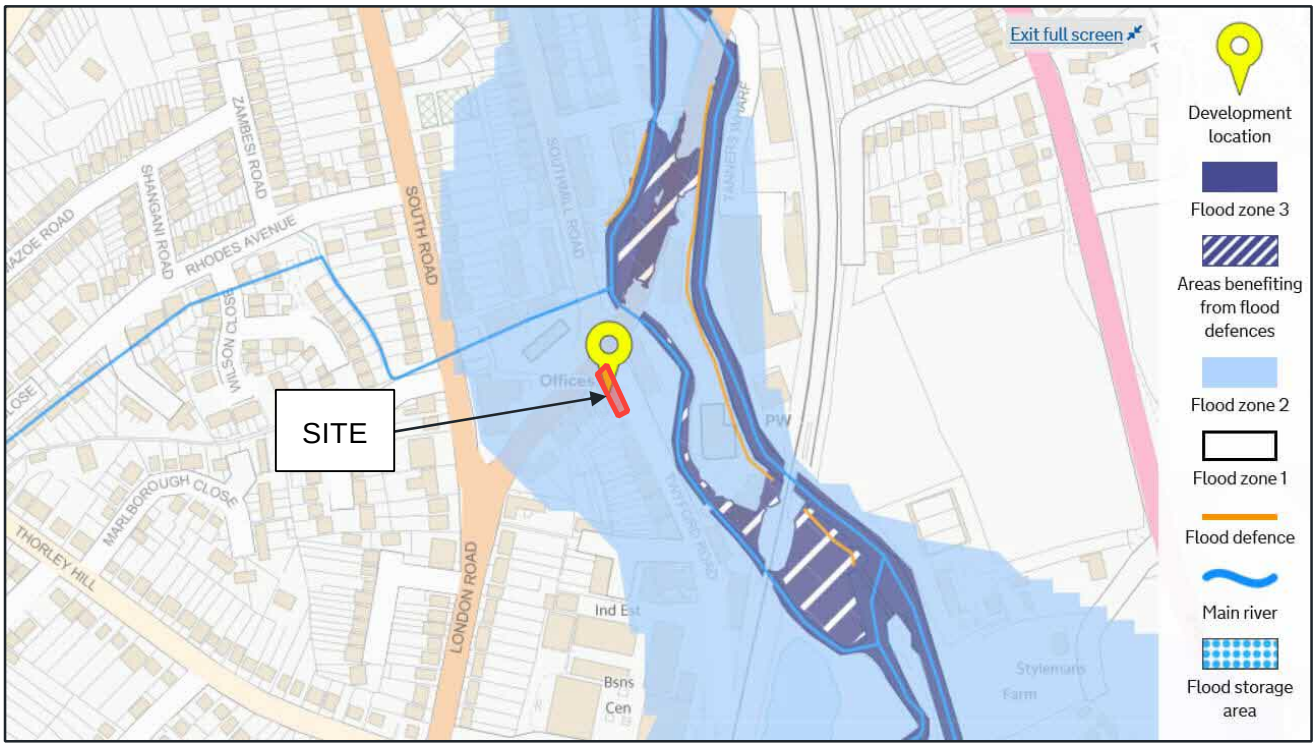
Table 4-2 – Modelled flood Levels at node MSN042

Return Period	5	20	100	100+20%	1000
Level (m AOD)	55.49	55.57	55.66	55.71	55.79

4.2.6. Lidar has been used to determine the site levels. Based upon the levels given in the above table and the Lidar data, approximately 165m^2 in plan area of the north east corner of the site is below the 1 in 100 yr flood level and therefore can be considered to be within flood zone 3a. Interestingly, using the levels provided by the EA, the extent of flood zone 2 (1 in 1000 year) is only shown to cover an area of approximately 180 m^2 in plan area of the existing site.

4.2.7. Based on the available information the risk of fluvial flooding is considered to be high for the proposed site.

Figure 4-1 - Environment Agency Flood Map – Flood Zones



4.3. GROUND WATER FLOODING

4.3.1. The EA have not provided any details on groundwater flooding and the LLFA have stated that they do not hold information on groundwater flooding. See **Appendix E** for LLFA correspondence.

4.3.2. The East Hertfordshire SFRA (2016) indicates that the site is at a <25% susceptibility to groundwater flooding. The SFRA identified that groundwater flooding has only occurred once in Bishop's Stortford since 1993.

4.3.3. The BGS borehole logs in Tables 3-2 and 3-3 indicate ground water levels at 3.76m and 2.60m below ground level respectively.

4.3.4. Based on the available information the risk of groundwater flooding is considered to be low for the proposed site.

4.4. SURFACE WATER FLOODING

4.4.1. The Environment Agency's Risk of Flooding from Surface Water map shows that the site is at low risk of surface water flooding. Areas at a high risk of surface water flooding were identified near to the site, most notably on Twyford Road directly outside the site's eastern border – see **Figure 4-2**. This flood risk is collaborated by the LLFA who have records of reported surface water flooding on the junction between Twyford Road and London Road.

4.4.2. The East Hertfordshire SFRA (2016) highlights that overland flow paths are known to form on Southmill Road (the southern end of which is on the opposite side of London Road to Grove Cottage). It also highlights that significant ponding is known to occur within the River Stort floodplain.

Figure 4-2 – Environment Agency Flood Map – Risk of Flooding from Surface Water

4.4.3. Based on the available information, although the EA mapping shows that there is up to a high risk of flooding from surface water in the public highways surrounding the site, the risk of surface water flooding to the site itself is considered to be low for the proposed site.

4.5. SURCHARGED SEWER FLOODING

4.5.1. The LLFA flood incident records has no information on flooding in this area, however this does not mean that there has never been flooding.

4.5.2. The EA have not stated that there has ever been surcharged sewer flooding in the area.

4.5.3. Based on the available information the risk of flooding from surcharged sewers is considered to be low.

4.6. FLOODING FROM OTHER SOURCES

4.6.1. Non-natural or artificial sources of flooding can include reservoirs, lakes, canals, culverts etc. The potential effects of flood risk management infrastructure and other structures also needs to be considered.

4.6.2. There are no canals within the vicinity of the site, therefore the risk of flooding from canals is considered to be insignificant.

4.6.3. The EA Flood Risk from Reservoirs map shows that the site does not fall within the maximum flooding extent of any reservoir breach, therefore the flood risk from reservoirs is considered to be insignificant.

4.6.4. As stated in section 3.4.3 an EA main river appears to flow beneath properties and roads which suggests that it mostly culverted from Thorley Hill up to the River Stort. Should this culverted watercourse become blocked it poses a risk of flooding the site due to its close proximity. Based on this information the risk of flooding from culverts is considered to be Possible.

4.7. HISTORICAL FLOOD RECORDS

4.7.1. The LLFA have stated that they do not have incidents of flooding for the site and its surrounding area within their records. However this does not mean that flooding has never taken place.

4.7.2. The EA have multiple records of the River Stort flooding. As stated in section 4.2.4 these incidents occurred in 1947, 1968,1974, 1978, 1993, and 2001, only the 1968 event is known to have affected the site

4.7.3. The East Hertfordshire SFRA (2016) presents many records of historical flooding. Most notably surface water flooding which has occurred 16 times in Bishop's Stortford since 1992. These have not impacted the site.

5

NPPF SEQUENTIAL AND EXCEPTION TEST

5. NPPF SEQUENTIAL AND EXCEPTION TEST

5.1. THE SEQUENTIAL TEST

5.1.1. Non-residential institution developments (uses for health services, nurseries and educational establishments) are classed as 'more vulnerable' as stated in table 2 of the Flood Risk and Coastal Change Chapter of the planning Practise Guidance (2015).

5.2. THE SEQUENTIAL TEST

5.2.1. The Sequential Test, within the National Planning Policy Framework, aims to steer all new developments to areas at the lowest risk of flooding and to ensure that the development type proposed is appropriate by reference to the flood risk.

5.2.2. The NPPF requires the Local Authority to apply the Sequential Test in consideration of new development. The aim of the Test is to steer new development to areas at the lowest probability of flooding

5.2.3. Table 2 of the Flood Risk and Coastal Change Chapter of the Planning Practice Guidance (2021) classifies different types of development depending upon their vulnerability. It classifies non-residential developments as 'more vulnerable'. The Environment Agency's Flood Map for Planning indicates that the site is located in Flood Zone 3. 'More vulnerable' land uses (residential development) require a Sequential and Exception test in Flood Zone 3a as stated in Table 3 of the Flood Risk and Coastal Change Chapter of the Planning Practice Guidance (2015).

5.2.4. In accordance with the NPPF [p.101] the proposed development within Zone 3 should only be permitted on the site if there are no reasonably available sites that are appropriate for the proposed use. As the proposed development is the redevelopment of an existing building which has a similar use and as no comparable alternative sites were identified in the area as owned by the applicant or for sale with non-residential permission.

5.2.5. It has been concluded that there are no other reasonably available sites available for development in areas of lower probability of flooding.

5.3. THE EXCEPTION TEST

5.3.1. Table 2 of the Flood Risk and Coastal Change Chapter of the Planning Practice Guidance (2015) classifies different types of development depending upon their vulnerability.

5.3.2. The Exception Test According to Table 3 of the NPPF technical guidance note, 'more vulnerable' developments are considered appropriate within Flood Zone 1 and Flood Zone 2 of the sequential test is satisfied.

5.3.3. According to Table 3 of the NPPF technical guidance note, 'water compatible' aspects of the development are considered appropriate within Flood Zones 1, 2 and 3.

5.3.4. The Exception Test aims to ensure that more vulnerable property types are not allocated to areas at high risk of flooding. For the Exception Test to be passed:

a) it must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by a Strategic Flood Risk Assessment where one has been prepared;

b) a site-specific flood risk assessment must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

5.3.5. The proposed development will need to meet the requirements of the Exceptions Test.

5.3.6. With reference to point (a) above; consultation with the Environment Agency and review of the mapping has been undertaken. This is a key requirement of national planning policy. The review has the proposed non-residential development will not be vulnerable to flooding because the proposal is to have the ground floor finished floor level at a level no lower than 55.79m AOD. This will ensure that the ground floor will not be flooded during the 1:1000 year flood event. Compensatory storage will be provided within the parking area. The proposed use of the development means it will not be used as residential and will have no rooms intended as bedrooms.

5.3.7. The Site is located in a sustainable location servicing the local community, being well connected to public transport, walking and cycle routes along with other facilities such as commercial uses and open space.

5.3.8. Therefore it can be concluded that the proposed site location would enable a sustainable development to be constructed.

5.3.9. With reference to point (b) above, this Flood Risk Assessment demonstrates that the development will be safe, and will include the maximisation of the use of SuDS within the development. The surface water management system identifies that surface water run-off be limited to less than 50% of the brownfield runoff rate (and so proving betterment within the vicinity) for the 1 in 100 year plus 40% allowance for climate change storm event.

6

SURFACE WATER MANAGEMENT– POLICY CONTEXT

6. SURFACE WATER MANAGEMENT– POLICY CONTEXT

6.1. NATIONAL PLANNING POLICY FRAMEWORK (NPPF) – MARCH 2021

6.1.1. The Extracts from applicable national planning policy documents are set out below.

6.1.2. The National Planning Policy Framework (NPPF) supersedes Planning Policy Statement 23 (Planning and Pollution Control) and Planning Policy Statement 25 (Development and Flood Risk) and associated Practice Guide.

6.1.3. The NPPF ensures that flood risk is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding and to direct development away from areas of highest flood risk.

6.1.4. Where new development is exceptionally necessary in such areas, policy aims to make it safe without increasing flood risk elsewhere and, where possible, reducing flood risk overall.

6.2. SUSTAINABLE DRAINAGE SYSTEMS WRITTEN STATEMENT HCWS161 (DECEMBER 2014)

6.2.1. The Secretary of State for Communities and Local Government laid a Written Ministerial Statement in the House of Commons on 18 December 2014 setting out changes to planning that will apply for major development from 6 April 2015. This confirms that in considering planning applications, local planning authorities should consult the relevant Lead Local Flood Authority (LLFA) on the management of surface water; satisfy themselves that the proposed minimum standards of operation are appropriate and ensure through the use of planning conditions or planning obligations that there are clear arrangements in place for ongoing maintenance over the lifetime of the development.

6.2.2. Therefore, from 6 April 2015 local planning policies and decisions on planning applications relating to major development are required to ensure that sustainable drainage systems (SuDS) are used for the management of surface water.

6.2.3. Major development is development involving any one or more of the following:

- The winning and working of minerals or the use of land for mineral-working deposits;
- Waste development;
- The provision of 10 dwellings or more;
- The provision of a building or buildings where the floor space to be created by the development is 1,000 square metres or more; or
- Development carried out on a site having an area of 1 hectare or more.

6.3. DEFRA SUSTAINABLE DRAINAGE SYSTEMS NON-STATUTORY TECHNICAL STANDARDS FOR SUSTAINABLE DRAINAGE SYSTEMS (MARCH 2015)

6.3.1. This document sets out non-statutory technical standards for sustainable drainage systems. It should be used in conjunction with the National Planning Policy Framework and Planning Practice Guidance.

6.3.2. For greenfield developments, the peak runoff rate from the development to any highway drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event should never exceed the peak greenfield runoff rate for the same event.

6.3.3. Where reasonably practicable, for greenfield development, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event should never exceed the greenfield runoff volume for the same event.

6.3.4. Where it is not reasonably practicable to constrain the volume of runoff to any drain, sewer or surface water body in accordance with the above, the runoff volume must be discharged at a rate that does not adversely affect flood risk.

6.3.5. The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur on any part of the site for a 1 in 30 year rainfall event.

6.3.6. The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur during a 1 in 100 year rainfall event in any part of: a building (including a basement); or in any utility plant susceptible to water (e.g. pumping station or electricity substation) within the development.

6.3.7. The design of the site must ensure that, so far as is reasonably practicable, flows resulting from rainfall in excess of a 1 in 100 year rainfall event are managed in exceedance routes that minimise the risks to people and property.

6.4. BRITISH STANDARD 8582:2013 CODE OF PRACTISE FOR SURFACE WATER MANAGEMENT FOR DEVELOPMENT SITES (NOVEMBER 2013)

6.4.1. In the absence of specific local guidance on the management of surface water run-off, BS 8582 should be considered as best practice guidance for the development of surface water drainage strategies for new development sites.

6.5. FLOOD AND WATER MANAGEMENT ACT (FWMA) 2010

6.5.1. The FWMA (2010) was first proposed as the legislative vehicle to implement the European Floods Directive, however due to delays in the bill, it was not implemented within the timeframe set out by the Floods Directive, and hence the implementation of the Floods Directive and the FWMA was delayed until 2010.

6.5.2. The FWMA provided the legislative basis for a number of recommendations in the Pitt Review. In October 2010, Section 9 of the FWMA came into force requiring all LLFAs in England to develop, maintain, review, update as well as apply and monitor the application of a strategy for local flood risk in their area. This is known as a Local Flood Risk Management Strategy (LFRMS).

6.6. SUDS DESIGN GUIDANCE FOR HERTFORDSHIRE (AUGUST 2021)

6.6.1. This guidance is for developers involved in the design and development of SuDS in Hertfordshire. It promotes an integrated approach to SuDS and landscape design, and establishes a set of local design criteria to help shape the development of SuDS in respect of the County's unique environmental context.

6.6.2. Storage volumes for all events up to a 1 in 100 chance in any year including an allowance for climate change storm event will be provided on site utilising above ground storage where practicable

6.6.3. The site will not flood from surface water up to a 1 in 100 year chance in any year including an allowance for climate change event, OR surface water flooding will be safely contained on site up to this event, ensuring that surface water runoff will not increase flood risk to the development or third parties. There should be no flooding within the site for up to and including the 1 in 30 chance in any year rainfall event.

6.6.4. Peak discharge rates from site will not increase as a result of the proposed development, up to a 1 in 100 chance in any year including an allowance for climate change storm event. We expect all applicants to achieve greenfield runoff rates for greenfield development sites and to aim to provide greenfield run-off rates for all brownfield sites to reduce the impact of the development on the surface water drainage infrastructure.

6.7. CLIMATE CHANGE

6.7.1. The Climate Change Adaptation Sub-Committee Progress Report 2014, increased flood risk is the greatest threat to the UK from climate change. Models of the climate system suggest floods of the type experienced in England and Wales in autumn 2000, and between December 2013 and February 2014, have become more likely as a consequence of increased concentrations of greenhouse gases in the atmosphere.

6.7.2. More frequent short-duration, high intensity rainfall and more frequent periods of long-duration rainfall could be expected. Sea levels are also expected to continue to rise.

6.7.3. New EA guidance "Flood risk assessments: climate change allowances" issued on the 19th February 2016 (updated May 2022) and forming part of the NPPF technical guidance provides up to date information on expected changes in rainfall, river flows and sea level rise as a consequence of climate change.

6.7.4. A key change from the previous guidance is that the climate change allowances for peak river flows now are based on "management catchments"; allowance are also now based on percentiles, whereby a percentile is a measure used in statistics to describe the proportion of possible scenarios that fall below an allowance level (e.g. a 50% percentile means that the allowance has 50% chances of not being exceeded).

6.7.5. On this basis key allowances for peak river flows based on percentiles are:

- central allowance, - based on the 50th percentile
- higher central - based on the 70th percentile
- upper end - based on the 90th percentile

These allowances are detailed in Table 1 (Peak river flow allowances by river basin district) of the EA guidance.

6.7.6. As discussed in the EA Guidance, the choice of the appropriate allowance for peak river flow (e.g. central or higher central) should reflect the risk for the proposed development and therefore is linked to the expected hazard, vulnerability and resilience of the scheme; recommendations on the appropriate allowances to be considered are provided in the EA Guidance.

6.7.7. For peak rainfall the EA Guidance provides an upper end and central allowance depending on epoch; the guidance recommends assessing both the central and upper end allowances to understand the range of impact. These allowances are variable on a regional basis and are detailed in the peak rainfall allowances map on the EA guidance.

6.7.8. For this proposed site, based on the new guidance development for non–residential uses for health services, nurseries and educational establishments (considered “More Vulnerable” in flood risk terms) should be reviewed against the following new climate change allowances:

TABLE 6-1 - SUMMARY OF CLIMATE CHANGE FACTORS

Flood Criteria	Climate Change Factor Upper Lee Management Catchment
Peak River Flow	+10% (year 2080s, central allowance)
Peak Rainfall	+40% (1% annual exceedance, year 2070s, upper end allowance)

HOW IS FLOOD RISK LIKELY TO BE AFFECTED BY CLIMATE CHANGE?

6.7.9. The projections for the UK in relation to climate change are that the UK will experience more frequent short-duration, high-intensity rainfall and more frequent periods of long-duration rainfall of the type that has been responsible for the large flood events recently experienced in the UK.

6.7.10. Flood risk is likely to increase with climate change. However, the flood risk management measures described in the following sections will make an allowance for this.

7

FLOOD RISK MANAGEMENT AND DRAINAGE STRATEGY

7. FLOOD RISK MANAGEMENT AND DRAINAGE STRATEGY

7.1. FLOOD RISK MANAGEMENT MEASURES

SITE LOCATION AND LAYOUT

7.1.1. The Environment Agency's Flood Map for Planning indicates that the site is located in Flood Zone 2. 'More vulnerable' land uses (non-residential uses for health services, nurseries and educational establishments) are acceptable in Flood Zone 2 as stated in Table 3 of the Flood Risk and Coastal Change Chapter of the Planning Practice Guidance (2015). However, based on the flood level data provided by the EA part of the site is shown to be within flood zone 3a.

SITE LEVELS

7.1.2. Finished site levels should be engineered to provide positive drainage, prevent ponding and channel flows away from the building during exceedance events. The accumulation of standing water would therefore not occur and thus not pose a risk to the development. The finished floor level of the building is set at the maximum 1 in 1000 year flood level.

FLOOD WARNINGS/ EVACUATION PLAN/ FLOOD PROOFING

7.1.3. The site is located within a Flood Warning Area and a Flood Alert Area as shown in the EA correspondence in **Appendix C**. The end user of the site should sign up to the EA's automated flood warning system.

ACCESS AND EGRESS

7.1.4. The proposed development is to be pedestrian access only. The site is shown on the EA flood map for planning to be located within the extent of flood zone 2 (1 in 1000 year event). Safe access and egress are generally considered to be acceptable in flood zone 2. However, detailed flood level data provided by the EA indicates that the north east corner of the site can be considered to be in flood zone 3a. Safe access and egress is available to the site from London Road in the north west corner of the site. The finished floor level of the building is set at the maximum 1 in 1000 year flood level.

COMPENSATORY STORAGE

TABLE 7-1 - EXISTING AND PROPOSED BUILT AREAS

Existing Building Area (m²)	Proposed Building Area (m²)	Increase (m²)
193	263	70

7.1.5. As per Hertfordshire Local Flood Risk Management Strategy, the impact on the floodplain should be evaluated on the 1 in 100 years plus climate change event. The relevant climate change allowance for this development is +10%. However, the EA flood model only provides data regarding the 1 in 100yrs +20% event. For this reason, the assessment has been based on this latter floodplain, as this is a more restrictive condition.

7.1.6. The proposed building will extend for approx. 21.7m^2 within the 1 in 100yrs +20% floodplain. According to available Lidar data, this will require a flood compensation volume of 1.8m^3. This will be provided within the north-eastern corner of the site by lowering the existing levels. The area has been modelled within Civil3D and a comparison of the existing and proposed surface has confirmed that the required volume could be accommodated with the proposed arrangement. Refer to drawing 0186-D-01 revision P02 in **Appendix H**.

7.2. PROPOSED DEVELOPMENT DRAINAGE

EXISTING SURFACE WATER RUNOFF RATE

7.2.1. The existing site is entirely brownfield land and completely impermeable.

7.2.2. It is assumed all surface water that falls upon the existing site is intercepted on the site. The existing brownfield runoff rate has been estimated applying the modified rational method as per below.

$$Q_p = C_v C_r i \quad A$$

Q_p: peak discharge
C_v: volumetric runoff coefficient (ranges between 0.6 – 0.9 as per Wallingford Procedure)
C_r: routing coefficient (1.3 as per Wallingford Procedure)
i: rainfall intensity (assumed 75mm/h)
A: catchment area

$Q_p = C_v C_r i \quad A \quad 0.9 \times 1.3 \times 0.075 / 5 m \times 4478 m^2 = 41.9445 m^3/h$

$Q_p = 11.65 m^3/s$

SUSTAINABLE DRAINAGE SYSTEMS (SUDS)

7.2.3. A Sustainable Drainage Systems (SuDS) hierarchy has been followed in applying the use of sustainable drainage techniques to the proposed development. This has been set out in **Table 7-3** below with justifications provided where particular techniques are deemed feasible.

TABLE 7-3 SUDS FEASIBILITY

SuDS Technique	Can they be feasibly incorporated into the site?	Reason
Green Roofs	✓	Proposed architect layout shows approx. 67m^2 of roof area used as green roof. This will have the benefit of slowing the flows for the shorter rainfall events and improve the water quality of the rain flow coming from this area of the roof. The remaining of the roof will accommodate solar panel array and roof lights.
Basins and Ponds	X	The site is far too small to utilise attenuation basins.
Filter Strips and Swales	X	The site is far too small to utilise swales.
Permeable Surfaces and Filter Drains	✓	A filter drain made up of 30% voided type 3 stone, wrapped in an impermeable liner is proposed underneath the garden area. This will be used as attenuation feature and will also improve the water quality of the rain flow coming from hard surfaced external area.
Rainwater Harvesting	X	Rainwater harvesting is not proposed on this scheme.
Tanked Systems	X	Tank systems are not proposed on this scheme.

7.2.4. Planning guidance requires drainage strategies for new developments to discharge surface water in line with the following hierarchy:

1. Infiltration
2. Existing Watercourse
3. Existing sewer

7.2.5. The site is underlain with London Clay and so the use of soakaways or other infiltration methods for the disposal of surface water drainage from the site is not considered to be feasible. There are no watercourses in the immediate vicinity of the site, so it is proposed to discharge to the Thames water sewers as per the existing site. Details of the existing site drainage system and the suitability for re-use of existing connections to the public sewer system to be confirmed by survey.

7.2.6. Drawing number 0186-D-01 revision P02 in **Appendix H** outlines the proposed surface water drainage strategy.

7.2.7. The proposed development drainage arrangement will comprise traditional drainage networks that will be supplemented with SuDS devices to provide source control and water quality treatment prior to discharging surface water to the existing Thames Water sewer.

7.2.8. All surface water will be directed towards a filter drain in the proposed garden area which will be made up of 30% voided stone wrapped in an impermeable liner and will provide surface water attenuation for the site. The filter drain will provide treatment of contaminants and subsequent degradation by micro-organisms of hydrocarbons & organic matter. The proposed filter drain storage has been designed to not flood during the critical 1 in 100 years event plus 40% climate change allowance.

7.2.9. Downstream of the proposed attenuation feature is located the flow control device. Greenfield runoff rates for the sites have been calculated (refer to **Appendix F**) and are summarised in the **Table 7-3**. Due to the size of the site (i.e. less than 0.05ha), the greenfield runoff rates are all lower than the minimum limit of discharge rate set by the Environment Agency in the guidance “Rainfall runoff management for developers” (i.e. 5.0 l/s).

7.2.10. For this reason, the orifice plate was designed to achieve the 5.0 l/s for the 1 in 100 years rainfall event plus 40% climate change allowance. This resulted in a 56mm diameter orifice. Compared with the brownfield runoff rate, this constitutes a betterment of the existing rates between 57% and 84%.

7.2.11. MicroDrainage calculations supporting the conceptual surface water drainage strategy can be found in **Appendix G.**

TABLE 7-4 – DISCHARGE RATES

Return Period	Greenfield Runoff Rates (l/s)	Brownfield Runoff Rates (l/s)	Modelled Discharge Rate (l/s)	Difference from Brownfield Rates
1yr	0.06	11.65	3.8	-67%
30yr	0.17		4.1	-65%
100yr	0.23		-	-
100yr + 40%	-		5.0	-57%

7.2.12. The attenuation volume required for the 1 in 100 + 40% climate change is 9.5m^3.

7.2.13. The proposed drainage network is designed not to exacerbate any existing flood risk associated with properties situated upstream, or downstream, of the site in accordance with principles set out within the NPPF.

7.2.14. SuDS will be implemented within this development scheme. The conceptual SuDS strategy for the proposed development has been derived using the principles outlined within the CIRIA C753 SuDS Design Manual and is provided in **Appendix I.**

8

CONCLUSIONS

8. CONCLUSIONS

8.1.1. This Flood Risk Assessment (FRA) and Drainage Strategy has been prepared to accompany a Full Planning Application for the site submitted on behalf of Moult Walker.

8.1.2. Based on the information provided within this report, it is concluded that:

- The development site is located within Flood Zone 2 and partially within Flood Zone 3a following the application of the latest allowances for climate change.
- The ground floor finished floor level should be set above 55.79mAOD (i.e. flood level for the 1 in 1000 year flood event).
- The proposed building will extend further into the 1 in 100 plus 20% climate change floodplain, requiring 1.8m^3 flood volume to be compensated within the site. this will be provided by lowering the hard-paved levels within the north-eastern corner of the site.
- The site is at low risk from all other sources of flooding aside from surface water which is considered possible.
- The site is to be pedestrian access only. safe access and egress can be gained via London Road to the north west of the site.
- Surface water runoff will be attenuated on-site for events up to and including the critical 1 in 100 year storm rainfall event with a 40% allowance for climate change and released off-site at rate that is significantly lower than the existing brownfield runoff (estimated reduction 57-67%). It is considered that the approach will not increase the risk of flooding elsewhere.
- To ensure the effectiveness of the proposals, a maintenance regime will be in place to ensure the future performance of all the SuDS and drainage devices.

8.1.3. Based upon information provided within this report, it is concluded that the site is presented as sustainable in terms of flood risk and compliant with the criteria set out in the NPPF.

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