



COMMERCIAL DEVELOPMENT

CHEADLE BUSINESS PARK

BROOKHOUSE WAY

CHEADLE

FLOOD RISK ASSESSMENT

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**PROPOSED COMMERCIAL DEVELOPMENT
CHEADLE BUSINESS PARK
BROOKHOUSE WAY
CHEADLE
ST10 1PJ**

FLOOD RISK ASSESSMENT

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A handwritten signature in black ink, appearing to read 'Gareth Small', is displayed on a light grey rectangular background.

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1 INTRODUCTION

1.1 General

Keytech Development Design (G) Ltd has been commissioned to undertake a Flood Risk Assessment (FRA) on behalf of Sammons Architects for a proposed commercial development comprising 15 new units and associated access road and parking at Brookhouse Way, Cheadle Business Park, Cheadle, Staffordshire, ST10 1PJ.

This report sets out the findings of an FRA required by the Local Planning Authority in support of the planning application for the proposed commercial development. The assessment has been conducted in accordance with the guidance set out in the National Planning Policy Framework (NPPF).

1.2 Background Information

The Department for Communities and Local Government (DCLG) published the NPPF and the Technical Guidance to the National Planning Policy Framework (Technical Guidance) in March 2012. The NPPF replaces the guidance previously contained within Planning Policy Statement 25 (PPS25) – Development and Flood Risk. The NPPF and Technical Guidance explain how flood risk should be taken into consideration during the planning process. The guidance specifies a sequential test which local planning authorities should apply to all future proposed development sites.

The following Table 1: Flood Zones, extracted from Table 1 of the Technical Guidance, defines the levels of flood risk.

TABLE 1: FLOOD ZONES

Flood Zone	Definition
Zone 1 Low Probability	Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map – all land outside Zones 2 and 3)
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue on the Flood Map)
Zone 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. (Land shown in dark blue on the Flood Map)
Zone 3b The Functional Floodplain	This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)

1.2.1 Information on the Gov.uk website indicates that a Flood Risk Assessment is required when the site is one or more of the following: -

- in flood zone 2 or 3 including minor development and change of use
- more than 1 hectare (ha) in flood zone 1
- less than 1 ha in flood zone 1, including a change of use in development type to a more vulnerable class (for example from commercial to residential), where they could be affected by sources of flooding other than rivers and the sea (for example surface water drains, reservoirs)
- in an area within flood zone 1 which has critical drainage problems as notified by the Environment Agency

1.2.2 As part of its general obligations under the Water Resources Act 1991, the EA has conducted surveys of its existing flood defences against flooding and has published a series of nationwide 'Indicative Floodplain Maps' based upon information from historic flood events and basic hydraulic modelling. In general terms, these maps give a good indication of the areas likely to be affected by flooding. The EA have published the 'Indicative Flood Map' on their website which is based on improved hydraulic

modelling and detailed local data. The Flood Map indicates areas which may be affected by a 1 in 100-year fluvial flood or a 1 in 200 year tidal/coastal flood (i.e., Zone 3 as defined in the NPPF). It also indicates which areas may be affected by an extreme flood (i.e., Zone 2 as defined in NPPF).

1.2.3 The Indicative Flood Map indicates that the proposed development is located in **Flood Zone 3**. The EA Flood Zone Map can be seen in **Appendix 2**. It should be noted that there is only a small area at the south of the site that is shown to be in Flood Zone 3. The majority of the site, including all of the proposed commercial units, access road and parking is located in Flood Zone 1.

1.2.4 Following Table 2, from the NPPF, Flood Risk and Coastal Change, shows the Vulnerability Class for the proposed industrial development is “Less Vulnerable”.

Table 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 and ambulance stations; fire stations and command centres; 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, 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.
- Car Parks

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.

1.2.5 The Following Table 3, from the NPPF, Flood Risk and Coastal Change, shows the Flood Risk Vulnerability and Flood Zone Compatibility

Table 3: VULNERABILITY AND FLOOD ZONE COMPATABILITY

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 †	X	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	X	X	X	✓*

† In Flood Zone 3a essential infrastructure should be designed and constructed to remain operational and safe in times of flood.

* In Flood Zone 3b (functional floodplain) essential infrastructure that has to be there and has passed the Exception Test, and water-compatible uses, should be designed and constructed to:

- remain operational and safe for users in times of flood.

- result in no net loss of floodplain storage.
- not impede water flows and not increase flood risk elsewhere.

1.3 The Sequential Test

The sequential test, as set out in the Technical Guidance is a risk-based approach that should be applied at all stages of the planning process. Its aim is to steer new development to areas at the lowest probability of flooding (i.e., Flood Zone 1).

Strategic Flood Risk Assessments (SFRA's) should provide the basis for applying the Sequential Test, and where an SFRA is not available, the Sequential Test should be based on the Environment Agency's Flood Zones.

This assessment will show that the proposed development is located within **Flood Zone 3**, with a **Less Vulnerable classification**, meaning that no sequential test is required.

2 STRUCTURE OF THE REPORT

- 2.1.1 The report has been structured to follow the general principles set out in Appendix C, FRA Pro-forma, of 'Development and Flood Risk: A Practice Guide Companion to PPS25' (which is still current although PPS25 itself is superseded).
- 2.1.2 The methodology for this FRA has comprised a desktop study comprising a review of existing information including:-
- Staffordshire Moorlands District Council Level 1 Strategic Flood Risk Assessment by Aecom, dated October 2015.
 - Severn Trent Water data

3 SITE SETTING

3.1 Site Description and Location

3.1.1 A summary of the site and its characteristics is provided in Table 2: 'Site Location Summary' below.

The site location is shown in **Appendix 1**.

Table 2: Site Location Summary	
Site Name	Proposed Commercial Development
Site Address	Brookhouse Way, Cheadle, Staffordshire, ST10 1PJ
Area Within Site Red Line Boundary	11165m ² (1.116Ha)
Existing Land Use	Greenfield
Proposed Land Use	Commercial Development
Local Planning Authority	Staffordshire Moorlands District Council
Nearest Environment Agency Office	Lichfield
Sewerage Undertaker	Severn Trent Water

3.1.2 The proposed development site is located off Brookhouse Way, Cheadle, Staffordshire. The National Grid Reference (NGR) is 399850,342500 and the nearest postcode is ST10 1PJ.

3.1.3 The proposals comprise the construction of a 15 commercial units with associated access road and parking areas.

3.1.4 The site topographical survey can be seen in the Drawings Appendix as drawing 2019-2458-01 Existing Conditions.

3.1.5 The survey indicates that the site falls from north west to generally south with a high level of **153.960** and a low level of **145.830**.

3.2 Existing Drainage Regime

- 3.2.1 There is a 225mm foul sewer crossing the site from west to east at a depth of between 2.9 and 1.8m. This sewer will require a diversion to be agreed with Severn Trent Water under Section 185 of the Water Industry Act 1991.
- 3.2.2 There are no other existing Severn Trent Water surface water sewers or any private sewers crossing the site.
- 3.2.3 Using the ICP SuDS Methodology as per the previously approved Flood Risk Assessment, based on the site area of **1.116 Ha**, the existing QBAR flows from the site is indicated to be **5.9 l/s**. The existing greenfield runoff assessment can be seen in **Appendix 4**.
- 3.2.4 The Severn Trent Water public sewer records can be found in **Appendix 3**.

3.3 Flooding History

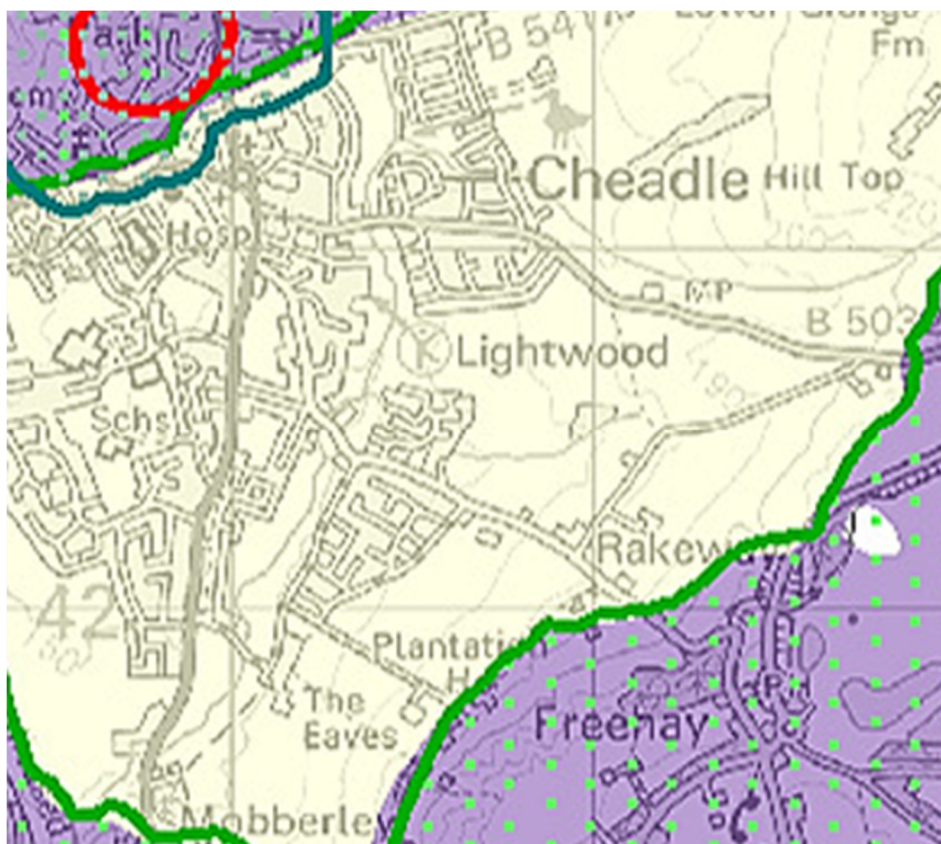
- 3.3.1 Flood warnings issued by the Environment Agency during 2024 for the River Churnet can be seen in **Appendix 5**. The warnings issued are along the River Churnet in the Staffordshire region and are not necessarily all related to the Cheadle area.
- 3.3.2 There were no Environment Agency flood warnings issued during 2024 for the River Tean, River Blythe, Mobberley Brook or Cecily Brook in the Cheadle area.

3.4 Sewer Flooding

- 3.4.1 The SFRA indicates that sewer flooding of properties is generally concentrated in the urban areas of the District, including Leek, Biddulph, Endon and Werrington. There were 18 recorded incidences of sewer flooding between 1997 and 2012, of which 8 were in 2012.
- 3.4.2 There are no incidences of sewer flooding occurring in the Cheadle area, where the site is located.

3.5 Ground Water Flooding

- 3.5.1 The SFRA indicates that *“there is currently no evidence to suggest that groundwater flooding is a major problem within Staffordshire and anticipates that groundwater flooding issues are likely to be localised in their nature, affecting only a small number of properties.”*
- 3.5.2 The following Ground Water Vulnerability and Source Protection Zones map is contained in the SFRA and indicates that the site is located in an area where no groundwater vulnerability is present.



EXTRACT FROM SMDC SFRA – FIGURE 9 APPENDIX B
GROUNDWATER VULNERABILITY AND SOURCE PROTECTION ZONES

3.5.3 The SFRA indicates that *“it is very difficult to predict the exact location of flooding from groundwater as it is often related to local geology.”*

4.0 PROPOSED DEVELOPMENT

4.1 Description of site proposals

4.1.1 The development proposals comprise the following: -

i) The development of 15 new commercial units with associated access road and parking areas.

4.1.2 The site will continue to be accessed of Brookhouse Way.

Drainage Proposals

4.1.3 The site is relatively flat with a high level of **153.960** in the north west and a low level of **145.830** in the south.

4.1.4 The total area within the site boundary is approximately **11165m² (1.116Ha)**.

4.1.5 The whole site area is currently greenfield and undeveloped.

4.1.6 Using the Micro Drainage ICP SuDS Methodology as per the previously approved Flood Risk Assessment, based on the site area of **1.116 Ha**, the existing QBAR flows from the site is indicated to be **5.9 l/s**.

4.1.7 The impermeable area of the proposed building and external hardstanding area is approximately **6050m²**.

4.1.8 Flows from the proposed development will be restricted to **5.9 l/s** to mimic existing greenfield runoff rates.

4.1.9 The restriction of surface water flows from the development will be achieved using an orifice plate flow control chamber with an orifice diameter of **53mm**.

4.1.10 The required surface water attenuation is a **30 x 10 x 1m deep cellular tank** in a single layer of crates. With a 95% void ratio, this will provide **285m³** of storage for all storm events up to and including the 1 in 100 year return period with an allowance of 40% for climate change.

4.1.11 A vortex separator will be installed downstream of the attenuation tank and upstream of the outlet to provide a measure of pollution mitigation and offer an improved water quality discharging to the tributary to the Mobberly Brook.

4.1.12 Permeable paving will also be provided as a further method of pollution mitigation with flows intercepted by a perforated pipe system and conveyed to the conventional drainage system.

4.1.13 It is proposed that the levels around the proposed commercial units and to the access road and parking areas are designed to minimise any uplift from existing levels.

4.1.14 Water Butts will be allocated to all commercial units to provide rainwater harvesting for the proposed surface water drainage system.

4.1.15 Foul drainage from the proposed development will discharge into the existing 225mm diameter foul sewer.

4.2 Vulnerability Classification

- 4.2.1 Table 3 of the NPPF Flood Zone and Flood Risk Tables indicates that the vulnerability classification for the proposed development is '**Less Vulnerable**', due to the proposed development industrial.
- 4.2.2 The proposed site is located within **Flood Zone 3**.
- 4.2.3 Table 3 shows that a less vulnerable classification is appropriate development within Flood Zone 3, without the requirement for an exceptions test.

5.0 FLOOD RISK

5.1 Flood Risk – To the Development

5.1.1 The NPPF, Flood Risk and Coastal Change, describes flood risk as, “flood risk” is a combination of the probability and the potential consequences of flooding from all sources – including from rivers and the sea, directly from rainfall on the ground surface and rising groundwater, overwhelmed sewers and drainage systems, and from reservoirs, canals and lakes and other artificial sources.

5.1.2 The presence of a potential flooding source within the vicinity of the site does not necessarily translate into a high risk of flooding.

Tidal Flooding

5.1.3 In this situation flooding from tidal waters is discounted due to the distance from the sea.

Fluvial Flooding

5.1.4 The indicative Flood Plain Map as published by the Environment Agency indicates that the proposed site is located within **Flood Zone 3**, albeit with the majority of the site being in Flood Zone 1.

5.1.5 Immediately to the south of the site is a tributary to the Mobberley Brook.

5.1.6 A hydraulic report of the Moberly Brook tributary was issued in 2015 and the results can be seen in **Appendix 6**.

5.1.7 The survey stations applicable to the site run from **XS10** to **XS25**. The critical water level at XS25 during the 1 in 1000 year return period storm event is reported as **148.39** and at XS10 the critical water level for the same return period storm event is reported as **145.460**.

5.1.8 The lowest finished floor level of the proposed commercial units nearest to the Mobberly Brook tributary is 150.200. Therefore, the critical water levels reported in the hydraulic report are between 1.81 and 4.74m lower than the lowest finished flood level..

5.1.9 The Mobberley Brook is located approximately 1.3Km to the south east of the site and the Cecily Brook is located approximately 1.8Km to the north east of the site. Further from the site at approximately 5.25 Km to the north is the River Churnet, 2.7Km to

the south east is the River Tean and approximately 4Km to the south is the River Blythe.

5.1.10 There are a number of tributaries to the River Churnet, River Tean, River Blythe, Mobberley Brook and Cecily Brook within 5Km of the site.

5.1.11 The SFRA indicates that there are three major fluvial events known to have impacted the district. These are from November 1959 and December 1964 on the River Churnet, November 1977 on the River Tean and August 1987 on the River Blithe. Whilst these flood events are within the Staffordshire Moorlands area, none of the events were in the vicinity of the site.

5.1.12 Flooding from this source should therefore be considered **negligible**.

Groundwater Flooding

5.1.13 The SFRA indicates that *"there is currently no evidence to suggest that groundwater flooding is a major problem within Staffordshire and anticipates that groundwater flooding issues are likely to be localised in their nature, affecting only a small number of properties."*

5.1.14 The Ground Water Vulnerability and Source Protection Zones map is contained in the SFRA and indicates that the site is located in an area where no major ground water flood risk is indicated.

5.1.15 Information on the Environment Agency website indicates that flooding from groundwater is unlikely in the site area.

5.1.16 Flooding from this source should therefore be considered **low**.

Flooding from Artificial Sources

5.1.17 There are a number of small ponds located within 2.5 Km of the site to the north, south, east and west.

5.1.18 Information on the Environment Agency website indicates that flooding from reservoirs in the site area is unlikely.

5.1.19 The SFRA does not indicate any potential risk of flooding from reservoirs in the site area.

5.1.20 Flooding from artificial sources should therefore be considered **low**.

Pluvial Flooding/ Overland Runoff

5.1.21 The Environment Agency Risk of Flooding from Surface Water map indicates that the

site area is at low risk of surface water flooding. There is a higher risk of flooding immediately to the south of the site, however the Environment Agency mapping indicates that any flooding would be confined within the Mobberly Brook tributary.

5.1.22 As indicated in paragraph 5.1.8, the hydraulic report for the tributary indicates that critical water levels in the 1 in 1000 year return period storm events are between 1.81 and 4.74m lower than the site.

5.1.23 Guidance on the Environment Agency website indicates that surface water flooding occurs when rainwater cannot drain away through normal drainage systems.

5.1.24 This can happen when there are large impermeable areas, such as roads, pavements, car parks, external yards etc where surface water has nowhere to drain and as a result, routes overland.

5.1.25 Intense rainfall only affecting a small geographic area can also impact on the overland routing of surface water.



SURFACE WATER FLOOD RISK MAP AS INDICATED BY THE ENVIRONMENT AGENCY

5.1.26 The above map indicates that the site is in an area of low surface water flood risk.

5.1.27 Based on the information from the Environment Agency, the risk of surface water flooding to the development is considered **low**.

Flooding from Sewers and Drains

5.1.28 There is a 225mm foul sewer crossing the site from east to west at a depth of between 2.9 and 1.8m. This sewer will require a diversion to be agreed with Severn Trent Water under Section 185 of the Water Industry Act 1991.

5.2 Flood Risk – From the Development

5.2.1 Surface water runoff from the development will be negligible. The existing site area is **11165m²**, with the area proposed works area containing 15 commercial units, access road and parking areas being **6050m²**. Flows from the proposed works area will be restricted to **5.9 l/s**, to mimic existing greenfield runoff rates.

5.2.2 By mimicking existing greenfield runoff rates, this will help to ensure that the flows from the proposed development do not generate or exacerbate any existing flows.

5.2.3 Surface water discharges from the proposed development will be of an improved water quality as a result of the pollution mitigation measures applied to the proposed development.

5.2.4 During the 1 in 100 year, 360 minute winter storm event, with 40% climate change allowance, the proposed surface water drainage system will discharge a volume of **272.939m³**. In comparison the existing discharge volume for the same event, also factoring in 40% climate change is **162.900³**. Therefore, the proposed surface water drainage system will decrease discharge volumes by **40.3%**. The assessment of existing volumes can be seen in **Appendix 4**.

Floodplain Storage

5.2.5 There are no functional floodplains (Flood Zone 3B) in the vicinity of the development.