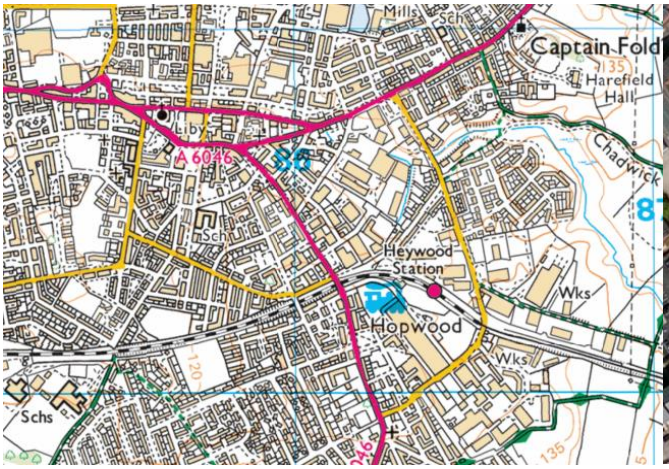
WtFR Ltd

Flood Risk Assessment

Development at

UK Granite and Quartz, Russell Street, Heywood, Rochdale, OL10 1 NU





On behalf of

UK Granite & Quartz

Date: 27th February 2019

Reference: WTFR-FRA-2019/02/Q10

Issue sheet

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0	JS	27/02/19	RM	01/03/19

1. Introduction 1
2. Site Description 1
3. Flood Risk Assessment 3
3.1 National Planning Policy 3
3.2 Local Planning Policy 4
3.3 Flood Risk Zones, Vulnerability and Classification 4
4. Sources of flooding 8
4.1 Fluvial/Tidal 8
4.2 Surface Water Flooding 9
4.3 Historic Flooding 9
4.4 Reservoir 9
4.5 Groundwater 10
4.6 Geology 11
5. Proposed development 12
6. Surface Water Drainage 13
7. Hierarchy of disposing surface water 14
7.1 Infiltration 14
7.2 Surface Water Body 14
7.3 Surface Water or Combined Sewer 14
8. Use of SuDS 15
9. Management of flood risk 15
9.1 Fluvial 15
9.2 Surface Water 15
10. Conclusions 15

1. Introduction

WtFR Ltd has been commissioned by UK Granite & Quartz to undertake a Flood Risk Assessment (FRA) in connection with the planning application for the proposed development at UK Granite and Quartz, Russell Street, Heywood, Rochdale, OL10 1NU.

This FRA has been produced to demonstrate how risks from all sources of flooding to the site and flood risk to others from the development will be managed, in order to satisfy the requirements set out in the National Planning Policy Framework (NPPF).

A full assessment of the flood risk to the site and consideration of the surface water management as a result of the development has been considered as part of this analysis.

Data has been gathered from a number of other sources including: the Environment Agency (EA), the British Geological Society (BGS), National Soil Research Institute (NSRI), aerial photographs, Ordnance Survey (OS), commercially available historical mapping and relevant strategic documents developed by the Rochdale Metropolitan Borough Council, in their capacity as both the Local Planning Authority and Lead Local Flood Authority.

2. Site Description

Area Size: 1500m^2

Grid reference: SD 86078 10550

The proposals are for the part demolition of the existing building and the erection of 3 new buildings at UK Granite and Quartz, Russell Street, Heywood, Rochdale, OL10 1NU.

Figures 1 and 2 below show location details of the development site. Figure 3 shows an aerial photograph of the development site.

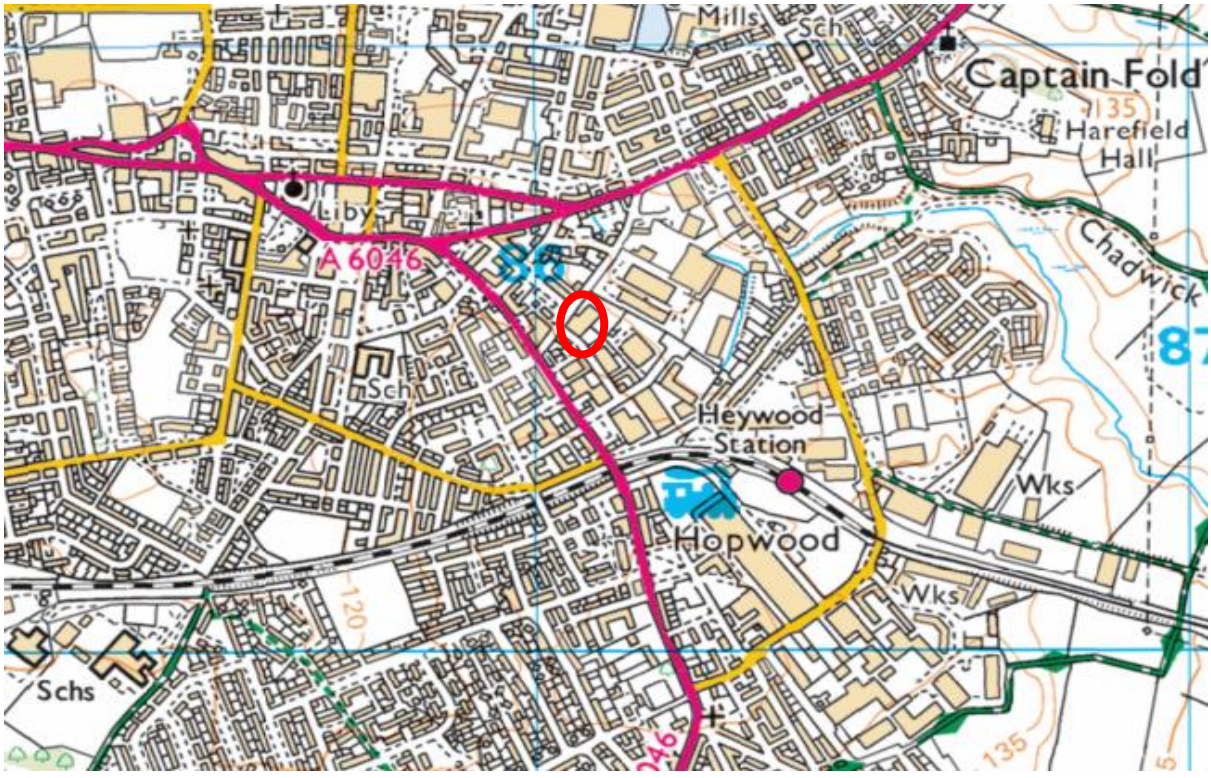


Figure 1 – Location of the site, highlighted.



Figure 2 – detailed location of the development site, highlighted.



Figure 3 – aerial photograph of the development site.

3. Flood Risk Assessment

3.1 National Planning Policy

Paragraph 163 of the NPPF states "When determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment[50]. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (the sequential and exception tests, as applicable) it can be demonstrated that:

a) within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;

b) the development is appropriately flood resistant and resilient;

c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;

d) any residual risk can be safely managed; and

e) safe access and escape routes are included where appropriate, as part of an agreed emergency plan".

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

Furthermore paragraph 30 of the Planning Practice Guide on Flood Risk and Climate Change 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, 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.

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;
- evidence for the local planning authority to apply (necessary) the Sequential Test, and;
- whether the development will be safe and pass the Exception Test, if applicable".

Continuing paragraph 31 of the Planning Practice Guidance quotes "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 increase the number of people present in an area at risk of flooding, the local planning authority would 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".

3.2 Local Planning Policy

Local Authorities consider flood risk through relevant environmental and climate change policies which enforce the requirements of the NPPF. Relevant local policy, as outlined by the Rochdale Metropolitan Borough Council, is contained within the;

i) Strategic Flood Risk Assessment
ii) Local Flood Risk Management Strategy

The Strategic Flood Risk Assessment (SFRA) and the Local Flood Risk Management Strategy (LFRMS) are key sources of flood risk specific information for the area. The SFRA provides a more detailed review of flood risks and recommendations for ensuring developments can be constructed and operated safely in accordance with the NPPF.

3.3 Flood Risk Zones, Vulnerability and Classification

These Flood Zones refer to the probability of river and sea flooding, ignoring the presence of defences. They are shown on the Environment Agency's Flood Map for Planning available on the Environment Agency's web site, as indicated in the table below.

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)

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.

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.

* Landfill as defined in Schedule 10 to the Environmental Permitting (England and Wales) Regulations 2010.

Table 3 - Flood risk vulnerability and flood zone 'compatibility'

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*	✗	✗	✗	✓*

Key:

✓ Development is appropriate

✗ Development should not be permitted.

Notes to table 3:

- This table does not show the application of the Sequential Test which should be applied first to guide development to Flood Zone 1, then Zone 2, and then Zone 3; nor does it reflect the need to avoid flood risk from sources other than rivers and the sea;
- The Sequential and Exception Tests do not need to be applied to minor developments and changes of use, except for a change of use to a caravan, camping or chalet site, or to a mobile home or park home site;

- Some developments may contain different elements of vulnerability and the highest vulnerability category should be used, unless the development is considered in its component parts.

† 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.

4. Sources of flooding

4.1 Fluvial/Tidal

The Environment Agency's Flood Map for Planning (Rivers and Sea) identifies fluvial and tidal flood zones, and provides an indication of whether or not these zones are protected, due to the presence of flood defences (also highlighted). Figure 4, below, presents the Flood Map for the surrounding area.

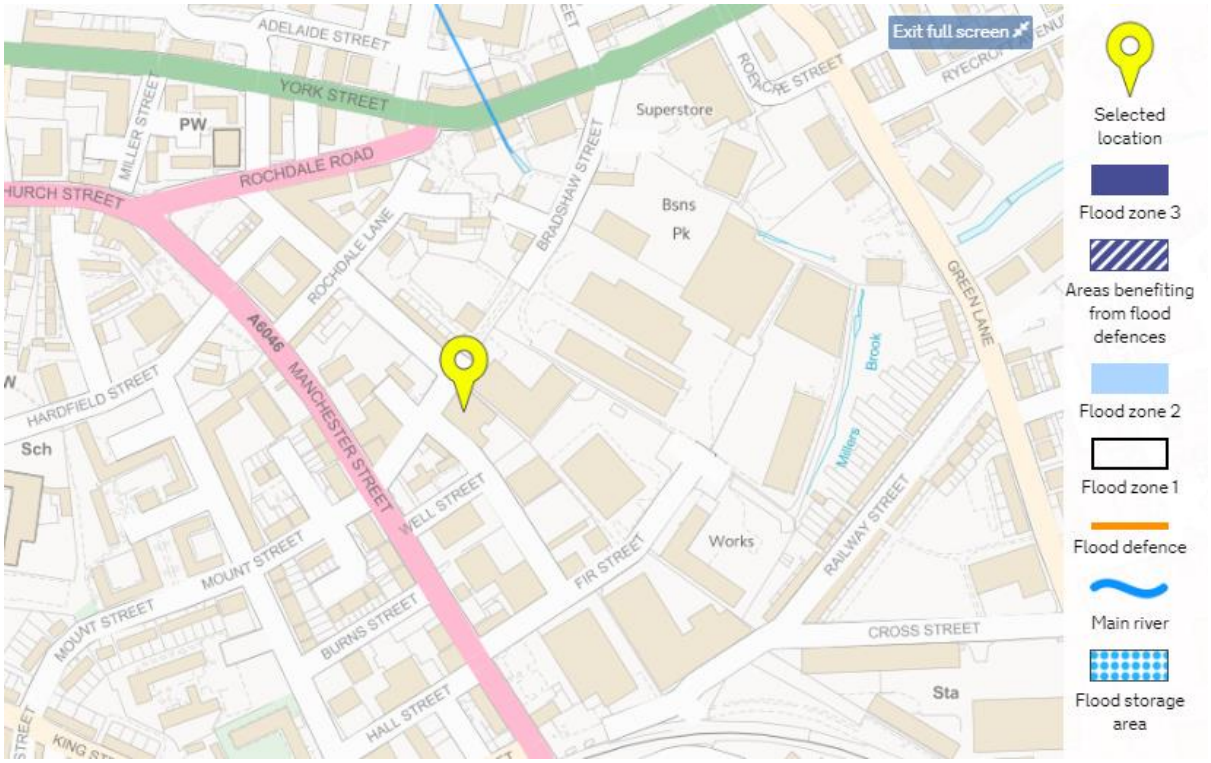


Figure 4 – Fluvial/tidal flood risk – EA Flood Map.

The EA Flood Map identifies the development site to lie within flood zone 1, where the chance of flooding in any given year is less than 1 in 1000 (0.1%) in a flood event.

4.2 Surface Water Flooding

The Environment Agency's updated Flood Map for Surface Water (uFMfSW) identifies pluvial flood risk. Figure 5, below, presents the uFMfSW for the development site and the surrounding area.

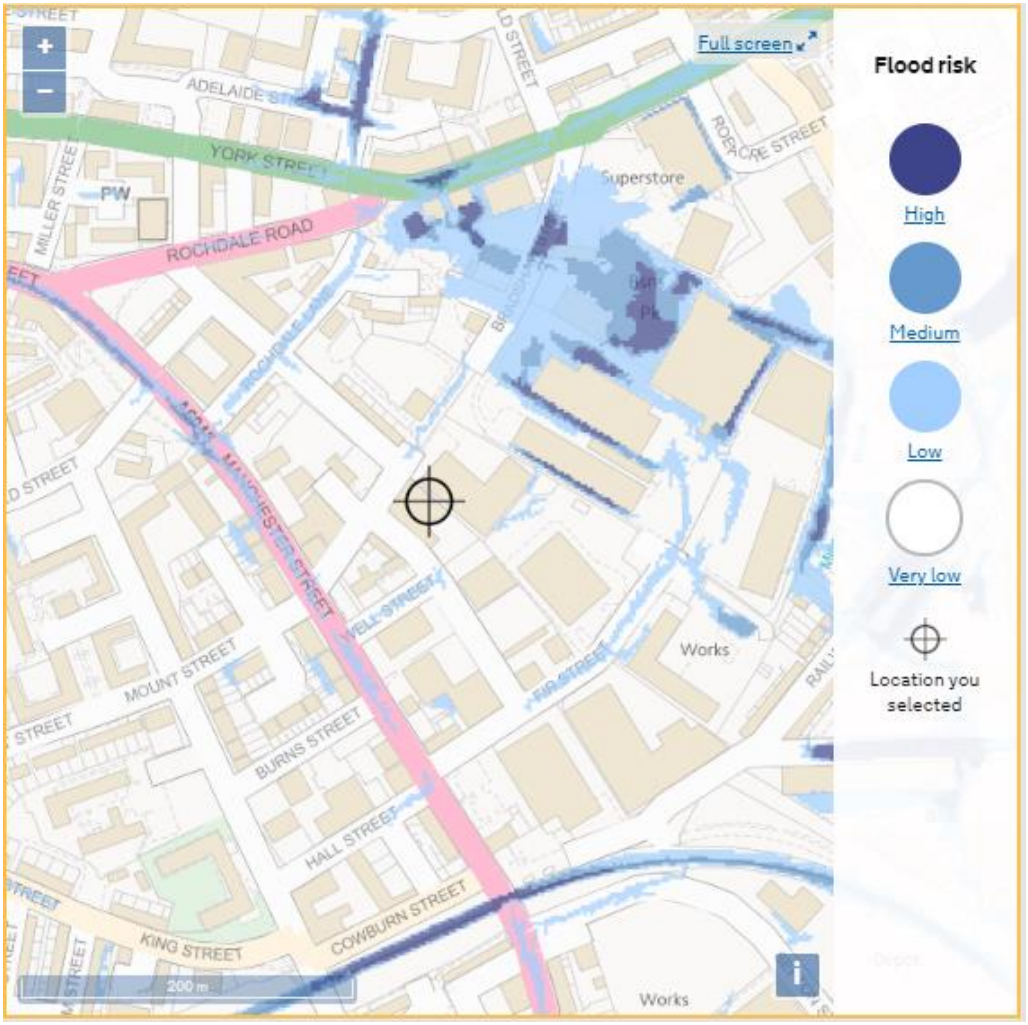


Figure 5 – Flooding from surface water sources, uFMfSW, site highlighted.

The uFMfSW shows that area in the vicinity of the development site is at very low risk of surface water flooding. Very low risk means that the probability of flooding in any given year is less than 1 in 1000 (0.1%).

4.3 Historic Flooding

Analysis of strategic flood risk documents developed by the Rochdale Metropolitan Borough Council does not indicate any historic flooding.

4.4 Reservoir

The Environment Agency's Risk of Reservoir Flooding Map identifies the maximum extent of flooding that may be expected in the unlikely event that a reservoir dam failed. The development is not at risk of a reservoir failing.

4.5 Groundwater

The Environment Agency's Groundwater Vulnerability Map indicates that the development site is situated over a minor aquifer high, as shown in Figure 6. Further analysis shows that the development site is not situated over a Groundwater Source Protection Zone as shown in Figure 7.

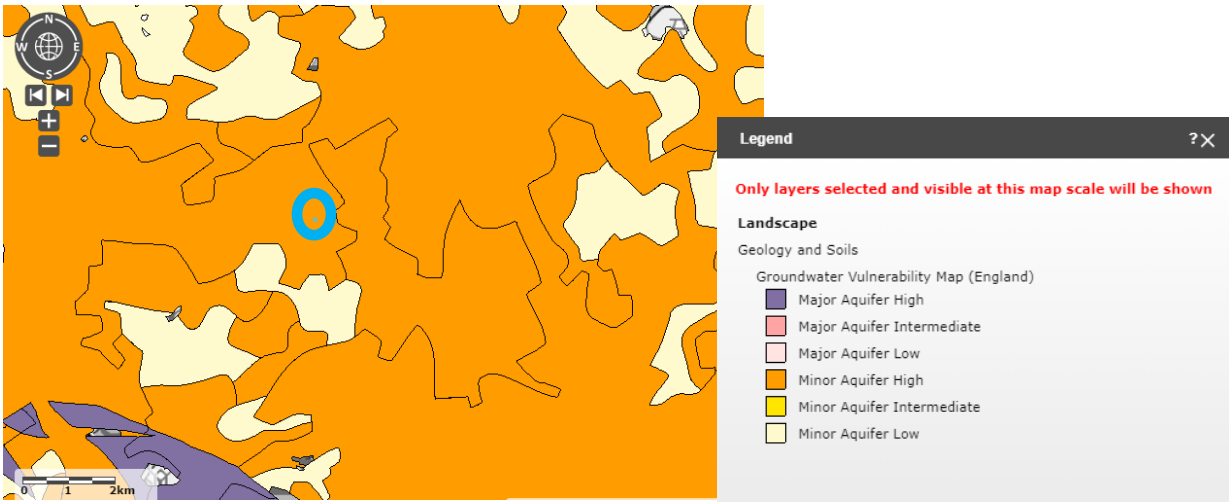


Figure 6 – Groundwater vulnerability map, site highlighted.

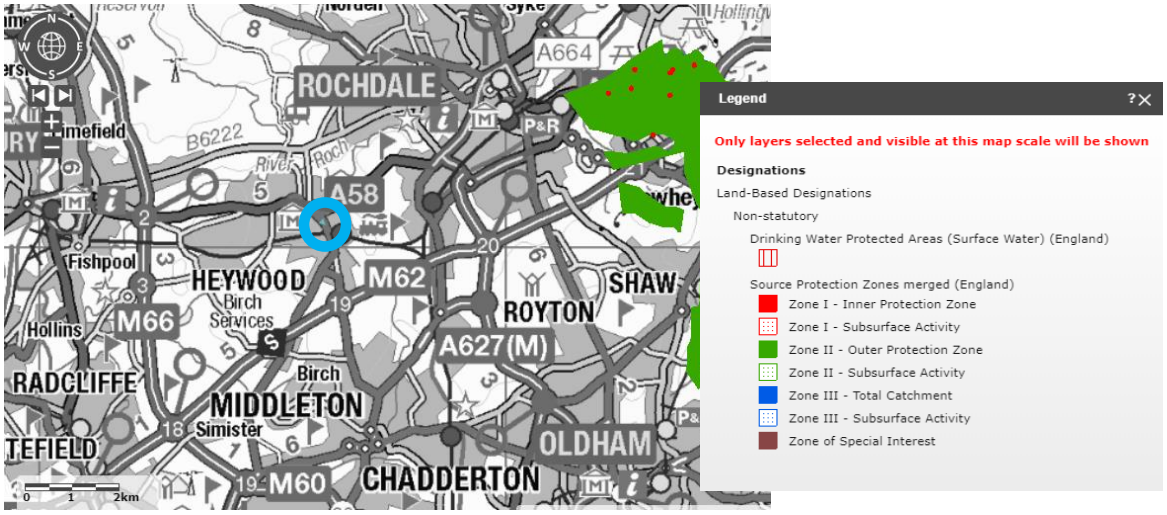


Figure 7 – Groundwater source protection zones, site highlighted.

Due to the minimal groundworks required for this development the impact on groundwater is considered to be negligible.

However, it is recommended that a groundwater mitigation plan is developed that may be implemented if groundwater is encountered during constriction.

4.6 Geology

Figures 8 and 9 present information from the British Geological Survey.

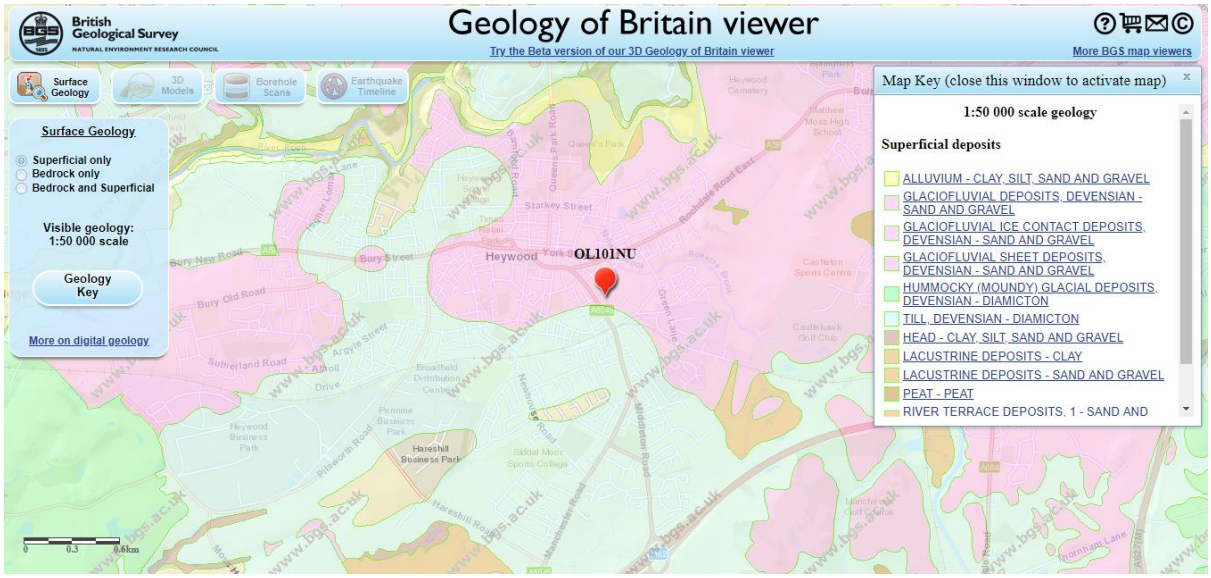


Figure 8 – Superficial Geology of the development.

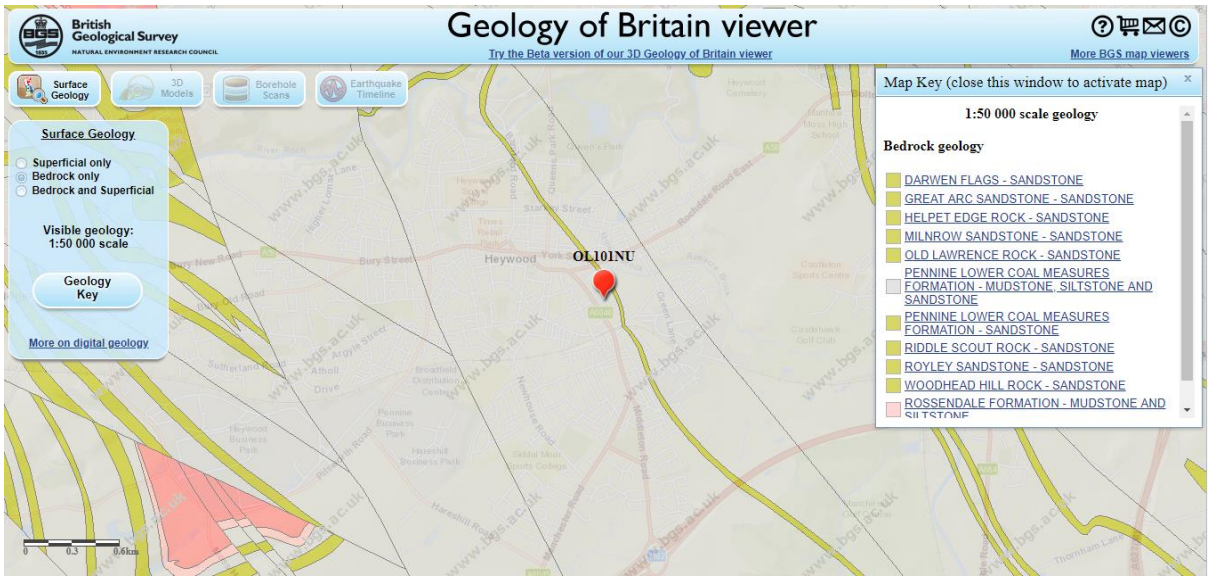


Figure 9 – Bedrock geology of the development.

The superficial deposit records at the development site are described as Glaciofluvial Deposits, Devensian - Sand and Gravel. The superficial deposits formed up to 2 million years ago in the Quaternary Period. The local environment was previously dominated by ice age conditions (UGF).

With regards to the bedrock, the site is underlain by the Pennine Lower Coal Measures Formation - Mudstone, Siltstone and Sandstone. The sedimentary bedrock formed approximately 318 to 319 million years ago in the Carboniferous Period. The local environment was previously dominated by swamps, estuaries and deltas.

5. Proposed development

This FRA is prepared to support a planning application for the part demolition of the existing building and the erection of 3 new buildings at UK Granite and Quartz, Russell Street, Heywood, Rochdale, OL10 1NU.

Buildings used for general industry are classified as being a **Less Vulnerable** development within Table 2 of the National Planning Practice Guidance. Less Vulnerable developments are acceptable within Flood Zone 1.

Figure 10 shows the proposed site layout.

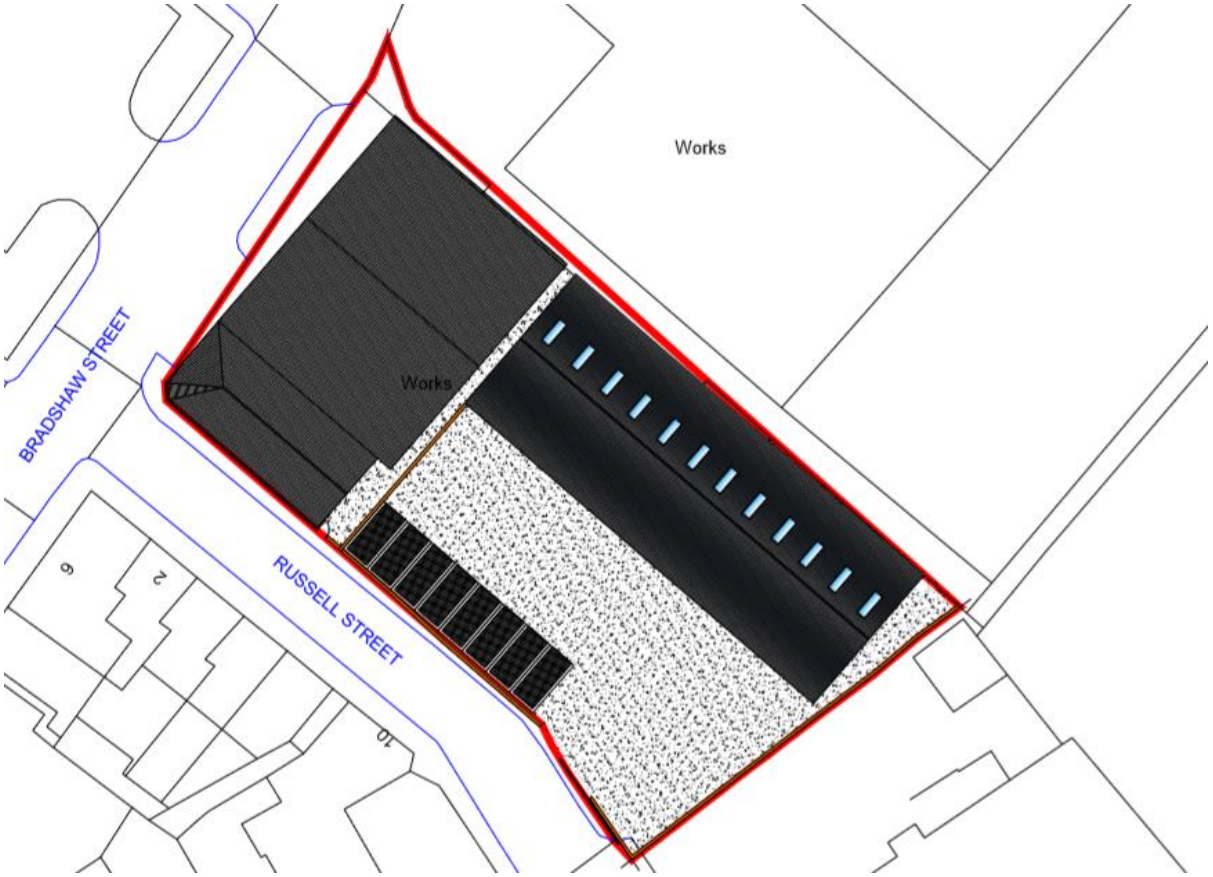


Figure 10 – Proposed site layout.

6. Surface Water Drainage

The existing runoff rate from the site can be calculated using the Modified Rational Rainfall Method. Where Q = 2.78 * Cv * Cr * Ri * A

Cv = **0.75** – Fully impermeable areas i.e. existing roads and hardstanding

Cr = **1.3** – Routing Coefficient (CIRIA C697 recommends a value of 1.3)

Ri = **120**mm Rainfall intensity

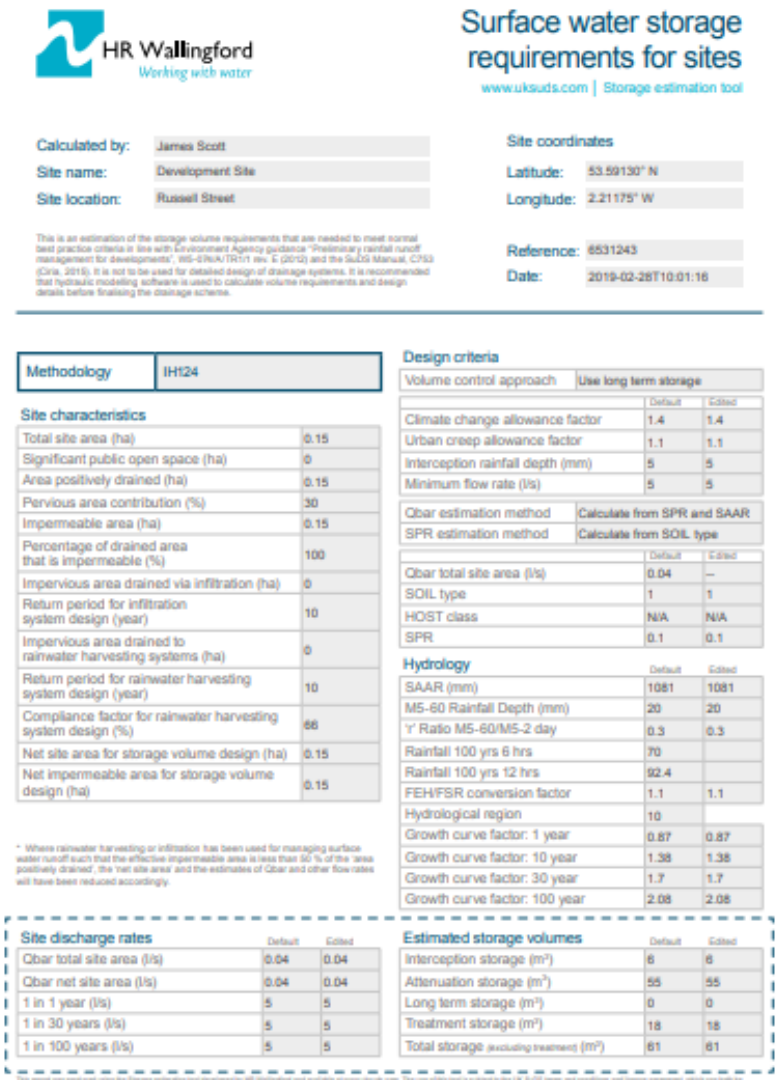
A = **0.15**ha current impermeable area

Q = 2.78 * 0.75 * 1.3 * 120 * 0.15

Q = 48.l/s

Table 8 below looks at the required attenuation that will be required on site. The figures include an allowance of 1.4 (+40%) for climate change.

The calculations show that 61m^3 of attenuation storage is required.



HR Wallingford
Working with water

Surface water storage requirements for sites

www.uksuds.com | Storage estimation tool

Calculated by:	James Scott
Site name:	Development Site
Site location:	Russell Street

This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance "Preliminary rainfall runoff management for developments", W5-074/A/TR/1 rev. E (2012) and the SuDS Manual, C753 (Ciria, 2015). It is not to be used for detailed design of drainage systems. It is recommended that hydraulic modelling software is used to calculate volume requirements and design details before finalising the drainage scheme.

Site coordinates

Latitude:	53.59130° N
Longitude:	2.21175° W
Reference:	6531243
Date:	2019-02-28T10:01:16

Methodology	IH124

Site characteristics

Total site area (ha)	0.15
Significant public open space (ha)	0
Area positively drained (ha)	0.15
Pervious area contribution (%)	30
Impermeable area (ha)	0.15
Percentage of drained area that is impermeable (%)	100
Impervious area drained via infiltration (ha)	0
Return period for infiltration system design (year)	10
Impervious area drained to rainwater harvesting systems (ha)	0
Return period for rainwater harvesting system design (year)	10
Compliance factor for rainwater harvesting system design (%)	66
Net site area for storage volume design (ha)	0.15
Net impermeable area for storage volume design (ha)	0.15

* Where rainwater harvesting or infiltration has been used for managing surface water runoff such that the effective impermeable area is less than 50 % of the 'area positively drained', the 'net site area' and the estimates of Qbar and other flow rates will have been reduced accordingly.

Design criteria

Volume control approach	Use long term storage	
	Default	Edited
Climate change allowance factor	1.4	1.4
Urban creep allowance factor	1.1	1.1
Interception rainfall depth (mm)	5	5
Minimum flow rate (l/s)	5	5
Qbar estimation method	Calculate from SPR and SAAR	
SPR estimation method	Calculate from SOIL type	
	Default	Edited
Qbar total site area (l/s)	0.04	–
SOIL type	1	1
HOST class	N/A	N/A
SPR	0.1	0.1

Hydrology

	Default	Edited
SAAR (mm)	1081	1081
M5-60 Rainfall Depth (mm)	20	20
'r' Ratio M5-60/M5-2 day	0.3	0.3
Rainfall 100 yrs 6 hrs	70	
Rainfall 100 yrs 12 hrs	92.4	
FEH/FSR conversion factor	1.1	1.1
Hydrological region	10	
Growth curve factor: 1 year	0.87	0.87
Growth curve factor: 10 year	1.38	1.38
Growth curve factor: 30 year	1.7	1.7
Growth curve factor: 100 year	2.08	2.08

Site discharge rates

	Default	Edited
Qbar total site area (l/s)	0.04	0.04
Qbar net site area (l/s)	0.04	0.04
1 in 1 year (l/s)	5	5
1 in 30 years (l/s)	5	5
1 in 100 years (l/s)	5	5

Estimated storage volumes

	Default	Edited
Interception storage (m³)	6	6
Attenuation storage (m³)	55	55
Long term storage (m³)	0	0
Treatment storage (m³)	18	18
Total storage (excluding treatment) (m³)	61	61

Table 4 – Site storage calculations.

Figure 11 below shows a schematic drainage layout for the development site.

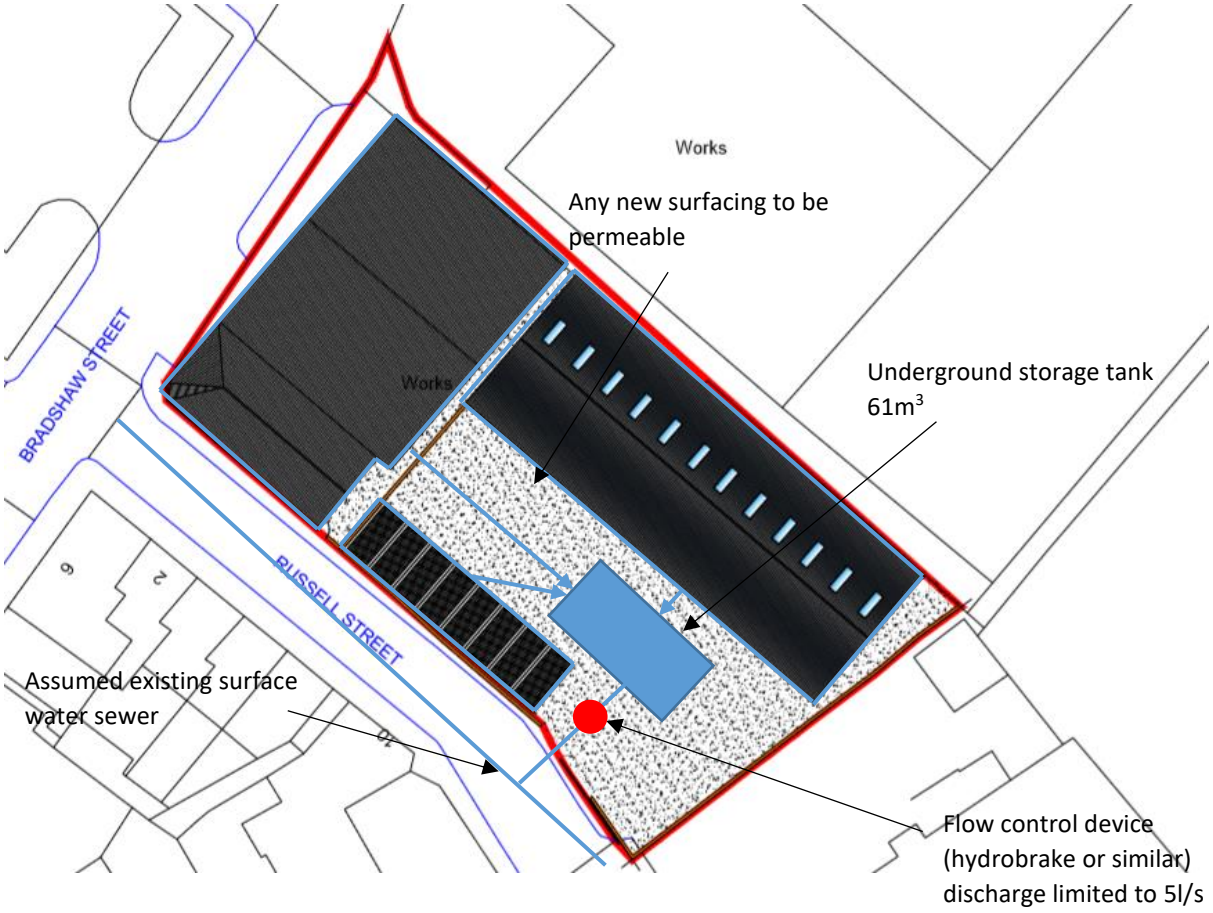


Figure 11 – Drainage layout.

7. Hierarchy of disposing surface water

The Planning Practice Guidance and part H of the Building Regulations state that "generally, the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable:

- into the ground (infiltration);
- to a surface water body;
- to a surface water sewer, highway drain, or another drainage system;
- to a combined sewer".

7.1 Infiltration

Due to the lack of permeable ground, infiltration is not a viable option.

7.2 Surface Water Body

There are no watercourses within the immediate vicinity of the development.

7.3 Surface Water or Combined Sewer

It is assumed that a public surface water or combined sewer is available and serves the other showrooms next to this development. As such, it is recommended that surface water is continued to be discharged into the public sewerage system.

8. Use of SuDS

The NPPF, Planning Practice Guide and the Ministerial Statement all look at the use of SuDS as a priority to aid the disposal of surface water from new developments.

Due to the nature of the development proposal there is limited capacity to include SuDS measures although permeable paving may be considered for use, where appropriate, to minimise surface water runoff from the site.

9. Management of flood risk

9.1 Fluvial

The analysis of flooding from fluvial and tidal sources shows that the building is not at risk from fluvial sources. The site is situated in flood zone 1.

Buildings used for general industry are classified as being a Less Vulnerable development within Table 2 of the Planning Practice Guidance. Such developments are acceptable in Flood Zone 1.

9.2 Surface Water

The vicinity of the development site is described as being at very low risk from surface water flooding, which means that the flood risk is less than 1 in 1000 (0.1%) in any year.

Surface water disposal will continue to be to the public sewerage system.

The calculations show that 61m^3 of attenuation storage is required.

Appropriate SuDS features and measures may be considered within the development to minimise surface water discharges. Due to the small-scale nature of the development this would be limited to permeable paving, where practicable.

The proposed development will not increase the risk of flooding elsewhere from surface water sources.

10. Conclusions

The development is situated in Flood Zone 1. The development is for the demolition of the existing building and the erection of 3 new general industry buildings, which are classed as being Less Vulnerable. Such developments are appropriate in flood zone 1.

The vicinity of the development site is at very low risk of surface water flooding.

The development will not increase the risk of flooding elsewhere.

Surface water disposal will be to the public sewerage system.

The calculations show that 61m^3 of attenuation storage is required.

It is recommended that appropriate SuDS measures should be incorporated in the development to minimise surface water discharges.

The proposed development will not increase the risk of flooding elsewhere from surface water sources.

There is no evidence of historic flooding of the development site.

The development is not at risk from reservoir flooding.

Based on the likely flooding risk, it is considered that the proposed development can be operated safely in flood risk terms, without increasing flood risk elsewhere and is therefore appropriate development in accordance with the NPPF.

Disclaimer

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