

 T J Booth Associates. Consulting Engineers 20A Eastgate St, Rochdale OL16 1DH	Project Hallmark - Walpole Street, Rochdale OL16 2AS				Job Ref. rep-tjba-hallmark-walpole st-DSR-030323	
	Section DRAINAGE STRATEGY REPORT				Sheet no./rev. 1 / 0	
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History.

Revision	Date	Reason
0	March 2023	Original to support planning application.

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Introduction.

Reference:

Reference document & policy requiring a drainage strategy report.

A planning application is to be submitted for the erection of 1No. commercial unit to tie in with the adjacent Heritage Business Park.

As part of the planning application, a development Drainage Strategy is required to address issues regarding sustainable drainage principles for the proposed development.

Purpose of Report:

The primary purpose of this report is to identify specific drainage proposals for parts of the proposed Site in accordance with the national drainage hierarchy for surface water disposal & exceedance characteristics, also considering the proposed end adopters and their requirements.

Regarding Site assessment, this report will appraise the existing Site and local drainage infrastructure, assess the suitability of the proposed development, giving recommendations for drainage design & management, specifically for approval of the LLFA/EA/sewerage undertakers, as applicable.

General principles:

Drainage from new developments is to be designed to follow the national drainage hierarchy for surface water discharge to the following networks in order of preference:

- infiltration
- watercourse
- public sewer

Flow rates (existing & proposed) are to be estimated for approval using the following methodology:

- *Development should aim to deliver greenfield runoff on greenfield sites up to a 100yr rainfall event, considering climate change.*
- *Development should aim for a minimum reduction in surface water runoff rates of 50% for brownfield sites on a 1yr rainfall event.*
- *Development should be designed so that there is no flooding to the development in a 30yr event and so that there is no property flooding in a 100yr event considering climate change.*

Plans.

Location Plan.

Refer to the appended Location Plan.

The Site is within a predominantly mixed commercial area with some residential habitation locally.

Walpole Street is located to the west boundary, where access to the Site is provided.

The River Roch is nominally 75m to the north, down a significant fall in land elevation, and through multiple 3rd party land.

There is a culverted watercourse to the east of the Site, but it lies at significant depth (16m) beneath landfill.

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Site Plan.

The most recent use of the Site was as a residential development/caravan Site used by the traveller community. It is covered in permanent impermeable hardstanding for the entire footprint, apart from a small shower/toilet block to the centre north boundary.

There is a gentle fall in elevation to the north boundary.

The predevelopment areas are:

- *Total area* 1440 sqm
- *Hardstanding area (impermeable)* 1440 sqm
- *Soft landscaped area (permeable)* 0 sqm.

The proposed development is for the demolition of all site structures and surfacing, and replacement with an industrial type business unit comprising a steel framed shed with plastisol coated cladding, access & parking hardstanding. There are some minor areas of soft landscaping/planting to the perimeter.

The proposed areas are:

- *Total area* 1440 sqm
- *Hardstanding area roof (impermeable)* 800 sqm
- *Hardstanding area access (impermeable)* 585 sqm
- *Soft landscaped area (permeable)* 55 sqm.

Desk Surveys & Investigations.

Existing and proposed topography.

No topographic survey of the Site has yet been undertaken.

The Site has a gentle fall to the north.

Geology & Site Investigations.

Geological maps of the local area indicate the Site is underlain by glaciofluvial sand & gravel, on top of Carboniferous sandstone (Old Lawrence Rock).

Historic maps of the local area indicate there has been considerable landfilling in the local area including beneath the Site. Local fill includes inert, industrial, commercial/household waste, and liquid sludge.

Boreholes.

There is no relevant borehole information in the local area.

Flood Risk.

Existing site flood zone from EA maps and flood risk probability.

Refer to the .gov flood maps appended. The Site is within Flood Zone 1, ie a LOW probability of flooding.

Watercourses – No risk from watercourses in the local area.

Surface water – Some minor surface water flooding along the east boundary of the Site in extreme events.

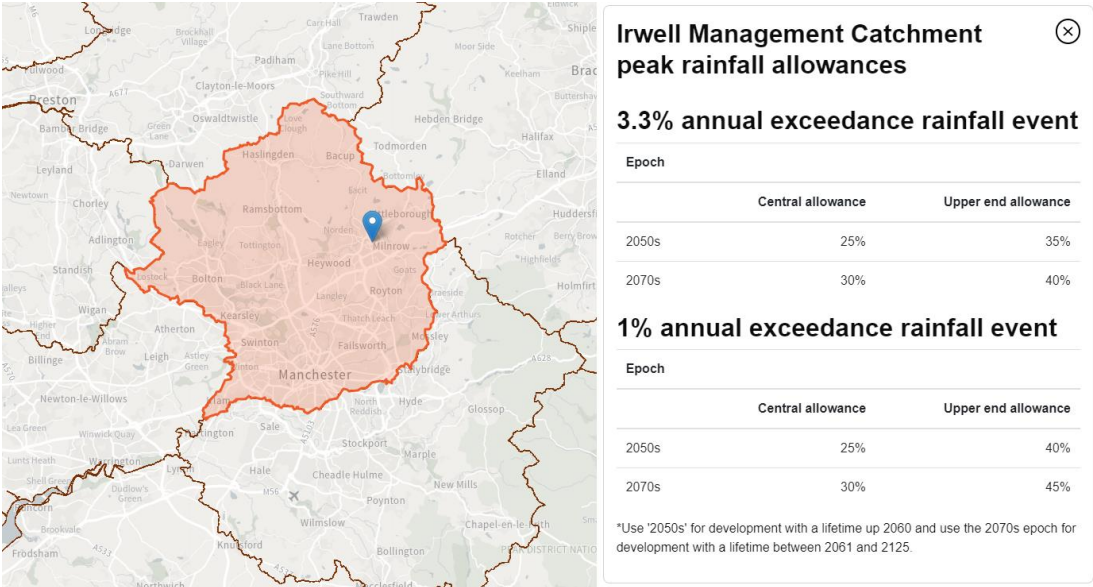
Canals/Artificial Water Bodies – No risk.

Reservoirs – Not known to be a risk.

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Climate change impacts.

Climate change allowances allow for uncertainty in the climate model, and the resultant change assumed through time. Allowances are thus related to the type of development and the potential lifetime expected of such development as per the Environment Agency table below:



Residential developments are classified within the '2070s' timeframe resulting in a 40% climate change allowance to be included on 30yr drainage proposals, and a 45% allowance on 100yr drainage proposals.

Assessments.

Existing surface water system.

The Site comprises approximately 1440sqm impermeable area, all of which is suspected to drain to the local sewer system.

Hydrological characteristics for the site were obtained from the HR Wallingford mapping database:

SAAR (mm)

1156

M5-60 rainfall depth (mm)

20

'r' ratio M5-60 / M5-2day

0.3

FEH/FSR conversion factor

1.14

Hydrological region

10

Specify SOIL type

4

BROWNFIELD RUNOFF CALCULATION					
Client:	Hallmark Developmens Ltd				
Site:	Walpole Street, Rochdale				
			return period (Tr)	rainfall mintensity (mm/hr)	runoff rate (l/s)
modified rational method	Q = 2.78 C i A		2	24.7	9.89
30 min storm event			30	47.1	18.86
Site area	1440 sqm		100	61.4	24.58
site area	0.144 Ha		100+40%	85.96	34.41

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Pass Forward Flow Rates:

Assessing the Site as brownfield gives a 2yr flow rate of 9.89l/s. Flow rate reduction of a 1yr flow of 50% is required for brownfield Sites, down to a minimum of 5l/s. As the 50% reduction on a 2yr flow would be below 5l/s, the reduction on a 1yr would be lower. As both a below the minimum 5l/s, the resulting pass forward flow rate for the Site is should be capped at 5l/s max.

Proposed Surface Water System.

Following the guidance of hierarchy for disposal of surface water (SUDS):

- **INFILTRATION:** Although the BGS maps have indicated the Site is underlain by glaciofluvial sand & gravel, they don't consider the unrecorded landfill that has occurred over the Site, and thus virgin material will be at depth.

The Site is underlain by fill materials locally which includes the following wastes:

- inert
- industrial
- commercial and household waste
- liquid sludge.

Due to the above historic landfilling in the local area, infiltration will not be a suitable way for surface water disposal, as contaminants may be mobilised.

- **WATERCOURSE:** The River Roch is approximately 75m north of the Site through 3rd party land, and is not considered reasonably available for connection.

There is also a culverted brook (Moss Brook), to the east side of Heritage Business Park, but this sewer is noted to be 16m deep below the landfill. It is not suitable for surface water disposal due to difficulty in construction.

No other watercourses exist locally.

- **SW SEWER:** There is a surface water sewer to the north of the Site in Liley Street which is suitable for surface water connection. Site drainage will have to be attenuated with a storage crate system suitable for up to and including the 100yr +CC pluvial flood event, controlled by a Hydrobrake at max 5/s.
- **COMBINED SEWER:** There is a combined sewer flowing through the east boundary of the Site which will be suitable for foul connection only.

Proposed Foul Water System.

Foul water flows from the proposed development will need to be kept separate from surface water flows and discharged using the existing Site connection.

Additional Recommendations.

The existing connections from the Site should be subject to a sewer survey and the position, connectivity, pipe sizes, depths and gradients recorded for reuse.

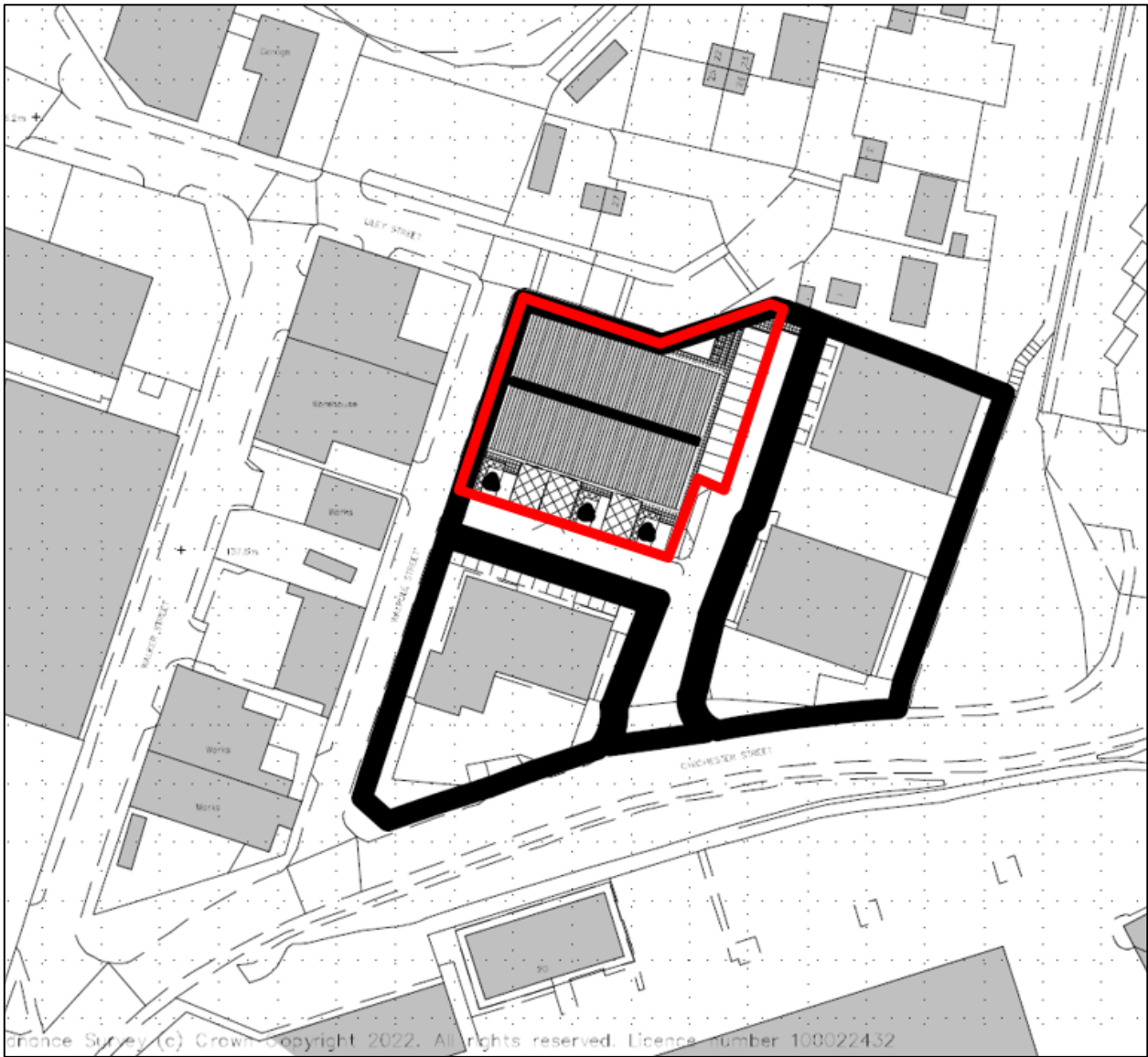
An S106 application for connection to the sewer network will need to be undertaken in due course.

This report should be submitted as part of the planning application for development and for approval by the LLFA/RMBC Drainage Officer.

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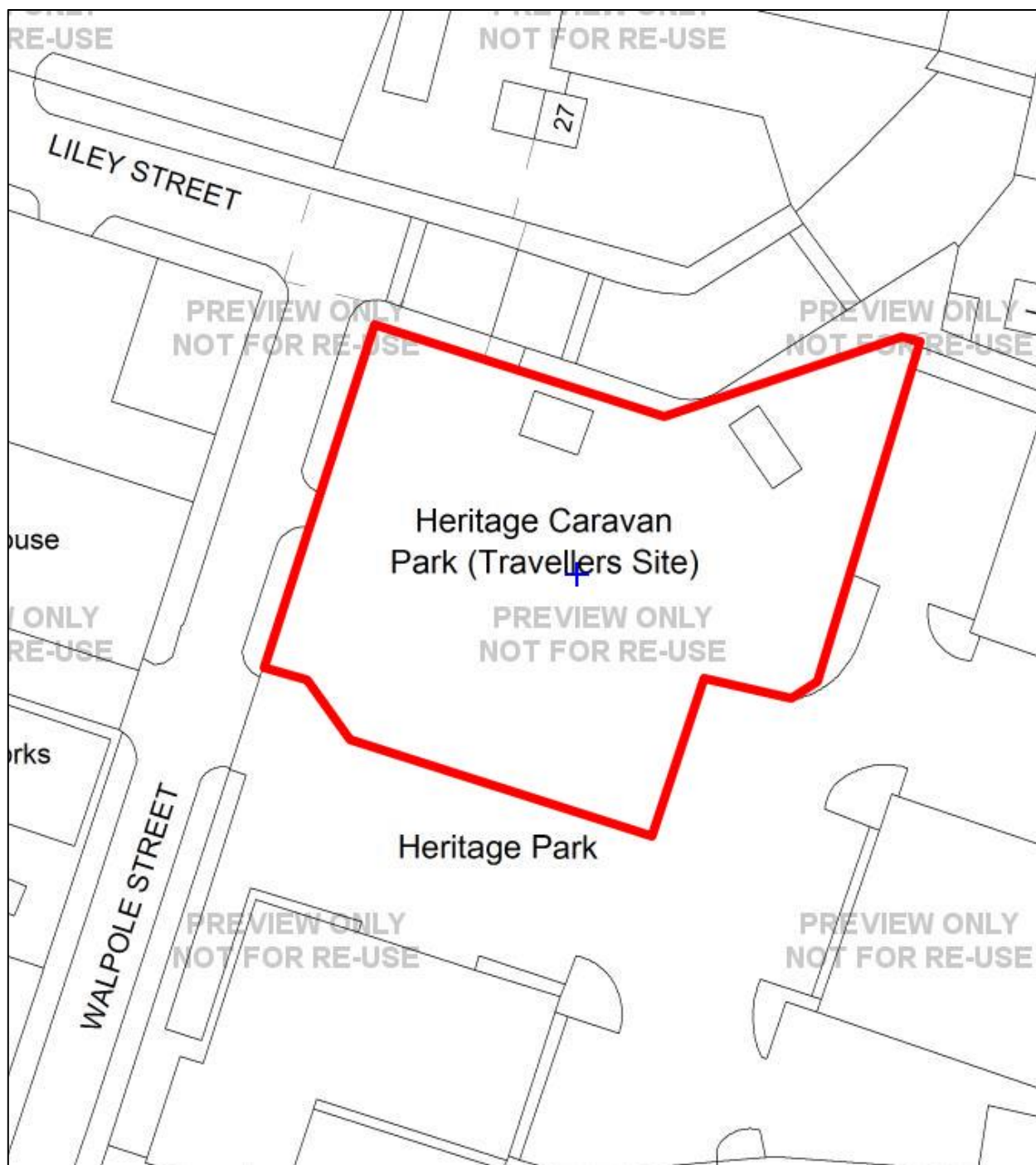
Appendix.

Location Plan.



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Existing Site/Topographic Plans.



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Proposed Site Plans.



Local BGS Borehole Records.

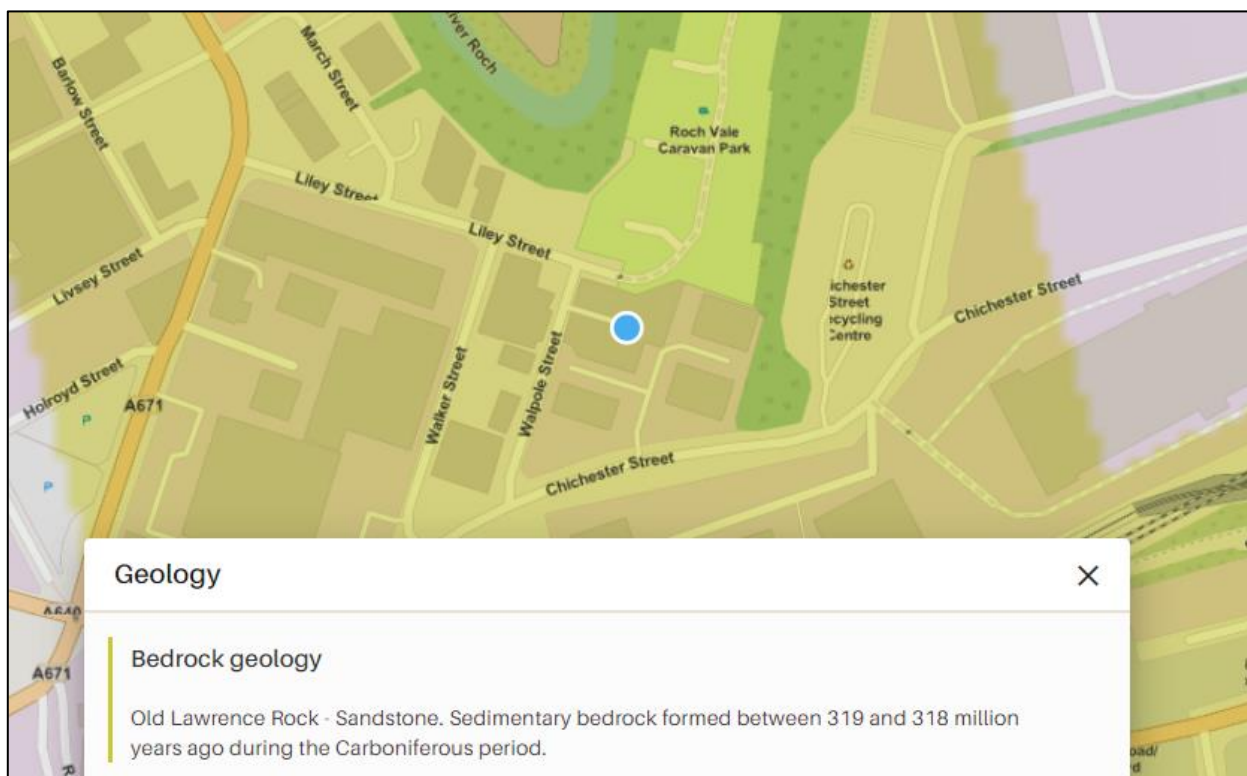
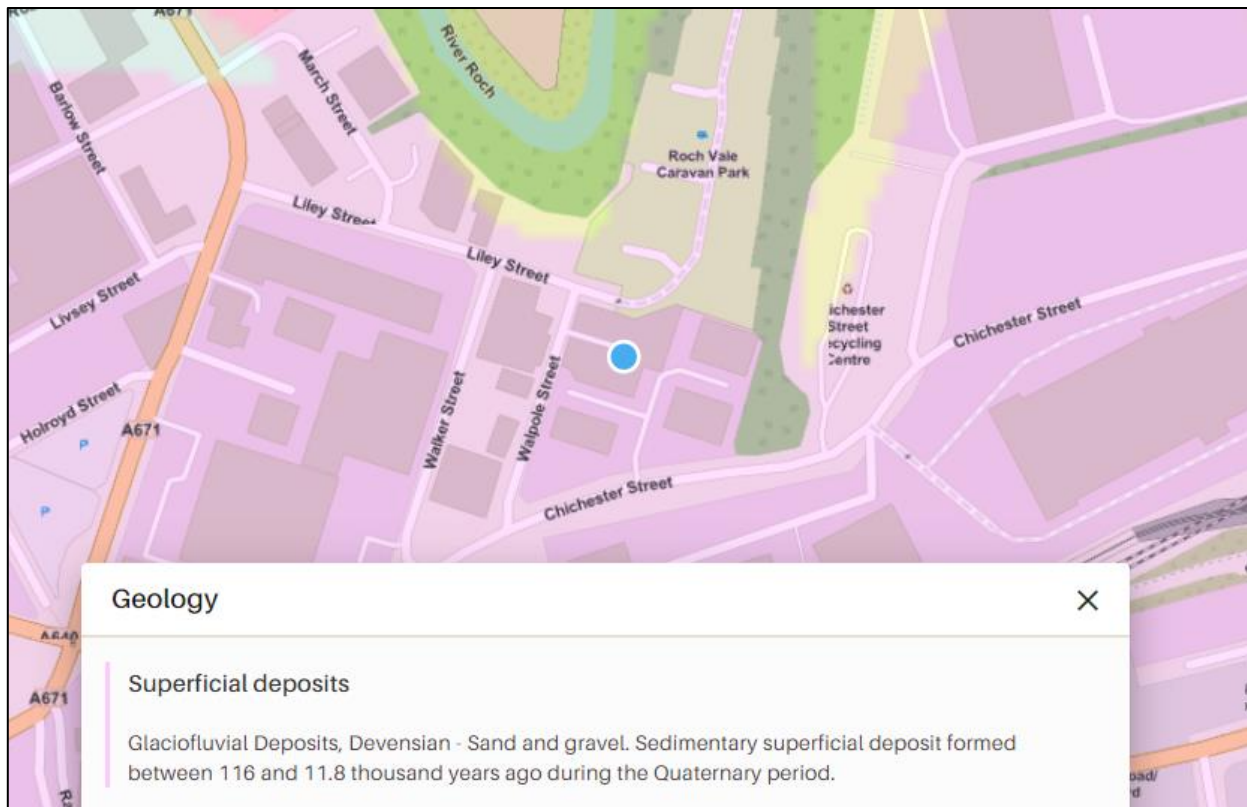
N/A.

Landmark Watercourse Map.

N/A, none available.

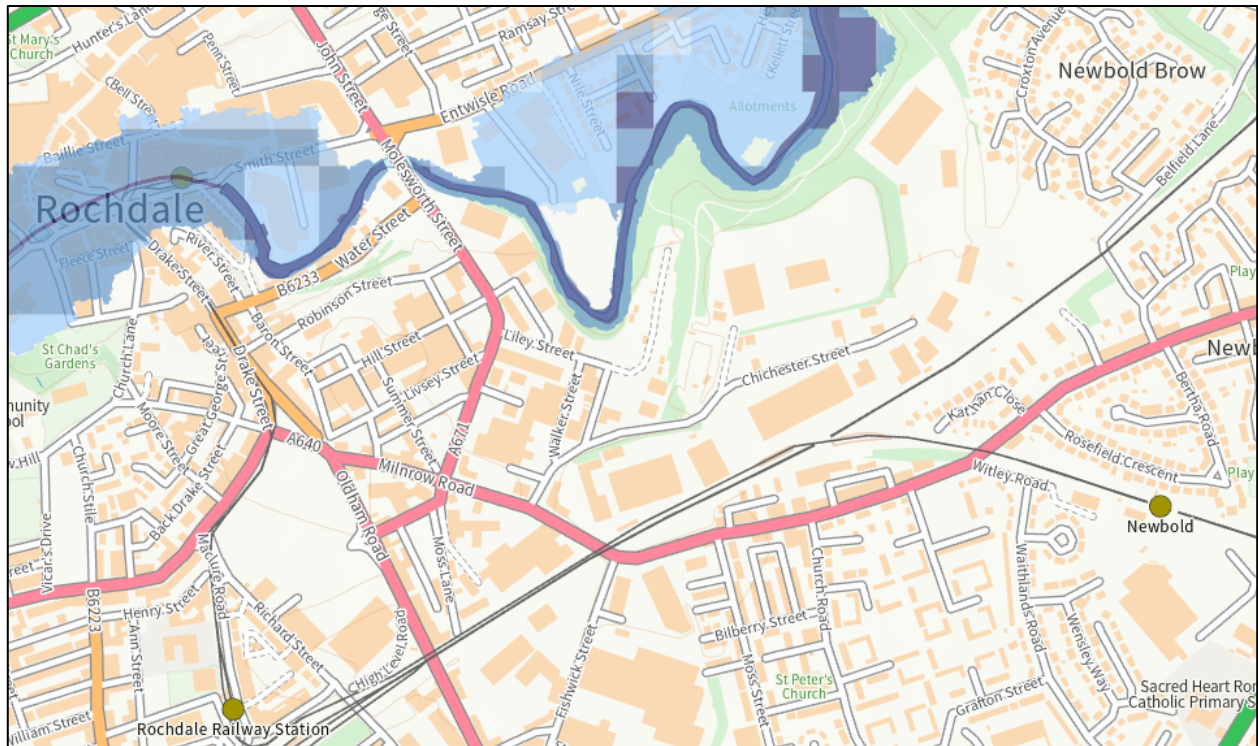
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BGS Geology Maps.

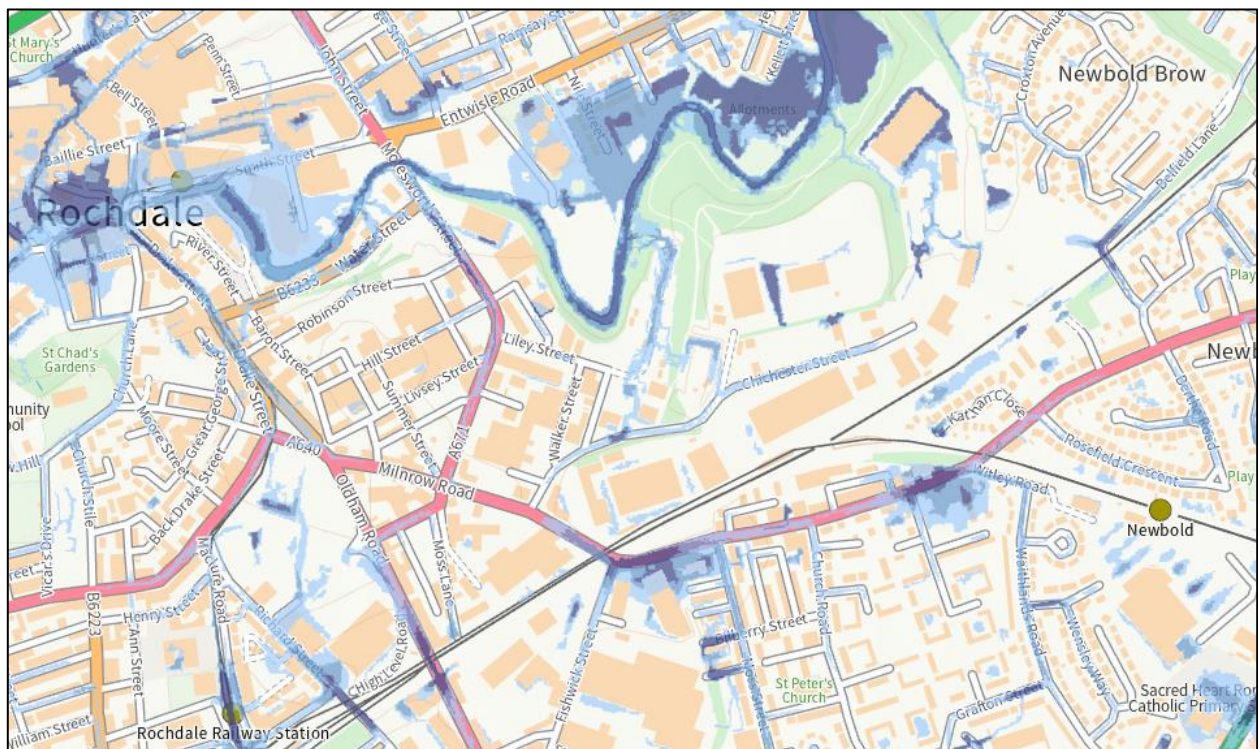


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Gov River Flood Map (Flood Zones).



Gov Surface Water Flood Map



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Drainage Calculations.

N/A.

Soil Permeability values.

Typical values of soil permeability

Some typical values of permeability coefficient are given below for different soil types. It refers to normally consolidated condition unless otherwise mentioned. These values should be used only as guideline for geotechnical problems; however, specific condition of each engineering problem often needs to be considered for an appropriate choice of geotechnical parameters.

Description	USCS	min (m/s)	max (m/s)	Specific value (m/s)	Reference
Well graded gravel, sandy gravel, with little or no fines	GW	5.00E-04	5.00E-02		[1].
Poorly graded gravel, sandy gravel, with little or no fines	GP	5.00E-04	5.00E-02		[1].
Silty gravels, silty sandy gravels	GM	5.00E-08	5.00E-06		[1].
Alluvial sand and gravel	(GM)	4.00E-04	4.00E-03		[2&3 in 4]
Clayey gravels, clayey sandy gravels	GC	5.00E-09	5.00E-06		[1].
Well graded sands, gravelly sands, with little or no fines	SW	1.00E-08	1.00E-06		[1].
Very fine sand, very well sorted	(SW)			8.40E-05	[5].
Medium sand, very well sorted	(SW)			2.23E-03	[5].
Coarse sand, very well sorted	(SW)			3.69E-01	[5].
Poorly graded sands, gravelly sands, with little or no fines	SP	2.55E-05	5.35E-04		[1]. [2&3 in 4]
Clean sands (good aquifers)	(SP-SW)	1.00E-05	1.00E-02		[5].
Uniform sand and gravel	(SP-GP)	4.00E-03	4.00E-01		[2&3 in 4]
Well graded sand and gravel without fines	(GW-SW)	4.00E-05	4.00E-03		[2&3 in 4]
Silty sands	SM	1.00E-08	5.00E-06		[1].
Clayey sands	SC	5.50E-09	5.50E-06		[1]. [5]
Inorganic silts, silty or clayey fine sands, with slight plasticity	ML	5.00E-09	1.00E-06		[1].
Inorganic clays, silty clays, sandy clays of low plasticity	CL	5.00E-10	5.00E-08		[1].
Organic silts and organic silty clays of low plasticity	OL	5.00E-09	1.00E-07		[1].
Inorganic silts of high plasticity	MH	1.00E-10	5.00E-08		[1].
Inorganic clays of high plasticity	CH	1.00E-10	1.00E-07		[1].
Compacted silt	(ML-MH)	7.00E-10	7.00E-08		[2&3 in 4]
Compacted clay	(CL-CH)	-	1.00E-09		[2&3 in 4]
Organic clays of high plasticity	OH	5.00E-10	1.00E-07		[1].
Peat and other highly organic soils	Pt	-	-		

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Site Photographs.



Figure 1 – View to south boundary.



Figure 2 – View to east boundary.

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Figure 3 – View to northeast corner.



Figure 4 – View to east boundary.

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Drainage Utilities Maps.

