



Drainage Scheme for proposed residential development on land adjacent to 6 Bentley Lane, Bury, BL9 6RZ.

Prepared for:

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1. Introduction

- 1.1. Martin Environmental Solutions has been commissioned to undertake a consideration of, and production of, a drainage scheme for the proposed residential development on land adjacent 6 Bentley Lane, Bury, BL9 6RZ.

Site Location and Context

- 1.2. The site currently consists of the garden area to 6 Bentley Lane, and consists of 0.05ha. To the rear, south, of the site the area is currently being redeveloped into a large housing estate, the ground here slopes downhill away from the site has been an agricultural field while further south an industrial complex did exist. To the east are the existing residential terrace properties along Bentley Lane. To the north on the opposite side of the road, garden areas and to the west another residential property.

- 1.3. An aerial Photograph is enclosed in Figure 1.

- 1.4. As part of the planning permission granted by Rochdale Council a condition was attached requiring this drainage scheme for foul and surface water. The condition reads:

“No development shall commence unless and until surface water drainage proposals have been submitted to and approved in writing by the Local Planning Authority. The scheme should be in accordance with the submitted Surface Water Sustainable Drainage Assessment and must be based on the hierarchy of drainage options in the National Planning Practice Guidance and be designed in accordance with the Non-Statutory Technical Standards for Sustainable Drainage Systems (March 2015).

This must include assessment of potential SuDS options for surface water drainage with appropriate calculations and test results to support the chosen solution. Details of proposed maintenance arrangements should also be provided. The approved scheme only shall be implemented prior to first occupation and thereafter maintained.”



2. Policy and Guidance

- 2.1. The Building Regulations, approved document H details the requirements for building drainage in terms of both foul and surface water drainage.
- 2.2. The approved document identifies a hierarchy in dealing with drainage from land, starting with infiltration into the land itself, surface water bodies, separate sewage systems and finally combined sewer systems.
- 2.3. In conjunction with the Non-Statutory Technical Standards for Sustainable Drainage Systems (March 2015), and BRE document Soakaway design Digest 365, a system for establishing the suitability for soakaway/infiltration systems has been identified.
- 2.4. The approved document also provides details over the location of any infiltration system with regard to property boundaries and building foundations.



3. The Assessment

Location

- 3.1 The proposed development is for three detached properties located adjacent to existing housing. Residential properties are located to the east and west with additional properties being built to the south. Access to the site is off Bentley Lane to the north.
- 3.2 Existing drainage for the surrounding properties and those previously located on site until 1980's consists of a combined sewer running along Bentley Lane and joining the public sewer system at the junction of Bentley Lane and Walmersley Old Road.
- 3.3 Research has identified that the geology in the area consists of Rough Rock Sandstone within the bedrock and Till, Devensian Diamicton within the superficial layers.
- 3.4 Hydrology in the area has been identified as consisting of a Secondary A Aquifer in the bedrock and unconfined aquifer in the superficial layers.
- 3.5 No watercourses are identified in the vicinity of the development site. The nearest being 140m to the southeast of the development site. The surrounding area is at a very low risk from flooding.

Foul drainage – Calculate discharge via existing sewer – 8 Neston

- 3.6 Along Bentley Lane there is located an existing shared combined sewer which flows onto Walmersley Old Road to the west. Since 2015 where any part of a property is within 30m of an existing sewer the Environment Agency will not allow a new discharge from a septic tank or sewage treatment plant. The development site is within 30m of the existing sewer as such these options are not available.
- 3.7 For discharge to ground a drainage field is required. Current Building Regulations state that drainage fields should be located at least 10m from any watercourse and at least 15m from any building. The rear garden area of the property is appropriate 8m long and as such a discharge to ground is not suitable for this development.
- 3.8 Current Building Regulations state that connection to non-mains foul drainage should only be considered where connection to the mains drainage is not practicable.
- 3.9 As such, it is proposed to connect the foul drainage of the proposed properties to the existing mains sewer within the Bentley Lane, via a suitably laid 100mm UPVC pipe.



Surface Water

3.10 Requirement H3 of the Building Regulations 2015 states that a hierarchy for surface water disposal should be considered, where priority should be given to soakaway/infiltration system, watercourse and as a last resort, sewers.

3.11 The National Planning Practice Guidance identifies the above measures and places them with a hierarchical structure:

Infiltration
Surface water body
Surface water sewer
Combined sewer

3.12 In line with the requirements of BRE 365 – Soakaway design a percolation test has been carried out on site and calculations undertaken as to the potential suitability of a soakaway at the development.

3.13 The percolation test was undertaken on the 2nd August 2021. The weather at the time was warm and dry, there had been no recent rainfall.

3.14 A trial pit was excavated to the southeast of the plot in the largest of the proposed gardens. In line with the BRE 365 guidance a 300mm square hole was dug at a depth of 1-1.3m bgl. This was then filled with water to time the rate of infiltration.

3.15 Virtually no movement in the water level was detected within 6 hours of filling the hole.

3.16 Based on the findings of the percolation test undertaken the site is not suitable for an infiltration system for surface water.

3.17 There is no suitable watercourse in the vicinity of the site in which surface water can be discharged.

3.18 There is no separate surface water sewer system in the area to which the surface water can be discharged, see Figure 2.

3.19 It is therefore concluded that the surface water from the site should discharge to the combined foul sewer system to the north of the site.



- 3.20 In order to elevate any potential storm water flooding it is recommended that sufficient storage be provided on site, in the form of attenuation on site and slow release to the sewer system.
- 3.21 The calculations in Appendix A, have identified the flows for a 12-hour 1, 30 and 100-year storm rainfall event. This identifies the need for a total of 3m³ storage for the surface water system. It is recommended that this is provided within the drainage system with a suitable flow control device to limit flow to 2l/s during storm activity.



4 Conclusion

- 4.1 A consideration of the disposal options for foul and surface water drainage has been undertaken. Given the constraints of the site in question and the results of the percolation test it has been identified that a discharge to ground is not a viable option for either foul or surface water.
- 4.2 As such it is proposed that a connection be made to the combined public sewer at the front of the site and both foul and surface water be discharged to this point.
- 4.3 To minimise the impact of the site on the sewer system it is recommended that adequate storage be provided on site for surface water. This has been identified as 3m³ holding tank.

Figure 1 – Aerial Photograph

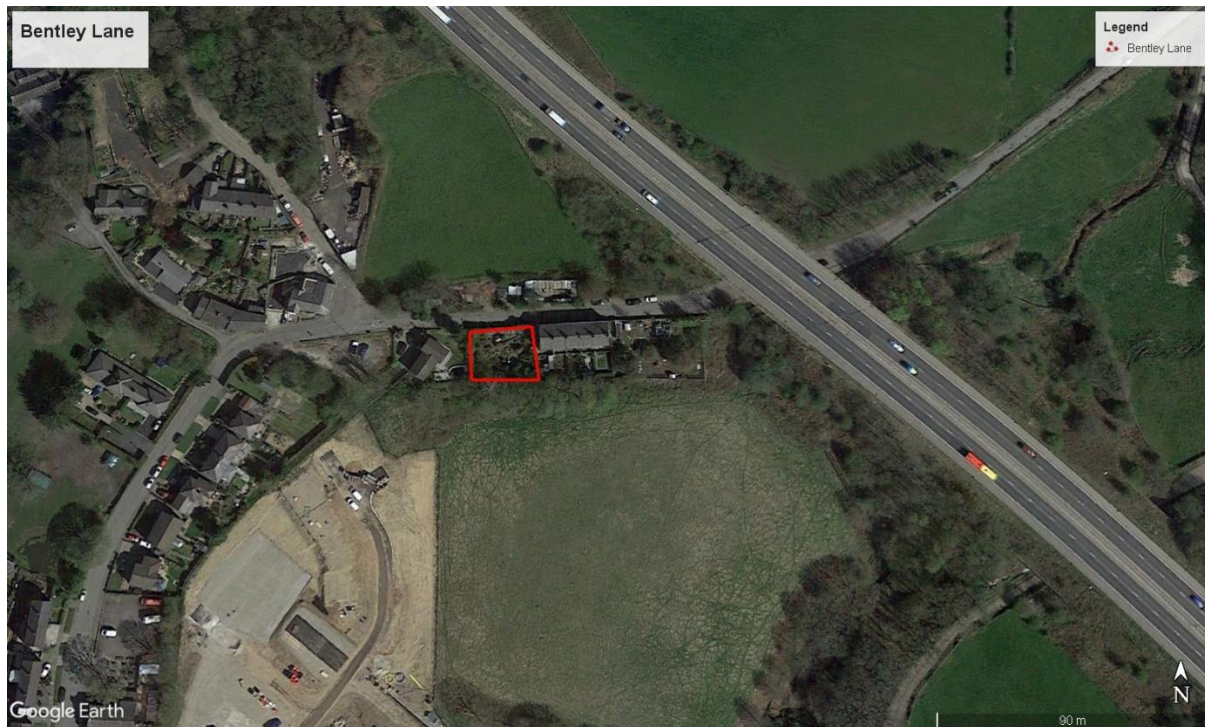
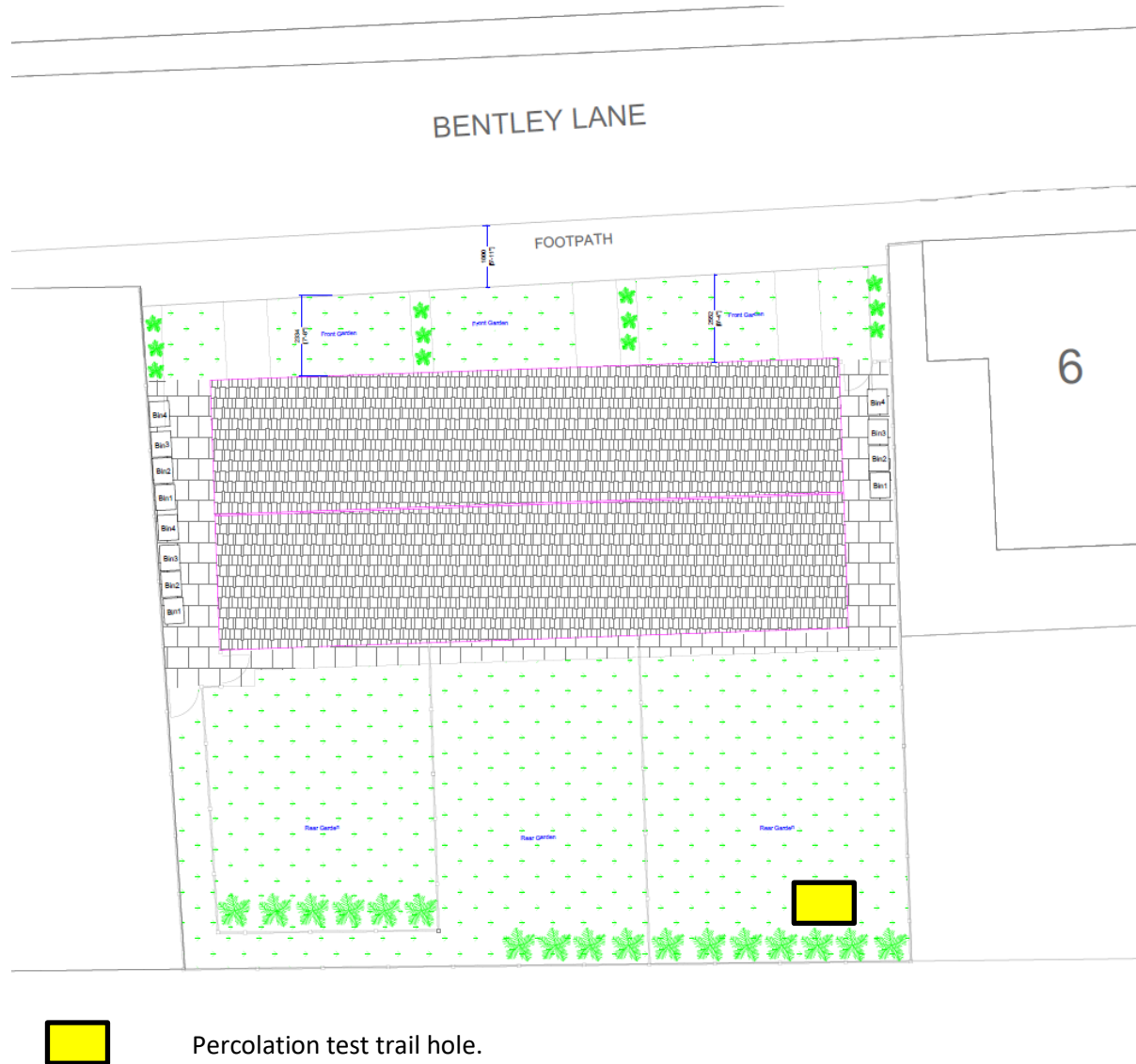


Figure 2 – Proposed site plan and percolation test location.





Appendix A – Surface water drainage calculations

Current 'Greenfield Run off Rate'



Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:

Site name:

Site location:

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:

Longitude:

Reference:

Date:

Runoff estimation approach

Site characteristics

Total site area (ha):

Methodology

Q_{BAR} estimation method:

SPR estimation method:

Soil characteristics

SOIL type:

HOST class:

SPR/SPRHOST:

Hydrological characteristics

SAAR (mm):

Hydrological region:

Growth curve factor 1 year:

Growth curve factor 30 years:

Growth curve factor 100 years:

Growth curve factor 200 years:

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates	Default	Edited
Q _{BAR} (l/s):	0.47	0.47
1 in 1 year (l/s):	0.41	0.41
1 in 30 years (l/s):	0.8	0.8
1 in 100 year (l/s):	0.98	0.98
1 in 200 years (l/s):	1.11	1.11

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

Surface Water Storage Requirements



Surface water storage requirements for sites

www.uksuds.com | Storage estimation tool

Calculated by:	Neil Martin
Site name:	Bentley Lane
Site location:	Bentley Lane

This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Cris, 2015) and the non-statutory standards for SuDS (Deira, 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 design of the drainage scheme.

Site Details

Latitude:	53.62371° N
Longitude:	2.28932° W
Reference:	3847856809
Date:	Oct 03 2021 20:18

Site characteristics

Total site area (ha):	0.04
Significant public open space (ha):	0.01
Area positively drained (ha):	0.03
Impermeable area (ha):	0.03
Percentage of drained area that is impermeable (%):	100
Impervious area drained via infiltration (ha):	0.0
Return period for infiltration system design (year):	10
Impervious area drained to rainwater harvesting (ha):	0.0
Return period for rainwater harvesting system (year):	10
Compliance factor for rainwater harvesting system (%):	66
Net site area for storage volume design (ha):	0.03
Net impermeable area for storage volume design (ha):	0.03
Pervious area contribution to runoff (%):	30

* 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 Q_{BAR} and other flow rates will have been reduced accordingly.

Design criteria

Climate change allowance factor:	1.4
Urban creep allowance factor:	1.1
Volume control approach	Flow control to max of 2 l/s/ha or
Interception rainfall depth (mm):	Q_{BAR} 5
Minimum flow rate (l/s):	2

Methodology

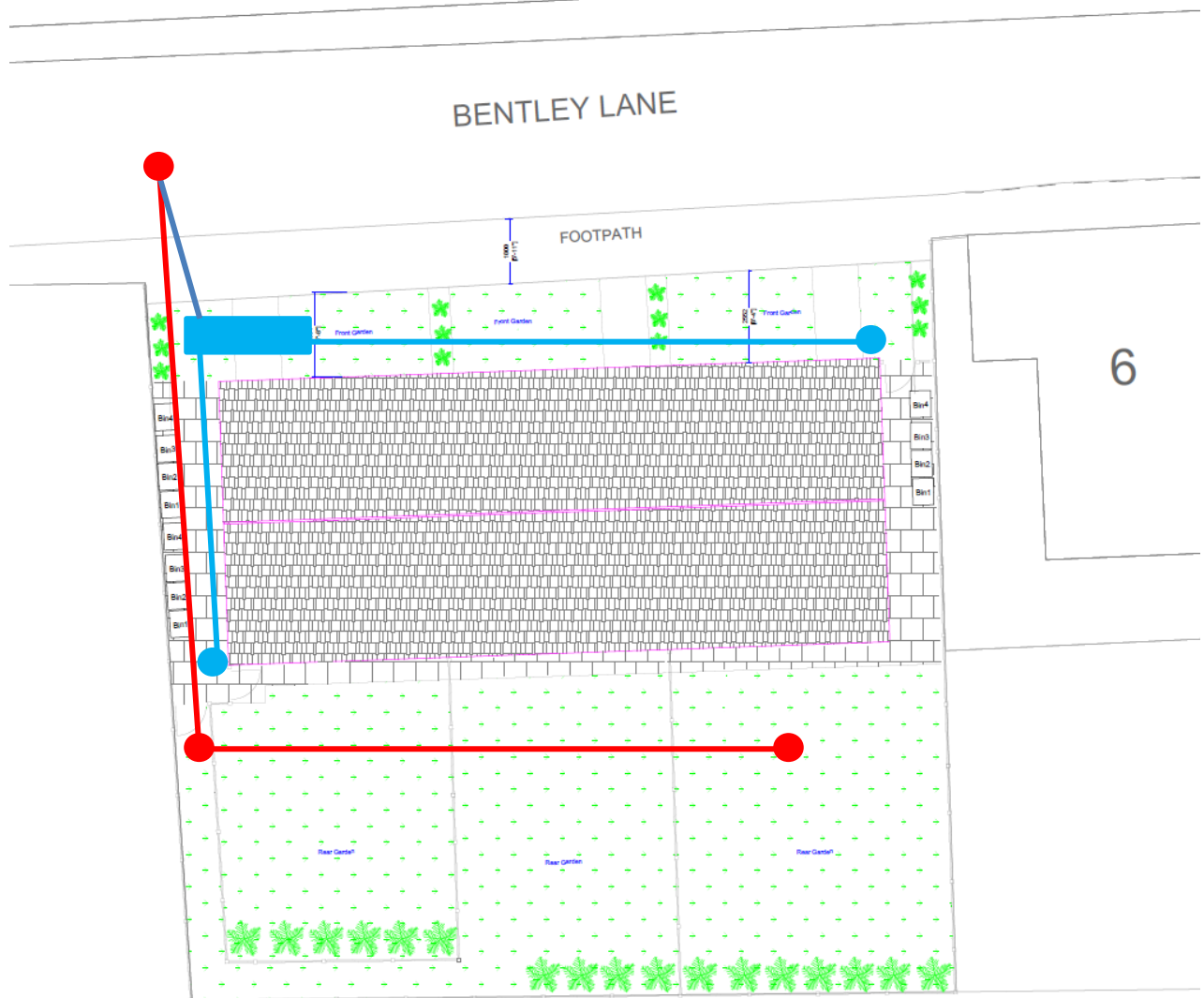
est	IH124
Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type
Soil characteristics	Default Edited
SOIL type:	5 5
SPR:	0.53 0.53
Hydrological characteristics	Default Edited
Rainfall 100 yrs 6 hrs:	-- 70
Rainfall 100 yrs 12 hrs:	-- 94.08
FEH / FSR conversion factor:	1.12 1.12
SAAR (mm):	1198 1198
M5-60 Rainfall Depth (mm):	20 20
'r' Ratio M5-60/M5-2 day:	0.3 0.3
Hydrological region:	10 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 years:	2.08 2.08
Q_{BAR} for total site area (l/s):	0.47 0.47
Q_{BAR} for net site area (l/s):	0.35 0.35



Site discharge rates	Default	Edited	Estimated storage volumes	Default	Edited
1 in 1 year (l/s):	2	2	Attenuation storage 1/100 years (m³):	3	3
1 in 30 years (l/s):	2	2	Long term storage 1/100 years (m³):	0	0
1 in 100 year (l/s):	2	2	Total storage 1/100 years (m³):	3	3

This report was produced using the storage estimation tool developed by HRWallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at <http://uksuds.com/terms-and-conditions.htm>. The outputs from this tool have been used to estimate storage volume requirements. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

Appendix B - Drainage Layout



3m³ surface water attenuation tank to be installed within the front garden of western property. The tank to receive water bot the front and rear surface water drainage system and to discharge via a flow control device to the public combined sewer through a combined pipe.