



Drainage Scheme for proposed residential development on Land Adjacent To 78 Willows Lane, Rochdale, OL16 4BG.

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 To 78 Willows Lane, Rochdale, OL16 4BG.

Site Location and Context

- 1.2. The development site is located to the east of 78 Willows Lane and is located in a cul-de-sac with residential properties surrounding it. The road runs to the south.
- 1.3. Existing drainage to the front of the property consists of a combined sewer system.
- 1.4. An aerial Photograph is enclosed in Figure 1.



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 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 the erection of a single residential dwelling house, on land adjacent to 78 Willows Lane, Rochdale.
- 3.2 Existing drainage for the surrounding properties consists of a combined sewer running along the centre of the Willows Lane to the south of the property.
- 3.3 Research has identified that the geology in the area consists of Pennine Lower Coal Measures or Mudstone, Siltstone and Sandstone overlaid with Glaciofluvial Deposits, Devensian - Sand and gravel.
- 3.4 Hydrology in the area has been identified as consisting of a Secondary A Aquifer in both the bedrock capable of supporting water supplies a local level and forming an important source of baseflow to rivers and undifferentiated in the superficial layers.
- 3.5 The nearest borehole to the site suggests that surface geology consists of fine to course sand and gravel with sand below.

Foul drainage

- 3.6 Along Willows Lane there is an existing combined public sewer. 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. Given the size of the site and position of neighbouring properties there is insufficient space to meet this requirement. Therefore, 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 Willows Lane, via a suitably laid 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 overall role of Sustainable Urban Drainage (SuDS) is the use of drainage design to mitigate the adverse effect of rainwater runoff due to the impact of both new and existing developments. The National Planning Practice Guidance confirms this approach and identifies a hierarchical structure:
- Infiltration
 - Surface water body
 - Surface water sewer
 - Combined sewer
- 3.12 Building Regulations Approved Document H states that infiltration drainage systems should not be located within 5m of a building or road. Given the size of the proposed development there is insufficient space to enable a n infiltration system on site.
- 3.13 There are no watercourses in the vicinity of the site as such discharge to a water course is not possible.
- 3.14 There is a combined public surface water sewer running along Willows Lane. It is therefore considered appropriate to discharge the site surface water into this sewer.
- 3.15 However to minimise the risk of surface water flooding during periods of intense rainfall it is recommended that an attenuation system is installed on site.

4 Determination of Options

- 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 it has been identified that a discharge to ground or a watercourse 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 to the front of the site and foul and surface water will be discharged to this point.



5 Drainage Design

- 5.1 The existing combined sewer system runs to the front of the site with the drainage line running approximately down the centre of the road. See Figure 2. It is therefore recommended that a new connected is made to this combined public sewer.
- 5.2 A survey has identified the drainage system at the neighbouring property is approx. 900mm deep within the inspection chamber at the edge of the property. The proposed system has been designed with this in mind.
- 5.3 It is however recommended that a drainage survey be undertaken to confirm the exact depth of the public sewer at the connection proposed connection point to ensure adequate fall is maintained.
- 5.4 To elevate the potential for flooding downstream it is recommended that a storm water storage system be incorporated into the drainage system.
- 5.5 The HR Wallingford, uksuds.com Surface water storage volume estimation tool has been used to calculate the required level of storage for the development. This is detailed in Appendix A and the resulting calculation confirms no additional storage is required.
- 5.6 It is however recommended that the surface water drains on site run via a suitable inspection chamber with a sump and orifice control outlet be installed just before its connection with the foul drain to allow surface water storage within the pipework and chamber, reducing the flow of surface water into the combined system. An indicative diagram is enclosed in Appendix B.
- 5.7 The above system will ensure suitable surface water disposal, in line with the Building Regulations hierarchy, while ensuring sufficient storage is available on site to tackle any excess surface water during periods of high storm rainfall.



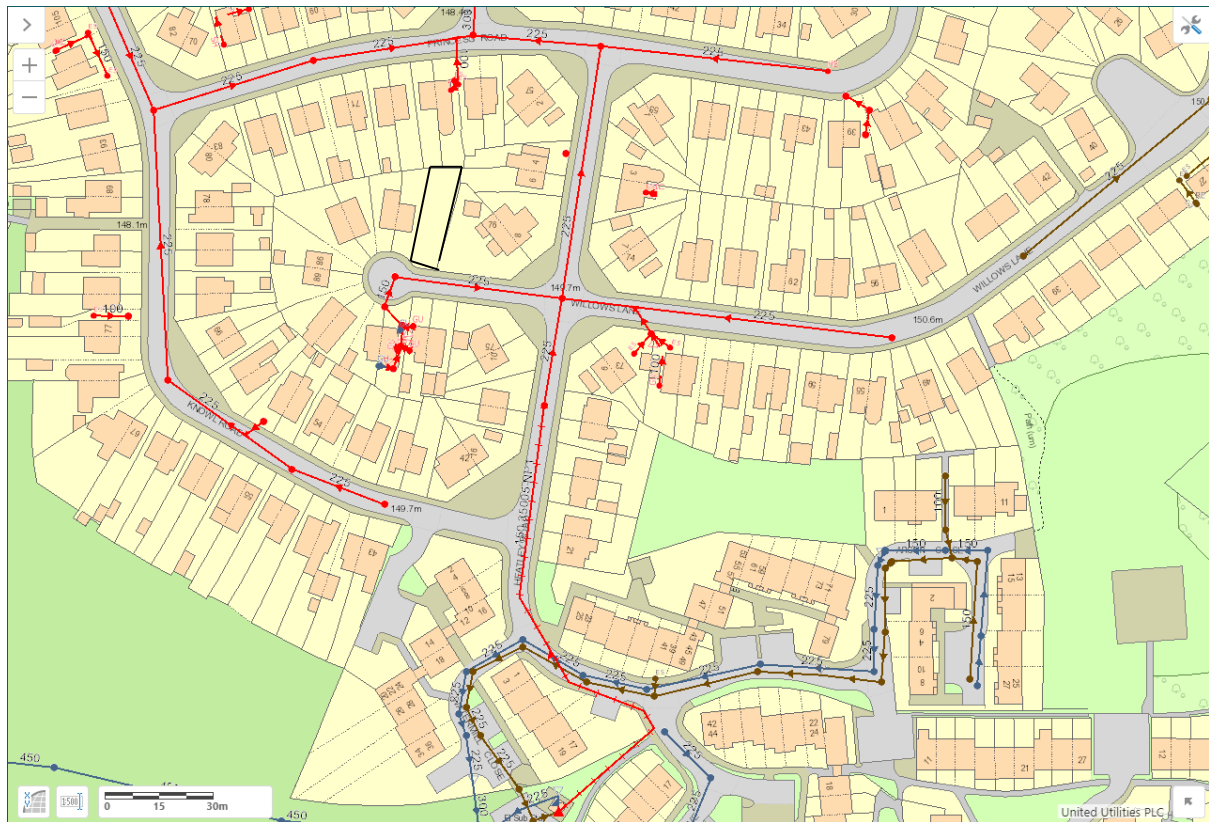
6 Conclusion

- 6.1 A consideration of the disposal options for foul and surface water drainage has been undertaken. Given the constraints of the site in question it has been identified that a discharge to ground or a watercourse is not a viable option for either foul or surface water.
- 6.2 As such it is proposed that the foul and surface water is discharged to the combined public sewer system at the front of the site.
- 6.3 Calculations have identified no need for a storm water storage system up to the 1 in 100yr rainfall event. However, it is advised that a reduced orifice control inspection chamber be fitted to the surface water drainage prior to its connection with the foul drain to restrict surface water flow during periods of heavy rainfall and ease the demand on the public system.

Figure 1 – Aerial Photograph



Figure 2 – Public Sewer System.





Appendix 1 – Surface Water Storage Calculation



Surface water storage requirements for sites

www.uksuds.com | Storage estimation tool

Calculated by: Neil Martin
Site name: 78 Willows Ln
Site location: Willows 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 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 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

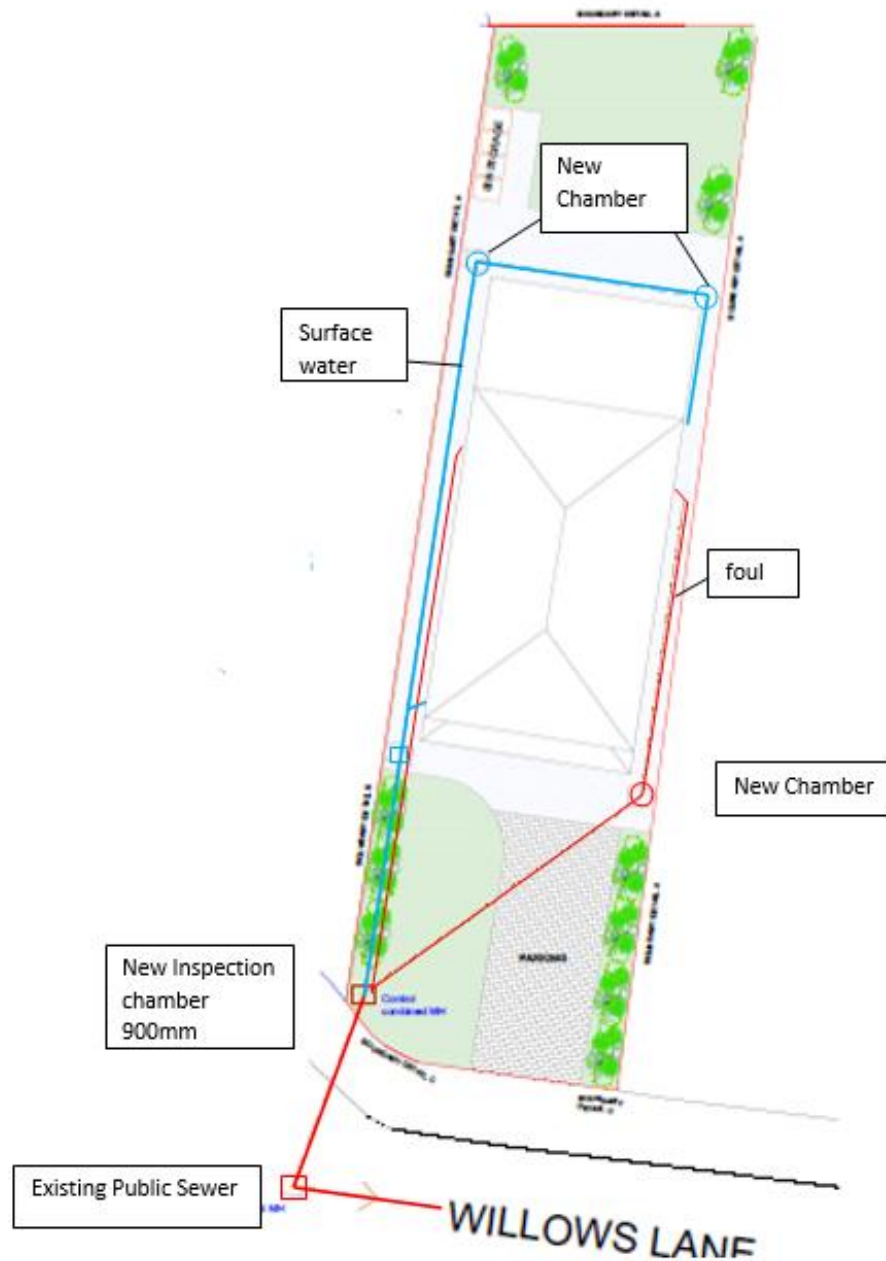
Latitude: 53.61330° N
Longitude: 2.12387° W
Reference: 1247564403
Date: Mar 05 2023 19:13

Site characteristics		Methodology													
Total site area (ha):	0.0133	esti	IH124												
Significant public open space (ha):	0	Q _{BAR} estimation method:	Calculate from SPR and SAAR												
Area positively drained (ha):	0.0133	SPR estimation method:	Calculate from SOIL type												
Impermeable area (ha):	0.0126	<table border="0"> <tr> <td>Soil characteristics</td> <td>Default</td> <td>Edited</td> </tr> <tr> <td>SOIL type:</td> <td> 4 </td> <td> 4 </td> </tr> <tr> <td>SPR:</td> <td> 0.47 </td> <td> 0.47 </td> </tr> <tr> <td colspan="2"></td> <td>Default Edited</td> </tr> </table>		Soil characteristics	Default	Edited	SOIL type:	4	4	SPR:	0.47	0.47			Default Edited
Soil characteristics	Default	Edited													
SOIL type:	4	4													
SPR:	0.47	0.47													
		Default Edited													
Percentage of drained area that is impermeable (%):	95														
Impervious area drained via infiltration (ha):	0														
Return period for infiltration system design (year):	100														
Impervious area drained to rainwater harvesting (ha):	0.0126														
Return period for rainwater harvesting system (year):	100														
Compliance factor for rainwater harvesting system (%):	66														
Net site area for storage volume design (ha):	0.02														
Net impermeable area for storage volume design (ha):	0.01														
Pervious area contribution to runoff (%):	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 Q_{BAR} and other flow rates will have been reduced accordingly.															
Design criteria		Hydrological characteristics													
Climate change allowance factor:	1.4	Rainfall 100 yrs 6 hrs:	-- 60												
Urban creep allowance factor:	1.1	Rainfall 100 yrs 12 hrs:	-- 97.44												
Volume control approach	Flow control to max of 2 l/s/ha	FEH / FSR conversion factor:	1.16 1.16												
Interception rainfall depth (mm):	5 or Q<sub>bar</sub>	SAAR (mm):	1163 1163												
Minimum flow rate (l/s):	2	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):	0.12 0.12												
		Q _{BAR} for net site area (l/s):	0.17 0.17												

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

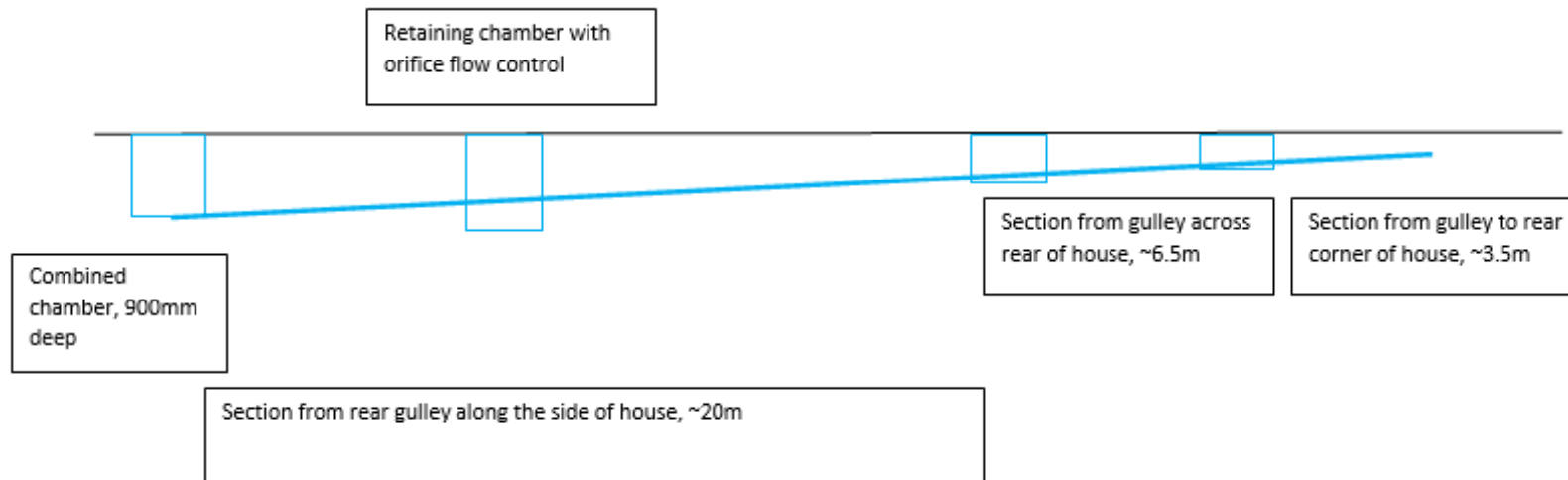
This report was produced using the storage estimation tool developed by HRWallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at <http://uksuds.com/terms-and-conditions.htm>. The outputs from this 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 Plan





Surface Water Drain



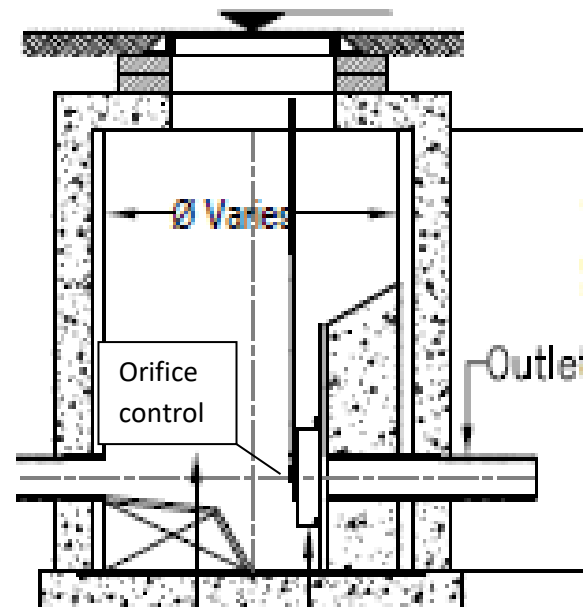
Fall of drain to be 1:100

Pipework to be 100mm diameter plastic pipe, bedded in compacted granular material confirming to BSEN1610, material to be <10mm. depth of bedding below pipe ≥ 100 mm, covered with minimum 150mm material.

Preformed inspection chambers to be used with additional orifice.

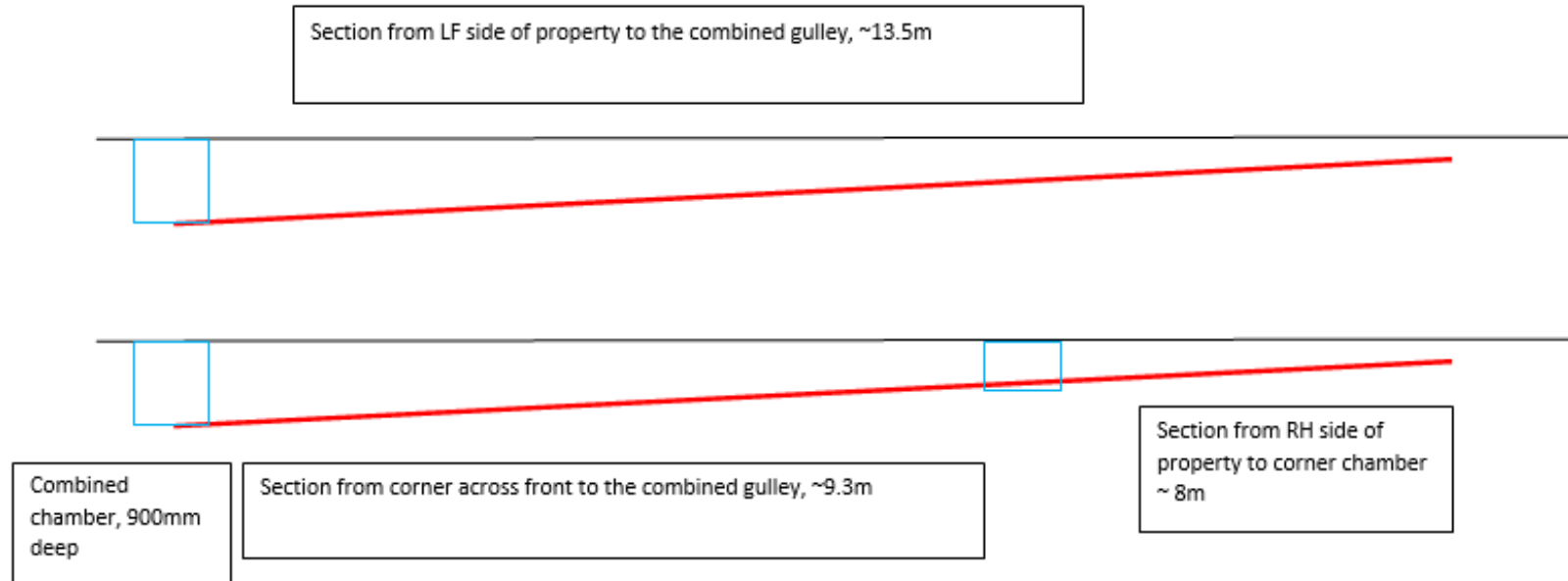
control unit located prior to connection with combined inspection.

chamber.





Foul Drain



Fall of drain to be 1:40

Pipework to be 100mm diameter plastic pipe, bedded in granular material confirming to BSEN1610, material to be <10mm. depth of bedding below pipe ≥ 100 mm. At least 150mm cover material.

Preformed inspection chambers to be used.