

Flood Risk Assessment for Greenfield Lane, Rochdale, OL11 1TJ – Rev 3

Reference: FD424

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Quality Assurance Record

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Limitation of Liability and Use

The work described in this report was undertaken for the party or parties stated; for the purpose or purposes stated; to the time and budget constraints stated. No liability is accepted for use by other parties or for other purposes, or unreasonably beyond the terms and parameters of its commission and its delivery to normal professional standards.

1. INTRODUCTION

1.1 Purpose of this Report

Townsend Water Engineering Ltd. has been appointed by MCI Developments for a Flood Risk Assessment (FRA) for a development of 44 residential units at Greenfield Lane, Rochdale, OL11 1TJ (Grid Ref: 390080, 411915). This report has been prepared in support of the full planning application for the aforementioned development.

The report is based on the available flood risk information for the site detailed in Section 1.2 and prepared in accordance with the planning policy requirements set out in Section 1.3. The scope of the FRA is consistent with the 'Site Specific Flood Risk Assessment Checklist' from the National Planning Policy Framework (NPPF) and accompanying Planning Practice Guidance (PPG):

<https://www.gov.uk/guidance/flood-risk-and-coastal-change#Site-Specific-Flood-Risk-Assessment-checklist-section>

1.2 Sources of Information and Consultation

This Report has been informed by:

- Existing Site Plan drawings and respective topographic survey prepared for MCI Developments;
- ArcGIS Lidar data;
- Rochdale Borough's Strategy for Flood Risk Management 2014-2024;
- Greater Manchester Level 1 SFRA and Appendices (2019);
- BGS website <http://mapapps.bgs.ac.uk/geologyofbritain/home.html?mode=boreholes>;
- Cranfield University Soil Mapping <http://www.landis.org.uk/soilscapes/>;
- The EA online flood maps;
- <https://flood-map-for-planning.service.gov.uk/>; and
- <https://flood-warning-information.service.gov.uk/long-term-flood-risk/>.

1.3 Policy Context

This report has been prepared in accordance with the relevant national, regional and local planning policy and statutory guidance as follows:

- National policy contained within the National Planning Policy Framework (NPPF) dated December 2024; and
- The Planning Practice Guidance (PPG) dated December 2024.

1.4 Structure of this Report

The Report has been prepared based on the following structure:

- Section 2 refers to spatial planning considerations by reference to the proposed land use, flood zoning and NPPF vulnerability;
- Section 3 presents the proposed development and findings of flooding;
- Section 4 presents the Drainage Strategy; and
- Section 5 provides a summary of the assessments.

Additional Appendices are provided that deal with the following:

- Appendix A: Topographical Survey;
- Appendix B: Infiltration Test Results
- Appendix C: EA Flood Data;
- Appendix D: Proposed Layout;

- Appendix E: Drainage Strategy Design; and
- Appendix F: Simple Pollution Index.

2. SPATIAL PLANNING CONSIDERATION

2.1 Location and Background

The location of the proposed development site is shown in Figure 1 and Figure 2, with location details found in Table 1. The site is located at Greenfield Lane, Rochdale, OL11 1TJ (Grid Ref: 390080, 411915). (Table 1: Site Details). The proposed site is currently a brownfield site.

The development involves the erection of 44 residential units with associated roads and car parking spaces. The development site is 1.42ha.

Rochdale Canal is on the sites northern border and there is a main river (Sudden Brook) approximately 50m east of the site.

To the North of the site is Rochdale Canal followed by a forested area that Sudden Brook runs through. To the east is Sudden Brook and the Iceland Supermarket. To the south are residential dwellings and the Rochdale Bypass and to the west is Dicken Green cul-de-sac.

Please see Figure 1 and Figure 2.

Table 1: Site Details Grid Reference Details Taken from Grid Reference Finder

Reference	Value
OS X (Eastings)	390080
OS Y (Northings)	411915
Nearest Post Code	OL11 1TJ
Nat. Grid	SD 90072 11917



Figure 1: Site Location (Source: Google Map)

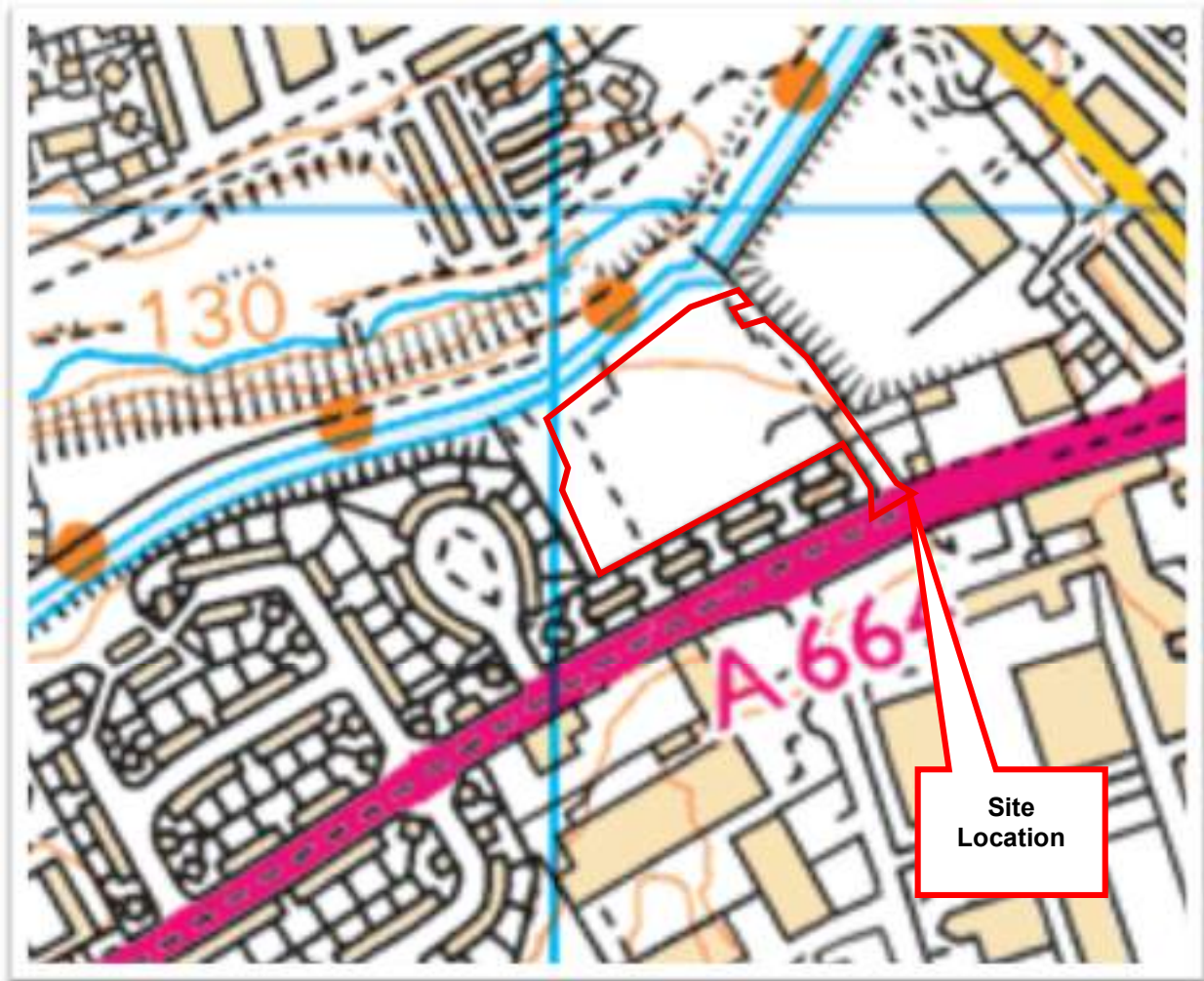


Figure 2: Ordnance Survey View of the Site (Source: Bing Maps)

2.2 Topography

According to the Topographical Survey the site is uneven and generally falls from the west to the east. The highest point in the west is approximately 147mAOD and the lowest point in the east is 143mAOD. The site levels are lower along the access road to the south-east, with an entry level of 141mAOD (Figure 3 & Appendix A).

The canal is not on the Topographical Survey, however, on ArcGIS lidar the canal level is approximately 4-8m lower than the site (39mAOD).

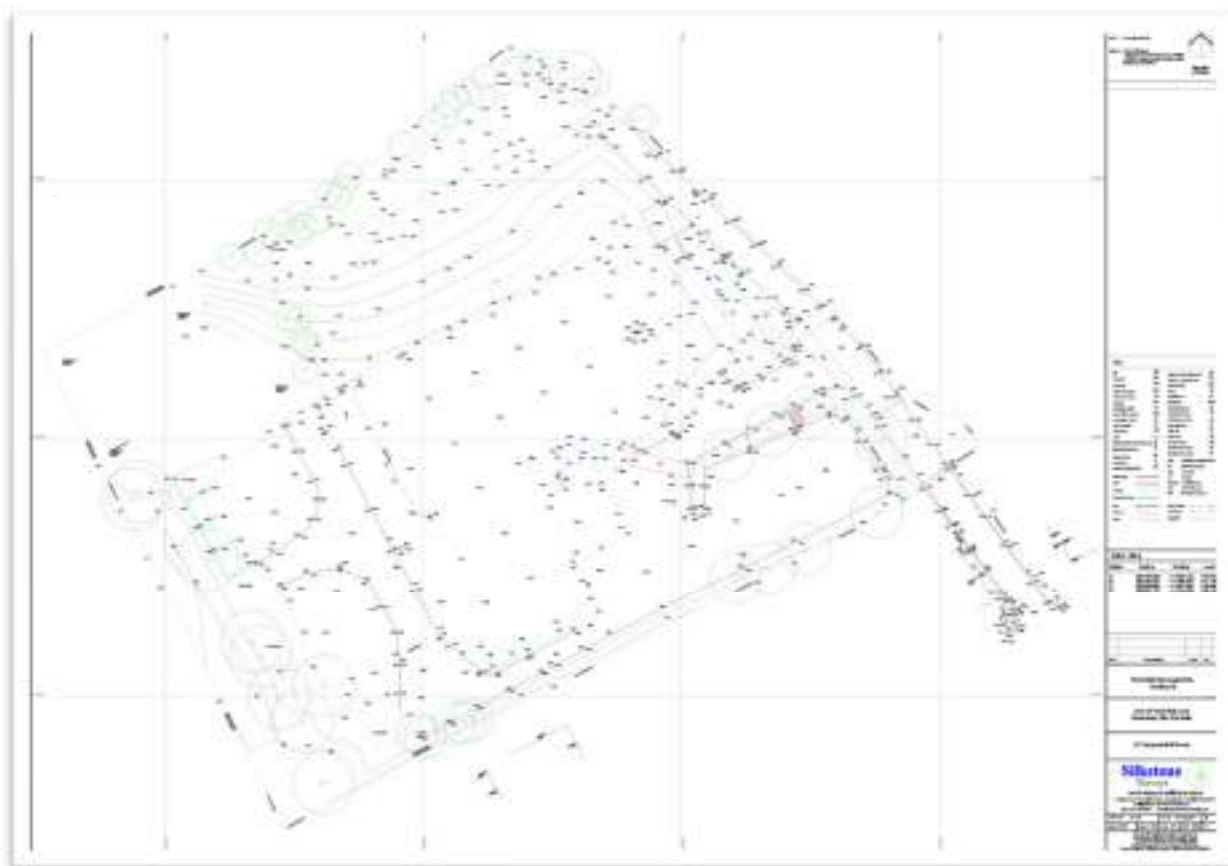


Figure 3: Topographical Survey



Figure 4: ArcGIS Lidar of Canal 39m AOD

2.3 Geology and Soil

The geology at the site has been obtained from the British Geological Survey (BGS) website. The bedrock beneath the site is described as 'Pennine Lower Coal Measures Formation-Mudstone, siltstone and sandstone'.

The superficial geology of the site is described as 'Glaciofluvial deposits, Devensian-Sand and gravel'. Please see Figure 5.

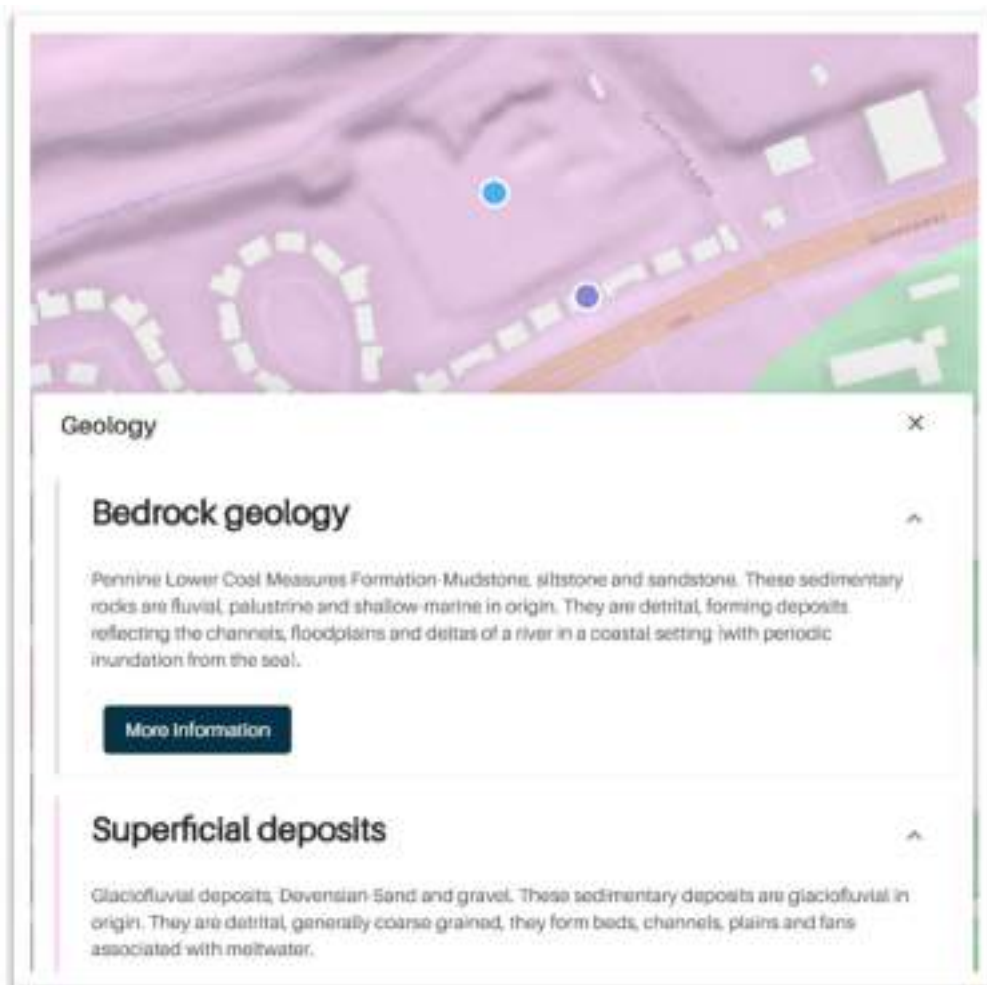


Figure 5: Bedrock & Superficial Deposits Underneath the Site (Source: BGS Bedrock Geology Mapping)

Soils at the site are described on the Cranfield University 'Soilscapes' website as, 'Freely draining slightly acid sandy soils' that drains to groundwater. Please see Figure 6 below.

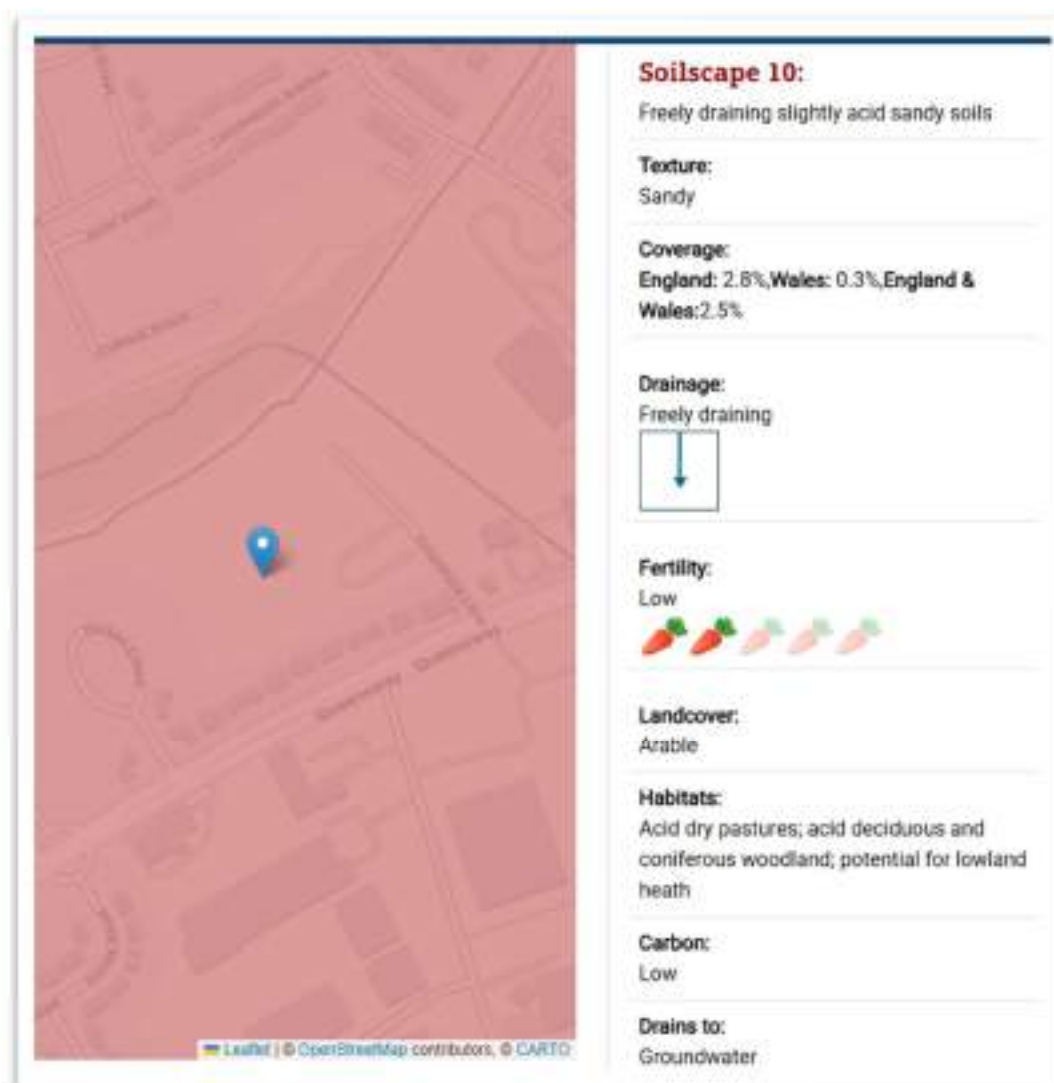


Figure 6: Soil Map of the Site (Source: Cranfield University Soil Mapping)

On the 19th of February 2026 soakaway tests were undertaken. The infiltration tests indicate that the proposed site has the potential to drain via infiltration. Please see below the results from the soakaway tests. For the full results please see Appendix B:

Table 2: BRE 365 Infiltration Tests Results

Trail Pit	Result
TP101	$1.08 \times 10^{-4} \text{ m/s}$ (0.3888 m/hr)
TP102	$8.62 \times 10^{-5} \text{ m/s}$ (0.310 m/hr)
TP104	$5.77 \times 10^{-5} \text{ m/s}$ (0.207 m/hr)

Therefore, it is recommended that soakaways are used for the site. For conservativeness $1.08 \times 10^{-4} \text{ m/s}$ has not been used.

2.4 NPPF Vulnerability

The development will be classed as '**More Vulnerable**' under the NPPF vulnerability classification. The flood risk vulnerability and Flood Zone compatibility are displayed in Table 2. As noted in Section 2.4, the site is within **Flood Zone 1** according to the EA flood risk map for planning.

Table 3: Flood Risk Vulnerability Classification (Source: NPPF Technical Guide)

More Vulnerable (MV)
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 ⁶ .
Sites used for holiday or short let caravans and camping, subject to a specific warning and evacuation plan. ⁷

Table 4: Flood Risk Vulnerability and Flood Zone Compatibility (Source: NPPF Technical Guide)

Flood Zone	Definition	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
1	$T > 1,000$	✓	✓	✓	✓	✓
2	$100 < T_{\text{fluv}} < 1,000$ $200 < T_{\text{tidal}} < 1,000$	✓	✓	Exc. Test	✓	✓
3a	$T_{\text{fluv}} < 100$ $T_{\text{tidal}} < 200$	Exc. Test	✓	✗	Exc. Test	✓
3b (functional floodplain)	$T_{\text{fluv}} < 20$	Exc. Test	✓	✗	✗	✗

As the site is in a **Flood Zone 1** and **More Vulnerable**, the site passes the sequential test, and the exception test is not required.

Furthermore, on the Greater Manchester SFRA Map for Rochdale (2019), the site is allocated for residential use – site reference SH0681 (Figure 7).

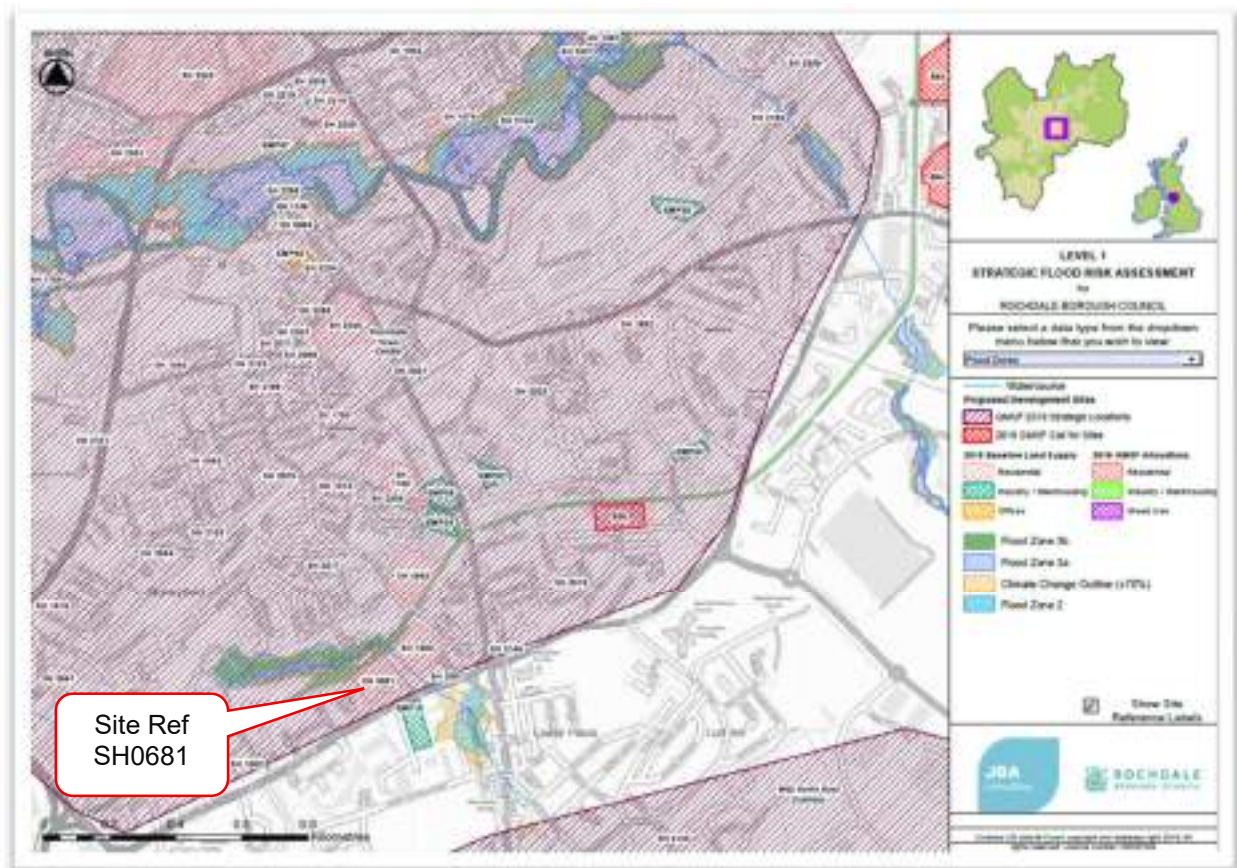


Figure 7: Greater Manchester Level 1 SFRA Map for Rochdale (2019)
[2017s6287 Manchester SFRA Detailed Rochdale Map 32.pdf](#)

2.5 Fluvial Flooding

The existing site is within a Flood Zone 1. Flood Zone 1 is an area at low risk of fluvial flooding (this means in any year land has a less than 0.1% chance of flooding from rivers or the sea). Please see Figure 8 below.



Figure 8: Flood Risk Maps

Flood data was obtained from the Environment Agency (EA), the site is not at risk of flooding from Sudden Brook as the site levels are a minimum of approximately 10m higher than the highest flood level and the site is in Flood Zone 1. The canal is approximately 4-8m lower than the site, so is not a flood risk. The full EA flood data can be found in Appendix C.

2.5.1 Climate Change Allowances for Peak River Flow

River flow guidance recommends a progressive increase, reaching **35%** for the ‘Central’ allowance by 2080 in this area. This allowance would be recommended for this proposed development, which is classified as ‘**More Vulnerable**’ and has been taken to have a 100-year design life. The **35%** climate change allowance is based on the 90th percentile, meaning that there is a 90% chance that rainfall will not increase by more than the **35%** increment. Please see Figure 9 below.



Figure 9: Flood Risk Assessment Climate Change Map Peak River Flow Allowances

2.6 Surface Water (SW) Flooding

The EA surface flood extents have been obtained from the EA open dataset. There is some surface water flooding within the site in the 1 in 100 year AEP plus climate change (cc) in the north where no dwellings have been placed.

In the 1 in 1000 year AEP plus cc, there is an area in the north at risk where no dwellings have been placed and an area in the south-west where dwellings have been placed (Figure 10).



Figure 10: 1 in 100 Year and 1 in 1000 Year AEP Surface Water Flood Risk Plus CC (Source: EA Open Dataset)

There is no flooding above 300mm in the 1 in 1000 year plus cc event within the site.

To investigate the 1 in 1000 year plus climate change SW flooding depth over 150mm around the plots in the south-west, the 1 in 1000 year SW flood risk plus climate change depth over 150mm map was put over the layout, there was no flooding where the dwellings have been placed up to the shallowest depths available (over 150mm) other than a speck at plot 12. Please see Figure 11.



Figure 11: 1 in 1000 Year Surface Water Plus Climate Change (Over 150mm and 300mm Depth) Plus Over 150mm Depth Flood Map Over Layout

Therefore, the risk on both the 1 in 100 year and 1 in 1000 year plus cc maps is very low and the surface water is very shallow and is likely a minimal risk of flooding.

2.6.1 Climate Change Allowances for Peak Rainfall Intensity

The Environment Agency and NPPF require a consideration of the impacts of climate change in Flood Risk Assessments (FRA). In February 2016, the Environment Agency updated the climate change allowances required in Flood Risk Assessments (Environment Agency, 2016); this advice updates previous climate change allowances to support the NPPF (DCLG, 2012).

The rainfall guidance recommends a progressive increase, reaching **45%** for the 'Upper End' allowance by 2070 in this area. This allowance would be recommended for this proposed development, which is classified as '**More Vulnerable**' and has been taken to have a 100-year design life. The **45%** climate change allowance is based on the 90th percentile, meaning that there is a 90% chance that rainfall will not increase by more than the **45%** increment. Please see Figure 12 below.

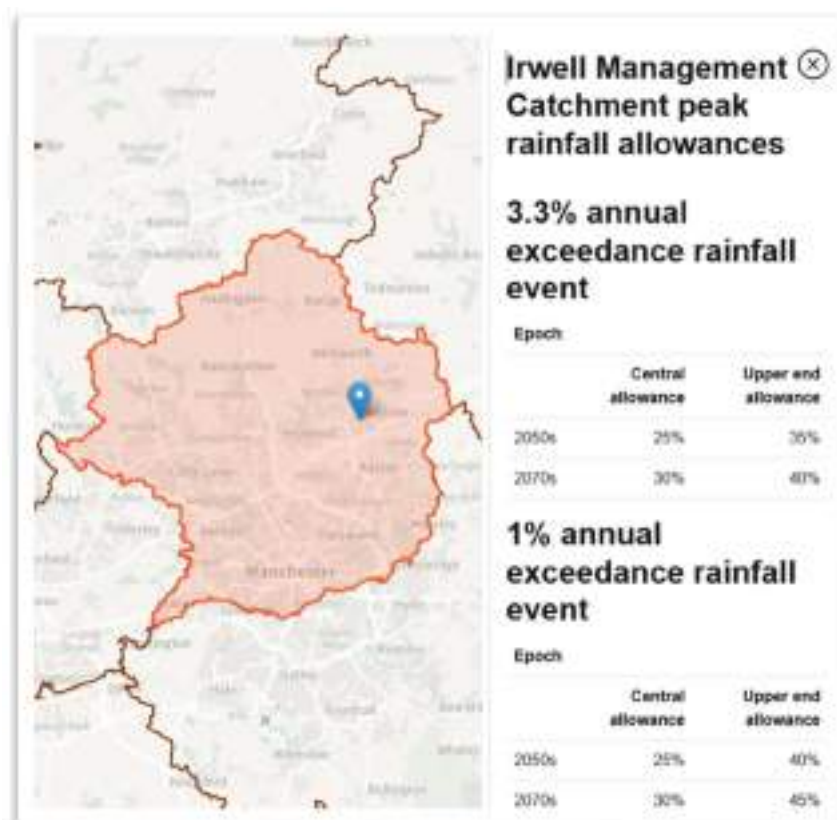


Figure 12: Flood Risk Assessment Climate Change Map Peak Rainfall Allowances

2.7 Flood Risk from Reservoir/ Canals/ Other Artificial Sources

The EA Extent of Flooding from Reservoirs map (Figure 13), based only on large reservoirs (over 25,000m³ of water), shows that there is no risk of flooding from reservoirs. Flooding from reservoir is considered to be extremely unlikely and the risk of flooding to the site considered to be low.

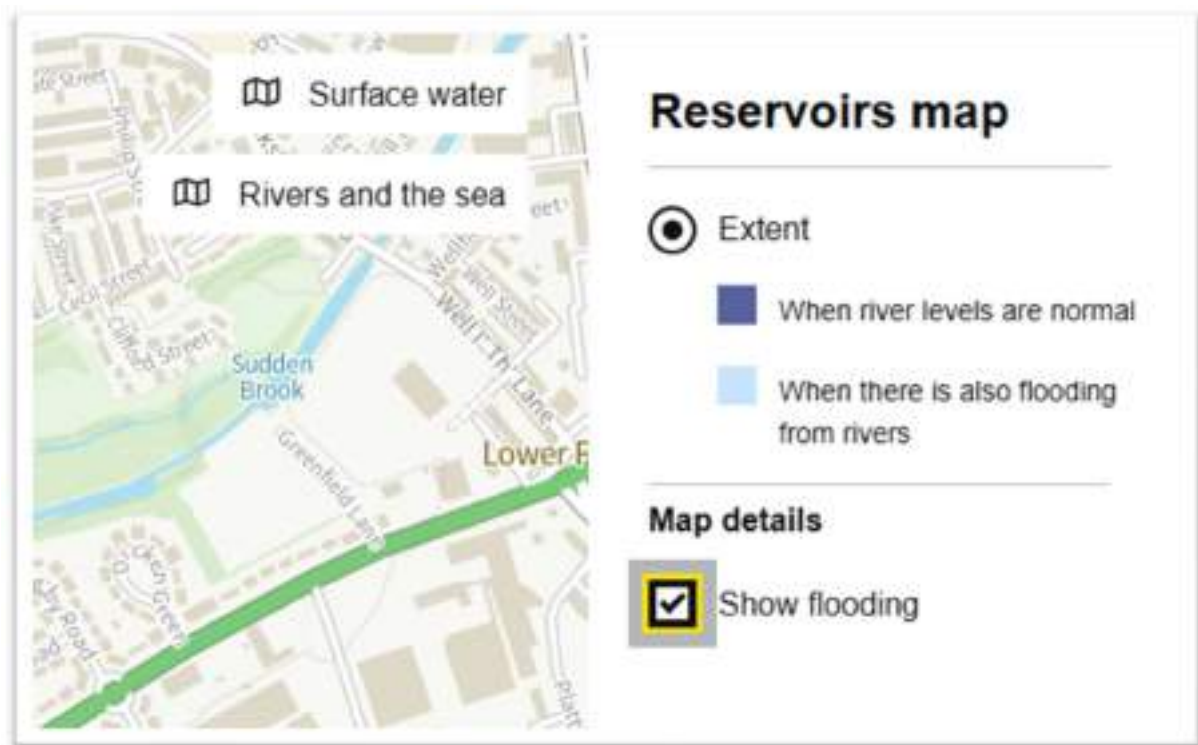


Figure 13:Extent of Flooding from Reservoirs (Source; EA Flood Warning Information Service)

The Rochdale Canal is on the sites northern border, outside of the sites red line boundary, and is 4-8m lower than the site.

2.8 Flood Risk from Groundwater

According to the Long Term Flood Risk checker, the site is outside of a groundwater flood alert area. Please see Figure 14 Below.

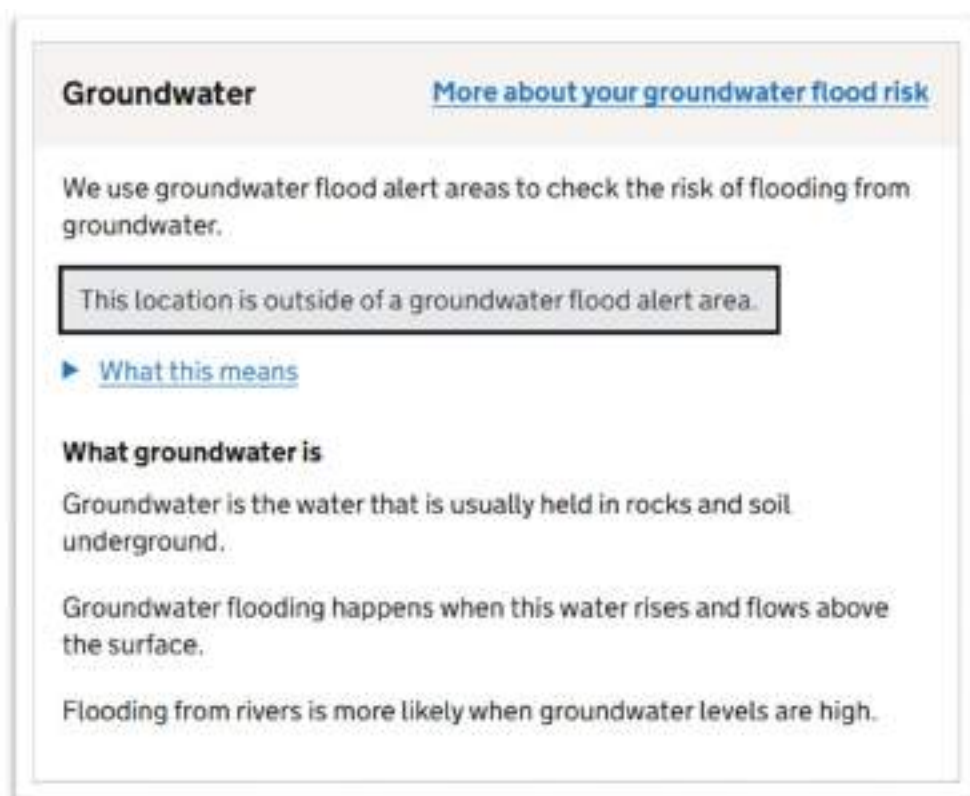


Figure 14: Long Term Flood Risk – Groundwater

The Rochdale Borough's Strategy for Flood Risk Management 2014-2024 Groundwater Flood Risk Map shows risk from groundwater flooding; the pale squares are usually associated with lower risk (Figure 15). Therefore, the risk of groundwater flooding is assumed to be low.

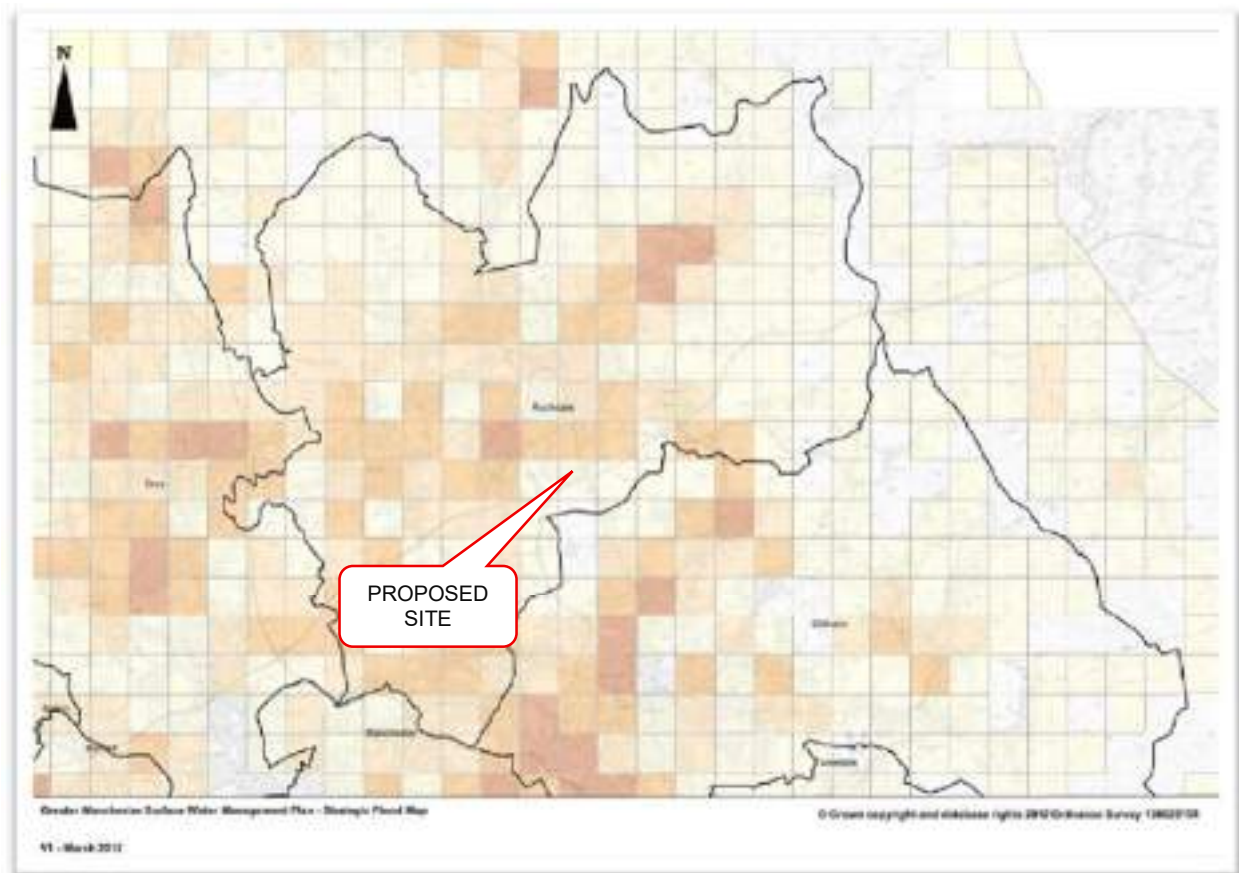


Figure 15: Areas Susceptible to Groundwater Flooding in Rochdale Borough Map (Rochdale Borough's Strategy for Flood Risk Management 2014-2024)

2.9 Flood Risk from Sewers

There are no known instances of sewer flooding within the vicinity of the site and there are no sewers crossing the site; therefore, the risk of sewer flooding is deemed to be low, please see the UU sewer map in Figure 16. There is a combined sewer in the access road, if this is to be moved or removed, a section 185 will need to be made.

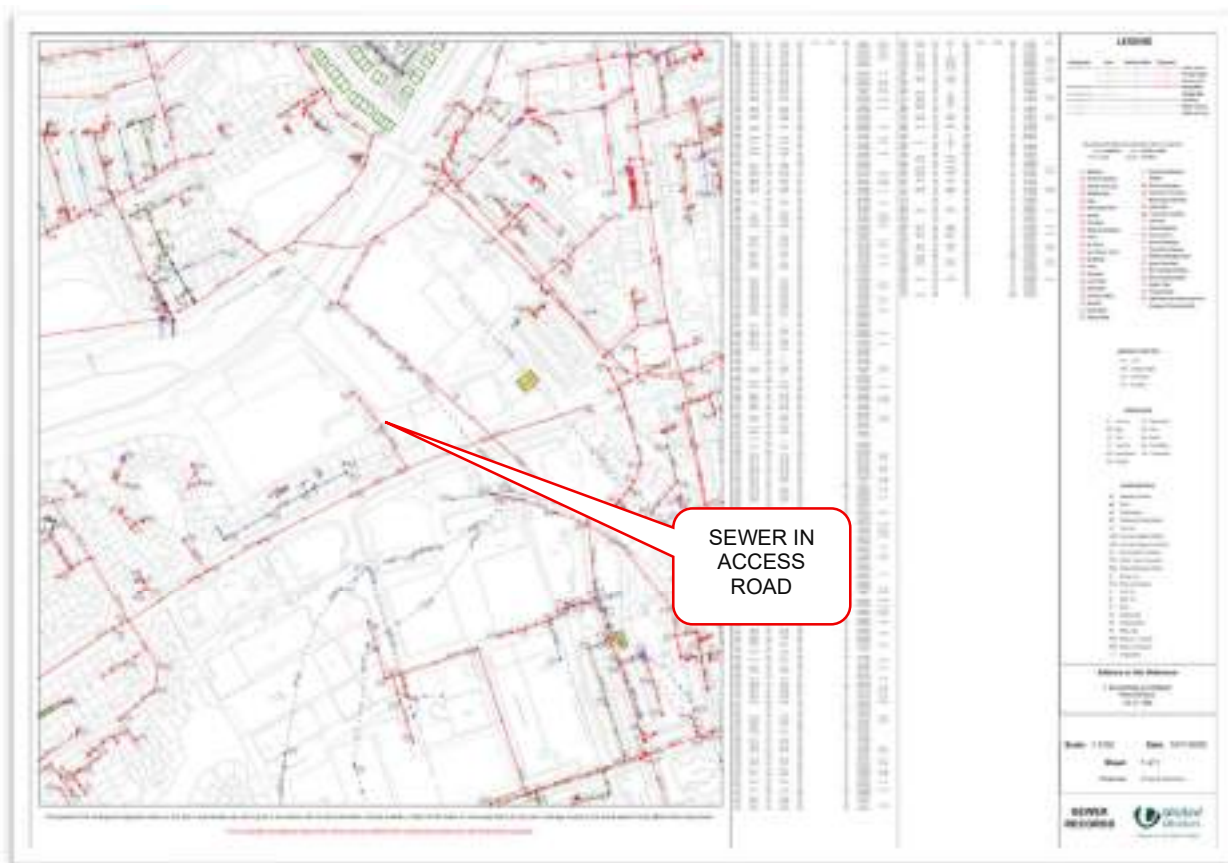


Figure 16: Sewer Map (United Utilities)

3. ASSESSMENT OF FLOOD RISK FOR PROPOSED DEVELOPMENT

3.1 Development Proposals

The site is located at Greenfield Lane, Rochdale, OL11 1TJ (Grid Ref: 390080, 411915). (Table 1: Site Details). The proposed site is currently a brownfield site.

The development involves the erection of 44 residential units with associated roads and car parking spaces. The development site is 1.42ha. The proposed developable area is approximately 1ha (2.47 acres). Please see Appendix D.



Figure 17: Proposed Site (Source: Client)

3.2 Fluvial Flood Management

The site is within a Flood Zone 1, an area at low risk of fluvial flooding, and suitable for residential development as a matter of principle.

The EA flood data was obtained, and the site is not at risk of flooding from Sudden Brook.

3.3 Surface Water Flooding

The EA surface flood extents have been obtained from the EA open dataset. There is some surface water flooding within the site in the 1 in 100 year AEP plus cc in the north where no dwellings have been placed.

In the 1 in 1000 year AEP plus cc, there is an area in the north at risk where no dwellings have been placed and an area in the south-west where dwellings have been placed (Figure 10).

There is no flooding above 300mm in the 1 in 1000 year plus cc event within the site.

To investigate the 1 in 1000 year plus climate change SW flooding depth over 150mm around the plots in the south-west, the 1 in 1000 year SW flood risk plus climate change depth over 150mm map was put over the layout, there was no flooding where the dwellings have been placed up to the shallowest depths available (over 150mm) other than a speck at plot 12. Please see Figure 11.

Therefore, the risk on both the 1 in 100 year and 1 in 1000 year plus cc maps is very low and the surface water is very shallow and is likely a minimal risk of flooding.

A new drainage system will be designed with a capacity to hold the 1 in 100 year event plus climate change of **45%**. This will ensure the site is unlikely to flood in the 1 in 100 year event plus climate change event, which will minimise the risk of surface water flooding to the site itself.

With the above mitigation, the risk of surface water flooding is considered to be low.

3.4 Groundwater Flooding

The site is outside of a groundwater flood risk alert area and the flood risk from groundwater is deemed to be low as the proposed dwellings will not have basements.

Therefore, risk of flooding from groundwater is believed to be low.

3.5 Infrastructure Flooding

No known instances of sewer flooding have occurred within the vicinity of the site and there are no sewers crossing the site.

There is a canal on the sites northern border, outside of the site boundary. The site is 4-8m higher than the canal. Therefore, the canal is of low flood risk to the site.

DRAINAGE STRATEGY

3.6 Existing Drainage Arrangements

3.6.1 Surface Water

The existing site is a brownfield site and drains to the sewer network.

3.7 Infiltration Rates

As indicated in section 2.3 that soakaways are feasible. Therefore, infiltration should be used for the drainage on site. As suggested in section 2.3, to be conservative it is recommended that the best soakaway result has been ignored. The rates that have been used are $8.62 \times 10^{-5} \text{m/s}$ (0.310m/hr) and $5.77 \times 10^{-5} \text{m/s}$ (0.207m/hr) through the design depending on which result is closer.

All individual plots will have soakaways.

There will be 3 surface water networks. 2 of networks are to drain highway drainage to soakaway manholes. Due to level constraints, 1 surface water network is to drain to the proposed SW manhole via gravity which ultimately discharges to the public surface water sewer in the Rochdale Bypass.

3.8 Run-off

As soakaways are to be used there will be no drainage to the surrounding watercourse, canal or sewer for the 2 surface water networks using soakaways.

For the 3rd network in the south-east of the site a discharge rate proposed is 5 l/s - this is to be agreed with all relevant parties. The point of connection is to be agreed with United Utilities.

3.9 Surface Water Drainage Strategy

The drainage strategy is based on the tenants of the national standards for sustainable drainage systems.

These standards are intended for application in the design of surface water drainage systems for new infrastructure and development, whether on greenfield or brownfield sites. They are not designed to apply to retrofit SuDS designs, which often have different objectives and face broader constraints. However, the standards could serve as a starting point for retrofit design. It is important to acknowledge that constraints specific to retrofit projects may prevent the full application of the standards.

These standards only apply to the management of surface water runoff that is essentially uncontaminated and consists predominantly of rainwater. For some land uses, where there is a higher risk (for example, a large car park), the inclusion of proprietary measures as opposed, or in addition, to SuDS may be needed. However, where there is a risk of pollution, an Environmental Permit or Registration of an Exemption may be required from the Environment Agency.

There are 7 standards which are indicated below:

Standard 1: Runoff Destination;

Standard 2: Management of everyday rainfall;

Standard 3: Management of extreme rainfall;

Standard 4: Water Quality;

Standard 5: Amenity;

Standard 6: Biodiversity; and

Standard 7: Design of drainage for construction, operation, maintenance and structural integrity.

- **Standard 1: Runoff Destination**

In accordance with the Flood Risk and Coastal Change Planning Practice Guidance, where possible, preference should be given to multi-functional sustainable drainage systems, and to solutions that allow surface water to be discharged according to the following hierarchy of drainage options:

- 1. Rainwater Harvesting
- 2. Into the ground (infiltration);
- 3. To a watercourse;
- 4. To a surface water sewer, highway drain, or another drainage system; and
- 5. To a combined sewer.

Water Butts have been given to each dwelling, which means that rainwater can be reused for the gardens and outdoor irrigation.

As detailed in section 2.3, infiltration is feasible at this site.

Individual plots will have individual soakaways.

The site will discharge into soakaways on site for 2 of the 3 surface water networks and the 3rd will discharge into the sewer.

- **Standard 2: Management of Everyday Rainfall (Interception)**

As the site will drain via infiltration into the ground all rainfall of the first 5mm will discharge to the ground and therefore the proposed drainage is in accordance with Statement 2.

- **Standard 3: Management of Extreme Rainfall and Flooding**

The drainage system is designed so that there is no on-site flooding in the 1 in 30-year event + 40% climate change.

The drainage system is designed so that there is no on-site flooding of any building, nor any off-site flooding for the 1 in 100-year event + 45% climate change.

The ground levels are to be designed such that overland flood routes in exceedance events do not result in adverse flood risk elsewhere.

Modelling of the surface water runoff to the design parameters was carried out using Micro Drainage, an industry leading software which allows design and analysis of SuDS features. (Appendix D) The following conservative assumptions and design parameters have been set within the Hydraulic model:

- Rainfall intensity was obtained using the Flood Estimation Handbook (FEH), and increased by 45%;
- No runoff loss has been assumed in the modelling for the surface water (sw) networks, therefore, all the design rainfall landing on the impermeable surfaces for the 2 sw networks is expected to reach the soakaways if used or to the United Utilities pipework;
- The third sw network will drain to the sewer at 5l/s; and
- The infiltration rate used in the drainage is $8.62 \times 10^{-5} \text{m/s}$ (0.310m/hr) and $5.77 \times 10^{-5} \text{m/s}$ (0.207m/hr), the rates closest to the soakaway has been used.

Please see Appendix E and Figure 18.

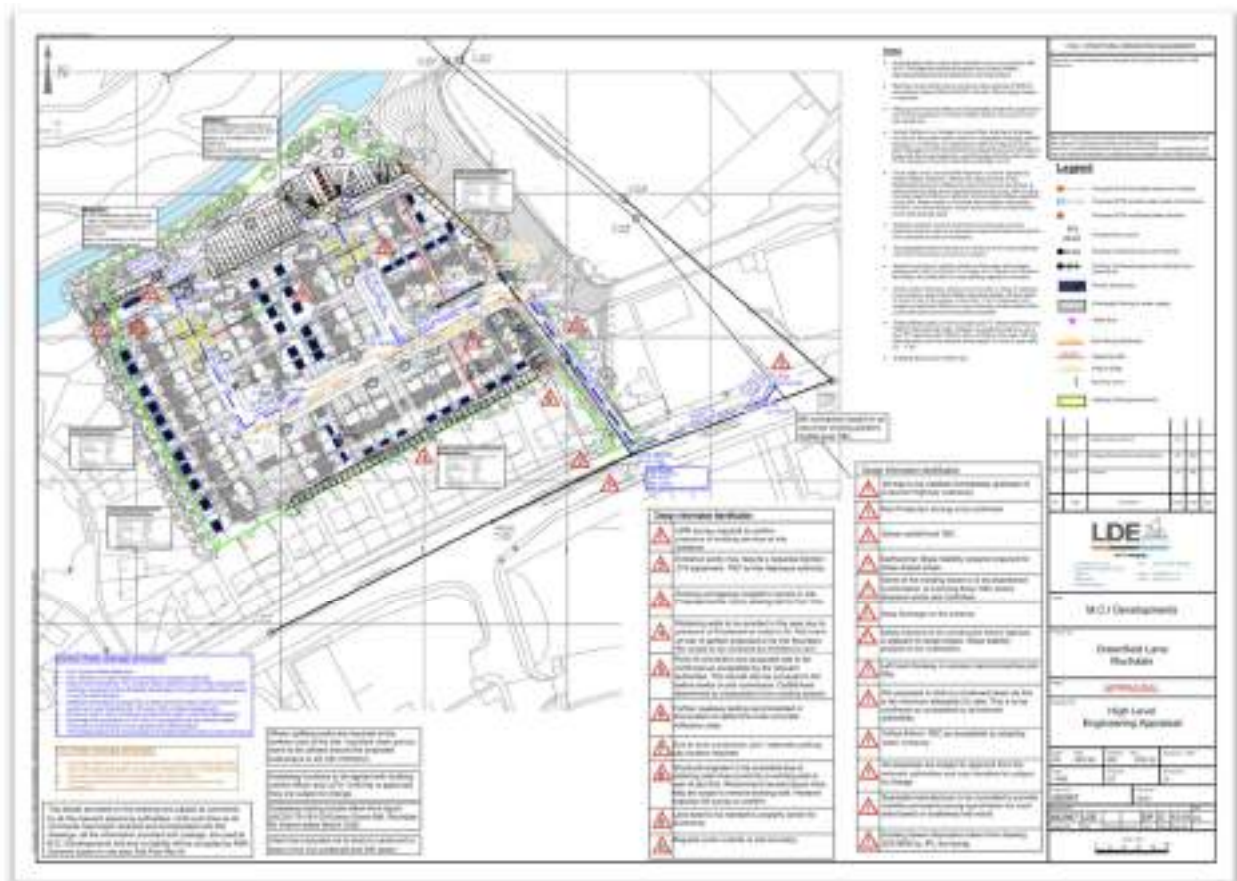


Figure 18: Drainage Strategy Design

- **Standard 4: Water Quality**

Adequate amount of SuDS required to be implemented on the site to achieve a suitable management train to achieve water quality improvements.

The impermeable surfaces pollution hazard levels are classed as very low (roofs), or low (driveways & roads). For low, pollution hazard indices are: TSS 0.5; Metals 0.4; Hydrocarbons 0.4.

The permeable paving alone provides mitigation indices as: TSS 0.5; Metals 0.5; Hydrocarbons 0.6.

Accordingly, the permeable paving alone provides sufficient water quality improvements to meet the minimum targets. Additional source control measures will provide further enhanced treatment over and above minimum requirements. Please see the Simple Pollution Index which indicates that the proposed SuDS is sufficient in Appendix F.

- **Standard 5: Amenity**

There will be an area of public open space that can be used for amenity.

- **Standard 6: Biodiversity**

The SuDS have been seeded with flowers and water compatible plants, please see the landscape drawings with the types of plants in it.

- **Standard 7: Design of Drainage for Construction, Operation, Maintenance & Structural Integrity**

Structures which manage surface water runoff require little maintenance, however, a regular maintenance schedule e.g., after heavy rainfall, should be established by the site owners to reduce

the risk of blockage within the drainage system and ensure the design remains in good working order. It is proposed that the soakaways and permeable paving will be adopted by the landowners. The soakaway manholes will be adopted by a private company. Please find a proposed strategy for maintenance below:

Table 5: Operation and Maintenance Requirements for Soakaways

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect for sediment and debris in pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings	Annually
	Cleaning of gutters and any filters on downpipes	Annually (or as required based on inspections)
	Trimming any roots that may be causing blockages	Annually (or as required)
Occasional maintenance	Remove sediment and debris from pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings	As required, based on inspections
Remedial actions	Reconstruct soakaway and/or replace or clean void fill, if performance deteriorates or failure occurs	As required
	Replacement of clogged geotextile (will require reconstruction of soakaway)	As required
Monitoring	Inspect silt traps and note rate of sediment accumulation	Monthly in the first year and then annually
	Check soakaway to ensure emptying is occurring	Annually

Table 6: Operation and Maintenance Requirements for Permeable Paving

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, 60 h after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

SUMMARY & CONCLUSIONS

A summary of the main conclusions for the FRA is presented below:

- The site is located at Greenfield Lane, Rochdale, OL11 1TJ (Grid Ref: 390080, 411915). The proposed site is currently a brownfield site.
- The development involves the erection of 44 residential units with associated roads and car parking spaces. The development site is 1.42ha. The developable area is approximately 1ha;
- The site is within a Flood Zone 1; an area at LOW risk of fluvial flooding. The EA flood data shows that the site is not at risk of fluvial flooding from Sudden Brook as the site is at least 10m higher than the highest flood level;
- There is a canal on the sites northern border, outside of the site boundary. The site is 4-8m higher than the canal. Therefore, the canal is of low flood risk to the site;
- The site is at low risk of surface water flooding;
- The site is allocated for residential use in the Greater Manchester Level 1 SFRA Maps (2019);
- A new drainage system will be installed that will attenuate the site up to the 1 in 100-year flood event plus climate change of 45%;
- There is a low risk of groundwater flooding as the dwelling will not have basements;
- BRE365 tests were undertaken and the tests results indicated that the site is permeable;
- As the proposed site is permeable that site will drain via permeable paving and soakaways. Each dwelling will have an individual soakaway;
- The unadopted roads will drain via soakaways. Due to level constraints and because this part of road will be adopted, 1 surface water network is to drain to the proposed Surface Water manhole via gravity which ultimately discharges to the public surface water sewer in the Rochdale Bypass. For the 3rd network a discharge rate proposed is 5 l/s - this is to be agreed with all relevant parties. The point of connection is to be agreed with United Utilities;
- The proposed site will be attenuated up to and including the 1 in 100-year event plus 45% climate change, at present via permeable paving and soakaways, but this will need to be reviewed at detailed design. Water Butts have been given to each dwelling, which means that rainwater can be reused for the gardens and outdoor irrigation;
- The SuDS has been seeded with flowers for biodiversity, and the public open space will be used for amenity; and
- According to the Simple Pollution Index method the water quality is sufficient.

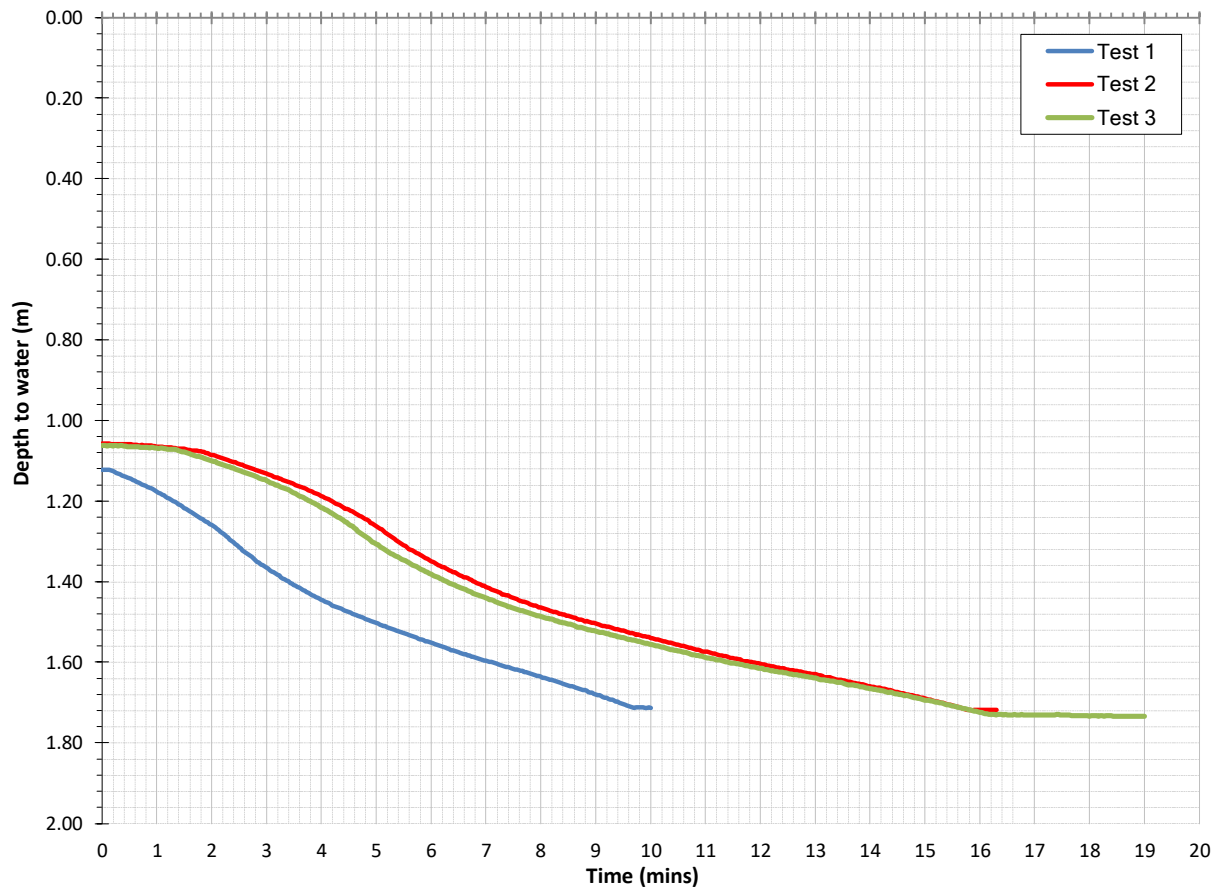
4. REFERENCES

Author	Date	Title/Description
Department for Communities and Local Government	Dec 2024	Planning Practice Guidance
Ministry of Housing, Communities and Local Government.	Dec 2024	National Planning Policy Framework

Appendix A: Topographical Survey

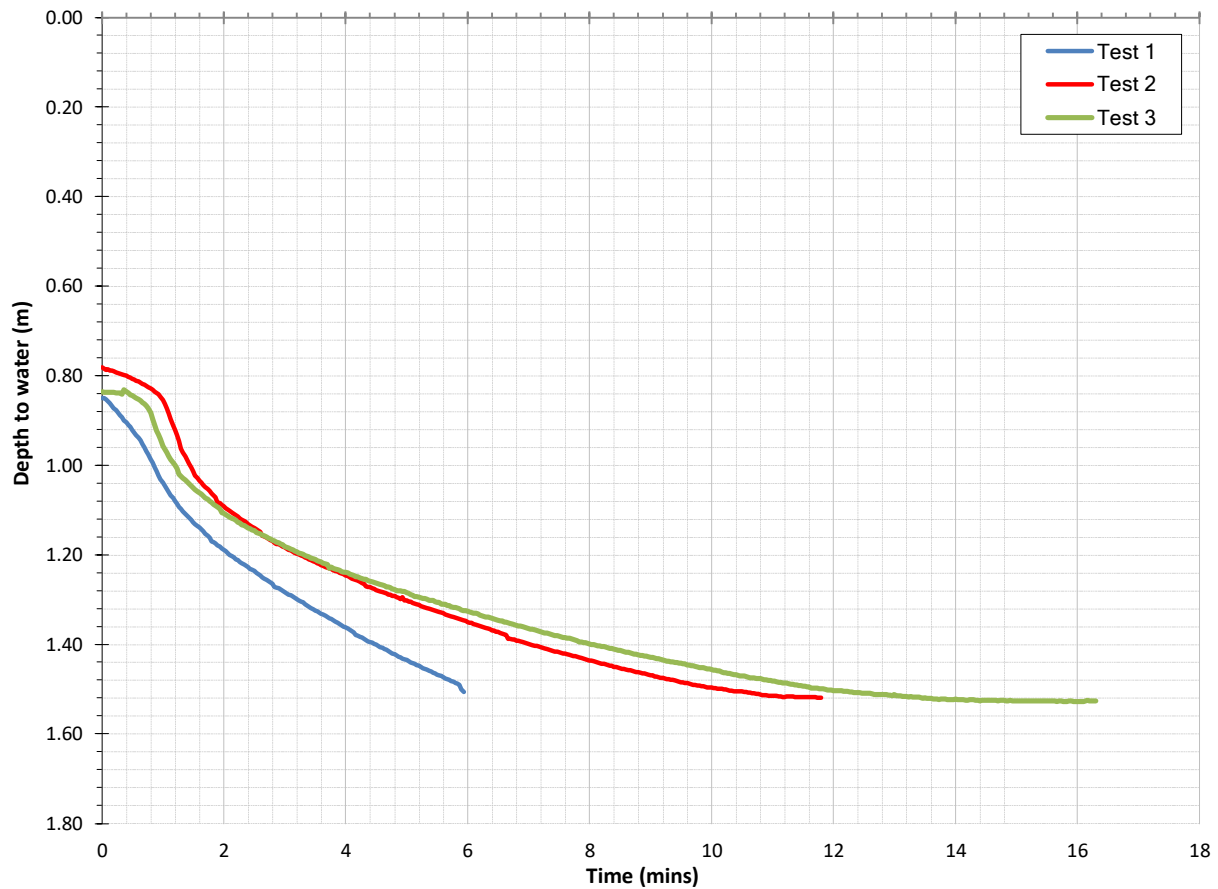
Appendix B: Infiltration Test

Site Name	Dicken Green Mill, Rochdale	Gravel Used	Yes	
Job Number	LKC251701	Length	2.70 m	
Date of Test	18/02/2026	Width	0.80 m	
Pit Number	TP101	Depth	1.80 m	
Strata Within Test Area	Sand	Groundwater Level	m	



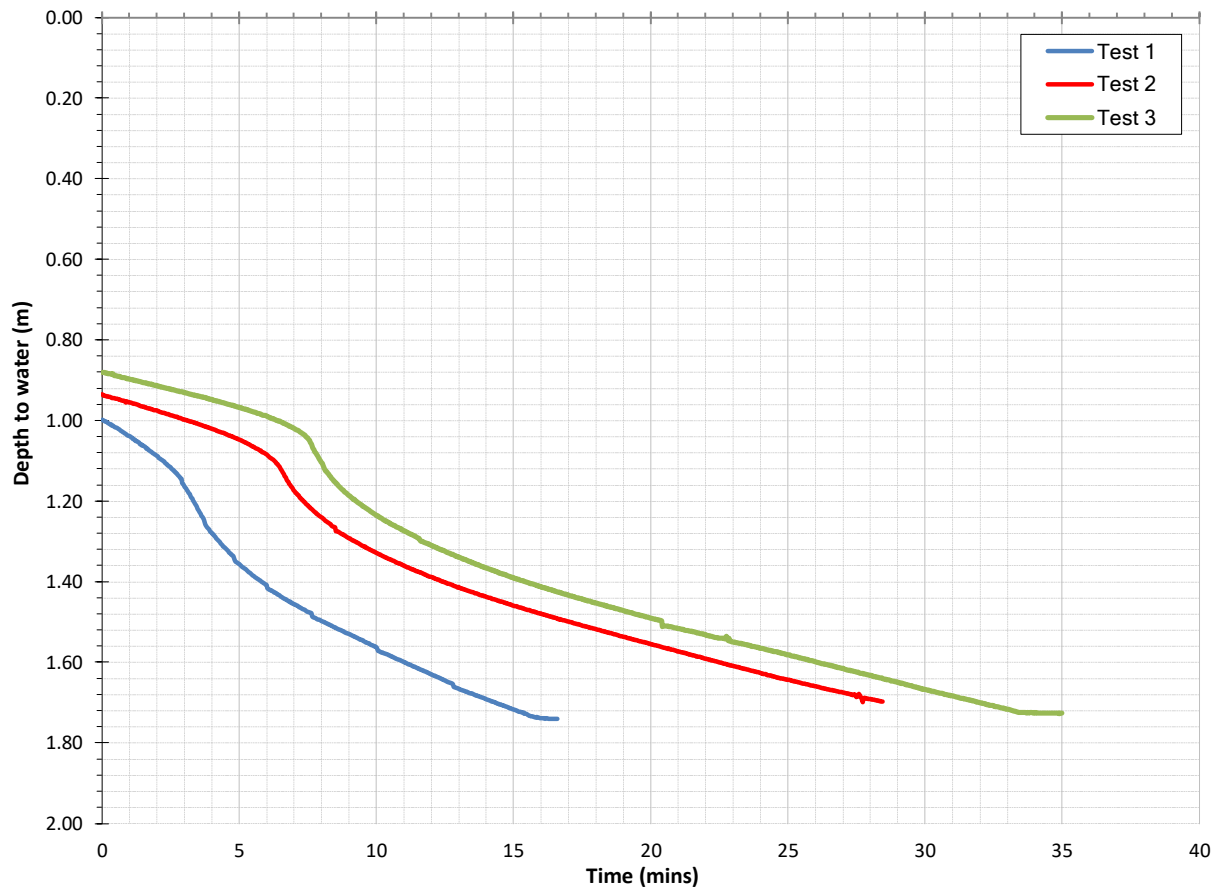
		Test 1	Test 2	Test 3
Starting Water Depth	m	1.12	1.06	1.06
Effective Storage Depth	m	0.68	0.74	0.74
75% Effective Storage Depth	m	0.51	0.56	0.55
75% Effective depth below GL	m	1.29	1.24	1.25
25% Effective Storage Depth	m	0.17	0.19	0.18
25% Effective depth below GL	m	1.63	1.61	1.62
Effective Storage Depth 75%-25%	m	0.34	0.37	0.37
Time to fall to 75% effective depth	mins	2.3	4.77	4.43
Time to fall to 25% effective depth	mins	7.86	12.30	12.2
V (75%-25%)	m ³	0.22	0.24	0.24
a (50%)	m ²	4.53	4.76	4.75
t (75%-25%)	mins	5.56	7.53	7.77
SOIL INFILTRATION RATE	m/s	1.453E-04	0.000111893	0.000108191
DESIGN SOIL INFILTRATION RATE (m/s)		1.08E-04		
COMMENTS				

Site Name	Dicken Green Mill, Rochdale	Gravel Used	Yes	
Job Number	LKC251701	Length	1.50 m	
Date of Test	18/02/2026	Width	0.80 m	
Pit Number	TP102	Depth	1.70 m	
Strata Within Test Area	Sand	Groundwater Level	m	



		Test 1	Test 2	Test 3
Starting Water Depth	m	0.85	0.78	0.84
Effective Storage Depth	m	0.85	0.92	0.86
75% Effective Storage Depth	m	0.64	0.69	0.65
75% Effective depth below GL	m	1.06	1.01	1.05
25% Effective Storage Depth	m	0.21	0.23	0.22
25% Effective depth below GL	m	1.49	1.47	1.48
Effective Storage Depth 75%-25%	m	0.43	0.46	0.43
Time to fall to 75% effective depth	mins	1.1	2.10	1.5
Time to fall to 25% effective depth	mins	5.87	9.03	10.93
V (75%-25%)	m ³	0.15	0.17	0.16
a (50%)	m ²	3.16	3.31	3.19
t (75%-25%)	mins	4.77	6.93	9.43
SOIL INFILTRATION RATE	m/s	1.695E-04	0.000120029	8.62222E-05
DESIGN SOIL INFILTRATION RATE (m/s)		8.62E-05		
COMMENTS				

Site Name	Dicken Green Mill, Rochdale	Gravel Used	Yes	
Job Number	LKC251701	Length	2.10 m	
Date of Test	19/02/2026	Width	0.90 m	
Pit Number	TP104	Depth	1.80 m	
Strata Within Test Area	Sand	Groundwater Level	m	



		Test 1	Test 2	Test 3
Starting Water Depth	m	1.00	0.93	0.88
Effective Storage Depth	m	0.80	0.87	0.92
75% Effective Storage Depth	m	0.60	0.65	0.69
75% Effective depth below GL	m	1.20	1.15	1.11
25% Effective Storage Depth	m	0.20	0.22	0.23
25% Effective depth below GL	m	1.60	1.58	1.57
Effective Storage Depth 75%-25%	m	0.40	0.43	0.46
Time to fall to 75% effective depth	mins	3.36	6.76	8.07
Time to fall to 25% effective depth	mins	11.03	21.37	24.27
V (75%-25%)	m ³	0.23	0.25	0.26
a (50%)	m ²	4.29	4.49	4.65
t (75%-25%)	mins	7.67	14.61	16.20
SOIL INFILTRATION RATE	m/s	1.149E-04	6.24046E-05	5.76882E-05
DESIGN SOIL INFILTRATION RATE (m/s)		5.77E-05		
COMMENTS				

Appendix C: Environment Agency Flood Data

Flood risk assessment data



Location of site: 390061 / 411903 (shown as easting and northing coordinates)

Document created on: 22 December 2025

This information was previously known as a product 4.

Customer reference number: G37TB36B357V

Map showing the location that flood risk assessment data has been requested for.



How to use this information

You can use this information as part of a flood risk assessment for a planning application. To do this, you should include it in the appendix of your flood risk assessment.

We recommend that you work with a flood risk consultant to get your flood risk assessment.

Included in this document

In this document you'll find:

- how to find information about surface water and other sources of flooding
- information on the models used
- definitions for the terminology used throughout
- flood map for planning (rivers and the sea)
- past floods
- modelled data
- information about strategic flood risk assessments
- information about this data
- information about flood risk activity permits
- help and advice

Information that's unavailable

This document **does not** contain:

- flood defences and attributes

We aren't able to display flood defence locations and attributes as there are no formal flood defences in the area of interest.

Surface water and other sources of flooding

When using the surface water map on the [check your long term flood risk service](#) the following considerations apply:

- surface water extents are suitable for use in planning
- surface water climate change scenarios may help to inform risk assessments, but the available data fall short of what is required to assess planned development
- surface water depth information should not be used for planning purposes

To find out about other factors that might affect the flood risk of this location, you should also check:

- [reservoir flood risk](#)
- groundwater flood risk - you could use the [British Geological Survey groundwater flooding data](#), [groundwater: current status and flood risk](#) and the guide on [mining and groundwater constraints for development](#) - further information may be available from the lead local flood authority (LLFA)
- your local planning authority's SFRA, which includes future flood risk

Your Lead Local Flood Authority is Rochdale District.

For information about sewer flooding, contact the relevant water company for the area.

About the models used

Model name: Rochdale and Littleborough 2013

Scenario(s): Defended fluvial, defences removed fluvial, defended climate change fluvial, defences removed climate change fluvial

Date: 1 June 2013

These models contain the most relevant data for your area of interest.

Terminology used

Annual exceedance probability (AEP)

This refers to the probability of a flood event occurring in any year. The probability is expressed as a percentage. For example, a large flood which is calculated to have a 1% chance of occurring in any one year, is described as 1% AEP.

Metres above ordnance datum (mAOD)

All flood levels are given in metres above ordnance datum which is defined as the mean sea level at Newlyn, Cornwall.

Flood map for planning (rivers and the sea)

Your selected location is in flood zone 1.

Flood zone 3 shows the area at risk of flooding for an undefended flood event with a:

- 0.5% or greater probability of occurring in any year for flooding from the sea
- 1% or greater probability of occurring in any year for fluvial (river) flooding

Flood zone 2 shows the area at risk of flooding for an undefended flood event with:

- between a 0.1% and 0.5% probability of occurring in any year for flooding from the sea
- between a 0.1% and 1% probability of occurring in any year for fluvial (river) flooding

It's important to remember that the flood zones on this map:

- refer to the land at risk of flooding and do not refer to individual properties
- refer to the probability of river and sea flooding, ignoring the presence of defences
- do not take into account potential impacts of climate change



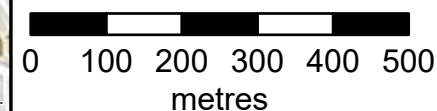
Flood map for planning

Location (easting/northing)
390061/411903

Scale
1:10,000

Created
22 Dec 2025

-  Selected area
-  Main river
-  Flood Zone 3
-  Flood Zone 2



Modelled data

This section provides details of different scenarios we have modelled and includes the following (where available):

- outline maps showing the area at risk from flooding in different modelled scenarios
- modelled node point map(s) showing the points used to get the data to model the scenarios and table(s) providing details of the flood risk for different return periods
- map(s) showing the approximate water levels for the return period with the largest flood extent for a scenario and table(s) of sample points providing details of the flood risk for different return periods

Climate change

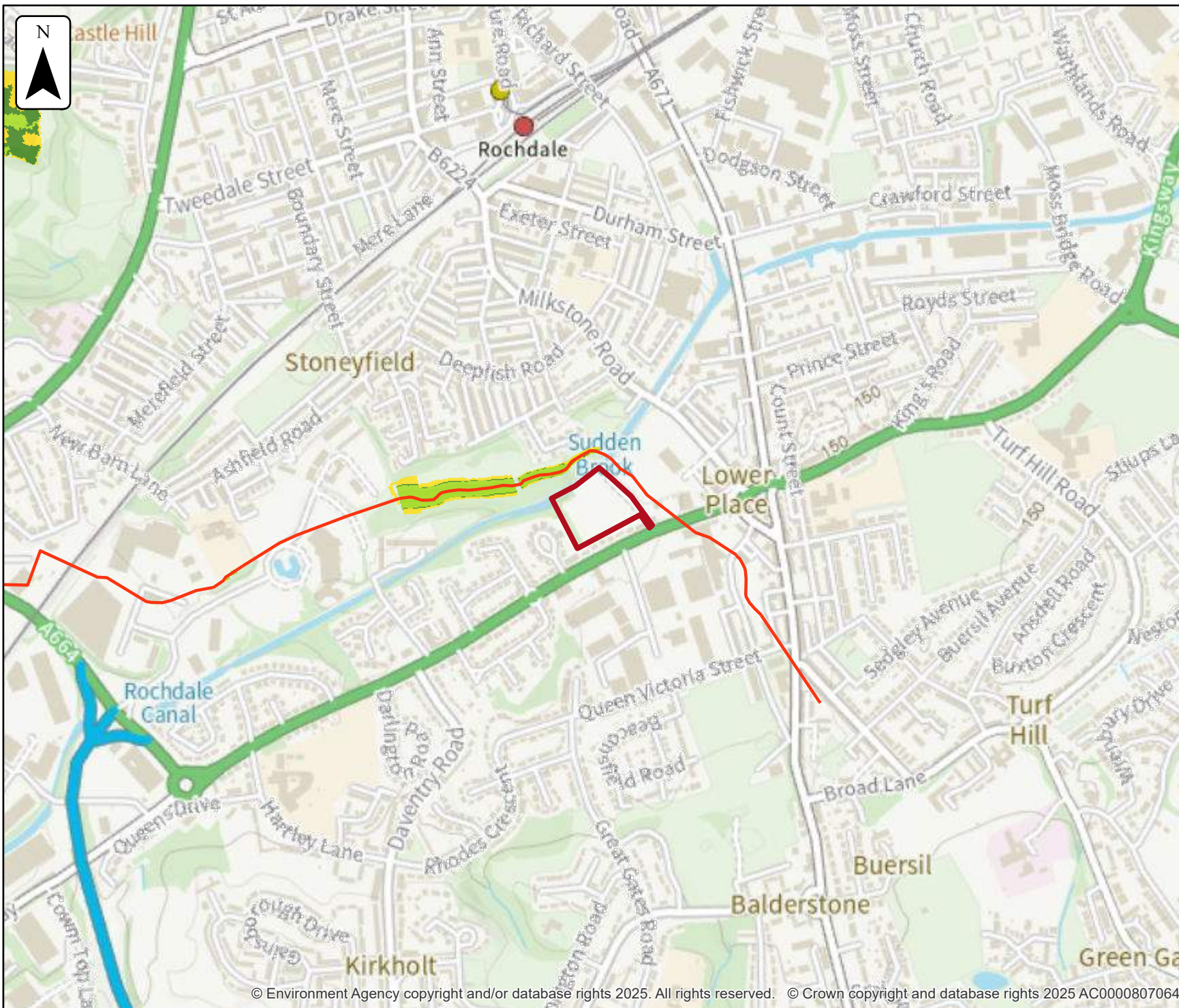
The climate change data included in the models may not include the latest [flood risk assessment climate change allowances](#). Where the new allowances are not available you will need to consider this data and factor in the new allowances to demonstrate the development will be safe from flooding.

The Environment Agency will incorporate the new allowances into future modelling studies. For now, it's your responsibility to demonstrate that new developments will be safe in flood risk terms for their lifetime.

Modelled scenarios

The following scenarios are included:

- Defended modelled fluvial: risk of flooding from rivers where there are flood defences
- Defences removed modelled fluvial: risk of flooding from rivers where flood defences have been removed
- No defences exist modelled fluvial: risk of flooding from rivers where there are no flood defences
- Defended climate change modelled fluvial: risk of flooding from rivers where there are flood defences, including estimated impact of climate change
- Defences removed climate change modelled fluvial: risk of flooding from rivers where flood defences have been removed, including estimated impact of climate change
- No defences exist climate change modelled fluvial: risk of flooding from rivers where there are no flood defences, including estimated impact of climate change



Defences removed climate change modelled fluvial extent

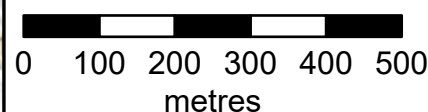
Location (easting/northing)
390061/411903

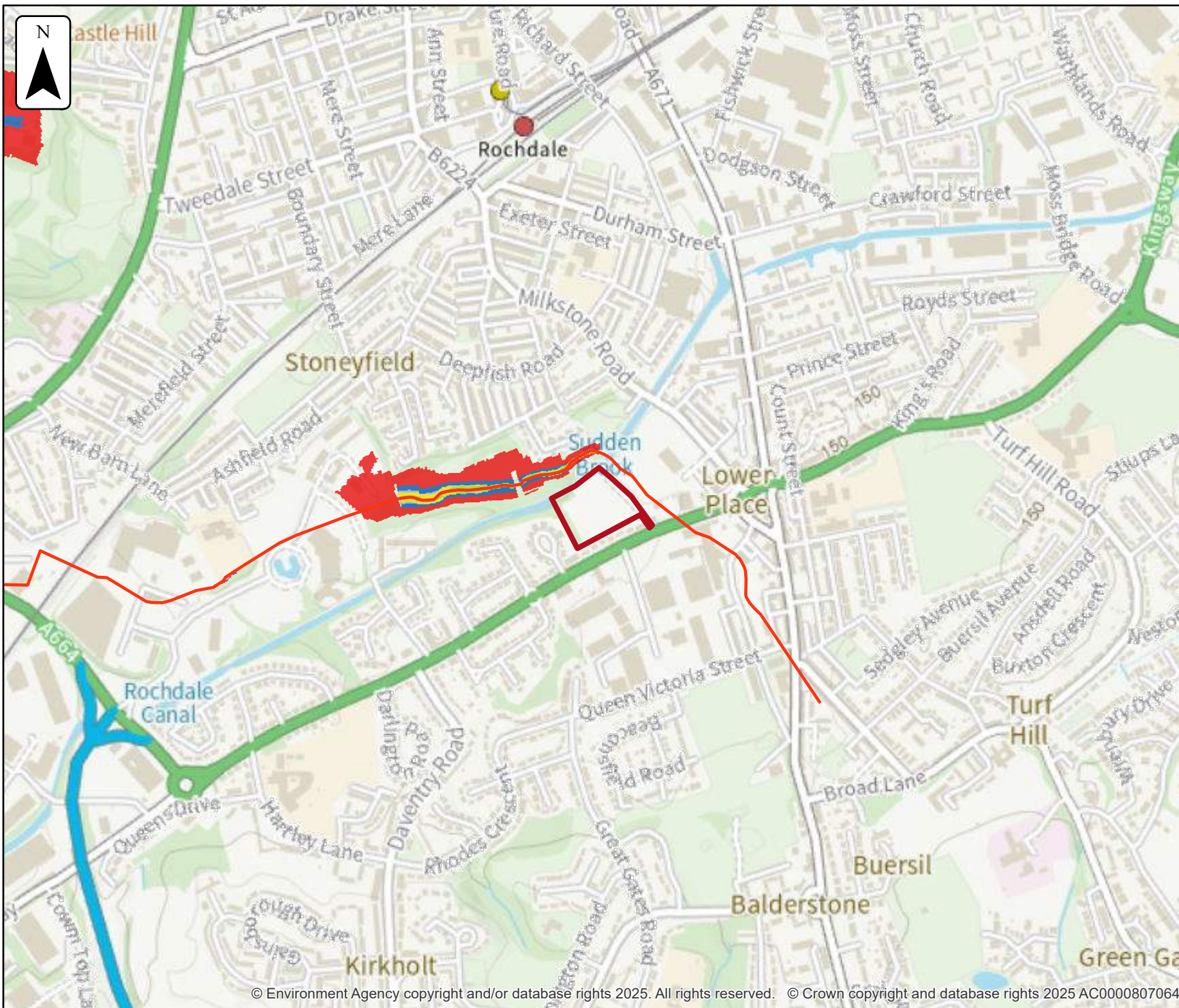
Scale Created
1:10,000 22 Dec 2025

Model name
**Rochdale and
Littleborough 2013**

- Selected area
- Main river
- Modelled flood extent
 - 1% AEP (+20%)
 - 1% AEP (+35%)
 - 1% AEP (+70%)

Flood extents may not be
visible where they overlap
other return periods





Defences removed modelled fluvial extent

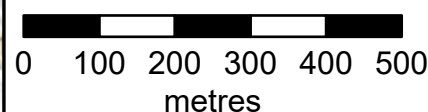
Location (easting/northing)
390061/411903

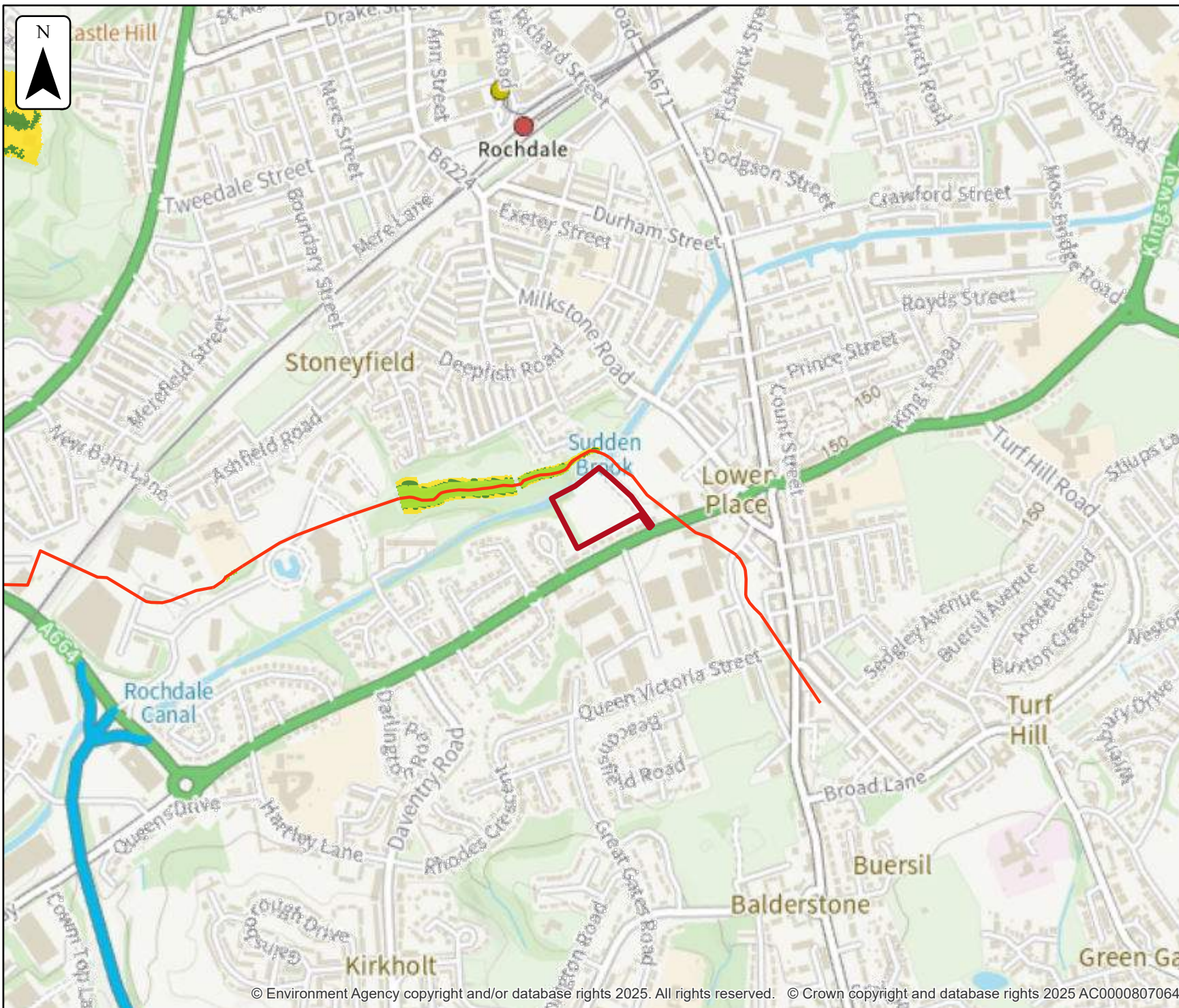
Scale Created
1:10,000 22 Dec 2025

Model name
**Rochdale and
Littleborough 2013**

- Selected area
- Main river
- Modelled flood extent
 - 5% AEP
 - 1.33% AEP
 - 1% AEP
 - 0.5% AEP
 - 0.1% AEP

Flood extents may not be
visible where they overlap
other return periods





Defended climate change modelled fluvial extent

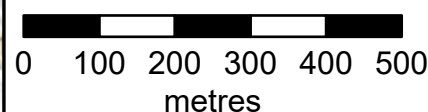
Location (easting/northing)
390061/411903

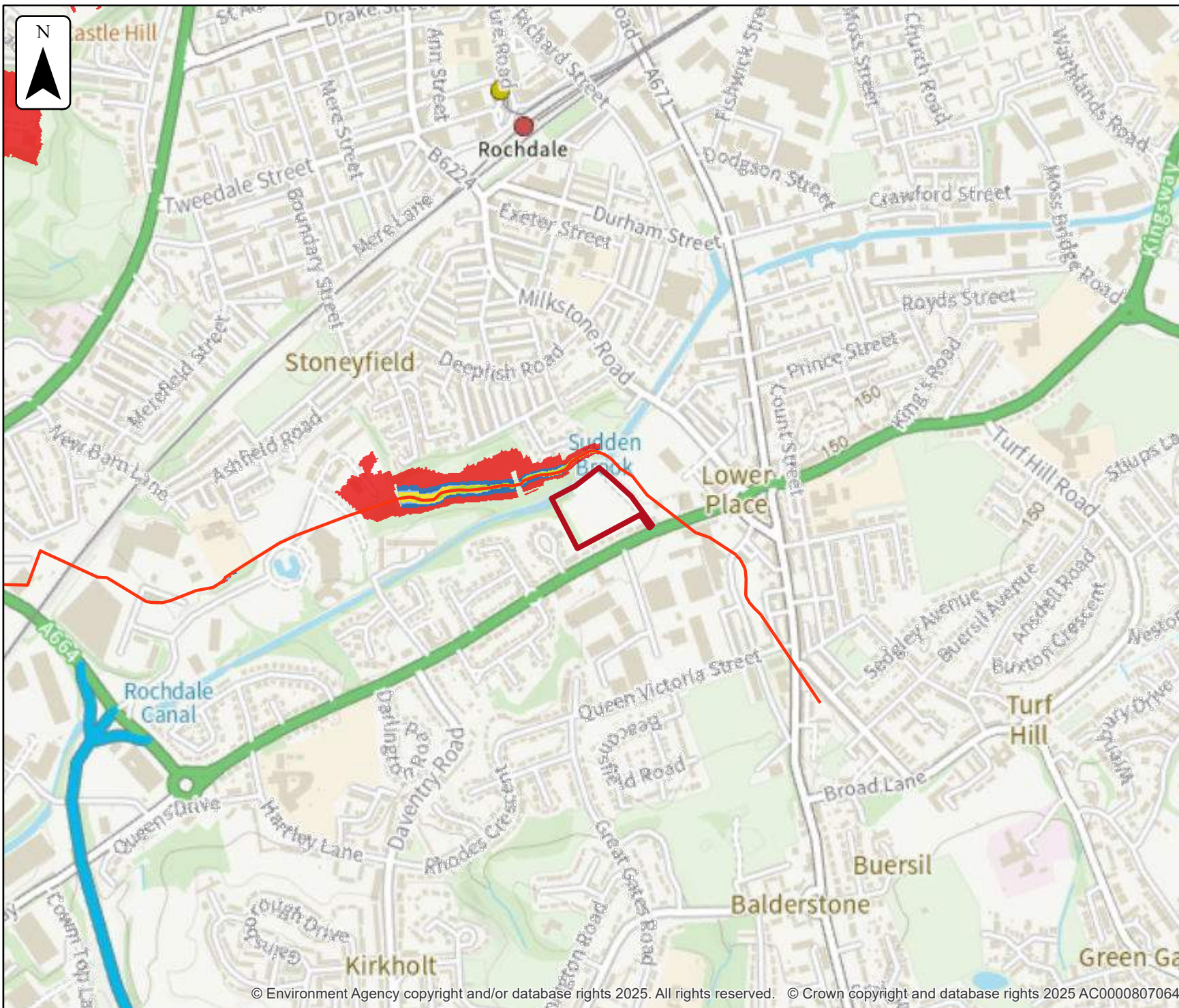
Scale Created
1:10,000 22 Dec 2025

Model name
**Rochdale and
Littleborough 2013**

- Selected area
- Main river
- Modelled flood extent
 - 1% AEP (+20%)
 - 1% AEP (+35%)
 - 1% AEP (+70%)

Flood extents may not be
visible where they overlap
other return periods





Defended modelled fluvial extent

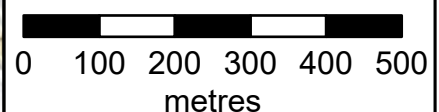
Location (easting/northing)
390061/411903

Scale Created
1:10,000 22 Dec 2025

Model name
Rochdale and Littleborough 2013

- Selected area
- Main river
- Modelled flood extent
 - 5% AEP
 - 1.33% AEP
 - 1% AEP
 - 0.5% AEP
 - 0.1% AEP

Flood extents may not be visible where they overlap other return periods





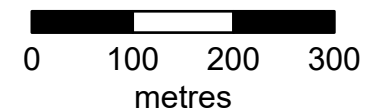
Defended modelled fluvial node locations

Location (easting/northing)
390061/411903

Scale Created
1:7,500 22 Dec 2025

Model name
**Rochdale and
Littleborough 2013**

-  Selected area
-  Modelled location
-  Main river



Modelled node locations data

Defended

Label	Modelled location ID	Easting	Northing	5% AEP	3.33% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
				Level	Level	Level	Level	Level	Level
1	1674525	389318	411749	124.60	124.69	125.04	125.12	125.30	125.70
2	1674429	389336	411760	124.63	124.70	124.98	125.07	125.24	125.64
3	1674277	389360	411780	125.36	125.41	125.61	125.66	125.75	125.96
4	1674614	389720	411918	128.03	128.15	129.15	129.62	130.69	133.78
5	1674187	389761	411930	128.58	128.65	129.18	129.63	130.69	133.78
6	1674645	389805	411937	128.94	128.99	129.25	129.65	130.69	133.78
7	1674134	389905	411946	129.33	129.37	129.53	129.72	130.70	133.78
8	1673945	390005	411979	130.17	130.20	130.33	130.38	130.76	133.78
9	1674542	390068	412010	130.79	130.84	131.01	131.07	131.20	133.78

Data in this table comes from the Rochdale and Littleborough 2013 model.

Level values are shown in mAOD, and flow values are shown in cubic metres per second.

Any blank cells show where a particular scenario has not been modelled for this location.

Defended

Label	Modelled location ID	Easting	Northing	5% AEP	3.33% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
				Flow	Flow	Flow	Flow	Flow	Flow
1	1674525	389318	411749	3.70	4.17	6.02	6.53	7.52	9.93
2	1674429	389336	411760	3.67	4.12	5.97	6.46	7.44	9.80
3	1674277	389360	411780	3.62	4.07	5.89	6.38	7.34	9.56
4	1674614	389720	411918	3.55	3.99	5.80	6.28	7.27	12.03
5	1674187	389761	411930	3.47	3.90	5.77	6.29	7.35	11.82
6	1674645	389805	411937	3.39	3.81	5.73	6.30	7.46	11.58
7	1674134	389905	411946	3.22	3.62	5.45	6.15	7.51	10.97
8	1673945	390005	411979	3.05	3.42	5.13	5.80	7.30	10.43
9	1674542	390068	412010	2.93	3.28	4.91	5.54	7.0	9.98

Data in this table comes from the Rochdale and Littleborough 2013 model.

Level values are shown in mAOD, and flow values are shown in cubic metres per second.

Any blank cells show where a particular scenario has not been modelled for this location.



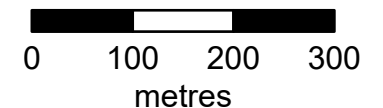
Defences removed modelled fluvial node locations

Location (easting/northing)
390061/411903

Scale Created
1:7,500 22 Dec 2025

Model name
**Rochdale and
Littleborough 2013**

-  Selected area
-  Modelled location
-  Main river



Modelled node locations data

Defences removed

Label	Modelled location ID	Easting	Northing	5% AEP	3.33% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
				Level	Level	Level	Level	Level	Level
1	1674525	389318	411749	124.60	124.69	125.04	125.12	125.30	125.69
2	1674429	389336	411760	124.63	124.70	124.98	125.07	125.24	125.64
3	1674277	389360	411780	125.36	125.41	125.61	125.66	125.75	125.96
4	1674614	389720	411918	128.03	128.15	129.15	129.62	130.69	133.76
5	1674187	389761	411930	128.58	128.65	129.18	129.63	130.69	133.76
6	1674645	389805	411937	128.94	128.99	129.25	129.65	130.69	133.76
7	1674134	389905	411946	129.33	129.37	129.53	129.72	130.70	133.76
8	1673945	390005	411979	130.17	130.20	130.33	130.38	130.76	133.76
9	1674542	390068	412010	130.79	130.84	131.01	131.07	131.20	133.75

Data in this table comes from the Rochdale and Littleborough 2013 model.

Level values are shown in mAOD, and flow values are shown in cubic metres per second.

Any blank cells show where a particular scenario has not been modelled for this location.

Defences removed

Label	Modelled location ID	Easting	Northing	5% AEP	3.33% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
				Flow	Flow	Flow	Flow	Flow	Flow
1	1674525	389318	411749	3.70	4.17	6.02	6.53	7.52	9.92
2	1674429	389336	411760	3.67	4.12	5.97	6.46	7.44	9.79
3	1674277	389360	411780	3.62	4.07	5.89	6.38	7.34	9.55
4	1674614	389720	411918	3.55	3.99	5.80	6.28	7.26	12.01
5	1674187	389761	411930	3.47	3.90	5.77	6.29	7.35	11.81
6	1674645	389805	411937	3.39	3.81	5.73	6.30	7.46	11.57
7	1674134	389905	411946	3.22	3.62	5.46	6.15	7.51	10.97
8	1673945	390005	411979	3.05	3.42	5.13	5.80	7.31	10.43
9	1674542	390068	412010	2.93	3.28	4.91	5.54	7.0	9.98

Data in this table comes from the Rochdale and Littleborough 2013 model.

Level values are shown in mAOD, and flow values are shown in cubic metres per second.

Any blank cells show where a particular scenario has not been modelled for this location.



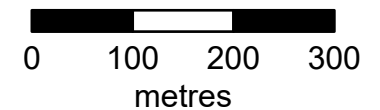
Defended climate change modelled fluvial node locations

Location (easting/northing)
390061/411903

Scale Created
1:7,500 22 Dec 2025

Model name
**Rochdale and
Littleborough 2013**

-  Selected area
-  Modelled location
-  Main river



Modelled node locations data

Defended climate change

Label	Modelled location ID	Easting	Northing	1% AEP (+20%)	1% AEP (+35%)	1% AEP (+70%)	1% AEP (+20%)	1% AEP (+35%)	1% AEP (+70%)
				Level	Level	Level	Flow	Flow	Flow
1	1674525	389318	411749	125.29	125.32	125.46	7.50	7.68	8.52
2	1674429	389336	411760	125.24	125.27	125.41	7.43	7.61	8.44
3	1674277	389360	411780	125.75	125.77	125.82	7.33	7.50	8.32
4	1674614	389720	411918	130.68	130.89	131.91	7.27	7.47	8.30
5	1674187	389761	411930	130.68	130.89	131.91	7.30	7.49	8.38
6	1674645	389805	411937	130.69	130.89	131.91	7.40	7.50	8.44
7	1674134	389905	411946	130.69	130.89	131.91	7.45	7.53	8.54
8	1673945	390005	411979	130.75	130.93	131.92	7.24	7.35	8.44
9	1674542	390068	412010	131.19	131.20	131.88	6.94	7.05	8.22

Data in this table comes from the Rochdale and Littleborough 2013 model.
 Level values are shown in mAOD, and flow values are shown in cubic metres per second.
 Any blank cells show where a particular scenario has not been modelled for this location.



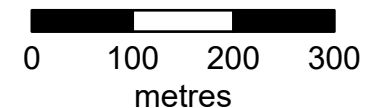
Defences removed climate change modelled fluvial node locations

Location (easting/northing)
390061/411903

Scale Created
1:7,500 22 Dec 2025

Model name
**Rochdale and
Littleborough 2013**

-  Selected area
-  Modelled location
-  Main river



Modelled node locations data

Defences removed climate change

Label	Modelled location ID	Easting	Northing	1% AEP (+20%)	1% AEP (+35%)	1% AEP (+70%)	1% AEP (+20%)	1% AEP (+35%)	1% AEP (+70%)
				Level	Level	Level	Flow	Flow	Flow
1	1674525	389318	411749	125.29	125.32	125.47	7.51	7.68	8.54
2	1674429	389336	411760	125.24	125.27	125.41	7.43	7.61	8.46
3	1674277	389360	411780	125.75	125.77	125.82	7.34	7.50	8.34
4	1674614	389720	411918	130.68	130.88	131.94	7.27	7.46	8.32
5	1674187	389761	411930	130.68	130.88	131.94	7.30	7.49	8.41
6	1674645	389805	411937	130.69	130.89	131.94	7.40	7.50	8.46
7	1674134	389905	411946	130.69	130.89	131.94	7.45	7.53	8.55
8	1673945	390005	411979	130.75	130.93	131.95	7.24	7.34	8.45
9	1674542	390068	412010	131.19	131.20	131.91	6.94	7.05	8.23

Data in this table comes from the Rochdale and Littleborough 2013 model.
 Level values are shown in mAOD, and flow values are shown in cubic metres per second.
 Any blank cells show where a particular scenario has not been modelled for this location.

Strategic flood risk assessments

We recommend that you check the relevant local authority's strategic flood risk assessment (SFRA) as part of your work to prepare a site specific flood risk assessment.

This should give you information about:

- the potential impacts of climate change in this catchment
- areas defined as functional floodplain
- flooding from other sources, such as surface water, ground water and reservoirs

Your Lead Local Flood Authority is Rochdale District.

About this data

This data has been generated by strategic scale flood models and is not intended for use at the individual property scale. If you're intending to use this data as part of a flood risk assessment, please include an appropriate modelling tolerance as part of your assessment. The Environment Agency regularly updates its modelling. We recommend that you check the data provided is the most recent, before submitting your flood risk assessment.

Flood risk activity permits

Under the Environmental Permitting (England and Wales) Regulations 2016 some developments may require an environmental permit for flood risk activities from the Environment Agency. This includes any permanent or temporary works that are in, over, under, or nearby a designated main river or flood defence structure.

[Find out more about flood risk activity permits](#)

Help and advice

Contact the Greater Manchester Merseyside and Cheshire Environment Agency team at inforequests.gmmc@environment-agency.gov.uk for:

- [more information about getting a product 5, 6, 7 or 8](#)
- general help and advice about the site you're requesting data for

Appendix D: Site Layout



Greenfield Lane, Rochdale

ACCOMMODATION SCHEDULE - MCI Developments

Code	Name	Bed & type	Storey	Parking	Unit Nos	Build Sq/Ft	Total Build Sq/Ft	Sales Sq/Ft	Total Sales Sq/Ft	Achieved %
RP										
DAR	Darracott	2B3P	2	2PS	23	873.53	20091	859.12	19760	52%
STR	Stratford	3B4P	2	2PS	17	1034.24	17582	1018.92	17322	39%
MAR	Marlow	3B5P	2	2PS	4	1037.42	4150	1020.83	4083	9%
RP Total					44		41823		41165	100%

Net developable site area	2.47	acre
Plots per net deliverable acre	17.81	
Sq.Ft per net deliverable acre	16,932	
Total site area	3.5	acre

Schedule Of Accommodation

- Site Boundary
- Existing Trees
- Proposed Trees
(SHOWN INDICATIVE)
- Soakaways
- Proposed Hedges
(SHOWN INDICATIVE)

N	29/06/26	LS	Plot 1 parking relocated due to visibility splay
M	09/06/26	LS	Layout amended to suit Planning Officers comments
K	15/05/26	LS	Layout amended to suit Planning Officers comments
J	29/04/26	LS	Holgate renamed to Stratford
H	21/04/26	LS	Amended following pre-application comments
G	17/04/26	LS	Red Boundary Line amended along Western Boundary
F	14/04/26	MH	Substation added
E	24/02/26	LS	Plots 10-13 amended. Darracott swapped for Holgate (Plot 24)
D	11/02/26	LS	Entrance Road amended
C	06/12/25	LS	Layout amended - Housetypes
B	05/12/25	LS	Layout amended - Housetypes / Total amount
A	03/12/25	LS	Layout amended upto 46 units

REV	DATE	DRAWN	DESCRIPTION	ARCH CHECK	ENG CHECK
-----	------	-------	-------------	------------	-----------

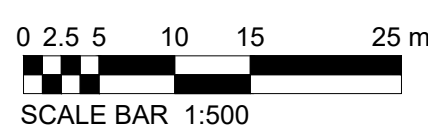
TITLE
PROPOSED SITE PLAN

A KEEPMOAT HOMES COMPANY

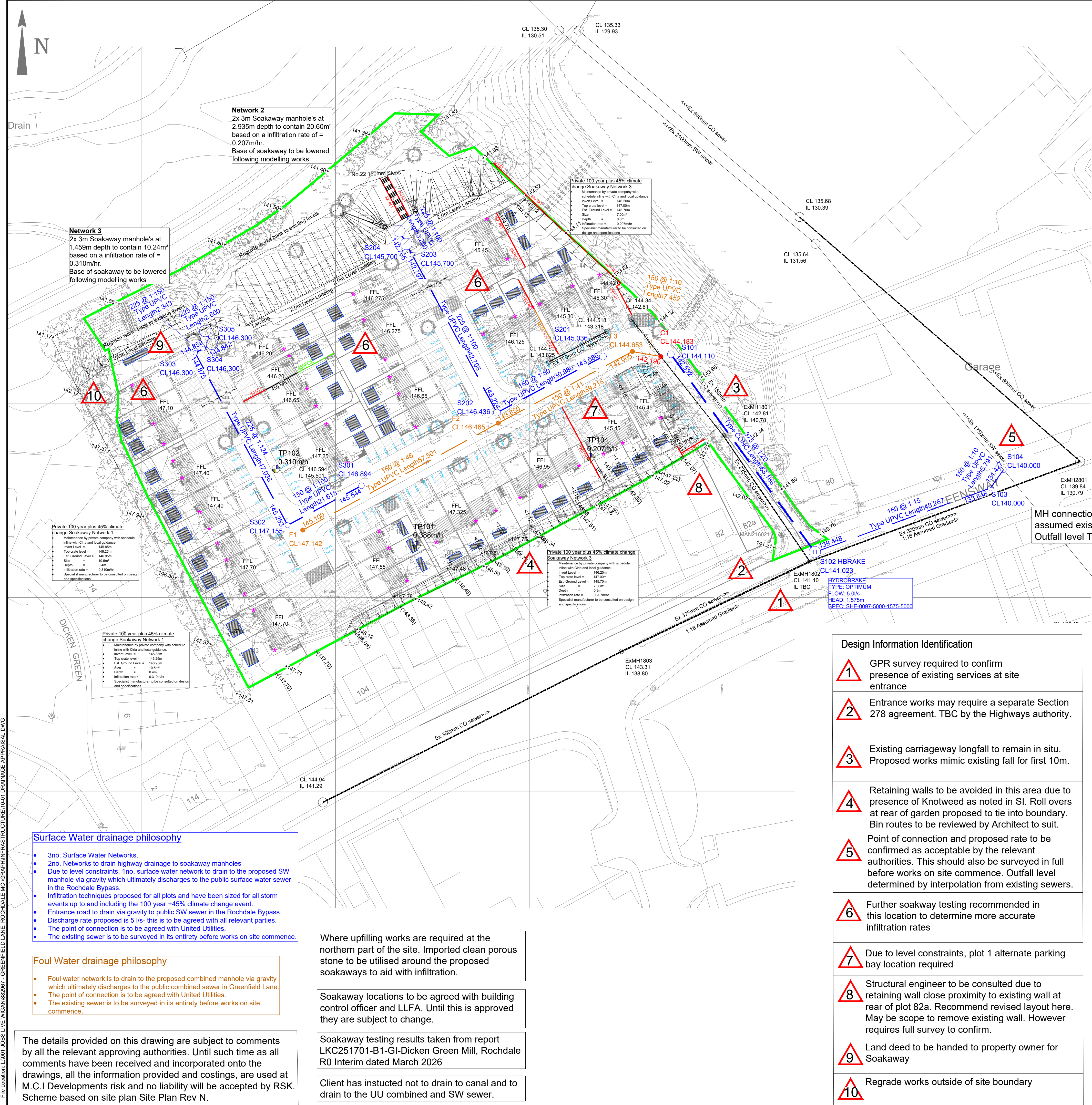
M.C.I. Developments Ltd.
15 Beecham Court,
Smithy Brook Road,
Wigan, WN3 6PR
tel: 08448871467
fax: 08448871468
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email: admin@mcidevelopments.com

PROJECT
GREENFIELD LANE, ROCHDALE

DRN BY	LS	SCALE	JOB REF	DRAWING NUMBER	REV
DATE	27.11.25	1:500 @ A2	109	MCI-109-DR-A-500	N



Appendix E: Drainage Strategy



File Location: L:\001_JOBS_LIVE\WGN\2967 - GREENFIELD LANE, ROCHDALE\MICROGRAPH\INFRASTRUCTURE\06-01_DRAINAGE_APPRAISAL.DWG



Network 2
2x 3m Soakaway manhole's at 1.935m depth to contain 20.60m³ based on an infiltration rate of = 0.207m/hr.
Base of soakaway to be lowered following modelling works

Network 3
2x 3m Soakaway manhole's at 1.459m depth to contain 10.24m³ based on an infiltration rate of = 0.310m/hr.
Base of soakaway to be lowered following modelling works

Private 100 year plus 45% climate change Soakaway Network 1
Maintenance by private company with schedule
Inlet Level = 146.25m
Top grate level = 146.25m
Est. Ground Level = 146.55m
Size = 10.5m²
Depth = 0.4m
Infiltration rate = 0.310m/hr
Specialist manufacturer to be consulted on design and specifications

Private 100 year plus 45% climate change Soakaway Network 1
Maintenance by private company with schedule
Inlet Level = 146.25m
Top grate level = 146.25m
Est. Ground Level = 146.55m
Size = 10.5m²
Depth = 0.4m
Infiltration rate = 0.310m/hr
Specialist manufacturer to be consulted on design and specifications

Private 100 year plus 45% climate change Soakaway Network 3
Maintenance by private company with schedule
Inlet Level = 146.25m
Top grate level = 146.25m
Est. Ground Level = 146.55m
Size = 10.5m²
Depth = 0.4m
Infiltration rate = 0.310m/hr
Specialist manufacturer to be consulted on design and specifications

Surface Water drainage philosophy

- 3no. Surface Water Networks.
- 2no. Networks to drain highway drainage to soakaway manholes
- Due to level constraints, 1no. surface water network to drain to the proposed SW manhole via gravity which ultimately discharges to the public surface water sewer in the Rochdale Bypass.
- Infiltration techniques proposed for all plots and have been sized for all storm events up to and including the 100 year +45% climate change event.
- Entrance road to drain via gravity to public SW sewer in the Rochdale Bypass.
- Discharge rate proposed is 5 l/s- this is to be agreed with all relevant parties.
- The point of connection is to be agreed with United Utilities.
- The existing sewer is to be surveyed in its entirety before works on site commence.

Foul Water drainage philosophy

- Foul water network is to drain to the proposed combined manhole via gravity which ultimately discharges to the public combined sewer in Greenfield Lane.
- The point of connection is to be agreed with United Utilities.
- The existing sewer is to be surveyed in its entirety before works on site commence.

The details provided on this drawing are subject to comments by all the relevant approving authorities. Until such time as all comments have been received and incorporated onto the drawings, all the information provided and costings, are used at M.C.I Developments risk and no liability will be accepted by RSK. Scheme based on site plan Site Plan Rev N.

Where upfiling works are required at the northern part of the site. Imported clean porous stone to be utilised around the proposed soakaways to aid with infiltration.

Soakaway locations to be agreed with building control officer and LLFA. Until this is approved they are subject to change.

Soakaway testing results taken from report LKC251701-B1-GI-Dicken Green Mill, Rochdale R0 Interim dated March 2026

Client has instructed not to drain to canal and to drain to the UU combined and SW sewer.

Notes

- All adoptable sewer works and material to be in accordance with DCG, The Relevant British/European and United Utilities' Standards/Requirements/Addendum and Kitemarked.
- Manhole covers shall have a minimum clear opening of 600mm and shall be Class D400 to BS EN 124 with 150mm deep frames in highways.
- Filled ground must be filled and consolidated under the supervision and to the satisfaction of United Utilities before any sewer works are carried out.
- United Utilities is not obliged to accept filter drain/land drainage run-off into the public sewer network or adoptable drainage system (directly or indirectly). An alternative method of disposal of the land drainage run-off will therefore be required and you will have to liaise with the Local Authority, Land Drainage Section with regard to the disposal of the filter drain/land drainage run-off.
- Cover slabs must carry the BSI Kitemark or will be rejected by United Utilities Inspector. Where the clear opening of the Kitemarked product is different to that of the cover and frame, a loading bearing slab should be fitted above the cover slab to bring the size down to 600mm x 600mm for the United Utilities specified cover size. Please refer to Concrete Pipe Systems Association (CPSA), 'Technical Bulletin' issued Autumn 2004 for Kitemarked cover slab opening sizes.
- Sulphate resistant cement (C20-DC2) and precast concrete products must be used or a laboratory report provided proving that such precautions are not necessary.
- The adoptable sewers should be a minimum of 1m and manholes 0.5m from kerb faces and service margins.
- Sewers must have 6 metres clearance from trees and hedges (please also refer to Figure 2.3 on page 33 in Sewers for Adoption 6th Edition for restrictions on tree planting adjacent to sewers).
- Unless noted otherwise, sewers are to be laid in Class S bedding in accordance with United Utilities standard details. Where depth of cover to top of the sewer is less than 1.2m in highways and verges (or less than 900mm in non vehicular access areas) then a concrete bed and surround shall be provided.
- United Utilities policy is not to accept Type "C" brick manholes and 1050mm dia manhole rings. Instead it is preferred that you use a type "B" manhole with 1200mm dia or 1500mm dia rings, with the opening sited over the channel where depth of cover to pipe soffit is 1 - 1.5m.
- All lateral drains to be 150mm dia.

CIVIL / STRUCTURAL DESIGN RISK MANAGEMENT	
Abnormal or unusual residual risks associated with the design outcomes shown on this drawing are:-	
RSK LDE LTD has followed its Design Risk Management process for Hazard Elimination and Risk reduction in developing the designs shown on this drawing. Abnormal or unusual residual risks may be shown above where it is considered that such risk may not normally be expected by competent persons engaged on work of this nature or type.	

Legend

- Proposed S104 foul water sewer and manhole
- Proposed S104 surface water sewer and manhole
- Proposed S104 combined water manhole
- FFL 26.40 Finished Floor Level
- Existing Combined sewer and manhole
- Existing Combined sewer and manhole to be abandoned
- Private Soakaways
- Permeable Paving for water quality.
- Water Butt
- Extra Facing Brickwork
- Retaining Wall
- Flag on Edge
- Banking works
- Highway Drainage Easement

MH connection based on an assumed existing gradient. Outfall level TBC.

Design Information Identification

- Silt trap to be installed immediately upstream of proposed Highway soakaway
- Root Protection Zoning to be confirmed
- Sewer outfall level TBC
- Earthworks/ Slope Stability analysis required for steep sloped areas.
- Some of the existing sewer is to be abandoned. Confirmation of incoming flows TBC before diversion works are confirmed.
- Deep drainage on the scheme.
- Safety barriers to be constructed where highway is adjacent to steep slopes. Slope stability analysis to be undertaken.
- Left hand footway on access road encroaches plot 82a.
- 5l/s proposed to drain to combined sewer as this is the minimum allowable UU rate. This is to be confirmed as acceptable by all relevant authorities.
- Orifice 84mm- TBC as acceptable by adopting water company
- All proposals are subject to approval from the relevant authorities and may therefore be subject to change
- Specialist manufacturer to be consulted to provide suitable permeable paving specification for each area based on soakaway test result.
- Existing Sewer information taken from drawing S25-0808 by JPL Surveying.

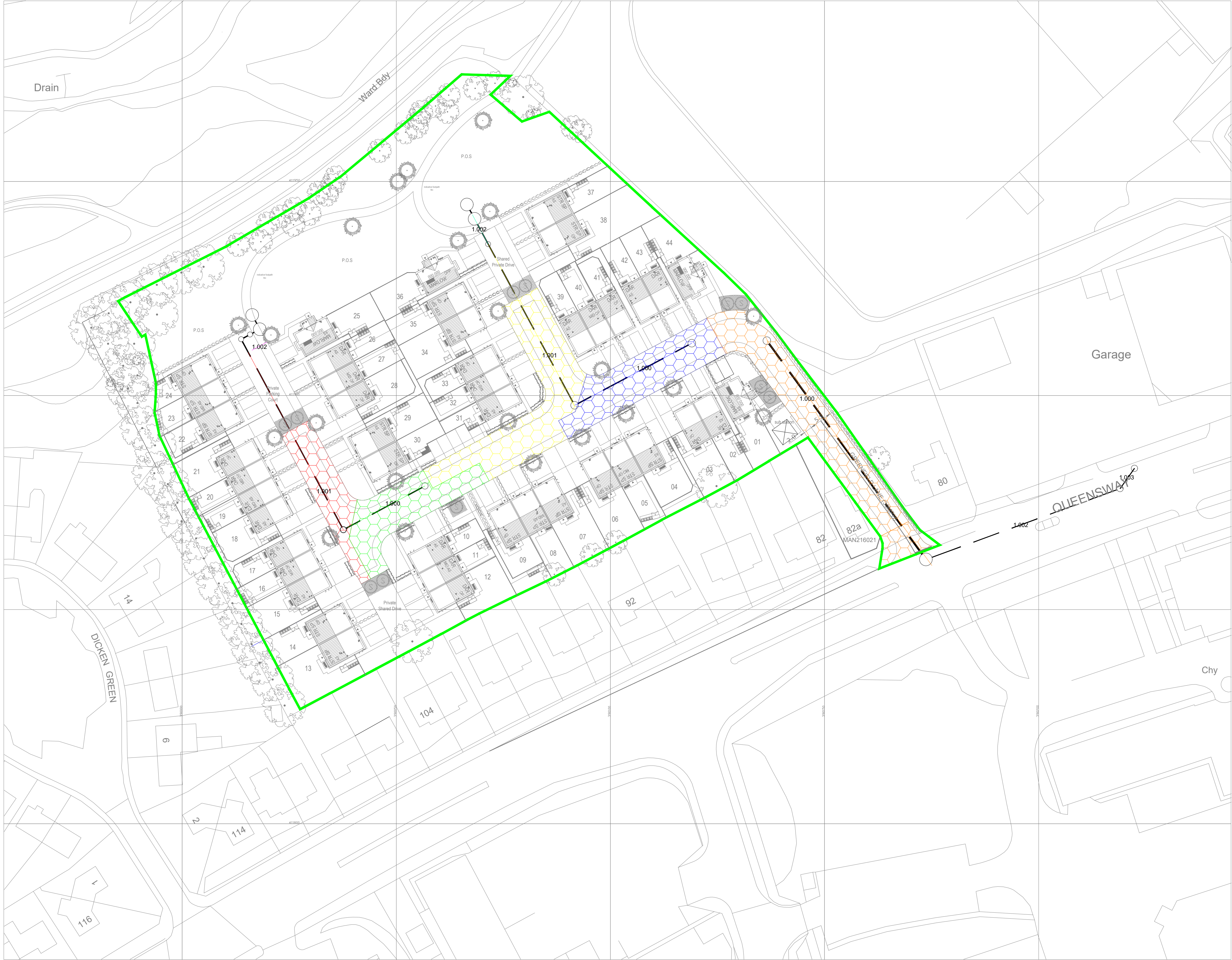
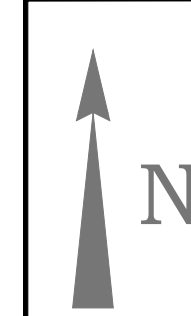
Design Information Identification

- GPR survey required to confirm presence of existing services at site entrance
- Entrance works may require a separate Section 278 agreement. TBC by the Highways authority.
- Existing carriageway longfall to remain in situ. Proposed works mimic existing fall for first 10m.
- Retaining walls to be avoided in this area due to presence of Knotweed as noted in SI. Roll overs at rear of garden proposed to tie into boundary. Bin routes to be reviewed by Architect to suit.
- Point of connection and proposed rate to be confirmed as acceptable by the relevant authorities. This should also be surveyed in full before works on site commence. Outfall level determined by interpolation from existing sewers.
- Further soakaway testing recommended in this location to determine more accurate infiltration rates
- Due to level constraints, plot 1 alternate parking bay location required
- Structural engineer to be consulted due to retaining wall close proximity to existing wall at rear of plot 82a. Recommend revised layout here. May be scope to remove existing wall. However requires full survey to confirm.
- Land deed to be handed to property owner for Soakaway
- Regrade works outside of site boundary

Rev	Date	Amendment	Drawn	Chkd	Appd
P3	15.07.26	Updated to site layout Rev N.			DS
P2	19.05.26	Drainage design amended to utilise soakaways			DS MAR
P1	10.04.26	First Issue			DS MS

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Client		M.C.I Developments			
Project Title		Greenfield Lane Rochdale			
Status		APPRAISAL			
Drawing Title		High Level Engineering Appraisal			
Drawn	Date	Checked	Date	Approved	Date
DS	APR 26	MS	APR 26		
Scale	Orig Size		Dimensions		
1:500	A1		m		
Project No.		File Name			
882967		10-01			
Drawing No.				Rev.	
882967	LDE		DR	D	10-01 P3
Project No.	Orig.	Vol./Sys.	Lev./Loc.	Type	Role
					Draw. No.
Scale 1:500					
0 5 10 15 20 25m					



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CIVIL / STRUCTURAL DESIGN RISK MANAGEMENT

Abnormal or unusual residual risks associated with the design outcomes shown on this drawing are:-

RSK LDE LTD has followed its Design Risk Management process for Hazard Elimination and Risk reduction in developing the designs shown on this drawing.
Abnormal or unusual residual risks may be shown above where it is considered that such risk may not normally be expected by competent persons engaged on work of this nature or type.

Catchments

Network 1

Pipe No	Catchment Ha
1.000	0.056
1.001	0.000
1.002	0.000
Total 0.056 Ha	

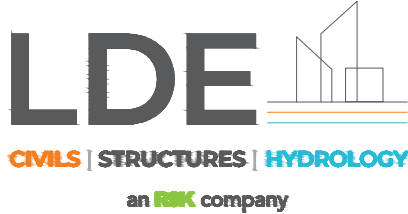
Network 2

Pipe No	Catchment Ha
1.000	0.037
1.001	0.053
1.002	0.000
Total 0.090 Ha	

Network 3

Pipe No	Catchment Ha
1.000	0.030
1.001	0.031
1.002	0.000
1.003	0.000
Total 0.061 Ha	

Rev	Date	Amendment	Drawn	Chkd	Appd
P3	15.07.26	Updated to site layout Rev N.		DS	
P2	19.05.26	Updated to suit drainage redesign to utilise scaleways		DS	MAR
P1	10.04.26	First Issue		DS	MS



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M.C.I Developments					
Project Title					
Greenfield Lane Rochdale					
Status					
APPRAISAL					
Drawing Title					
High Level Impermeable Areas Plan					
Drawn DS Scale 1:500		Date APR 26		Checked MS Date APR 26	
Orig Size A1		Approved Date		Dimensions m	
Project No. 882967			File Name 10-03		
Drawing No.					
882967		LDE		DR	D
10-03		P3	Rev.		
Project No.		Orig.	Vol./Sys.	Lev./Loc.	Type
Role		Draw. No.			
Scale 1:500					
0 5 10 15 20 25m					

The details provided on this drawing are subject to comments by all the relevant approving authorities. Until such time as all comments have been received and incorporated onto the drawings, all the information provided and costings, are used at M.C.I Developments risk and no liability will be accepted by RSK. Scheme based on site plan Site Plan Rev N.



CIVIL / STRUCTURAL DESIGN RISK MANAGEMENT

Abnormal or unusual residual risks associated with the design outcomes shown on this drawing are:-

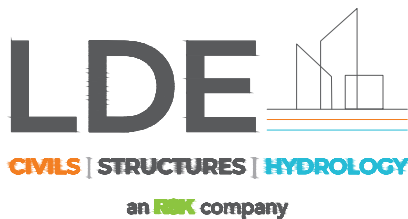
RSK LDE LTD has followed its Design Risk Management process for Hazard Elimination and Risk reduction in developing the designs shown on this drawing. Abnormal or unusual residual risks may be shown above where it is considered that such risk may not normally be expected by competent persons engaged on work of this nature or type.

Legend:

- S1 Proposed surface water sewer and manhole
- Site Boundary
- 0.873m³ Flood volume and direction for 100year + 45%cc event
- Direction of overland flow in the carriageway in the event of exceedance surface water flooding
- Direction of overland flow in the rear gardens in the event of exceedance surface water flooding

Note:
Drawing to be read in conjunction with Flow simulations

Rev	Date	Amendment	Drawn	Chkd	Appd
P3	15.07.26	Updated to site layout Rev N.		DS	
P2	19.05.26	Updated to suit drainage redesign to utilise soakaways		DS	MAR
P1	10.04.26	First Issue		DS	MS



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Client					
M.C.I Developments					
Project Title					
Greenfield Lane Rochdale					
Status					
APPRAISAL					
Drawing Title					
High Level Flood Exceedance Plan					
Drawn	Date	Checked	Date	Approved	Date
DS	APR 26	MS	APR 26		
Scale	1:500	Orig Size	A1	Dimensions	m
Project No.	882967	File Name	10-04		
Drawing No.	882967	LDE	DR D	10-04	P3
Project No.	Orig.	Vol./Sys.	Lev./Loc.	Type	Role
					Draw. No.
Scale 1:500					
0 5 10 15 20 25m					

The details provided on this drawing are subject to comments by all the relevant approving authorities. Until such time as all comments have been received and incorporated onto the drawings, all the information provided and costings, are used at M.C.I Developments risk and no liability will be accepted by RSK. Scheme based on site plan Site Plan Rev N

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.600
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	250.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
101	0.056	5.00	144.107	1800	390136.541	411912.797	1.575
102	0.000		141.023	3000	390173.682	411861.705	1.575
103	0.000	5.00	140.000	1500	390219.018	411878.270	5.573
104			140.000	1500	390222.369	411882.992	6.152

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	101	102	63.166	0.600	142.532	139.448	3.084	20.5	375	5.26	41.5
1.001	102	103	48.267	0.600	139.448	136.152	3.296	14.6	150	5.57	39.3
1.002	103	104	5.791	0.600	134.427	133.848	0.579	10.0	150	5.60	39.1

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	4.019	443.8	8.4	1.200	1.200	0.056	0.0
1.001	2.646	46.8	8.0	1.425	3.698	0.056	0.0
1.002	3.204	56.6	7.9	5.423	6.002	0.056	0.0

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	63.166	20.5	375	1 Circular	144.107	142.532	1.200	141.023	139.448	1.200
1.001	48.267	14.6	150	1 Circular	141.023	139.448	1.425	140.000	136.152	3.698
1.002	5.791	10.0	150	1 Circular	140.000	134.427	5.423	140.000	133.848	6.002

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	101	1800	Manhole	1 Adoptable	102	3000	Manhole	1 Adoptable
1.001	102	3000	Manhole	1 Adoptable	103	1500	Manhole	1 Adoptable
1.002	103	1500	Manhole	1 Adoptable	104	1500	Manhole	1 Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
101	390136.541	411912.797	144.107	1.575	1800		0	1.000	142.532	375
102	390173.682	411861.705	141.023	1.575	3000		1	1.000	139.448	375
							0	1.001	139.448	150
103	390219.018	411878.270	140.000	5.573	1500		1	1.001	136.152	150
							0	1.002	134.427	150
104	390222.369	411882.992	140.000	6.152	1500		1	1.002	133.848	150

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	✓	Check Discharge Rate(s)	✓
Summer CV	1.000	Drain Down Time (mins)	240	Check Discharge Volume	✓
Winter CV	1.000	Additional Storage (m³/ha)	0.0	100 year 360 minute (m³)	

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	0	0	0
100	45	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	1.95
Greenfield Method	IH124	Growth Factor 100 year	2.48
Positively Drained Area (ha)		Betterment (%)	0
SAAR (mm)		QBar	
Soil Index	1	Q 1 year (l/s)	
SPR	0.10	Q 30 year (l/s)	
Region	1	Q 100 year (l/s)	
Growth Factor 1 year	0.85		

Pre-development Discharge Volume

Site Makeup	Greenfield	Return Period (years)	100
Greenfield Method	FSR/FEH	Climate Change (%)	0
Positively Drained Area (ha)		Storm Duration (mins)	360
Soil Index	1	Betterment (%)	0
SPR	0.10	PR	
CWI		Runoff Volume (m³)	

Node 102 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	139.448	Product Number	CTL-SHE-0097-5000-1575-5000
Design Depth (m)	1.575	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	5.0	Min Node Diameter (mm)	1200

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.03%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	101	10	142.568	0.036	8.7	0.0915	0.0000	OK
30 minute summer	102	22	139.609	0.160	8.1	1.1344	0.0000	SURCHARGED
30 minute summer	103	23	134.455	0.028	3.8	0.0489	0.0000	OK
30 minute summer	104	23	133.875	0.027	3.8	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	101	1.000	102	8.6	1.171	0.019	1.3517	
30 minute summer	102	1.001	103	3.8	1.593	0.082	0.1160	
30 minute summer	103	1.002	104	3.8	1.774	0.068	0.0125	5.1

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.03%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	101	10	142.589	0.056	22.4	0.1437	0.0000	OK
60 minute summer	102	43	140.021	0.573	16.9	4.0525	0.0000	SURCHARGED
60 minute summer	103	56	134.458	0.031	4.7	0.0545	0.0000	OK
60 minute summer	104	56	133.877	0.029	4.7	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	101	1.000	102	22.1	1.415	0.050	3.7055	
60 minute summer	102	1.001	103	4.7	1.695	0.101	0.1348	
60 minute summer	103	1.002	104	4.7	1.883	0.084	0.0146	18.0

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.03%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	101	10	142.608	0.076	41.4	0.1940	0.0000	OK
60 minute summer	102	49	140.974	1.526	31.8	10.7890	0.0000	FLOOD RISK
60 minute summer	103	50	134.458	0.031	4.9	0.0554	0.0000	OK
60 minute summer	104	50	133.878	0.030	4.9	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	101	1.000	102	41.0	1.529	0.092	3.9893	
60 minute summer	102	1.001	103	4.9	1.710	0.104	0.1377	
60 minute summer	103	1.002	104	4.9	1.898	0.086	0.0149	33.9

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
201	0.037	5.00	145.036	1800	390119.016	411912.215	1.350
202	0.053	5.00	146.436	1800	390091.638	411897.717	3.212
203	0.000		145.700	1200	390071.457	411935.353	2.903
204	0.000		145.700	3000	390069.944	411938.173	2.935

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	201	202	30.980	0.600	143.686	143.299	0.387	80.0	150	5.46	50.0
1.001	202	203	42.705	0.600	143.224	142.797	0.427	100.0	225	6.00	50.0
1.002	203	204	3.200	0.600	142.797	142.765	0.032	100.0	225	6.04	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.125	19.9	6.7	1.200	2.987	0.037	0.0	60	1.017
1.001	1.307	52.0	16.3	2.987	2.678	0.090	0.0	87	1.161
1.002	1.307	52.0	16.3	2.678	2.710	0.090	0.0	87	1.161

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	30.980	80.0	150	1 Circular	145.036	143.686	1.200	146.436	143.299	2.987
1.001	42.705	100.0	225	1 Circular	146.436	143.224	2.987	145.700	142.797	2.678
1.002	3.200	100.0	225	1 Circular	145.700	142.797	2.678	145.700	142.765	2.710

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	201	1800	Manhole	1 Adoptable	202	1800	Manhole	1 Adoptable
1.001	202	1800	Manhole	1 Adoptable	203	1200	Manhole	1 Adoptable
1.002	203	1200	Manhole	1 Adoptable	204	3000	Manhole	1 Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
201	390119.016	411912.215	145.036	1.350	1800		0	1.000	143.686	150
202	390091.638	411897.717	146.436	3.212	1800		1	1.000	143.299	150
203	390071.457	411935.353	145.700	2.903	1200		1	1.001	143.224	225
204	390069.944	411938.173	145.700	2.935	3000		1	1.002	142.797	225

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	✓	Check Discharge Rate(s)	✓
Summer CV	1.000	Drain Down Time (mins)	240	Check Discharge Volume	✓
Winter CV	1.000	Additional Storage (m³/ha)	20.0	100 year 360 minute (m³)	

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440
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Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	0	0	0
100	45	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	1.95
Greenfield Method	IH124	Growth Factor 100 year	2.48
Positively Drained Area (ha)		Betterment (%)	0
SAAR (mm)		QBar	
Soil Index	1	Q 1 year (l/s)	
SPR	0.10	Q 30 year (l/s)	
Region	1	Q 100 year (l/s)	
Growth Factor 1 year	0.85		

Pre-development Discharge Volume

Site Makeup	Greenfield	Return Period (years)	100
Greenfield Method	FSR/FEH	Climate Change (%)	0
Positively Drained Area (ha)		Storm Duration (mins)	360
Soil Index	1	Betterment (%)	0
SPR	0.10	PR	
CWI		Runoff Volume (m³)	

Node 204 Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.20700	Invert Level (m)	142.765	Depth (m)	2.935
Side Inf Coefficient (m/hr)	0.20700	Time to half empty (mins)	414	Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	7.020	Number Required	1
Porosity	0.95	Pit Length (m)	7.020		

Results for 2 year Critical Storm Duration. Lowest mass balance: 98.19%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
15 minute summer	201	11	143.741	0.055	5.7	0.1707	0.0000	OK
15 minute summer	202	11	143.302	0.078	13.6	0.2236	0.0000	OK
180 minute summer	203	124	142.920	0.123	6.1	0.1394	0.0000	OK
180 minute summer	204	124	142.920	0.155	5.8	8.3647	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m ³)
15 minute summer	201	1.000	202	5.6	0.959	0.280	0.1797
15 minute summer	202	1.001	203	13.4	1.023	0.259	0.5708
180 minute summer	203	1.002	204	5.8	0.703	0.111	0.0824
180 minute summer	204	Infiltration		1.5			

Results for 30 year Critical Storm Duration. Lowest mass balance: 98.19%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
15 minute summer	201	11	143.784	0.098	14.8	0.3025	0.0000	OK
15 minute summer	202	10	143.363	0.138	35.4	0.3982	0.0000	OK
120 minute winter	203	118	143.200	0.403	12.2	0.4558	0.0000	SURCHARGED
120 minute winter	204	118	143.200	0.435	11.4	23.4359	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m ³)
15 minute summer	201	1.000	202	14.4	1.208	0.724	0.3691
15 minute summer	202	1.001	203	35.2	1.317	0.678	1.1746
120 minute winter	203	1.002	204	11.4	1.003	0.219	0.1273
120 minute winter	204	Infiltration		1.8			

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 98.19%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	201	20	144.193	0.507	26.3	1.5684	0.0000	SURCHARGED
30 minute summer	202	19	143.699	0.475	56.8	1.3656	0.0000	SURCHARGED
180 minute winter	203	176	143.665	0.868	16.4	0.9816	0.0000	SURCHARGED
180 minute winter	204	176	143.665	0.900	15.5	48.4866	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
30 minute summer	201	1.000	202	20.9	1.217	1.050	0.5454
30 minute summer	202	1.001	203	52.9	1.330	1.017	1.6984
180 minute winter	203	1.002	204	15.5	1.026	0.299	0.1273
180 minute winter	204	Infiltration		2.1			

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
301	0.030	5.00	146.894	1500	390056.692	411878.868	1.350
302	0.031	5.00	147.155	1350	390037.640	411868.652	1.902
303	0.000		146.300	1200	390015.412	411910.104	1.425
304	0.000		146.300	1200	390017.478	411911.211	1.441
305	0.000		146.300	3000	390019.769	411912.440	1.458

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	301	302	21.618	0.600	145.544	145.328	0.216	100.0	150	5.36	43.6
1.001	302	303	47.036	0.600	145.253	144.875	0.378	124.4	225	6.03	41.5
1.002	303	304	2.344	0.600	144.875	144.859	0.016	150.0	225	6.07	41.4
1.003	304	305	2.600	0.600	144.859	144.842	0.017	150.0	225	6.11	41.3

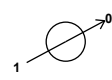
Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.005	17.8	4.7	1.200	1.677	0.030	0.0	53	0.853
1.001	1.171	46.5	9.2	1.677	1.200	0.061	0.0	67	0.912
1.002	1.065	42.3	9.1	1.200	1.216	0.061	0.0	71	0.853
1.003	1.065	42.3	9.1	1.216	1.233	0.061	0.0	71	0.853

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	21.618	100.0	150	1 Circular	146.894	145.544	1.200	147.155	145.328	1.677
1.001	47.036	124.4	225	1 Circular	147.155	145.253	1.677	146.300	144.875	1.200
1.002	2.344	150.0	225	1 Circular	146.300	144.875	1.200	146.300	144.859	1.216
1.003	2.600	150.0	225	1 Circular	146.300	144.859	1.216	146.300	144.842	1.233

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	301	1500	Manhole	1 Adoptable	302	1350	Manhole	1 Adoptable
1.001	302	1350	Manhole	1 Adoptable	303	1200	Manhole	1 Adoptable
1.002	303	1200	Manhole	1 Adoptable	304	1200	Manhole	1 Adoptable
1.003	304	1200	Manhole	1 Adoptable	305	3000	Manhole	1 Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
301	390056.692	411878.868	146.894	1.350	1500		0	1.000	145.544	150
302	390037.640	411868.652	147.155	1.902	1350		1	1.000	145.328	150
303	390015.412	411910.104	146.300	1.425	1200		0	1.001	145.253	225
						1	1.001	144.875	225	
304	390017.478	411911.211	146.300	1.441	1200		0	1.002	144.875	225
						1	1.002	144.859	225	
305	390019.769	411912.440	146.300	1.458	3000		0	1.003	144.859	225
						1	1.003	144.842	225	

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	✓	Check Discharge Rate(s)	✓
Summer CV	1.000	Drain Down Time (mins)	240	Check Discharge Volume	✓
Winter CV	1.000	Additional Storage (m³/ha)	0.0	100 year 360 minute (m³)	

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	0	0	0
100	45	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	1.95
Greenfield Method	IH124	Growth Factor 100 year	2.48
Positively Drained Area (ha)		Betterment (%)	0
SAAR (mm)		QBar	
Soil Index	1	Q 1 year (l/s)	
SPR	0.10	Q 30 year (l/s)	
Region	1	Q 100 year (l/s)	
Growth Factor 1 year	0.85		

Pre-development Discharge Volume

Site Makeup	Greenfield	Return Period (years)	100
Greenfield Method	FSR/FEH	Climate Change (%)	0
Positively Drained Area (ha)		Storm Duration (mins)	360
Soil Index	1	Betterment (%)	0
SPR	0.10	PR	
CWI		Runoff Volume (m ³)	

Node 305 Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.31000	Invert Level (m)	144.842	Depth (m)	1.458
Side Inf Coefficient (m/hr)	0.31000	Time to half empty (mins)	160	Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	7.020	Number Required	1
Porosity	0.95	Pit Length (m)	7.020		

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.21%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	301	10	145.597	0.053	4.6	0.0928	0.0000	OK
15 minute summer	302	11	145.320	0.067	9.2	0.0961	0.0000	OK
15 minute winter	303	9	144.976	0.101	8.6	0.1147	0.0000	OK
15 minute winter	304	9	144.972	0.113	9.7	0.1277	0.0000	OK
120 minute summer	305	78	144.914	0.072	5.0	3.8945	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	301	1.000	302	4.5	0.830	0.252	0.1167
15 minute summer	302	1.001	303	9.2	0.756	0.197	0.6278
15 minute winter	303	1.002	304	9.7	0.740	0.228	0.0437
15 minute winter	304	1.003	305	10.3	1.399	0.244	0.0262
120 minute summer	305	Infiltration		2.2			

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.21%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
15 minute summer	301	10	145.637	0.093	12.0	0.1648	0.0000	OK
15 minute summer	302	10	145.368	0.114	24.1	0.1638	0.0000	OK
60 minute summer	303	54	145.064	0.189	18.4	0.2135	0.0000	OK
60 minute summer	304	54	145.064	0.205	17.6	0.2315	0.0000	OK
60 minute summer	305	54	145.064	0.222	17.3	11.9384	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m ³)
15 minute summer	301	1.000	302	11.7	1.053	0.661	0.2417
15 minute summer	302	1.001	303	23.9	1.032	0.514	1.0915
60 minute summer	303	1.002	304	17.6	0.797	0.416	0.0862
60 minute summer	304	1.003	305	17.3	0.978	0.409	0.1008
60 minute summer	305	Infiltration		2.4			

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.21%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	301	11	145.784	0.240	22.2	0.4249	0.0000	SURCHARGED
15 minute summer	302	11	145.423	0.170	43.0	0.2433	0.0000	OK
60 minute winter	303	61	145.329	0.454	25.0	0.5139	0.0000	SURCHARGED
60 minute winter	304	60	145.331	0.471	24.0	0.5332	0.0000	SURCHARGED
60 minute winter	305	61	145.330	0.488	23.0	26.2693	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	301	1.000	302	21.0	1.196	1.184	0.3676
15 minute summer	302	1.001	303	43.3	1.179	0.931	1.6925
60 minute winter	303	1.002	304	24.0	0.730	0.567	0.0932
60 minute winter	304	1.003	305	23.0	1.243	0.543	0.1034
60 minute winter	305	Infiltration		2.7			

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	Cover Level (m)	Depth (m)
1	0.009	146.250	0.400

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	240	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	45	0	0

Node 1 Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.31000	Invert Level (m)	145.850	Depth (m)	0.400
Side Inf Coefficient (m/hr)	0.31000	Time to half empty (mins)	17	Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	3.500	Number Required	1
Porosity	0.95	Pit Length (m)	3.000		

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	1	56	146.223	0.373	3.7	3.7243	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)
60 minute winter	1	Infiltration	0.7

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	Cover Level (m)	Depth (m)
1	0.009	146.700	0.800

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	240	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	45	0	0

Node 1 Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.38800	Invert Level (m)	145.900	Depth (m)	0.800
Side Inf Coefficient (m/hr)	0.38800	Time to half empty (mins)	50	Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	1.500	Number Required	1
Porosity	0.95	Pit Length (m)	3.500		

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	1	56	146.659	0.759	3.7	3.7847	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)
60 minute winter	1	Infiltration	0.7

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	Cover Level (m)	Depth (m)
1	0.009	147.000	0.800

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	240	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	45	0	0

Node 1 Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.20700	Invert Level (m)	146.200	Depth (m)	0.800
Side Inf Coefficient (m/hr)	0.20700	Time to half empty (mins)	99	Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	2.000	Number Required	1
Porosity	0.95	Pit Length (m)	3.500		

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute winter	1	98	146.867	0.667	2.2	4.4326	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)
120 minute winter	1	Infiltration	0.4

Appendix F: Simple Pollution Index

SIMPLE INDEX APPROACH: TOOL



HMRW shall not be liable for any direct or indirect damage claim, loss, cost, expense or liability however arising out of the use or impossibility to use the tool, even when HMRW has been informed of the possibility of the same. The user hereby releases HMRW from and against any damage claim, loss, expense or liability resulting from any action taken against HMRW that is related in any way to the use of the tool or any reliance made in respect of the output of such use by any person whatsoever. HMRW does not guarantee that the tool's functions meet the requirements of any person, nor that the tool is free from errors.

- The steps set out in the tool should be applied for each inflow or 'runoff area' (ie each impermeable surface area separately discharging to a SuDS component).
- The supporting 'Design Conditions' stated by the tool must be fully considered and implemented in all cases.
- The process that is automated in this tool is described in the SuDS Manual, Chapter 26 (Section 26.7)
- Relevant design examples are included in the SuDS Manual Appendix C.
- Each of the steps below are part of the process set out in the flowchart on Sheet 3.
- Sheet 4 summarises the selections made below and indicates the acceptability of the proposed SuDS components.
- Interception should be delivered for all upstream impermeable areas as part of the strategy for water quantity and quality control for the site. This is required in order to deliver both of the water quality criteria set out in Chapter 4 of the SuDS Manual

DROP DOWN LIST	RELEVANT INPUTS NEED TO BE SELECTED FROM THESE LISTS, FOR EACH STEP
USER ENTRY	USER ENTRY CELLS ARE ONLY REQUIRED WHERE INDICATED BY THE TOOL

STEP 1: Determine the Pollution Hazard Index for the runoff area discharging to the proposed SuDS scheme

This step requires the user to select the appropriate land use type for the area from which the runoff is occurring

If the land use varies across the 'runoff area', either:

- use the land use type with the highest Pollution Hazard Index
- apply the approach for each of the land use types to determine whether the proposed SuDS design is sufficient for all. If it is not, consider collecting more hazardous runoff separately and providing additional treatment

If the generic land use types suggested are not applicable, select 'Other' and enter a description of the land use of the runoff area and agreed user defined indices in the row below the drop down lists.

Runoff Area Land Use Description		Hazard Level	Pollution Hazard Indices			DESIGN CONDITIONS	
			Total Suspended	Metals	Hydrocarbons	1	2
Select land use type from the drop down list (or 'Other' if none applicable)							
Individual driveway		Low	0.5	0.4	0.4		
If the generic land use types in the drop down list above are not applicable, select 'Other' and enter a description of the land use of the runoff area and agreed user defined indices in this row							
Landuse Pollution Hazard Index		Low	0.5	0.4	0.4		

STEP 2A: Determine the Pollution Mitigation Index for the proposed SuDS components

This step requires the user to select the proposed SuDS components that will be used to treat runoff - before it is discharged to a receiving surface waterbody or downstream infiltration component

If the runoff is discharged directly to an infiltration component, without upstream treatment, select 'None' for each of the 3 SuDS components and move to Step 2B

This step should be applied to evaluate the water quality protection provided by proposed SuDS components for discharges to receiving surface waters or downstream infiltration components (note: in England and Wales this will include components that allow any amount of infiltration, however small, even where infiltration is not specifically accounted for in the design)

If you have fewer than 3 components, select 'None' for the components that are not required

If the proposed component is bespoke and/or a proprietary treatment product and not generally described by the suggested components, then 'Proprietary treatment system' or 'User defined index' should be selected and a description of the component and agreed user defined indices should be entered in the row below the drop down lists

SuDS Component Description		Pollution Mitigation Indices			DESIGN CONDITIONS		
		Suspended Solids	Metals	Hydrocarbons			
Select SuDS Component 1 (i.e. the upstream SuDS component) from the drop down list					1	2	3
Permeable pavement (where the pavement is not designed as an infiltration component)		0.7	0.6	0.7	SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B		
Select SuDS Component 2 (i.e. the second SuDS component in a series) from the drop down list:							
None		0	0	0			
Select SuDS Component 3 (i.e. the third SuDS component in a series) from the drop down list:							
None		0	0	0			
If the proposed SuDS components are bespoke/proprietary and/or the generic indices above are not considered appropriate, select "Proprietary treatment system" or "User defined index" and enter component descriptions and agreed user defined indices in these rows:							
Aggregated Surface Water Pollution Mitigation Index		0.7	0.6	0.7	Note: If the total aggregated mitigation index is > 1 (which is not a realistic outcome), then the outcome is fixed at "<0.50". In this scenario, the proposed components are likely to have a very high mitigation potential for reducing pollutant levels in the runoff and should be sufficient for any proposed land use (note: where risk assessment is required, this outcome would need more detailed verification)		

Is the runoff now discharged to an infiltration component?

Yes ? [Go to Step 2B](#)
No ? [Go to Step 2C](#)

STEP 2B: Determine the Pollution Mitigation Index for the proposed Groundwater Protection

This step requires the user to select the type of groundwater protection that is either part of the SuDS component or that lies between the component and the groundwater

This step should be applied where a SuDS component is specifically designed to infiltrate runoff (note: in England and Wales this will include components that allow any amount of infiltration, however small, even where infiltration is not specifically accounted for in the design)

'Groundwater protection' describes the proposed depth of soil or other material through which runoff will flow between the runoff surface and the underlying groundwater.

Where the discharge is to surface waters and not to groundwater need not be considered, select 'None'

If the proposed groundwater protection is bespoke and/or a proprietary product and not generally described by the suggested measures, then a description of the protection and agreed user defined indices should be entered in the row below the drop down list

		Total Suspended	Pollution Mitigation Indices		DESIGN CONDITIONS			
			Metals	Hydrocarbons				
Select type of groundwater protection from the drop down list					1	2	3	4
None								
If the proposed groundwater protection is bespoke/proprietary and/or the generic indices above are not considered appropriate, select 'Proprietary product' or 'User defined index' and enter a description of the protection and agreed user defined indices in this row:								
Groundwater Protection Pollution Mitigation Index		0	0	0				

STEP 2C: Determine the Combined Pollution Mitigation Indices for the Runoff Area

This is an automatic step which combines the proposed SuDS Pollution Mitigation Indices with any Groundwater Protection Pollution Mitigation Indices

		Combined Pollution Mitigation Indices		
		Total Suspended	Metals	Hydrocarbons
Combined Pollution Mitigation Indices for the Runoff Area		0.7	0.6	0.7

Note: If the total aggregated mitigation index is > 1 (which is not a realistic outcome), then the outcome is fixed at "<0.50". In this scenario, the proposed components are likely to have a very high mitigation potential for reducing pollutant levels in the runoff and should be sufficient for any proposed land use (note: where risk assessment is required, this outcome would need more detailed verification)

STEP 2D: Determine Sufficiency of Pollution Mitigation Indices for Selected SuDS Components

This is an automatic step which compares the Combined Pollution Mitigation Indices with the Land Use Hazard Indices, to determine whether the proposed components are sufficient to manage each pollutant category type

When the combined mitigation index exceeds the land use pollution hazard index, then the proposed components are considered sufficient in providing pollution risk mitigation.

In England and Wales, where the discharge is to protected surface waters or groundwater, an additional treatment component (in over and above that required for standard discharges), or other equivalent protection, is required that provides environmental protection in the event of an unexpected pollution event or poor system performance. Protected surface waters are those designated for drinking water abstraction. In England and Wales, protected groundwater resources are defined as Source Protection Zone 1. In Northern Ireland, a more precautionary approach may be required and this should be checked with the environmental regulator on a site by site basis.

		Sufficiency of Pollution Mitigation Indices			DESIGN CONDITIONS
		Total Suspended	Metals	Hydrocarbons	
					1
Sufficient		Sufficient	Sufficient	Sufficient	

Note: In order to meet both Water Quality criteria set out in the SuDS Manual (Chapter 4), Interception should be delivered for all impermeable areas wherever possible. Interception delivery and treatment may be met by the same components, but Interception requires separate evaluation.

Reference to local planning documents should also be made to identify any additional protection required for sites due to habitat conservation (see Chapter 7 The SuDS design process). The implications of developments on or within close proximity to sensitive areas with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered via consultation with relevant conservation bodies (such as Natural England)