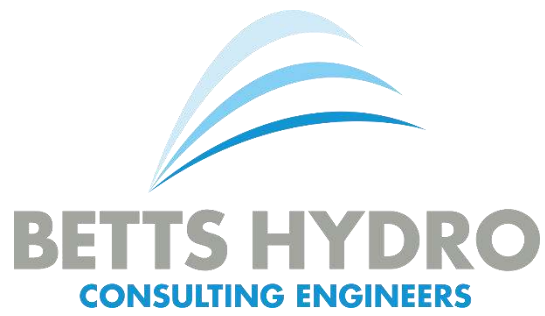




LAND OFF GREENVALE BAMFORD

DRAINAGE MANAGEMENT STRATEGY

For

Wain Homes North West
Kelburn Court
Daten Park
Warrington
WA3 6UT



FEBRUARY 2026

This page has been intentionally left blank.

**LAND OFF GREENVALE
BAMFORD
DRAINAGE MANAGEMENT STRATEGY**

Document Tracking Sheet

Document Reference: HYD883_GREENVALE.BAMFORD_DMS
Revision: 2.2
Date of Issue: 19/02/2026
Report Status: FINAL

Prepared by:



Hannah Buchanan BSc (Hons) MSc GradCIWEM
Flood Risk Analyst

Checked by:



Kirsty Halliday BSc (Hons) MCIWEM
Associate

Authorised by:



Richard Nicholas BEng (Hons) MSc MBA GMICE MCIWEM
Director

Revision History:

Rev:	Date:	Status:	Prepared by:	Checked by:	Issued by:
2.1	19/02/26	FINAL	HW	HB	HW
2.1	12/12/25	FINAL	BE	HB	HB
2.0	10/04/25	FINAL	HB/SM	KH	HB
1.0	01/04/25	FINAL	HB/SM	KH	HB
0	02/12/24	DRAFT	HB	KH	HB



Old Marsh Farm Barns
Welsh Road, Sealand
Flintshire CH5 2LY
Telephone: 01244 289 041

This page has been intentionally left blank.

EXECUTIVE SUMMARY

This Drainage Management Strategy was commissioned by Wain Homes North West, referred to hereafter as 'the client'. This report has been prepared to support an application for the construction of 45no. residential dwellings on land located off Greenvale in Bamford, Rochdale.

This assessment has been completed in accordance with National Planning Policy Framework and Planning Practice Guidance to consider the most appropriate sustainable drainage options for the proposals in line with the Non-Statutory SuDS Standards. The surface water run-off management options have been assessed in accordance with the sustainable drainage hierarchy.

It is understood that at present, the site drains in south-westerly direction with the existing levels, where it ponds in a low-lying area offsite further south-west. Based on the ground conditions identified by the published online datasets and the soil classification; it is understood that infiltration is unlikely to offer a means of managing surface water run-off generated by the site.

The next method is to discharge surface water run-off to a nearby watercourse/ waterbody. The nearest watercourse is Naden Brook (Main River), which is located 500m west of the site. Given the proximity and surrounding topography, this watercourse does not offer a viable drainage option.

Should infiltration not offer a full practical solution at the site, then the alternative is to discharge into the public surface water sewer (300mm dia.) which crosses the site. The proposals are to divert the public surface water sewer through the site. The proposed diversion route is indicated within the Drainage Appraisal prepared by the client.

The proposals are to utilise permeable surfaces across the site where practical, even if a full infiltration solution is not viable. The permeable surfaces will be lined with a connection to the proposed main drainage systems where infiltration rates are not suitable. A below ground pipe network will be utilised for conveyance, and the required onsite attenuation will be provided above ground via 2no. attenuation basins. The specific means are to be determined during the detailed design stage.

In accordance with the SuDS Manual (CIRIA) and the Non-Technical Standards for SuDS (March 2015) all sites should endeavour to achieve as close to pre-development greenfield rates as is viable. Based on the development area, the pre-development greenfield rate (QBar) is calculated to be 21.0/s (based on 7.8l/s/ha). United Utilities have confirmed a lower discharge rate of 16.9l/s for surface water being discharged into the sewer system.

In terms of foul water management due to existing ground levels within the site, it will be necessary to allow for a pumped drainage solution on this site. Any offsite asset routing works will also need to be considered in terms of consents with the relevant offsite landowners (Highways Authority).

This Drainage Management Strategy has been prepared in consultation with the relevant interested parties. The report is commensurate with the scale and nature of the development and the development is appropriate in accordance with the Non-Statutory Standards.

This page has been intentionally left blank.

CONTENTS

Document Tracking Sheet	iii
EXECUTIVE SUMMARY	v
CONTENTS	vii
Figures & Tables	vii
Specialist Software	viii
Abbreviations & Acronyms	ix
1.0 INTRODUCTION	10
1.1 Planning Policy Context	10
1.2 Site Context	10
1.3 Consultation	10
2.0 EXISTING SITE LOCATION	11
2.1 Location	11
2.2 Existing and Historical Land Use	11
2.3 Topography	12
2.4 Site Walkover	12
3.0 DEVELOPMENT PROPOSALS	13
3.1 Nature of the Development	13
4.0 SURFACE WATER MANAGEMENT	15
4.1 Pre-Development Surface Water Run-off	15
4.2 Post Development Surface Water Run-Off	15
4.3 Sustainable Drainage Systems (SuDS)	16
4.4 Methods of Surface Water Management	17
4.5 Discharge via Infiltration	17
4.6 Discharge to Watercourse/Waterbody	17
4.7 Discharge to the Public Sewer Network	18
<i>Proposed Discharge Rates</i>	19
4.8 Climate Change	20
5.0 FOUL WATER MANAGEMENT	22
6.0 SUMMARY AND CONCLUSIONS	23
7.0 RECOMMENDATIONS	24
BIBLIOGRAPHY & REFERENCES	25
Web-based References	25

Figures & Tables

Figure 1: Existing Features Plan (Google Maps, 2024)	11
Figure 2: Proposed Site Layout (Wain Homes, 2026)	13

Table 1: Pre-Development Surface Water Run-Off Rates (Betts Hydro, 2025)	15
Table 2: Post-Development Un-Restricted Run-Off Rates (Betts Hydro, 2025)	15
Figure 3: SuDS Photographs (SusDrain, 2012)	16
Figure 4: Drainage Appraisal (LDE, 2025)	19
* This drawing is not a drainage 'design' it is a preliminary drainage plan.	19
Table 3: Estimated Stormwater Storage Requirements (Betts Hydro, 2025)	20
Table 4: Change to Peak Rainfall Compared to 1981-2000 Baseline (Environment Agency, 2025)	21
APPENDIX A: NPPF + PPG EXTRACTS	
APPENDIX B: EA INFORMATION & CORRESPONDENCE	
APPENDIX C: UU CORRESPONDENCE.....	
APPENDIX D: LPA/LLFA CORRESPONDENCE	
APPENDIX E: LOCATION PLAN	
APPENDIX F: TOPOGRAPHICAL SURVEY	
APPENDIX G: SITE PHOTOGRAPHS.....	
APPENDIX H: PROPOSED SITE LAYOUT	
APPENDIX I: SURFACE WATER RUN-OFF CALCULATIONS	
APPENDIX J: DRAINAGE APPRAISAL	
APPENDIX K: QUICK STORAGE ESTIMATES	
APPENDIX L: SUDS EXAMPLES	
APPENDIX M: NOTES OF LIMITATIONS	

Specialist Software

-  MicroDrainage WinDES (v.2020.1.3) – Calculation of Greenfield run-off volumes, rates of rainfall and stormwater storage estimates.

Abbreviations & Acronyms

BGS	British Geological Survey
DMS	Drainage Management Strategy
EA	Environment Agency
FEH	Flood Estimation Handbook
LLFA	Lead Local Flood Authority
LPA	Local Planning Authority
QBAR	Mean Annual Flood
NPPF	National Planning Policy Framework
PPG	Planning Practice Guidance
QSE	Quick Storage Estimate
RMBC	Rochdale Metropolitan Borough Council
SuDS	Sustainable Drainage Systems
UU	United Utilities

1.0 INTRODUCTION

1.1 Planning Policy Context

- 1.1.1 All forms of flooding and their impact on the natural and built environment are material planning considerations. The National Planning Policy Framework (NPPF) sets out the Government's objectives for the planning system, and how planning should facilitate and promote sustainable patterns of development, avoiding flood risk and accommodating the impacts of climate change.
- 1.1.2 Government policy with respect to development in flood risk areas is contained within the NPPF and the supporting Planning Practice Guidance (PPG) (refer to extracts in **Appendix A**). This Drainage Management Strategy (DMS) has been completed in accordance with NPPF/PPG to consider the most appropriate sustainable surface water and foul water drainage options for the proposals.
- 1.1.3 The purpose of this report is to ensure that there is no increased flood risk because of the development in line with the NPPF guidance. The use of Sustainable Drainage Systems (SuDS) to manage surface water run-off has also been considered as part of the assessment in line with the Non-Statutory Standards.

1.2 Site Context

- 1.2.1 This DMS has been prepared to support a planning application for the construction of 45no. residential dwellings on land located south of Greenvale in Bamford, Rochdale. The proposals will be complete with access, car parking, external works, boundary fencing, external services, and drainage.

1.3 Consultation

- 1.3.1 The preparation of this report has been undertaken in consultation with the Environment Agency (EA), United Utilities (UU), and Rochdale Metropolitan Borough Council (RMBC). The consultation responses can be seen in **Appendix B, C, and D** respectively.

2.0 EXISTING SITE LOCATION

2.1 Location

- 2.1.1 The site is located Greenvale in Bamford, Rochdale. The nearest Ordnance Survey National Grid Reference is E: 386034, N: 413432 and the nearest postcode is OL11 5QL (see the Location Plan in **Appendix E**). The whole site covers 2.695ha and is edged in red in **Figure 1**.
- 2.1.2 In terms of the surrounding land-use, the site is bound to the north by Greenvale, and to the north-west by a culdesac off Norford Way. The site is surrounded by residential development to the north, and by undeveloped agricultural land to the south, west and east. The closest watercourse to the site is Naden Brook (Main River), located 480m west of the site.

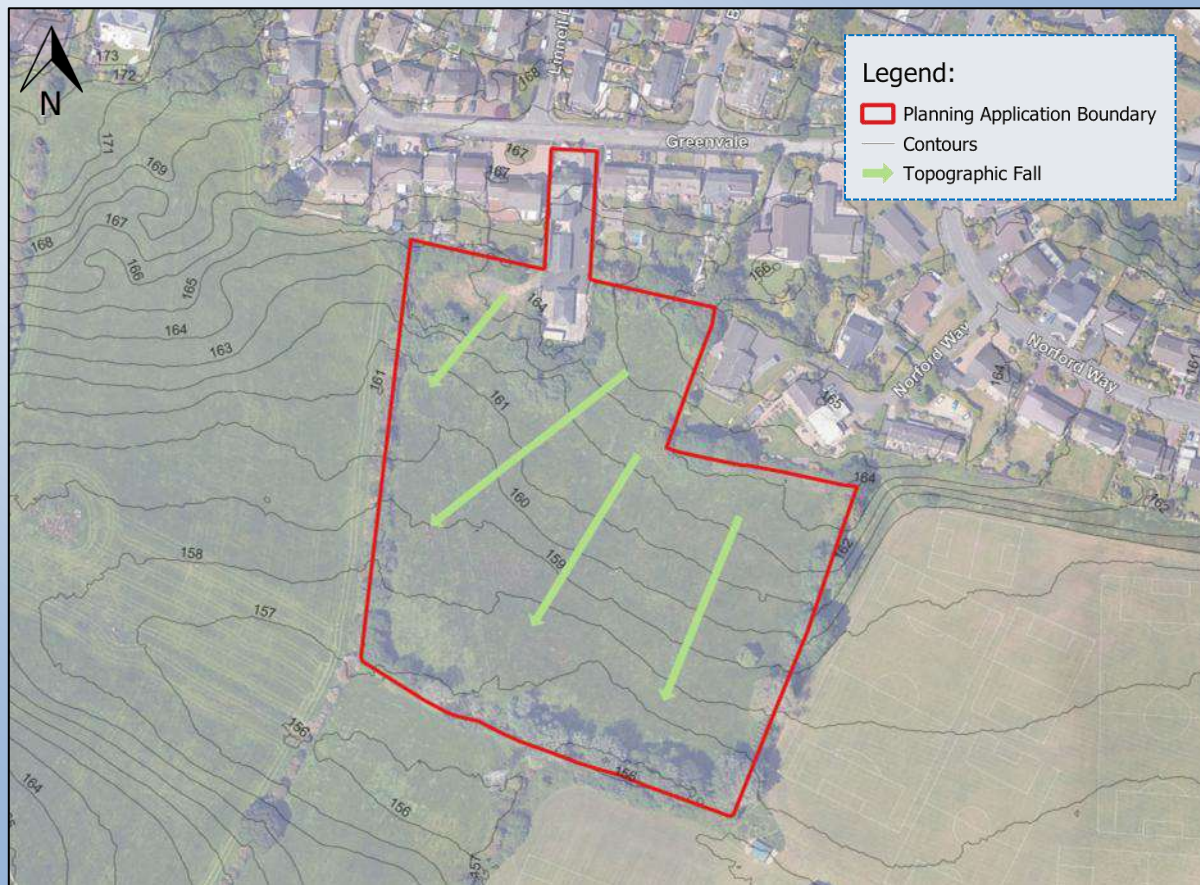


Figure 1: Existing Features Plan (Google Maps, 2024)

2.2 Existing and Historical Land Use

- 2.2.1 The site is currently undeveloped agricultural land, and comprises of low-density vegetation, with larger shrubs and trees located along the field boundaries. No other historical land uses have been identified during the preparation of this report.

2.3 Topography

- 2.3.1 A topographic survey has been undertaken and is included within **Appendix F** for completeness. The topographic survey identifies that the site falls from a high point of 167.084mAOD in the north, down to a level of 156.215mAOD in the south of the site. The arrows shown in **Figure 1** indicate the general fall across the site.

2.4 Site Walkover

- 2.4.1 A site walkover was also undertaken by Betts Hydro in November 2024. This visit was to confirm the general topography and to understand the natural drainage regimes serving the site. The site photographs from the visit are included in **Appendix G**.

3.0 DEVELOPMENT PROPOSALS

3.1 Nature of the Development

- 3.1.1 This DMS has been prepared to support a planning application for the construction of 45no. residential dwellings on land located off Greenvale in Bamford, Rochdale. The proposals will be complete with access, footpaths, car parking, external works, landscaping, boundary fencing, and drainage. The planning layout is included within **Figure 2** below (see full plan in **Appendix H**).



Figure 2: Proposed Site Layout (Wain Homes, 2026)

- 3.1.2 The total site covers 2.695ha and is 100% permeable at present. Based on the above planning layout, the post-development impermeable areas will likely increase to approximately 55% of the development area, which will equate to 1.482 ha. A further 10% has been added for the allowance of urban creep, which equates to a post-development impermeable area of 1.752ha.
- 3.1.3 Betterment in the form of permeable surfaces opposed to external hardstanding should also be considered where feasible to reduce the surface water run-off. Opportunities to provide soft landscaping on the site would provide added benefits to water quality and ecology. National and local policy identifies that SUDS should be incorporated into new development where feasible to manage surface water run-off generated by new development.
- 3.1.4 There is a requirement to provide maintenance offsets from the public sewers, where they are located onsite. The specific offset needs to be discussed with UU as they vary depending on the size of the infrastructure and the depth at which it is laid. The proposals are to divert the public surface water sewer which crosses the site (subject to consent and agreement from UU).

4.0 SURFACE WATER MANAGEMENT

4.1 Pre-Development Surface Water Run-off

- 4.1.1 The total site covers 2.695ha and is 100% permeable at present. The post-development impermeable areas will likely increase to approximately 55% of the development area, which will equate to 1.482ha. It is understood that at present the site drains with the existing topography in a south-westerly direction where it ponds in a low-lying area offsite to the south-west.
- 4.1.2 The peak rates and volumes of run-off generated by the site have been calculated for the peak events shown in **Table 1**. The surface water run-off rates have been calculated using the FEH Method. The full calculations in **Appendix I** are based on an area of 1ha, and these rates and volumes are calculated pro-rata for the site area of 2.695ha.

Dev. Area	Run-Off Rates				Run-Off Volumes	
	1 In 1yr	1 In 30yr	1 In 100yr	QBar	1 In 1yr	1 In 100yr
2.695ha	19.7l/s	38.5l/s	47.2l/s	21.0l/s	267.1cu.m	715.0cu.m

Table 1: Pre-Development Surface Water Run-Off Rates (Betts Hydro, 2025)

4.2 Post Development Surface Water Run-Off

- 4.2.1 Due to the nature of the development proposals, it is understood that the impermeable areas of the site will increase. We have estimated that the post-development impermeable areas will equate to 55% of the development area (this equates to 1.482ha).
- 4.2.2 In accordance with local and national guidance, an additional 10% allowance has been added to the impermeable area to account for urban creep, totalling 65% (equating to 1.752ha). These proposed impermeable areas will, however, be refined as part of the drainage design work based on the specific contributing areas for the main drainage and plot drainage networks. The unrestricted post-development run-off rates generated by this assumed impermeable area are detailed in **Table 2**.

Proposed Imp. Area (+ 10% UC)	Run-Off Rates			Run-Off Volumes	
	1 In 1yr	1 In 30yr	1 In 100yr + 45% CC	1 in 1yr	1 in 100yr
1.752ha	86.6l/s	161.0l/s	300.5l/s	462.8cu.m	1111.5cu.m

Table 2: Post-Development Un-Restricted Run-Off Rates (Betts Hydro, 2025)

- 4.2.3 In accordance with national and local planning policies it is necessary to restrict surface water run-off rates where at all practical to mimic a pre-development greenfield situation. The pre-development rates in this case are detailed in **Table 1**. Full details of the proposed rates of discharge can be found in section 4.6 subsequently.

4.3 Sustainable Drainage Systems (SuDS)

- 4.3.1 In accordance with national and local planning policy, including the Non-Statutory Technical Standards for Sustainable Drainage Systems (March 2015) and the SuDS Manual (CIRIA 753), peak surface water discharge rates from new development should be appropriately managed and where possible reduced. To manage surface water run-off policy shows that preference should always be given to Sustainable Drainage Systems (SuDS) over the traditional methods wherever possible and practical.
- 4.3.2 SuDS can (if designed and situated appropriately) address the four key sustainability objectives embedded in planning policy including providing space for water (water quantity), improving water quality and biodiversity, along with providing valuable amenity/recreational space within new development sites. These benefits of SuDS depend on the type of features being proposed, some typical examples relevant to this nature of development are illustrated in **Figure 3**.



Figure 3: SuDS Photographs (SusDrain, 2012)

- 4.3.3 Whilst opportunities should also be taken to provide soft landscaping where at all possible on site to assist in minimising surface water run-off. Promoting SuDS to deal with surface water at the source, will limit the required attenuation and in turn reduce the volume of surface water in the nearby watercourse and sewer infrastructure. In accordance with the Non-Statutory Technical Standards for Sustainable Drainage Systems and the SuDS Manual (CIRIA 753), the proposed SuDS features are discussed below in terms of hierarchy of use.
- 4.3.4 Due to the levels along the southern boundary, It is proposed that permeable surfacing and bio-filtration techniques be included within the plots along this boundary, where practical, to provide opportunity for natural uptake but also added benefits to the water quality of run-off generated in these areas. It is also recommended to incorporate these features across the wider site where feasible. If infiltration is not viable, then a connection into the main drainage systems is needed, but the presence of the permeable surfaces will allow the first 5mm of rainfall to be dealt with at source as identified in the SuDS Manual (CIRIA 753).
- 4.3.5 There may also be scope to incorporate rainwater collection butts and/or rain garden style raised planters (as illustrated in **Figure 3**) to provide added water quality, amenity,

and biodiversity benefits. In terms of stormwater storage, attenuation will be provided above ground via 2no. attenuation basins.

- 4.3.6 Detailed design should confirm suitability for incorporation of SuDS following more detailed analysis of levels, ground conditions and attenuation needs. If designed appropriately SuDS features such as those proposed can aid with attenuation and provide added benefits in terms of water quality, biodiversity, and amenity value.

4.4 Methods of Surface Water Management

- 4.4.1 There are three methods that have been reviewed for the management and discharge of surface water. These may be applied individually or collectively to form a complete strategy and should be applied in the order of priority listed below:

- Discharge via infiltration
- Discharge to watercourse
- Discharge to the public sewerage system

4.5 Discharge via Infiltration

- 4.5.1 Any impermeable areas that can drain to soakaway or an alternative method of infiltration would significantly improve the sustainability of any new surface water system. The published online datasets have been reviewed to consider how favourable the underlying strata is to support a potential infiltration-based solution at the site.
- 4.5.2 The Cranfield Soil and AgriFood Institute (CSAI), Soilscape viewer identifies the soils to be 'slowly permeable wet very acid upland soils with a peaty surface'. The British Geology Survey (BGS) mapping data indicates that the bedrock geology consists of Old Lawrence Rock (sandstone), with superficial deposits of Devensian Till. The underlying strata (noted above) appears to suggest that underlying permeability is medium to high, and an SPR value of 0.367 suggests that the underlying soils have a low/medium permeability (0.1 is very high and 0.5 is very low).
- 4.5.3 To confirm whether infiltration rates at the site would promote the use of permeable surfacing and other infiltration solutions, it is recommended that Soakaway Testing (to BRE365) is undertaken at an early stage. Based on the ground conditions identified by the published datasets, infiltration is unlikely to offer a fully viable drainage management solution for the wider proposals.
- 4.5.4 The proposals are still to utilise permeable surfaces in external areas where an engineerable solution can be achieved, even if a full infiltration solution is not viable. The permeable surfaces themselves will be lined with a connection to the proposed main drainage serving the new development. The presence of the permeable surfaces will still allow the first 5mm of rainfall to be dealt with at source as identified in the SuDS Manual (CIRIA 753).

4.6 Discharge to Watercourse/Waterbody

- 4.6.1 The next method is to discharge surface water run-off to a nearby watercourse/waterbody. The nearest watercourse is Naden Brook (Main River), which is located

500m west of the site. Given the proximity and surrounding topography, this watercourse does not offer a viable drainage option. Should infiltration not offer a full drainage solution for the site, then the fallback option would be to discharge to public surface water sewer, subject to formal consents and further design work to confirm constraints for this approach.

4.7 Discharge to the Public Sewer Network

- 4.7.1 UU sewer records have identified the nearest public sewer suitable for a surface water connection crosses the site (see sewer records in **Appendix C**). Should infiltration not offer a full practical solution at the site, then the alternative is to discharge into the public surface water sewer (300mm dia.) which crosses the site as illustrated in **Figure 4** (see full plan in **Appendix J**).
- 4.7.2 Given the nature of the development, the proposals are to divert the public surface water sewer (subject to consent from United Utilities) and re-route this through the development proposals in a location suitable to allow future development to take place. Discussion with UU will need to be undertaken for agreement, and to ensure there are no additional requirements in terms of diverting the public surface water sewer network.
- 4.7.3 The proposals are still to utilise permeable surfaces across the site where practical, even if a full infiltration solution is not viable. The permeable surfaces will be lined with a connection to the proposed main drainage systems where infiltration rates are not suitable. The presence of the permeable surfaces will still allow the first 5mm of rainfall to be dealt with at source in accordance with the SuDS Manual (CIRIA 753).
- 4.7.4 Detailed design will need to be carried out to confirm whether a site wide gravity solution can be achieved, at this time this is anticipated to be the case. It is understood that no offsite works will be required to form a connection to the public surface water sewer onsite.
- 4.7.5 Consent and formal agreement will be required from UU for any works to the public sewers crossing the site. Early discussion will be needed to identify any additional capacity constraints. A pre-development enquiry has been submitted to United Utilities; however, a response is currently outstanding (see correspondence in **Appendix C**).

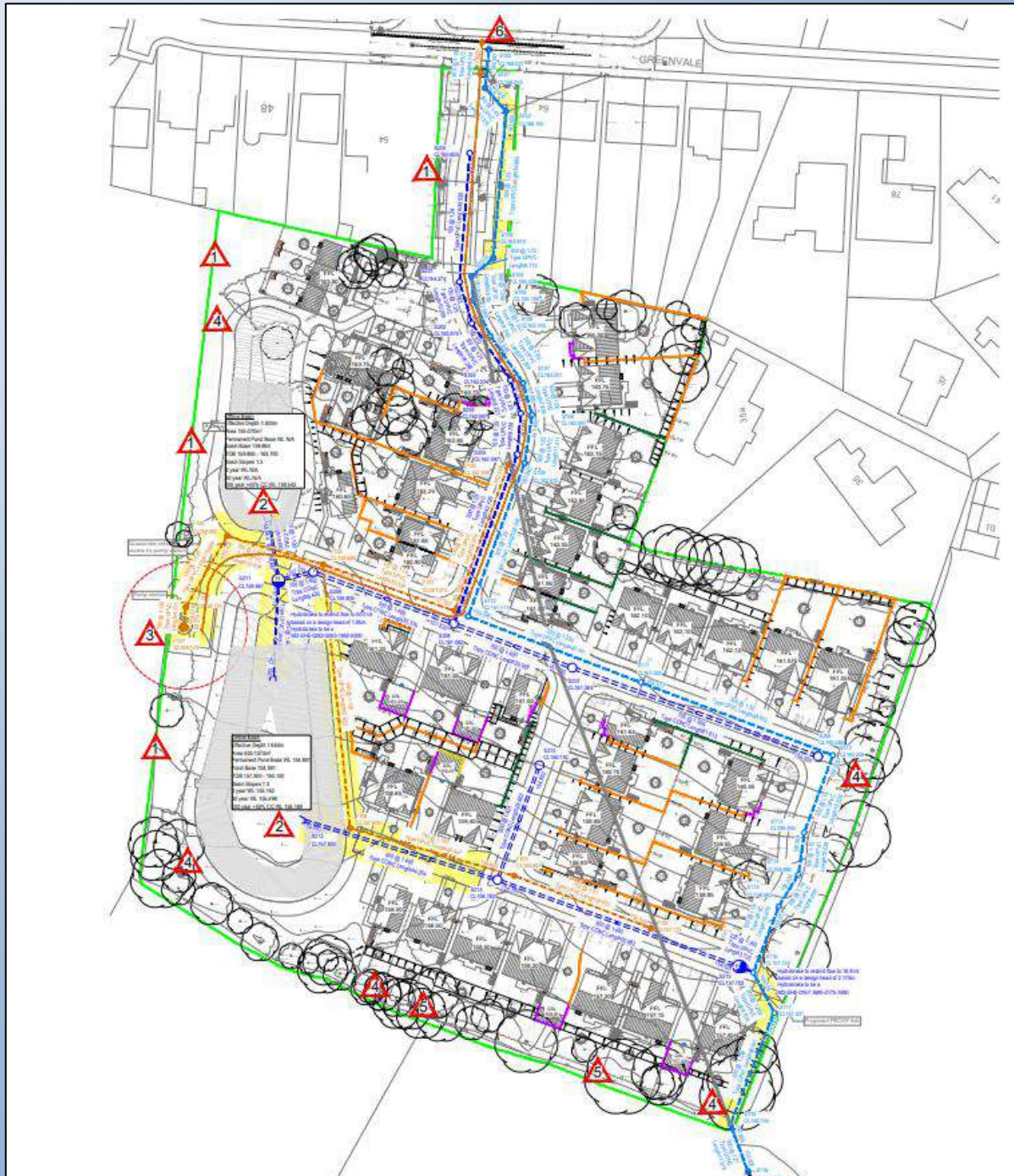


Figure 4: Drainage Appraisal (LDE, 2025)

* This drawing is not a drainage 'design' it is a preliminary drainage plan.

Proposed Discharge Rates

- 4.7.6 In accordance with the SuDS Manual (CIRIA) and the Non-Technical Standards for SuDS (March 2015) all sites should endeavour to achieve as close to pre-development greenfield rates as is viable. Based on the development area, the pre-development greenfield rate (QBar) is calculated to be 21.0l/s (based on 7.8l/s/ha). United Utilities have agreed a rate of 16.9l/s (see correspondence in **Appendix C**).

- 4.7.7 Restricting the rate of discharge will generate a requirement to provide onsite stormwater storage for the extreme rainfall events. The stormwater storage figures quoted in **Table 3 (Appendix K)** are estimates only based on a maximum discharge rate of 16.9l/s. This discharge rate has been agreed with UU and correspondence can be seen in **Appendix C**. Detailed design in due course will determine with accuracy the attenuation requirements considering engineering constraints and hydraulics.

Prop. Imp. Area (1.113ha)	1 In 1yr	1 In 30yr	1 In 100yr + 45% CC
Restricted Run-Off Rate	16.9l/s	16.9l/s	16.9l/s
Est. Stormwater Storage Volume	208cu.m-428cu.m	560cu.m-913cu.m	1310cu.m-2236cu.m

Table 3: Estimated Stormwater Storage Requirements (Betts Hydro, 2025)

- 4.6.8 The surface water scheme for the development will need to be designed to cater for the surface water run-off generated in the events up to and including the 1 in 100yr return period event with 45% allowance for climate change. A below ground pipe network will be utilised for conveyance, and the required onsite attenuation will be provided above ground via 2no. attenuation basins. The specific means are to be determined during the detailed design stage.

4.8 Climate Change

- 4.8.1 There are indications that the climate in the UK is changing significantly, and it is widely believed that the nature of climate change will vary greatly by region. Expert opinion indicates the likelihood that future climate change would produce more frequent short duration and high intensity rainfall events with the addition of more frequent periods of long duration rainfall.
- 4.8.2 It is believed that the impact of climate change means there is likely to be a long-term increase in the average sea levels, with an expectation that sea levels will rise gradually. An increase in flood water levels means that future flooding events will occur more frequently and will have a greater impact.
- 4.8.3 In light of the future uncertainties Climate Change should be accounted for within the design of all new developments. Climate change factors have been considered and any increase in the level of flood risk (to the site) from climate change is likely to be related to the increase in rainfall intensity and duration and its impact upon the surface water drainage system.
- 4.8.4 In accordance with the Irwell Management Catchment peak rainfall allowances, the upper end allowance (**Table 4**) for the 2070's has been utilised (based on 100yr design life).

PROJECTIONS	TOTAL POTENTIAL CHANGE ANTICIPATED FOR THE 2070'S
Upper End Allowance	45%
Central Allowance	30%

Table 4: Change to Peak Rainfall Compared to 1981-2000 Baseline (Environment Agency, 2025)

5.0 FOUL WATER MANAGEMENT

- 5.1 UU sewer records have identified a public foul water sewer within Greenvale to the north of the site (sewer records included in **Appendix C**). The proposals are to discharge foul water generated by the development to the public foul water sewer network within Greenvale to the north of the site, as shown previously in **Figure 4**.
- 5.2 Given the understanding of current ground levels and the location of the neighbouring public foul water compatible network, a pumped solution will likely be required.
- 5.3 Based on the proposals for the construction of 45no. residential dwellings, the approximate peak foul water flows generated by the site have been calculated at 2.1l/s, based on 4000 litres per dwelling per 24 hours as per the guidance contained within Sewers for Adoption.
- 5.4 Detailed design will need to confirm the exact point of outfall, although as noted a pumped solution and the associated onsite infrastructure (pumping station and offsets) will need to be allowed for within the planning proposals.
- 5.5 Any offsite asset routing works will need to be considered in terms of consents with the relevant offsite landowners (Highways Authority). Furthermore, design criteria (offsets) for both United Utilities and the LLFA should be considered when locating any pumping station infrastructure within the wider site extents.
- 5.6 Consent for work to the public sewer network will be required from UU at an early stage, this includes consent for the proposed rates of discharge and the points of connection. A pre-development enquiry with UU has been undertaken; however, a response is currently outstanding (see correspondence in **Appendix C**).

6.0 SUMMARY AND CONCLUSIONS

- 6.1 The key focus of this assessment is on the sustainable management of surface water run-off to ensure no increased flood risk results from the development proposals. The surface water run-off management options have been assessed in accordance with the sustainable drainage hierarchy.
- 6.2 It is understood that at present, the site drains in south-westerly direction with the existing levels, where it ponds in a low-lying area offsite further south-west. Based on the ground conditions identified by the published online datasets and the soil classification; it is understood that infiltration is unlikely to offer a means of managing surface water run-off generated by the site.
- 6.3 The next method is to discharge surface water run-off to a nearby watercourse/waterbody. The nearest watercourse is Naden Brook (Main River), which is located 500m west of the site. Given the proximity and surrounding topography, this watercourse does not offer a viable drainage option.
- 6.4 Should infiltration not offer a full practical solution at the site, then the alternative is to discharge into the public surface water sewer (300mm dia.) which crosses the site. The proposals are to divert the public surface water sewer through the site. The proposed diversion route is indicated within the Drainage Appraisal prepared by the client.
- 6.5 The proposals are to utilise permeable surfaces across the site where practical, even if a full infiltration solution is not viable. The permeable surfaces will be lined with a connection to the proposed main drainage systems where infiltration rates are not suitable. The presence of the permeable surfaces will still allow the first 5mm of rainfall to be dealt with at source in accordance with the SuDS Manual (CIRIA 753).
- 6.6 A below ground pipe network will be utilised for conveyance, and the required onsite attenuation will be provided above ground via 2no. attenuation basins. The specific means are to be determined during the detailed design stage.
- 6.7 In accordance with the SuDS Manual (CIRIA) and the Non-Technical Standards for SuDS (March 2015) all sites should endeavour to achieve as close to pre-development greenfield rates as is viable. Based on the development area, the pre-development greenfield rate (QBar) is calculated to be 21.0l/s (based on 7.8l/s/ha). United Utilities have confirmed a lower discharge rate of 16.9l/s, which has been used when calculating stormwater storage estimates.
- 6.8 In terms of foul water management due to existing ground levels within the site, it will be necessary to allow for a pumped drainage solution on this site. Any offsite asset routing works will also need to be considered in terms of consents with the relevant offsite landowners (Highways Authority).
- 6.9 This Drainage Management Strategy has been prepared in consultation with the relevant interested parties. The report is commensurate with the scale and nature of the development and the development is appropriate in accordance with the Non-Statutory Standards.

7.0 RECOMMENDATIONS

- 7.1 To confirm whether infiltration rates at the site would promote the use of permeable surfacing and other infiltration solutions, it is recommended that Soakaway Testing (to BRE365) is undertaken at an early stage.
- 7.2 By keeping the finished floor levels elevated relative to the externals, this should help create an overland flood flow route in the event of a breach or any other source of flooding that could lead to overland flow.
- 7.3 Any overland flows generated by the development must be carefully controlled. Safe avenues directing overland flow away from any existing and proposed buildings are advised.
- 7.4 To minimise the flood risk to the neighbouring properties it is recommended that the surface water run-off generated by the proposals be managed effectively with the peak rates of run-off being restricted to the equivalent of the pre-development situation (with betterment where required).
- 7.5 The proposed onsite surface water drainage system will need to be sized to contain up to and including the 1 in 100yr return period storm event with a 45% allowance for climate change being contained onsite.
- 7.6 Detailed design will need to confirm the exact point of outfall although as noted a pumped solution (and the associated onsite infrastructure) may need to be considered within the planning proposals for foul water.
- 7.7 Any offsite works to accommodate the drainage proposals will need to be discussed with the relevant parties during the detailed design stage.
- 7.8 As with any drainage system, blockages within either the foul or surface water system have the potential to cause flooding or disruption. It is important that should any drainage systems not be offered for adoption to either the Water Company or the Local Authority then an appropriate maintenance regime should be scheduled with a suitably qualified management company for these private drainage systems.
- 7.9 If an extreme rainfall event exceeds the design criteria for the drainage system it is likely that there will be some overland flows that are unable to enter the system, it is important that these potential overland flows are catered for within the proposed development site if the capacity of the drainage system is exceeded.

BIBLIOGRAPHY & REFERENCES

Adapting to Climate Change: Advice for Flood and Coastal Erosion Risk Management Authorities – Environment Agency/DEFRA 2016
CIRIA 522: Sustainable urban drainage systems – design manual for England and Wales (2000).
CIRIA 523: Sustainable urban drainage systems – best practice manual (2001).
CIRIA 609: Sustainable drainage systems. Hydraulic, structural and water quality advice (2004).
CIRIA 624: Development and flood risk – guidance for the construction industry (2004).
CIRIA 635: Designing for Exceedance in urban drainage: Good practice (2006).
CIRIA 644: Building Greener (2007).
CIRIA 753: The SUDS manual (2015).
Flood Risk to People – Phase 2 (FD2321/TR2), DEFRA and the Environment Agency (2006).
Flood estimation for small catchments: Institute of Hydrology Report No.124, NERC (1994).
Flood Estimation Handbook, Centre for Ecology and Hydrology (1999).
Planning Practice Guidance (2022).
Sewers for Adoption 7th Edition, WRc (2012).
Technical Guidance to the National Planning Policy Framework, CLG (2019).

Web-based References

Bingmaps – <http://www.bing.com/Maps/>
British Geological Survey – <http://www.bgs.ac.uk/opengeoscience/home.html>
Chronology of British Hydrological Events – www.dundee.ac.uk/
CIRIA – <http://www.ciria.org/>
Cranfield University – <http://www.landis.org.uk/soilscapes/>
Environment Agency – www.environment-agency.gov.uk/
FloodProBE – <http://www.floodprobe.eu/>
Flood Forum – <http://www.floodforum.org.uk/>
Google Maps – <http://maps.google.co.uk/>
Rainfall Climate Change Allowance - <https://environment.data.gov.uk/hydrology/climate-change-allowances/rainfall>
Streetmap – <http://www.streetmap.co.uk/>
United Utilities - <https://www.unitedutilities.com/>

This page has been left intentionally blank.

APPENDIX A: NPPF + PPG EXTRACTS

This page has been left intentionally blank.

14. Meeting the challenge of climate change, flooding and coastal change

161. The planning system should support the transition to net zero by 2050 and take full account of all climate impacts including overheating, water scarcity, storm and flood risks and coastal change. It should help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure.

Planning for climate change

162. Plans should take a proactive approach to mitigating and adapting to climate change, taking into account the long-term implications for flood risk, coastal change, water supply, biodiversity and landscapes, and the risk of overheating and drought from rising temperatures⁶¹. Policies should support appropriate measures to ensure the future health and resilience of communities and infrastructure to climate change impacts, such as providing space for physical protection measures, or making provision for the possible future relocation of vulnerable development and infrastructure.
163. The need to mitigate and adapt to climate change should also be considered in preparing and assessing planning applications, taking into account the full range of potential climate change impacts.
164. New development should be planned for in ways that:
- a) avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through incorporating green infrastructure and sustainable drainage systems; and
 - b) help to reduce greenhouse gas emissions, such as through its location, orientation and design. Any local requirements for the sustainability of buildings in plans should reflect the Government's policy for national technical standards.
165. To help increase the use and supply of renewable and low carbon energy and heat, plans should:
- a) provide a positive strategy for energy from these sources, that maximises the potential for suitable development, and their future re-powering and life extension, while ensuring that adverse impacts are addressed appropriately (including cumulative landscape and visual impacts);

⁶¹ In line with the objectives and provisions of the Climate Change Act 2008.

- b) consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure their development; and
 - c) identify opportunities for development to draw its energy supply from decentralised, renewable or low carbon energy supply systems and for co-locating potential heat customers and suppliers.
166. In determining planning applications, local planning authorities should expect new development to:
- a) comply with any development plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable; and
 - b) take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption.
167. Local planning authorities should also give significant weight to the need to support energy efficiency and low carbon heating improvements to existing buildings, both domestic and non-domestic (including through installation of heat pumps and solar panels where these do not already benefit from permitted development rights). Where the proposals would affect conservation areas, listed buildings or other relevant designated heritage assets, local planning authorities should also apply the policies set out in chapter 16 of this Framework.
168. When determining planning applications for all forms of renewable and low carbon energy developments and their associated infrastructure, local planning authorities should:
- a) not require applicants to demonstrate the overall need for renewable or low carbon energy, and give significant weight to the benefits associated with renewable and low carbon energy generation and the proposal's contribution to a net zero future;
 - b) recognise that small-scale and community-led projects provide a valuable contribution to cutting greenhouse gas emissions;
 - c) in the case of applications for the repowering and life-extension of existing renewable sites, give significant weight to the benefits of utilising an established site.
169. Once suitable areas for renewable and low carbon energy have been identified in plans, local planning authorities should expect subsequent applications for commercial scale projects outside these areas to demonstrate that the proposed location meets the criteria used in identifying suitable areas.

Planning and flood risk

170. Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where

development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere.

171. Strategic policies should be informed by a strategic flood risk assessment, and should manage flood risk from all sources. They should consider cumulative impacts in, or affecting, local areas susceptible to flooding, and take account of advice from the Environment Agency and other relevant flood risk management authorities, such as lead local flood authorities and internal drainage boards.
172. All plans should apply a sequential, risk-based approach to the location of development – taking into account all sources of flood risk and the current and future impacts of climate change – so as to avoid, where possible, flood risk to people and property. They should do this, and manage any residual risk, by:
 - a) applying the sequential test and then, if necessary, the exception test as set out below;
 - b) safeguarding land from development that is required, or likely to be required, for current or future flood management;
 - c) using opportunities provided by new development and improvements in green and other infrastructure to reduce the causes and impacts of flooding, (making as much use as possible of natural flood management techniques as part of an integrated approach to flood risk management); and
 - d) where climate change is expected to increase flood risk so that some existing development may not be sustainable in the long-term, seeking opportunities to relocate development, including housing, to more sustainable locations.
173. A sequential risk-based approach should also be taken to individual applications in areas known to be at risk now or in future from any form of flooding, by following the steps set out below.
174. Within this context the aim of the sequential test is to steer new development to areas with the lowest risk of flooding from any source. Development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower risk of flooding. The strategic flood risk assessment will provide the basis for applying this test.
175. The sequential test should be used in areas known to be at risk now or in the future from any form of flooding, except in situations where a site-specific flood risk assessment demonstrates that no built development within the site boundary, including access or escape routes, land raising or other potentially vulnerable elements, would be located on an area that would be at risk of flooding from any source, now and in the future (having regard to potential changes in flood risk).
176. Applications for some minor development and changes of use⁶² should also not be subject to the sequential test, nor the exception test set out below, but should still meet the requirements for site-specific flood risk assessments set out in footnote 63.

⁶² This includes householder development, small non-residential extensions (with a footprint of less than 250m²) and changes of use; except for changes of use to a caravan, camping or chalet site, or to a mobile home or park

177. Having applied the sequential test, if it is not possible for development to be located in areas with a lower risk of flooding (taking into account wider sustainable development objectives), the exception test may have to be applied. The need for the exception test will depend on the potential vulnerability of the site and of the development proposed, in line with the Flood Risk Vulnerability Classification set out in Annex 3.
178. The application of the exception test should be informed by a strategic or site-specific flood risk assessment, depending on whether it is being applied during plan production or at the application stage. To pass the exception test it should be demonstrated that:
- a) the development would provide wider sustainability benefits to the community that outweigh the flood risk; and
 - b) the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.
179. Both elements of the exception test should be satisfied for development to be allocated or permitted.
180. Where planning applications come forward on sites allocated in the development plan through the sequential test, applicants need not apply the sequential test again. However, the exception test may need to be reapplied if relevant aspects of the proposal had not been considered when the test was applied at the plan-making stage, or if more recent information about existing or potential flood risk should be taken into account.
181. When determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment⁶³. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:
- a) within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;
 - b) the development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment;
 - c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;

home site, where the sequential and exception tests should be applied as appropriate.

⁶³ A site-specific flood risk assessment should be provided for all development in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.

- d) any residual risk can be safely managed; and
 - e) safe access and escape routes are included where appropriate, as part of an agreed emergency plan.
182. Applications which could affect drainage on or around the site should incorporate sustainable drainage systems to control flow rates and reduce volumes of runoff, and which are proportionate to the nature and scale of the proposal. These should provide multifunctional benefits wherever possible, through facilitating improvements in water quality and biodiversity, as well as benefits for amenity. Sustainable drainage systems provided as part of proposals for major development should:
- a) take account of advice from the Lead Local Flood Authority;
 - b) have appropriate proposed minimum operational standards; and
 - c) have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development.

Coastal change

183. In coastal areas, planning policies and decisions should take account of the UK Marine Policy Statement and marine plans. Integrated Coastal Zone Management should be pursued across local authority and land/sea boundaries, to ensure effective alignment of the terrestrial and marine planning regimes.
184. Plans should reduce risk from coastal change by avoiding inappropriate development in vulnerable areas and not exacerbating the impacts of physical changes to the coast. They should identify as a Coastal Change Management Area any area likely to be affected by physical changes to the coast, and:
- a) be clear as to what development will be appropriate in such areas and in what circumstances; and
 - b) make provision for development and infrastructure that needs to be relocated away from Coastal Change Management Areas.
185. Development in a Coastal Change Management Area will be appropriate only where it is demonstrated that:
- a) it will be safe over its planned lifetime and not have an unacceptable impact on coastal change;
 - b) the character of the coast including designations is not compromised;
 - c) the development provides wider sustainability benefits; and
 - d) the development does not hinder the creation and maintenance of a continuous signed and managed route around the coast⁶⁴.

⁶⁴ As required by the Marine and Coastal Access Act 2009.

186. Local planning authorities should limit the planned lifetime of development in a Coastal Change Management Area through temporary permission and restoration conditions, where this is necessary to reduce a potentially unacceptable level of future risk to people and the development.

How can neighbourhood plans and neighbourhood development/community right to build orders take account of coastal change?

In any instance where a Neighbourhood Area is proposed in a Coastal Change Management Area, careful attention should be paid to the guidance on [what development would be appropriate in such an area](#), including whether [time-limiting planning permissions](#) are needed. The local planning authority will need to be consulted about existing and anticipated levels of risk, and the types of development that may or may not be appropriate.

See related policy in [paragraphs 170 to 173 of the National Planning Policy Framework](#) (<https://www.gov.uk/guidance/national-planning-policy-framework/14-meeting-the-challenge-of-climate-change-flooding-and-coastal-change>).

Paragraph: 076 Reference ID: 7-076-20220825

Revision date: 25 08 2022

Flood Zone and flood risk tables

- Table 1: Flood Zones
- [National Planning Policy Framework Annex 3 - Flood risk vulnerability classification](#) (<https://www.gov.uk/guidance/national-planning-policy-framework/annex-3-flood-risk-vulnerability-classification>)
- [Table 2: Flood risk vulnerability and flood zone 'incompatibility'](#)

Paragraph: 077 Reference ID: 7-077-20220825

Revision date: 25 08 2022

Table 1: Flood Zones

Flood Zone	Definition
Zone 1 Low Probability	Land having a less than 0.1% annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map for Planning – all land outside Zones 2, 3a and 3b)
Zone 2 Medium Probability	Land having between a 1% and 0.1% annual probability of river flooding; or land having between a 0.5% and 0.1% annual probability of sea flooding. (Land shown in light blue on the Flood Map)

Flood Zone	Definition
Zone 3a High Probability	Land having a 1% or greater annual probability of river flooding; or Land having a 0.5% or greater annual probability of sea. (Land shown in dark blue on the Flood Map)
Zone 3b The Functional Floodplain	This zone comprises land where water from rivers or the sea has to flow or be stored in times of flood. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. Functional floodplain will normally comprise: • land having a 3.3% or greater annual probability of flooding, with any existing flood risk management infrastructure operating effectively; or • land that is designed to flood (such as a flood attenuation scheme), even if it would only flood in more extreme events (such as 0.1% annual probability of flooding). Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)

Note: The Flood Zones shown on the Environment Agency's Flood Map for Planning (Rivers and Sea) do not take account of the possible impacts of climate change and consequent changes in the future probability of flooding. Reference should therefore also be made to the [Strategic Flood Risk Assessment \(https://www.gov.uk/guidance/local-planning-authorities-strategic-flood-risk-assessment\)](https://www.gov.uk/guidance/local-planning-authorities-strategic-flood-risk-assessment) when considering location and potential future flood risks to developments and land uses.

Paragraph: 078 Reference ID: 7-078-20220825

Revision date: 25 08 2022

Table 2: Flood risk vulnerability and flood zone 'incompatibility'

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	X	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	X	X	X	✓ *

Key:

✓ Exception test is not required

X Development should not be permitted

Notes to table 2:

- This table does not show the application of the [Sequential Test](#) which should be applied first to guide development to the lowest flood risk areas; nor does it reflect the need to avoid flood risk from sources other than rivers and the sea;
- The Sequential and [Exception Tests](#) do not need to be applied to those developments set out in [National Planning Policy Framework footnote 56](#) (<https://www.gov.uk/guidance/national-planning-policy-framework/14-meeting-the-challenge-of-climate-change-flooding-and-coastal-change>). The Sequential and Exception Tests should be applied to ‘major’ and ‘non major’ development;
- Some developments may contain different elements of vulnerability and the highest vulnerability category should be used, unless the development is considered in its component parts.

“†” In Flood Zone 3a essential infrastructure should be designed and constructed to remain operational and safe in times of flood.

APPENDIX B: EA INFORMATION & CORRESPONDENCE

This page has been left intentionally blank

Flood map for planning

Your reference
<Unspecified>

Location (easting/northing)
386049/413443

Created
7 Sep 2023 13:59

Your selected location is in flood zone 1, an area with a low probability of flooding.

You will need to do a flood risk assessment if your site is **any of the following:**

- bigger than 1 hectare (ha)
- In an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

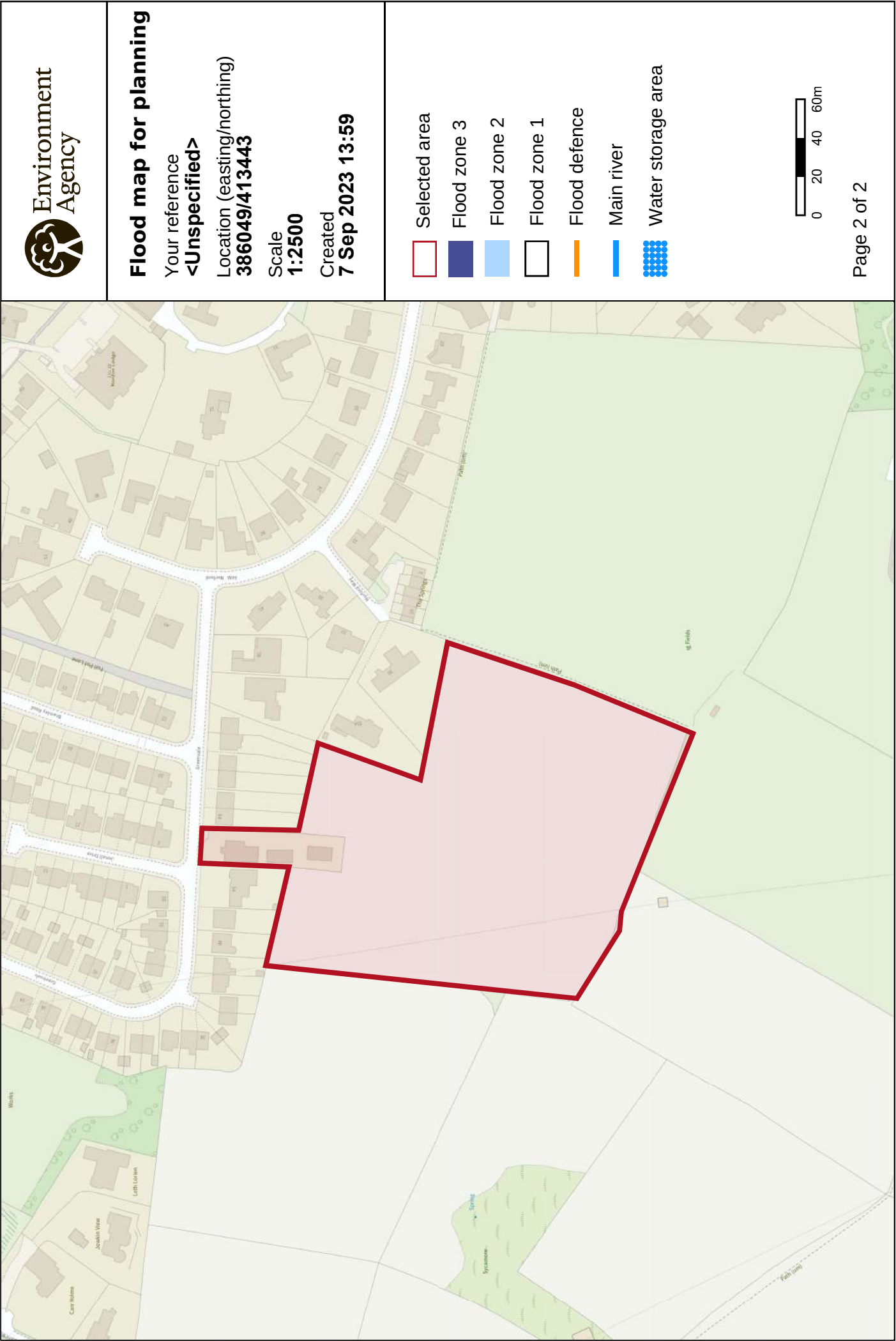
Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence **which** sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2022 OS 100024198. <https://flood-map-for-planning.service.gov.uk/os-terms>



Hannah Buchanan

From: Hannah Buchanan
Sent: 18 September 2023 10:22
To: GMMC Info Requests
Subject: Flood Risk Information Request - Products 4, 5, 6, & 7
Attachments: Location Plan.pdf

To whom it may concern,

Greenvale, Bamford, Rochdale

Please could you confirm whether you have any information (Products 4, 5, 6, & 7) that you feel would be valuable to a Flood Risk Assessment and Drainage Management Strategy for the above site (location plan attached), including details of historical flooding and specific drainage requirements; this would be greatly appreciated. If there are any other specific requirements that you require in a scope of works for this site, please can you advise at this stage so that it can be fully incorporated into the proposals at an early stage.

Please do not hesitate to contact me on the details below to discuss further should you require additional information or clarification.

Kind Regards,

Hannah Buchanan BSc (Hons) MSc GradCIWEM
Graduate Flood Risk Analyst

BETTS HYDRO

Consulting Engineers

Old Marsh Farm Barns, Welsh Road, Sealand, Flintshire, CH5 2LY
Chester +44 (0)1244 289041

hannahbuchanan@betts-associates.co.uk
www.betts-associates.co.uk

CIVIL | STRUCTURAL | GEO-ENVIRONMENTAL | HYDROLOGY | FLOOD RISK MANAGEMENT
SUDS | STRUCTURAL SURVEYS | PARTY WALL DUTIES | INFILTRATION | GEOTECHNICAL

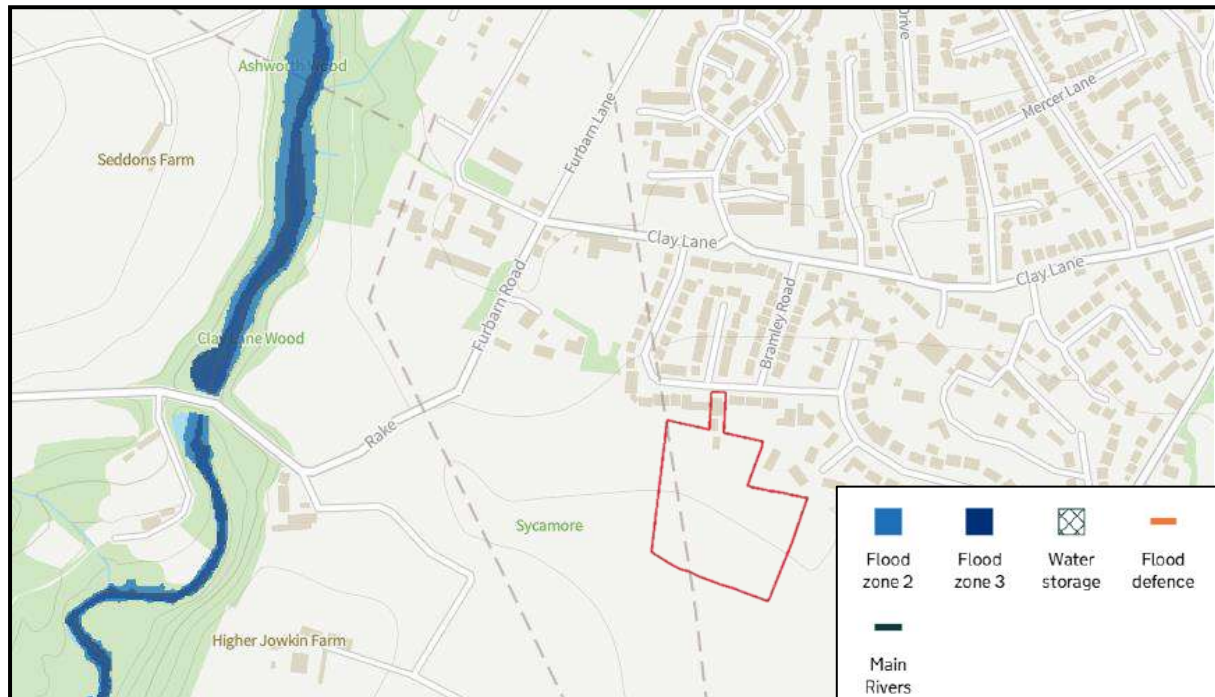
ELECTRONICALLY TRANSMITTED INFORMATION

This electronic transmission is strictly confidential and intended solely for the addressee. It may contain information which is covered by legal, professional or other privilege. If you are not the intended addressee, you must not disclose, copy or take any action in reliance of this transmission. If you have received this transmission in error, please notify us as soon as possible. All emails transmitted by Betts Associates, Betts Geo or Betts Hydro are virus checked. This does not guarantee that transmissions are virus free. Reference should always be made to the hard copy of any electronically transmitted files. Electronic data does not constitute contract documentation. Use of the content of our files is at your own risk. You remain responsible for anything produced using all or part of the data supplied.

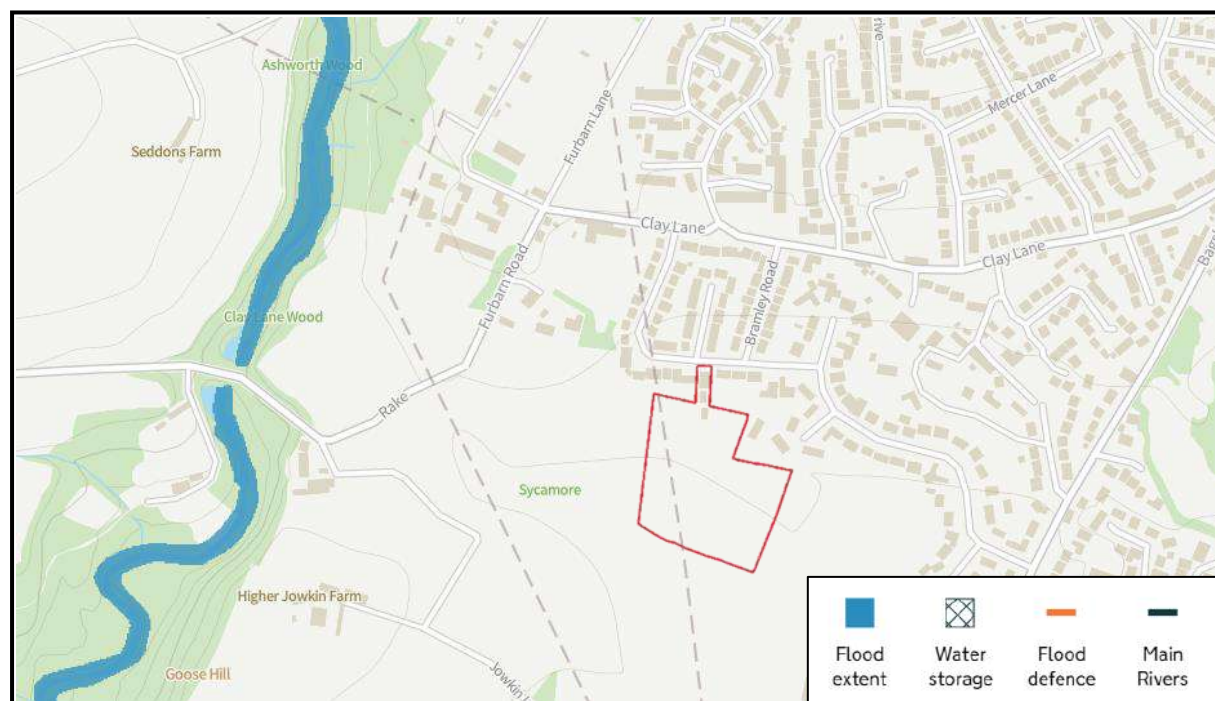
Please consider the environment before printing this email

FLOOD MAP FOR PLANNING

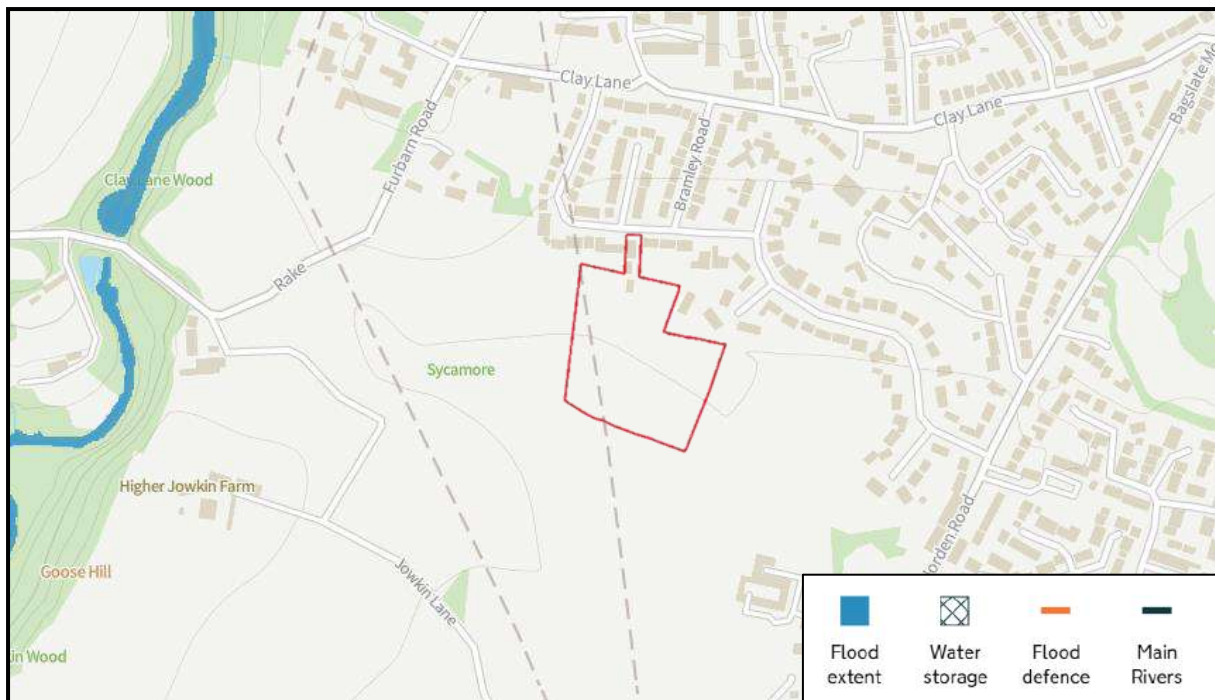
Flood Zones



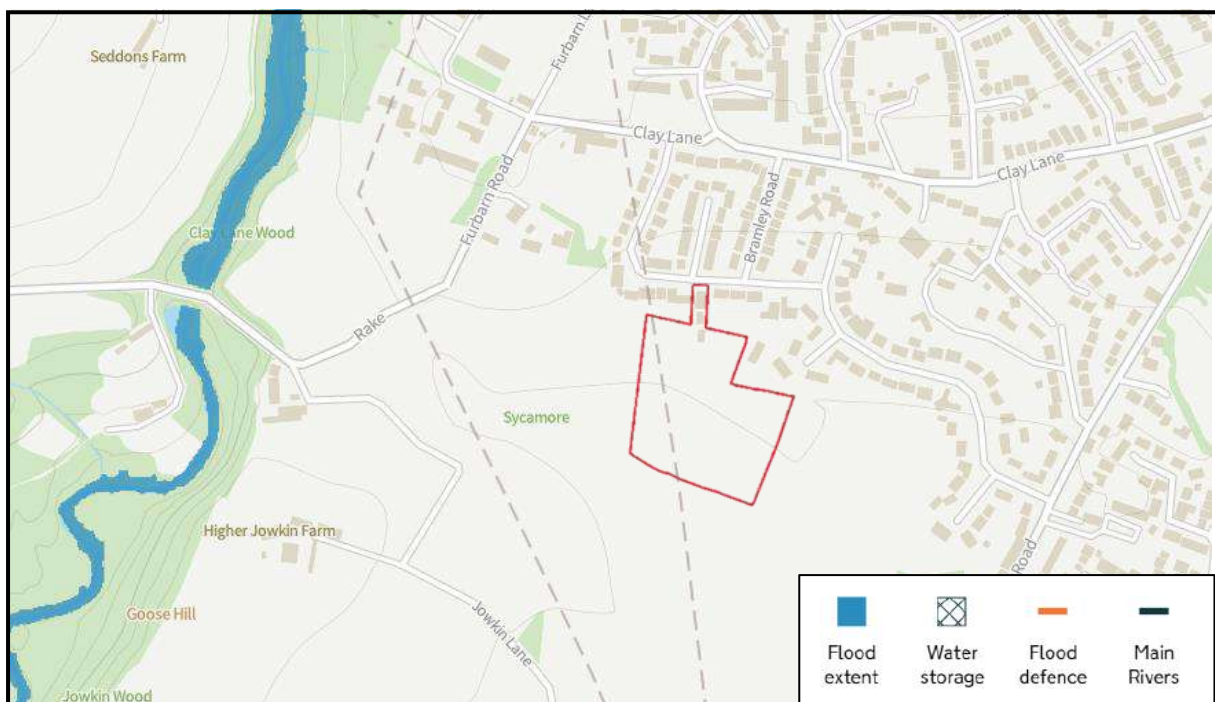
River and Sea with Defenses (Present Day) - 1 in 30yr



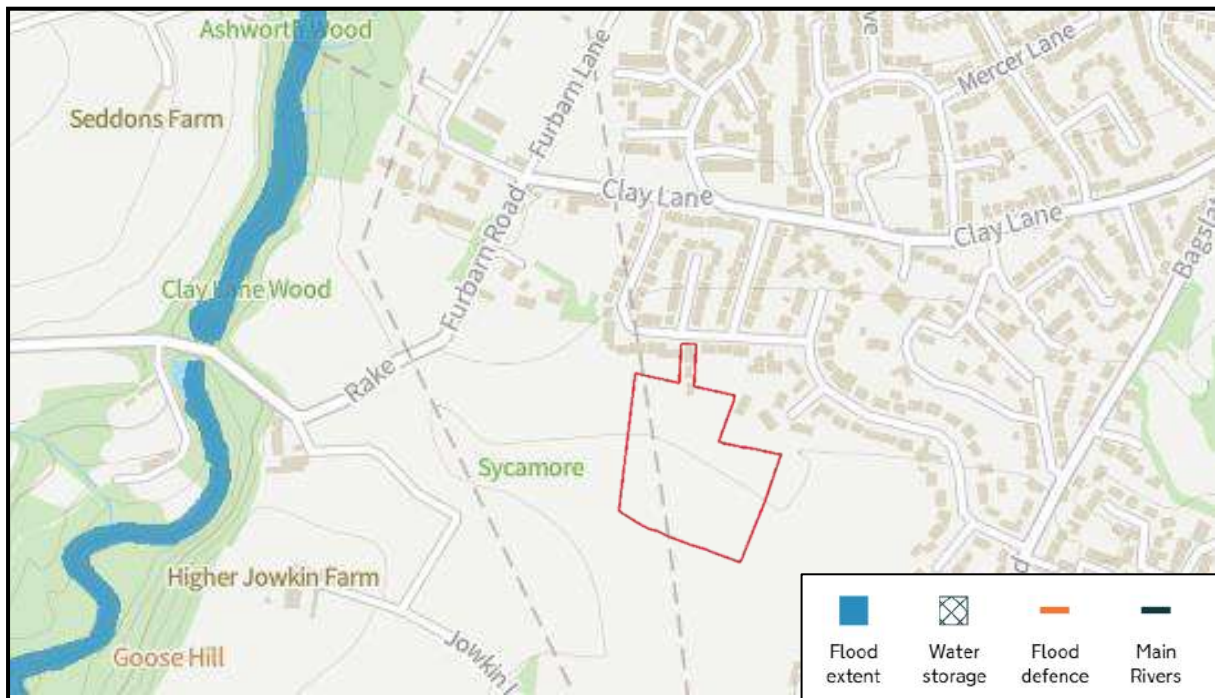
River and Sea with Defenses (Present Day) - 1 in 100yr/1 in 200yr



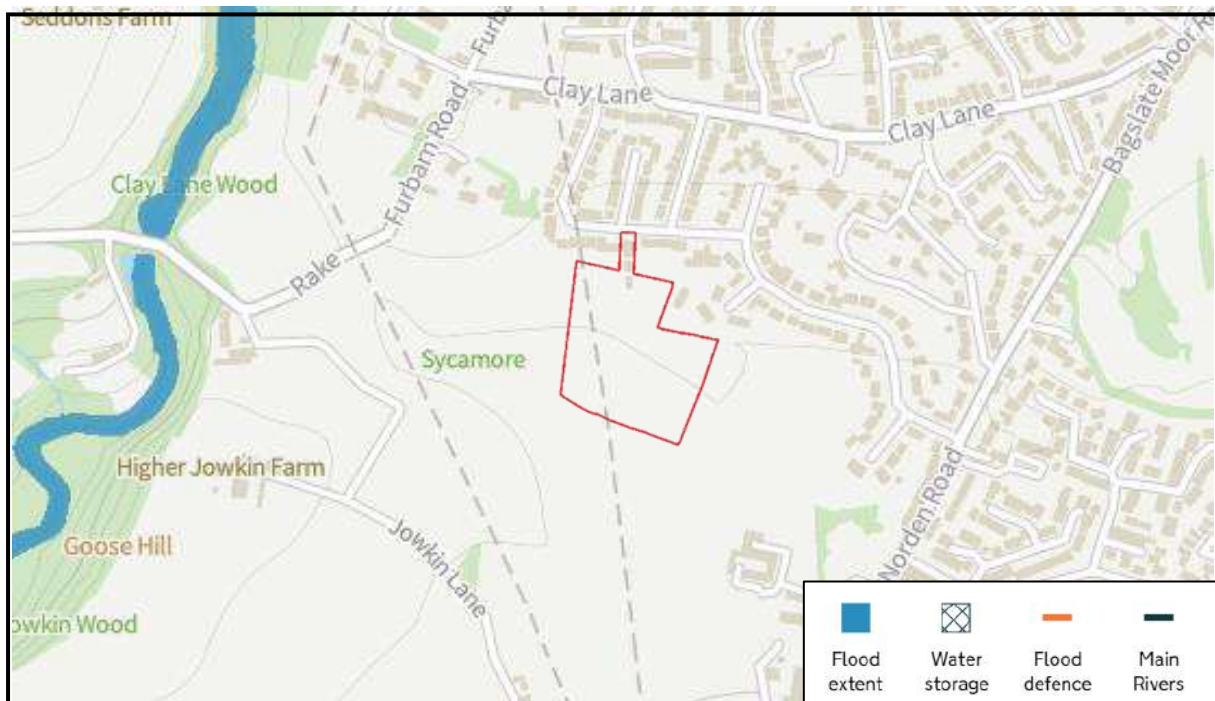
River and Sea with Defenses (Present Day) - 1 in 1000yr



River and Sea with Defenses (with Climate Change) – 1 in 30yr



River and Sea with Defenses (with Climate Change) – 1 in 100/1 in 200yr



NATIONAL FLOOD MAPPING

River and Sea with Defenses (with Climate Change) – 1 in 1000yr



River and Sea without Defenses (Current Day) – 1 in 100yr/1 in 200yr



NATIONAL FLOOD MAPPING

River and Sea without Defences (Current Day) - 1 in 1000yr



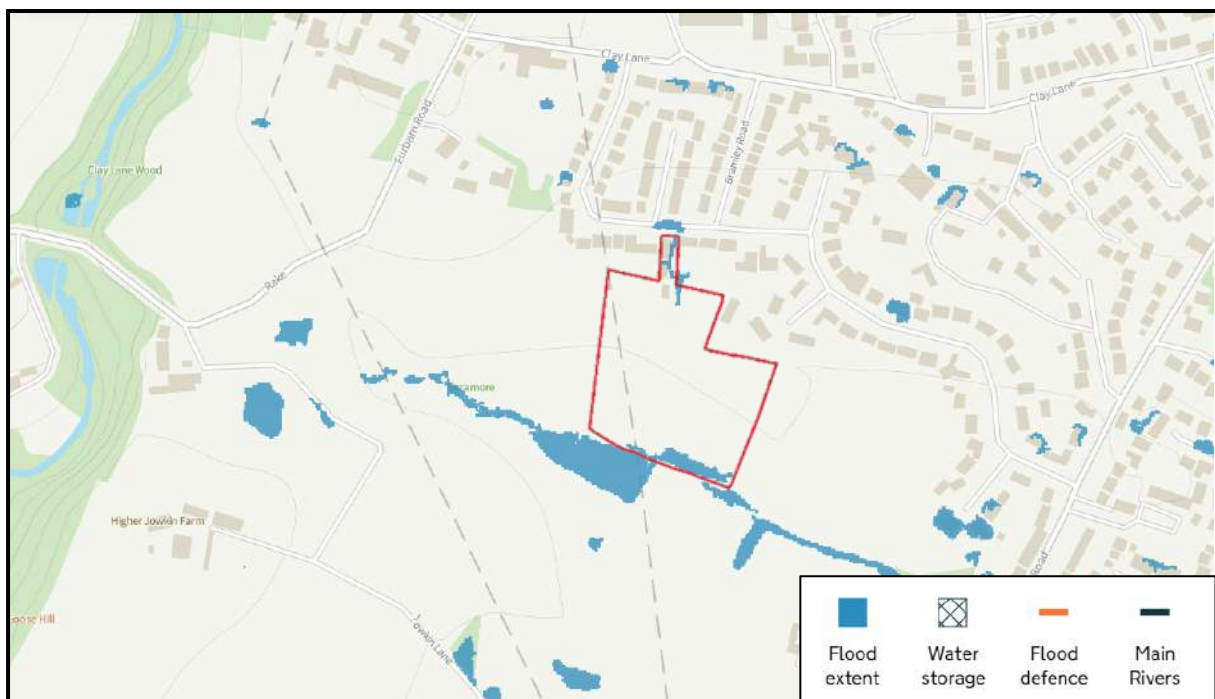
River and Sea without Defences (with Climate Change) - 1 in 100yr/1 in 200yr



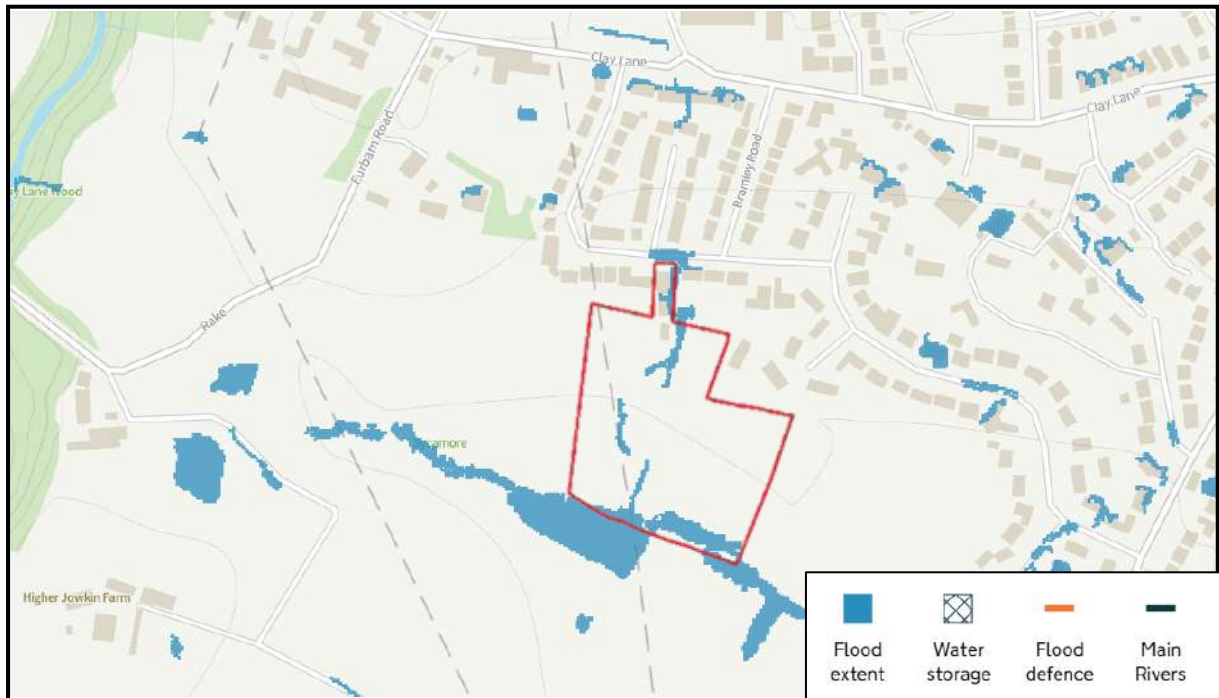
River and Sea without Defenses (with Climate Change) - 1 in 1000yr



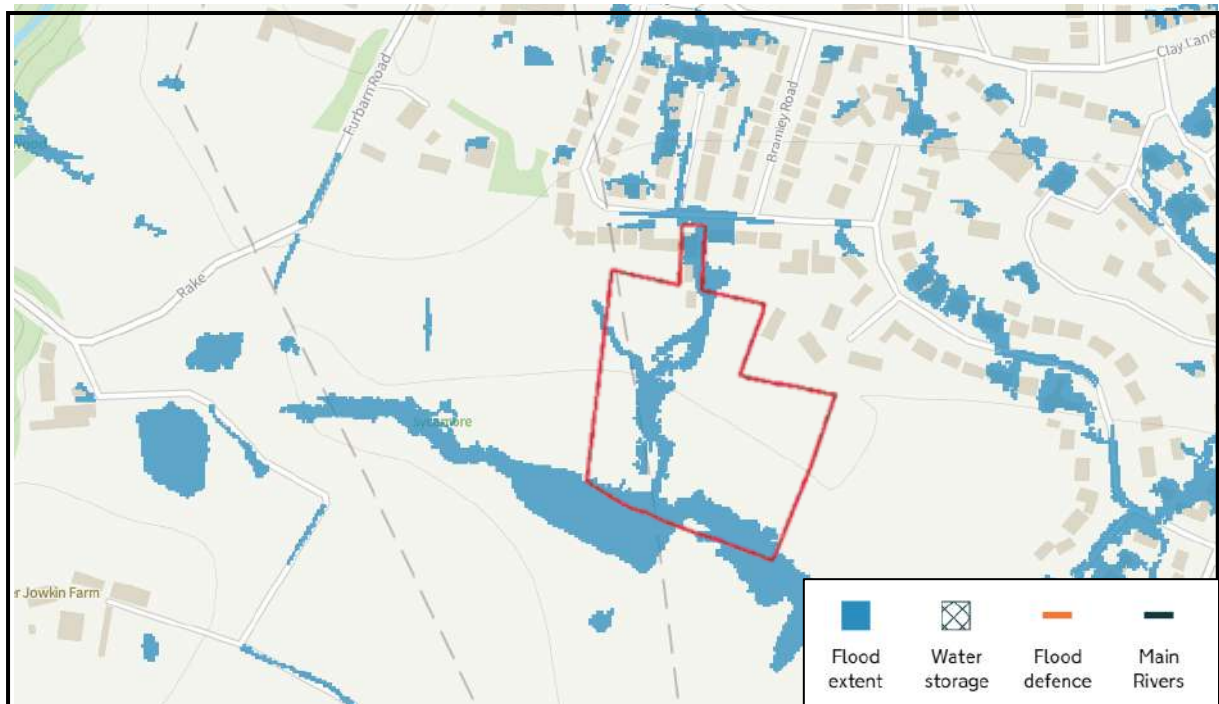
Surface Water Annual Likelihood of Flooding - 1 in 30yr



Surface Water Annual Likelihood of Flooding - 1 in 100yr

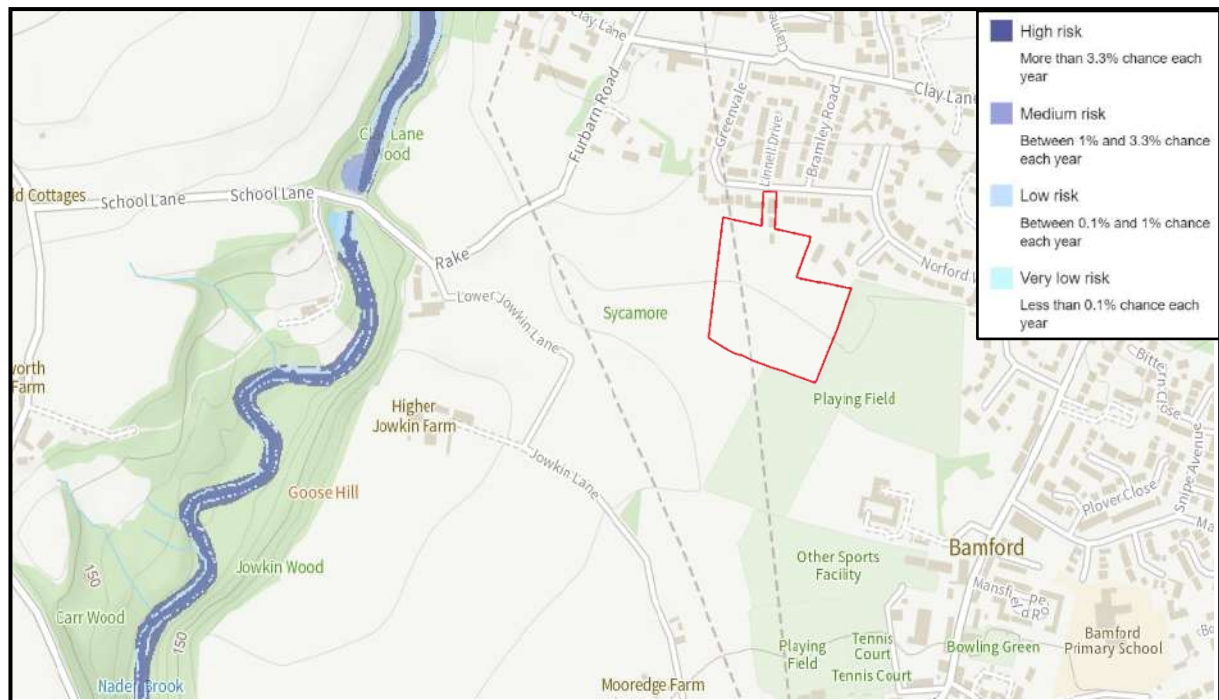


Surface Water Annual Likelihood of Flooding - 1 in 1000yr

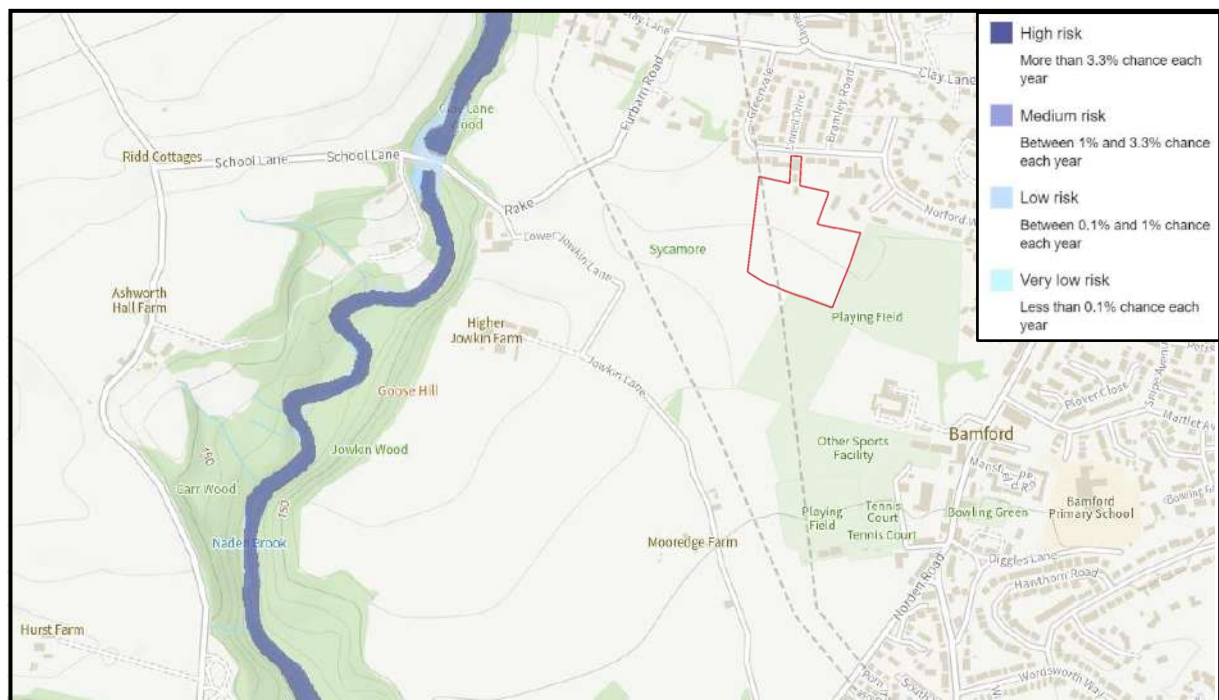


LONG TERM RISK OF FLOODING MAPPING

Rivers or Sea – Current



Rivers or Sea – Future (2036-2069)



Surface Water – Current



Future (2040-2060)



Long Term Flood Risk - Reservoirs



APPENDIX C: UU CORRESPONDENCE

This page has been left intentionally blank

Hannah Buchanan

From: wastewaterdeveloperservices@uuplc.co.uk
Sent: 11 November 2024 10:33
To: Hannah Buchanan
Subject: RE: United Utilities - Our reference - 04651854 Greenvale, Bamford, Rochdale [Filed 11 Nov 2024 10:40]
Attachments: OL11 5QL.pdf
Categories: Filed by Mail Manager

Good Morning Hannah,

Please note that United Utilities Water Limited (UUV) can only record and check flooding events which are reported to us, and we have to comply with our Regulators instructions on the qualification of flooding events. Our response does not include:

- any sewer flooding events caused by blockages or collapses which are the result of third-party actions, natural events or other actions over which UUV has no control and not a facet of sewer capacity; or
- any historical sewer flooding events that have been resolved from investment in our infrastructure.

Please note that our modelling data is indicative, and only representative of the 1:100year storm event.

Please see attached file of the sewers in this area, we have no incidents of flooding on this site.

And our plans are indicative and that everything will need to be check on site for confirmation.

Regards,



James Darlington
Developer Engineer
Developer Services & Metering
T: 01925 429095
M: 07917096253
unitedutilities.com

If you have received a great service today why not tell us?

Visit: unitedutilities.com/wow

----- Original Message -----

From: wastewaterdeveloperservices@uuplc.co.uk [wastewaterdeveloperservices@uuplc.co.uk]
Sent: 11/11/2024 08:55
To: hannahbuchanan@betts-associates.co.uk
Subject: United Utilities - Our reference - 04651854 Greenvale, Bamford, Rochdale

Good Morning

Thank you for contacting United Utilities

Your query has been logged to an engineer who will respond on or before 14/11/2024

Kind Regards

If you feel you have received a good service from myself, please can you take two minutes to fill in the survey below. This will be much appreciated



Visit: <https://unitedutilities.thewowawards.co.uk/nominate>



Olivia Morley

Customer Advisor Advanced
Developer Services & Metering
Customer Services
unitedutilities.com

Tel: 0345 072 6067 Option 2 for
Wastewater Services)

Direct Tel:

----- Original Message -----

From: Hannah Buchanan [hannahbuchanan@betts-associates.co.uk]

Sent: 07/11/2024 16:44

To: wastewaterdeveloperservices@uuplc.co.uk

Subject: RE: 04651854 Sewer Flood Risk Information Request

Good afternoon,

I received the below response from your team last year, and the project has been on hold until now since then. I noticed the response says “no current record / we do have (a) current record”. Please could you confirm whether there is or isn’t records of flooding in proximity of this site?

Kind Regards,

Hannah Buchanan *BSc (Hons) MSc GradCIWEM*

Graduate Flood Risk Analyst

BETTS HYDRO

Consulting Engineers

Old Marsh Farm Barns, Welsh Road, Sealand, Flintshire, CH5 2LY

Chester +44 (0)1244 289041

hannahbuchanan@betts-associates.co.uk

www.betts-associates.co.uk

CIVIL | STRUCTURAL | GEO-ENVIRONMENTAL | HYDROLOGY | FLOOD RISK MANAGEMENT

SUDS | STRUCTURAL SURVEYS | PARTY WALL DUTIES | INFILTRATION | GEOTECHNICAL

ELECTRONICALLY TRANSMITTED INFORMATION

This electronic transmission is strictly confidential and intended solely for the addressee. It may contain information which is covered by legal, professional or other privilege. If you are not the intended addressee, you must not disclose, copy or take any action in reliance of this transmission. If you have received this transmission in error, please notify us as soon as possible. All emails transmitted by Betts Associates, Betts Geo or Betts Hydro are virus checked. This does not guarantee that transmissions are virus free. Reference should always be made to the hard copy of any electronically transmitted files. Electronic data does not constitute contract documentation. Use of the content of our files is at your own risk. You remain responsible for anything produced using all or part of the data supplied.

Please consider the environment before printing this email

From: wastewaterdeveloperservices@uuplc.co.uk <wastewaterdeveloperservices@uuplc.co.uk>

Sent: 20 September 2023 13:17

To: Hannah Buchanan <hannahbuchanan@betts-associates.co.uk>

Subject: 04651854 Sewer Flood Risk Information Request

Hi Hannah

'I can confirm that we have no current record / we do have (a) current record(s)] of sewer flooding within the vicinity of the proposed development.

Please note that United Utilities Water Limited (U UW) can only record and check flooding events which are reported to us and we have to comply with our Regulators instructions on the qualification of flooding events to place on the register.

Our response does not include:

- 1. any sewer flooding events caused by blockages or collapses which are the result of third party actions, natural events or other actions over which U UW has no control and not a facet of sewer capacity; or*
- 1. any historical sewer flooding events that have been removed from the register as a result of investment in our infrastructure.*

As with all development sites, we recommend you liaise with our water and wastewater engineers by contacting our Developer Services team so the details of your development proposal can be considered further. Details can be found at the following link.

<https://www.unitedutilities.com/services/builders-developers/>

Should you require any further information please do not hesitate to contact me.'

Kind regards Jill



Jill Ellis

Customer Advisor Advanced
Developer Services & Metering
Customer Services

Direct Tel: 01925 233 064

Tel: 0345 072 6067
[unitedutilities.com](https://www.unitedutilities.com)

If you have received a great service today why not tell us?

Visit: [unitedutilities.com/wow](https://www.unitedutilities.com/wow)

Did you know we now have a live chat facility available to you Mon to Friday 8 -5pm. You just click on the orange live chat box on our webpage and one of our advisors will be ready to chat to you and help you with your enquiry <https://www.unitedutilities.com/builders-developers/> or you can email us at WastewaterDeveloperServices@uuplc.co.uk

----- Original Message -----

From: Hannah Buchanan [hannahbuchanan@betts-associates.co.uk]

Sent: 18/09/2023 10:20

To: wastewaterdeveloperservices@uuplc.co.uk

Subject: Sewer Flood Risk Information Request

To whom it may concern,

Greenvale, Bamford, Rochdale

Please could you confirm whether you have any information that you feel would be valuable to a Flood Risk Assessment and Drainage Management Strategy for the above site (location plan attached), including details of historical flooding and specific drainage requirements; this would be greatly appreciated. If there are any other specific requirements that you require in a scope of works for this site, please can you advise at this stage so that it can be fully incorporated into the proposals at an early stage.

Please do not hesitate to contact me on the details below to discuss further should you require additional information or clarification.

Kind Regards,

Hannah Buchanan BSc (Hons) MSc GradCIWEM

Graduate Flood Risk Analyst

BETTS HYDRO

Consulting Engineers

Old Marsh Farm Barns, Welsh Road, Sealand, Flintshire, CH5 2LY

Chester +44 (0) 1244 289041

hannahbuchanan@betts-associates.co.uk

www.betts-associates.co.uk

CIVIL | STRUCTURAL | GEO-ENVIRONMENTAL | HYDROLOGY | FLOOD RISK MANAGEMENT

SUDS | STRUCTURAL SURVEYS | PARTY WALL DUTIES | INFILTRATION | GEOTECHNICAL

ELECTRONICALLY TRANSMITTED INFORMATION

This electronic transmission is strictly confidential and intended solely for the addressee. It may contain information which is covered by legal, professional or other privilege. If you are not the intended addressee, you must not disclose, copy or take any action in reliance of this transmission. If you have received this transmission in error, please notify us as soon as possible. All emails transmitted by Betts Associates, Betts Geo or Betts Hydro are virus checked. This does not guarantee that transmissions are virus free. Reference should always be made to the hard copy of any electronically transmitted files. Electronic data does not constitute contract documentation. Use of the content of our files is at your own risk. You remain responsible for anything produced using all or part of the data supplied.

Please consider the environment before printing this email

The information contained in this e-mail is intended only for the individual to whom it is addressed. It may contain legally privileged or confidential information or otherwise be exempt from disclosure. If you have received this Message in error or there are any problems, please notify the sender immediately and delete the message from your computer. You must not use, disclose, copy or alter this message for any unauthorised purpose. Neither United Utilities Group PLC nor any of its subsidiaries will be liable for any direct, special, indirect or consequential damages as a result of any virus being passed on, or arising from the alteration of the contents of this message by a third party.

United Utilities Group PLC, Haweswater House, Lingley Mere
Business Park, Lingley Green Avenue, Great Sankey,
Warrington, WA5 3LP
Registered in England and Wales. Registered No 6559020

www.unitedutilities.com

www.unitedutilities.com/subsidiaries



Hannah Buchanan

From: wastewaterdeveloperservices@uuplc.co.uk
Sent: 20 September 2023 13:17
To: Hannah Buchanan
Subject: 04651854 Sewer Flood Risk Information Request

Hi Hannah

'I can confirm that we have no current record / we do have (a) current record(s)] of sewer flooding within the vicinity of the proposed development.

Please note that United Utilities Water Limited (Uuw) can only record and check flooding events which are reported to us and we have to comply with our Regulators instructions on the qualification of flooding events to place on the register.

Our response does not include:

- any sewer flooding events caused by blockages or collapses which are the result of third party actions, natural events or other actions over which Uuw has no control and not a facet of sewer capacity; or*
- any historical sewer flooding events that have been removed from the register as a result of investment in our infrastructure.*

As with all development sites, we recommend you liaise with our water and wastewater engineers by contacting our Developer Services team so the details of your development proposal can be considered further. Details can be found at the following link.

<https://www.unitedutilities.com/services/builders-developers/>

Should you require any further information please do not hesitate to contact me.'

Kind regards Jill



Jill Ellis

Customer Advisor Advanced
Developer Services & Metering
Customer Services

Direct Tel: 01925 233 064

Tel: 0345 072 6067

[unitedutilities.com](https://www.unitedutilities.com)

If you have received a great service today why not tell us?

Visit: [unitedutilities.com/wow](https://www.unitedutilities.com/wow)

Did you know we now have a live chat facility available to you Mon to Friday 8 -5pm. You just click on the orange live chat box on our webpage and one of our advisors will be ready to chat to you and help you with your enquiry <https://www.unitedutilities.com/builders-developers/> or you can email us at

----- Original Message -----

From: Hannah Buchanan [hannahbuchanan@betts-associates.co.uk]

Sent: 18/09/2023 10:20

To: wastewaterdeveloperservices@uuplc.co.uk

Subject: Sewer Flood Risk Information Request

To whom it may concern,

Greenvale, Bamford, Rochdale

Please could you confirm whether you have any information that you feel would be valuable to a Flood Risk Assessment and Drainage Management Strategy for the above site (location plan attached), including details of historical flooding and specific drainage requirements; this would be greatly appreciated. If there are any other specific requirements that you require in a scope of works for this site, please can you advise at this stage so that it can be fully incorporated into the proposals at an early stage.

Please do not hesitate to contact me on the details below to discuss further should you require additional information or clarification.

Kind Regards,

Hannah Buchanan *BSc (Hons) MSc GradCIWEM*

Graduate Flood Risk Analyst

BETTS HYDRO

Consulting Engineers

Old Marsh Farm Barns, Welsh Road, Sealand, Flintshire, CH5 2LY

Chester +44 (0)1244 289041

hannahbuchanan@betts-associates.co.uk

www.betts-associates.co.uk

ELECTRONICALLY TRANSMITTED INFORMATION

This electronic transmission is strictly confidential and intended solely for the addressee. It may contain information which is covered by legal, professional or other privilege. If you are not the intended addressee, you must not disclose, copy or take any action in reliance of this transmission. If you have received this transmission in error, please notify us as soon as possible. All emails transmitted by Betts Associates, Betts Geo or Betts Hydro are virus checked. This does not guarantee that transmissions are virus free. Reference should always be made to the hard copy of any electronically transmitted files. Electronic data does not constitute contract documentation. Use of the content of our files is at your own risk. You remain responsible for anything produced using all or part of the data supplied.

Please consider the environment before printing this email



The information contained in this e-mail is intended only for the individual to whom it is addressed. It may contain legally privileged or confidential information or otherwise be exempt from disclosure. If you have received this Message in error or there are any problems, please notify the sender immediately and delete the message from your computer. You must not use, disclose, copy or alter this message for any unauthorised purpose. Neither United Utilities Group PLC nor any of its subsidiaries will be liable for any direct, special, indirect or consequential damages as a result of any virus being passed on, or arising from the alteration of the contents of this message by a third party.

United Utilities Group PLC, Haweswater House, Lingley Mere
Business Park, Lingley Green Avenue, Great Sankey,
Warrington, WA5 3LP
Registered in England and Wales. Registered No 6559020

www.unitedutilities.com
www.unitedutilities.com/subsidiaries

WASTEWATER PRE-DEVELOPMENT ENQUIRY



United Utilities Grasmere House, 2nd Floor
Lingley Mere Business Park
Great Sankey
Warrington
WA5 3LP

01/07/2025

Dear **Chris Lynch**,

Pre-Development Enquiry for Land behind 58 Greenvale, Rochdale, OL11 5QP UU Reference Number:
07704700

We have assessed your application based on the information provided. This pre-development advice on your drainage strategy will be valid for 12 months. Your strategy will need review by other authorities as part of the planning process. We advise conducting necessary site investigations to confirm viability of your proposals.

Modelled Flood Risk [Please see the image at the end of this letter for details](#)

I can confirm that we do not have modelled flood risk within the vicinity of the proposed development.

Please note that our modelling data is indicative, and only representative of the 1:100year storm event.

[Please see **comment 2** of the attached guidance sheet](#)

Asset Protection

According to our public sewer records, there are public sewers located within your site boundary. This requires an easement of 3m from the centre line of the asset. If you cannot achieve the required clearance, you may wish to consider diverting and or abandoning the public sewer.

[Please see **comment 3** of the attached guidance sheet and **Working Near Our Pipelines Guidance document**](#)

Foul Water

Foul flow from this site will be allowed to drain into the public foul water/combined sewer system.

Our preferred point of discharge would be to the 150mm diameter public foul within Greenvale, North of your proposed development at an unrestricted rate.

Between Manhole reference SD86130502 and SD86130506 **Grid reference** x:386,031 y:413,576.5

[Please see the images at the end of this letter for clarification](#)

Surface Water

WASTEWATER PRE-DEVELOPMENT ENQUIRY



Follow the National Planning Policy Guidance drainage hierarchy and Provide evidence for discounting higher options before considering public sewer discharge. Consult the Lead Local Flood Authority regarding surface water concerns.

[Please see comment 4 within the guidance sheet](#)

Infiltration

[Please see comment 4 within the guidance sheet](#)

(If evidence of infiltration not being feasible has been provided, please state so)

Waterbody

There are not identifiable watercourses in the immediate vicinity of the development

Public Sewer

United Utilities will consider a connection to the 300mm diameter public surface water within the proposed site at a pass forward flow to be agreed by the Lead Local Flood Authority. United Utilities requests that any agreed rate does not exceed 16.90l/s. As the drainage strategy suggests, the connection will be made into the proposed diversion. While acceptable in principle, this is caveated by the diversion being accepted.

[Please see images at the end of this letter for clarification](#)

Site Images



Figure 1 Development Extent

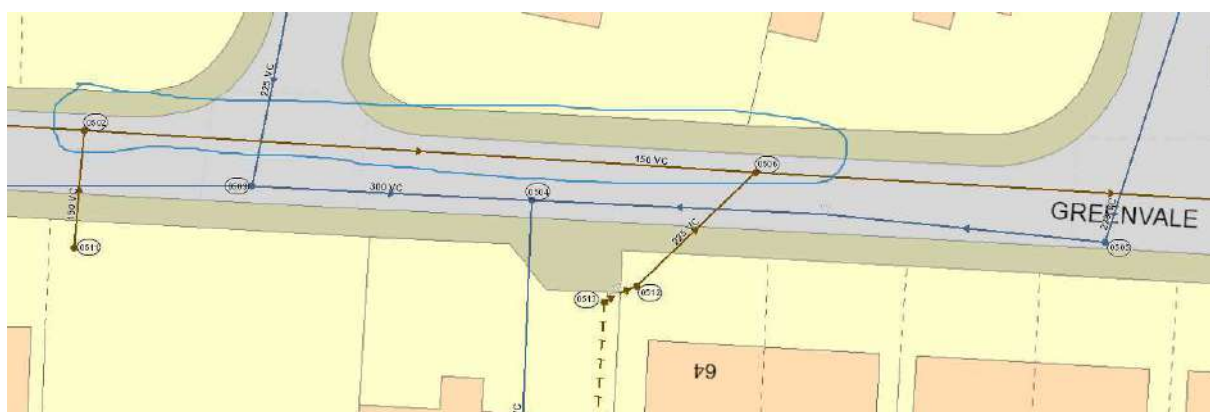


Figure 2 Foul connection point

WASTEWATER PRE-DEVELOPMENT ENQUIRY

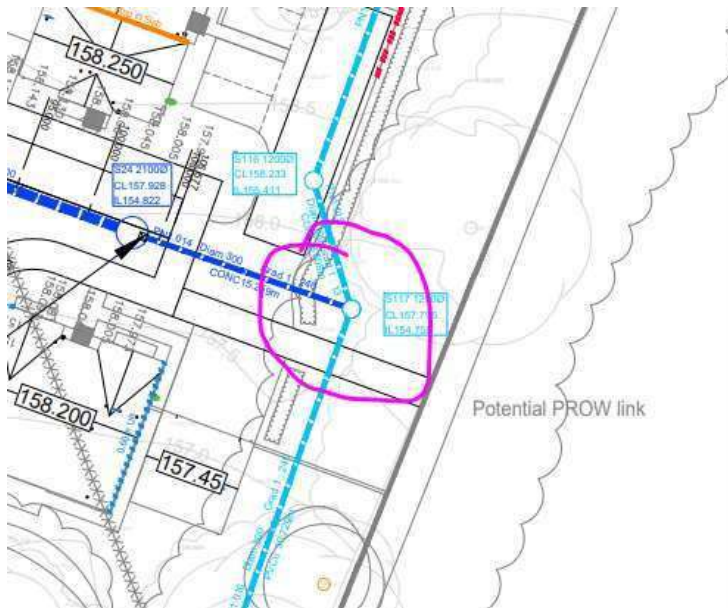


Figure 3 Surface Water Connection Point

If you have any queries on the above, please do get in touch.

Kind Regards

Gulshan



Gulshan Seetulparsad, MEng (Hons)
Developer Engineer (Salford, Bury, Oldham,
Rochdale, Burnley)
Developer Services & Metering
Customer Services
T: 01925 429092
unitedutilities.com



If you have received a great service today why not tell us?

Visit: unitedutilities.com/wow

APPENDIX D: LPA/LLFA CORRESPONDENCE

This page has been left intentionally blank

Hannah Buchanan

From: Stephen McCann <Stephen.McCann@Rochdale.Gov.UK>
Sent: 21 September 2023 14:02
To: Hannah Buchanan
Cc: Kate Fletcher
Subject: RE: Historic Flood Risk and Information Request
Attachments: UU safedig plans - vicinity.jpg

Hello Hannah,

Appended are UU safedig plans for the area. UU may have a more detailed plan.

I don't have any records of any flooding reported in this vicinity – from the last 6 years (the time I've been working for the Council).

regards

Stephen McCann

Drainage & Flooding Engineer

Network Improvement/Development/Flooding



☎ 01706 924606

📠 07552 570262

✉ stephen.mccann@rochdale.gov.uk

From: Kate Fletcher <Kate.Fletcher@Rochdale.Gov.uk> **On Behalf Of** Development Management

Sent: 21 September 2023 12:27

To: Stephen McCann <Stephen.McCann@Rochdale.Gov.UK>

Cc: Ryan Killeen (He/Him) <Ryan.Killeen@Rochdale.Gov.UK>

Subject: FW: Historic Flood Risk and Information Request

Hi Stephen

Are you ok to respond to this from a drainage pov please?

Although, looking at some previous advice on this site it will be needed.

Ryan- you know more about the flood risk requirement changes. I want to say yes but looking at Qgis it's quite away from the flood zone..

Any help would be great

Thanks ☺

Kate Fletcher

Senior Technical Admin Officer

Planning & Development



 01706 924306

 kate.fletcher@rochdale.gov.uk

Rochdale Borough Council
Floor 3, Number One Riverside
Smith Street, Rochdale, OL16 1XU

To access our services go to www.rochdale.gov.uk

For news, events and social media updates go to www.rochdale.gov.uk/newsandevents

Please consider the environment before printing this email.

From: Environmental Management <environmental.management@rochdale.gov.uk>

Sent: 19 September 2023 16:25

To: Development Management <development.management@rochdale.gov.uk>

Subject: RE: Historic Flood Risk and Information Request

Hi Kate,

This is the attachment, please let me know if it still has not come through.
Thankyou .

Regards

Karla
Customer Service Advisor

Rochdale Borough Council
Floor 1, Number One Riverside
Smith Street, Rochdale, OL16 1XU

To access our services go to www.rochdale.gov.uk

For news and social media updates go to www.rochdale.gov.uk/news

From: development.management@rochdale.gov.uk

Sent: Tuesday, September 19, 2023 12:58 PM

To: Environmental.Management@Rochdale.Gov.UK

Subject: RE: Historic Flood Risk and Information Request

Hi Rabiah, do you have the attachment at all?

Thanks

Kate

Kate Fletcher

Senior Technical Admin Officer
Planning & Development



 01706

924306

 kate.fletcher@rochdale.gov.uk

Rochdale Borough Council
Floor 3, Number One Riverside
Smith Street, Rochdale, OL16 1XU

To access our services go to
www.rochdale.gov.uk
For news, events and social media updates go to
www.rochdale.gov.uk/newsandevents

Please consider the environment before printing this email.

From: Environmental Management <Environmental.Management@Rochdale.Gov.UK>

Sent: 19 September 2023 12:16

To: Development Management <development.management@rochdale.gov.uk>

Subject: FW: Historic Flood Risk and Information Request

Afternoon,

Please see below

Thanks

Rabiah

Customer Service Advisor (Contact Centre)
Information, Customers & Communities



Rochdale Borough Council
Floor 1, Number One Riverside
Smith Street, Rochdale, OL16 1XU

To access our services go to
www.rochdale.gov.uk
For news, events and social media updates go to
www.rochdale.gov.uk/newsandevents

Please consider the environment before printing this email.

From: Council Mailbox <council@rochdale.gov.uk>

Sent: 18 September 2023 12:53

To: Hannah Buchanan <hannahbuchanan@betts-associates.co.uk>

Cc: Environmental Management <Environmental.Management@Rochdale.Gov.UK>

Subject: Re: Historic Flood Risk and Information Request

Good Afternoon

Thank you for your email, your email has been passed to the relevant service who will assist you with your enquiry.

Regards

Rochdale Council

From:
hannahbuchanan@betts-associates.co.uk
Sent: Monday, September 18, 2023 10:23 AM
To:
council@rochdale.gov.uk
Subject: Historic Flood Risk and Information Request

:CAUTION: This email originated from outside of the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

To whom it may concern,
Greenvale, Bamford, Rochdale

Please could you confirm whether you have any information that you feel would be valuable to a Flood Risk Assessment and Drainage Management Strategy for the above site (location plan attached), including details of historical flooding and specific drainage requirements; this would be greatly appreciated. If there are any other specific requirements that you require in a scope of works for this site, please can you advise at this stage so that it can be fully incorporated into the proposals at an early stage.

Please do not hesitate to contact me on the details below to discuss further should you require additional information or clarification.

Kind Regards,

Hannah Buchanan
BSc (Hons) MSc GradCIWEM
Graduate Flood Risk Analyst

BETTS HYDRO
Consulting Engineers

Old Marsh Farm Barns, Welsh Road, Sealand, Flintshire, CH5 2LY
Chester +44 (0)1244 289041

hannahbuchanan@betts-associates.co.uk
www.betts-associates.co.uk

CIVIL | STRUCTURAL | GEO-ENVIRONMENTAL | HYDROLOGY | FLOOD RISK MANAGEMENT
SUDS | STRUCTURAL SURVEYS | PARTY WALL DUTIES | INFILTRATION | GEOTECHNICAL

ELECTRONICALLY TRANSMITTED INFORMATION

This electronic transmission is strictly confidential and intended solely for the addressee. It may contain information which is covered by legal, professional or other privilege. If you are not the intended addressee, you must not disclose, copy or take any action in reliance of this transmission. If you have received this transmission in error, please notify us as soon as possible. All emails transmitted by Betts Associates, Betts Geo or Betts Hydro are virus checked. This does not guarantee that transmissions are virus free. Reference should always be made to the hard copy of any electronically transmitted files. Electronic data does not constitute contract documentation. Use of the content of our files is at your own risk. You remain responsible for anything produced using all or part of the data supplied.

Please consider the environment before printing this email

This email, its contents and any attachments are intended only for the above named. As the email may contain confidential and/or legally privileged information, if you are not, or suspect that you are not, the above named or the

person responsible for delivery of the message to the above named, please delete or destroy the email and any attachments immediately and inform the sender of the error. Unauthorised access, use, disclosure, storage or copying is not permitted and may be unlawful. The views of the author may not necessarily reflect those of Rochdale Borough Council.

Rochdale Borough Council undertakes monitoring of both incoming and outgoing e-mails. You should therefore be aware that if you send an e-mail to a person within Rochdale Borough Council it may be subject to any monitoring deemed necessary by Rochdale Borough Council from time to time. Rochdale Borough Council cannot guarantee that this message or any attachment is virus free or has not been intercepted and amended.

As a public body, Rochdale Borough Council may be required to disclose this email (or any response to it) under the Freedom of Information Act 2000, unless the information in it is covered by one of the exemptions within the Act.

Hannah Buchanan

From: Kate Fletcher <Kate.Fletcher@Rochdale.Gov.uk> on behalf of Development Management <development.management@rochdale.gov.uk>
Sent: 25 September 2023 09:48
To: Hannah Buchanan
Subject: FW: Historic Flood Risk and Information Request

Hello Hannah

After seeking advice from an officer, he states that. If you are making queries in the interest of developing the site, I would recommend that their client submit a request for pre-application advice, where all matters including flood risk can be explored in more detail.

Matters of Flood Risk are typically considered by The Environment Agency who may hold additional detail to what we do. They operate a chargeable pre-application service which they may wish to consider.

I hope this helps
Kind Regards
Kate

Kate Fletcher

Senior Technical Admin Officer
Planning & Development



☎ 01706 924306

✉ kate.fletcher@rochdale.gov.uk

Rochdale Borough Council
Floor 3, Number One Riverside
Smith Street, Rochdale, OL16 1XU

To access our services go to www.rochdale.gov.uk

For news, events and social media updates go to www.rochdale.gov.uk/newsandevents

Please consider the environment before printing this email.

From: Environmental Management <environmental.management@rochdale.gov.uk>
Sent: 19 September 2023 16:25
To: Development Management <development.management@rochdale.gov.uk>
Subject: RE: Historic Flood Risk and Information Request

Hi Kate,

This is the attachment, please let me know if it still has not come through.
Thankyou .

Regards

Karla
Customer Service Advisor

Rochdale Borough Council
Floor 1, Number One Riverside
Smith Street, Rochdale, OL16 1XU
To access our services go to www.rochdale.gov.uk
For news and social media updates go to www.rochdale.gov.uk/news

From: development.management@rochdale.gov.uk
Sent: Tuesday, September 19, 2023 12:58 PM
To: Environmental.Management@Rochdale.Gov.UK
Subject: RE: Historic Flood Risk and Information Request

Hi Rabiah, do you have the attachment at all?

Thanks
Kate

Kate Fletcher
Senior Technical Admin Officer
Planning & Development



☎ 01706
924306
✉ kate.fletcher@rochdale.gov.uk

Rochdale Borough Council
Floor 3, Number One Riverside
Smith Street, Rochdale, OL16 1XU

To access our services go to
www.rochdale.gov.uk
For news, events and social media updates go to
www.rochdale.gov.uk/newsandevents

Please consider the environment before printing this email.

From: Environmental Management <Environmental.Management@Rochdale.Gov.UK>
Sent: 19 September 2023 12:16
To: Development Management <development.management@rochdale.gov.uk>
Subject: FW: Historic Flood Risk and Information Request

Afternoon,

Please see below

Thanks

Rabiah
Customer Service Advisor (Contact Centre)
Information, Customers & Communities

Rochdale Borough Council
Floor 1, Number One Riverside
Smith Street, Rochdale, OL16 1XU

To access our services go to

www.rochdale.gov.uk

For news, events and social media updates go to

www.rochdale.gov.uk/newsandevents

Please consider the environment before printing this email.

From: Council Mailbox <council@rochdale.gov.uk>

Sent: 18 September 2023 12:53

To: Hannah Buchanan <hannahbuchanan@betts-associates.co.uk>

Cc: Environmental Management <Environmental.Management@Rochdale.Gov.UK>

Subject: Re: Historic Flood Risk and Information Request

Good Afternoon

Thank you for your email, your email has been passed to the relevant service who will assist you with your enquiry.

Regards

Rochdale Council

From:

hannahbuchanan@betts-associates.co.uk

Sent: Monday, September 18, 2023 10:23 AM

To:

council@rochdale.gov.uk

Subject: Historic Flood Risk and Information Request

:CAUTION: This email originated from outside of the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

To whom it may concern,

Greenvale, Bamford, Rochdale

Please could you confirm whether you have any information that you feel would be valuable to a Flood Risk Assessment and Drainage Management Strategy for the above site (location plan attached), including details of historical flooding and specific drainage requirements; this would be greatly appreciated. If there are any other specific requirements that you

require in a scope of works for this site, please can you advise at this stage so that it can be fully incorporated into the proposals at an early stage.

Please do not hesitate to contact me on the details below to discuss further should you require additional information or clarification.

Kind Regards,

Hannah Buchanan

BSc (Hons) MSc GradCIWEM

Graduate Flood Risk Analyst

BETTS HYDRO

Consulting Engineers

Old Marsh Farm Barns, Welsh Road, Sealand, Flintshire, CH5 2LY
Chester +44 (0)1244 289041

hannahbuchanan@betts-associates.co.uk

www.betts-associates.co.uk

CIVIL | STRUCTURAL | GEO-ENVIRONMENTAL | HYDROLOGY | FLOOD RISK MANAGEMENT
SUDS | STRUCTURAL SURVEYS | PARTY WALL DUTIES | INFILTRATION | GEOTECHNICAL

ELECTRONICALLY TRANSMITTED INFORMATION

This electronic transmission is strictly confidential and intended solely for the addressee. It may contain information which is covered by legal, professional or other privilege. If you are not the intended addressee, you must not disclose, copy or take any action in reliance of this transmission. If you have received this transmission in error, please notify us as soon as possible. All emails transmitted by Betts Associates, Betts Geo or Betts Hydro are virus checked. This does not guarantee that transmissions are virus free. Reference should always be made to the hard copy of any electronically transmitted files. Electronic data does not constitute contract documentation. Use of the content of our files is at your own risk. You remain responsible for anything produced using all or part of the data supplied.

Please consider the environment before printing this email

This email, its contents and any attachments are intended only for the above named. As the email may contain confidential and/or legally privileged information, if you are not, or suspect that you are not, the above named or the person responsible for delivery of the message to the above named, please delete or destroy the email and any attachments immediately and inform the sender of the error. Unauthorised access, use, disclosure, storage or copying is not permitted and may be unlawful. The views of the author may not necessarily reflect those of Rochdale Borough Council.

Rochdale Borough Council undertakes monitoring of both incoming and outgoing e-mails. You should therefore be aware that if you send an e-mail to a person within Rochdale Borough Council it may be subject to any monitoring deemed necessary by Rochdale Borough Council from time to time. Rochdale Borough Council cannot guarantee that this message or any attachment is virus free or has not been intercepted and amended.

As a public body, Rochdale Borough Council may be required to disclose this email (or any response to it) under the Freedom of Information Act 2000, unless the information in it is covered by one of the exemptions within the Act.

APPENDIX E: LOCATION PLAN

This page has been left intentionally blank

LOCATION PLAN

Greenvale, Bamford, Rochdale



OS X (Eastings)	386034
OS Y (Northings)	413432
Nat Grid	SD860134 / SD8603413432
Nearest Post Code	OL11 5QL
Lat (WGS84)	N53:37:02 (53.61724358865183)
Long (WGS84)	W2:12:45 (-2.2125958835149233)
Lat, Long (WGS84)	53.61724358865183,-2.2125958835149233
Lat (OSGB36)	N53:37:01 (53.617011035206254)
Long (OSGB36)	W2:12:40 (-2.2111475770717584)
Lat, Long (OSGB36)	53.617011035206254,-2.2111475770717584



APPENDIX F: TOPOGRAPHICAL SURVEY

This page has been left intentionally blank

APPENDIX G: SITE PHOTOGRAPHS

This page has been left intentionally blank



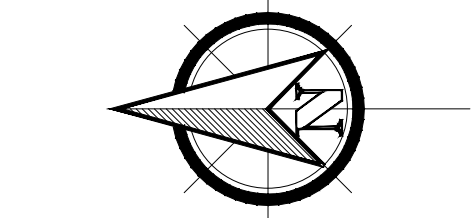




APPENDIX H: PROPOSED SITE LAYOUT

This page has been left intentionally blank

Code	House Type	Bed & Type	Storey	Parking	Unit No.	Build Sq/Ft	Total Built Sq/Ft	Mix %
Affordable								
GOA	Greenfield	3B-4P Mews	2	2PS	3	970	3010	7%
GOA	Ordnance	4B-5P Semi	2.5	2PS	3	1294	3882	7%
Sub-Total							6792	13%
Open Market								
PAR	Parkland	3B-4P Semi / Detached	2	2PS	5	1012	5060	11%
MEA	Meadowdale	3B-4P Semi	2	2PS	9	1094	9846	20%
HIG	Highstone	4B-7P Detached	2	2PS + 5IG	7	1396	9772	16%
PEA	Peakridge	5B-8P Detached	2	2PS + 5IG	6	1679	10074	13%
STA	Standish	5B-8P Detached	2	2PS + 5IG	6	1907	11442	13%
CAP	Capstone	5B-8P Detached	2	2PS + DOG	6	2240	13440	13%
Sub-Total							59634	87%
TOTAL							66426	100%
Gross Site Area			6.66 Acres		45		11592	
Nett Site Area			4.23 Acres		11		1704	
Net Density			1704 Units/Acre		45		1704	
Sq/Ft/Net Developable Acre			15704		Sq/Ft/Acre		15704	



- General notes:
- All information on this drawing is copyright ©
 - All dimensions are to the face of the work
 - No dimensions to be scaled off this drawing
 - All dimensions to be scaled off this drawing
 - This drawing is to be read in conjunction with all other project drawings
 - In locations where it is not possible to erect a boundary treatment on the line of the legal ownership, an additional line will be identified on the above plan to illustrate the ownership boundary. This boundary line will be erected in cases to the site boundary. A possible alternative drawing is shown in the drawing. The drawing is a result of the following items:

Existing hedgerows/trees and woodland areas

Existing boundary fences and significant topographical features

Proposed and existing retaining structures and foundations.

The architect is responsible for maintaining all items within the plot boundary identified by the red edge boundary.

DRAWING TO BE PRINTED IN COLOUR.

KEY	
Red Edge Application Boundary	
Adopted Roads	
Adopted footpaths	
Shared Drives	
Parking Bays	
Private Paths	
Private Gardens	
Open Space	
Grasscrete / Bodysave ground reinforcement	
Pond / Attenuation Pond	
Self binding hoggin path	
Plot divisional boundaries	
Knee Rail	
Brick Pier Wall & Timber Infill	
Screen Wall R4	
Railings	
Service verge	
Feature Plot with dual aspect elevations	
Affordable Units	
Feather Edge Fencing & gre	
Denotes overhead line swing	
1.2M Estate Railing Gate (BT1201)	
Indicative Tree Planting	
Removed Trees / Hedges	
Retained Trees / Hedges	

REV	DATE	DESCRIPTION
0	19/03/2024	Added in landscape for the substation and included amenity wall
N	12/03/2024	Updated substation location and boundary treatment. Following client comment.
M	11/03/2024	Updated plot 47's parking and substation location. Updated plot 1's parking and added amenity wall
L	22/01/2024	Added additional ramping following client comment.
J	19/01/2024	Updated plot 47's parking and substation location. Updated plot 1's parking and added amenity wall
I	16/01/2024	Updated plot 47's parking and substation location. Updated plot 1's parking and added amenity wall
H	15/01/2024	Updated plot 47's parking and substation location. Updated plot 1's parking and added amenity wall
G	14/01/2024	Updated plot 47's parking and substation location. Updated plot 1's parking and added amenity wall
F	27/11/2023	Plot 19 & 20 swapped 1:5 ft 27.52 moved towards overhead cables.
E	19/03/2023	Stock updates to issue 02. Minor amendments following production of planning pack.
C	04/03/2023	Overhead cable survey lines updated. Plot along amenity line adjusted accordingly. Includes amenity wall and substation location.
B	04/03/2023	Plot 19 & 20 swapped 1:5 ft 27.52 moved towards overhead cables.
A	04/03/2023	Substation moved & amenity wall adjusted to accommodate. Plot 47 swapped to HIG. Plot 48 swapped to HIG. Plot 49 swapped to HIG. Plot 50 swapped to HIG.



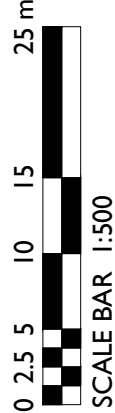
Project Title:
**GREENVALE
BAMFORD
ROCHDALE**

Drawing Title:
PROPOSED SITE LAYOUT (JG Option 07)

PLANNING

Drawing No:	WH-001-NW-A-401	Site Code:	001
Scale:	1:500@A1	Date:	Sep 2025
Drawn by:	JSG	Checked by:	XX
		Revision:	0

Existing trees to the southern boundary and just around its south-eastern corner stock trees, that will be located outside the private garden boundaries, within a linear 2m wide strip of land that it is to be maintained by the management company.



APPENDIX I: SURFACE WATER RUN-OFF CALCULATIONS

This page has been left intentionally blank

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

Project details

Date	24/03/2025
Calculated by	
Reference	
Model version	0.6.5

Location

Site name	Greenvale
Site location	Bamford



Site easting	386026
Site northing	413446

Site details

Total site area (ha)	1	ha
----------------------	--------------------------------	----

Greenfield runoff

Method

Method	FEH statistical
--------	-----------------

FEH statistical

	<u>My value</u>		<u>Map value</u>
SAAR (mm)	1174	mm	1157
BFIHOST	0.531		
QMed-QBar conversion	1.075		1.075
QMed (l/s)	7.84	l/s	
QBar (FEH statistical) (l/s)	8.4	l/s	

Growth curve factors

	<u>My value</u>		<u>Map value</u>
Hydrological region	10		10
1 year growth factor	0.87		
2 year growth factor	0.93		
10 year growth factor	1.38		
30 year growth factor	1.7		
100 year growth factor	2.08		
200 year growth factor	2.37		

Results

Method	FEH statistical	
Flow rate 1 year (l/s)	7.3	l/s
Flow rate 2 year (l/s)	7.8	l/s
Flow rate 10 years (l/s)	11.6	l/s
Flow rate 30 years (l/s)	14.3	l/s
Flow rate 100 years (l/s)	17.5	l/s
Flow rate 200 years (l/s)	20	l/s

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (0.6.5) developed by HR Wallingford and available at uksuds.com (<https://www.uksuds.com/>).

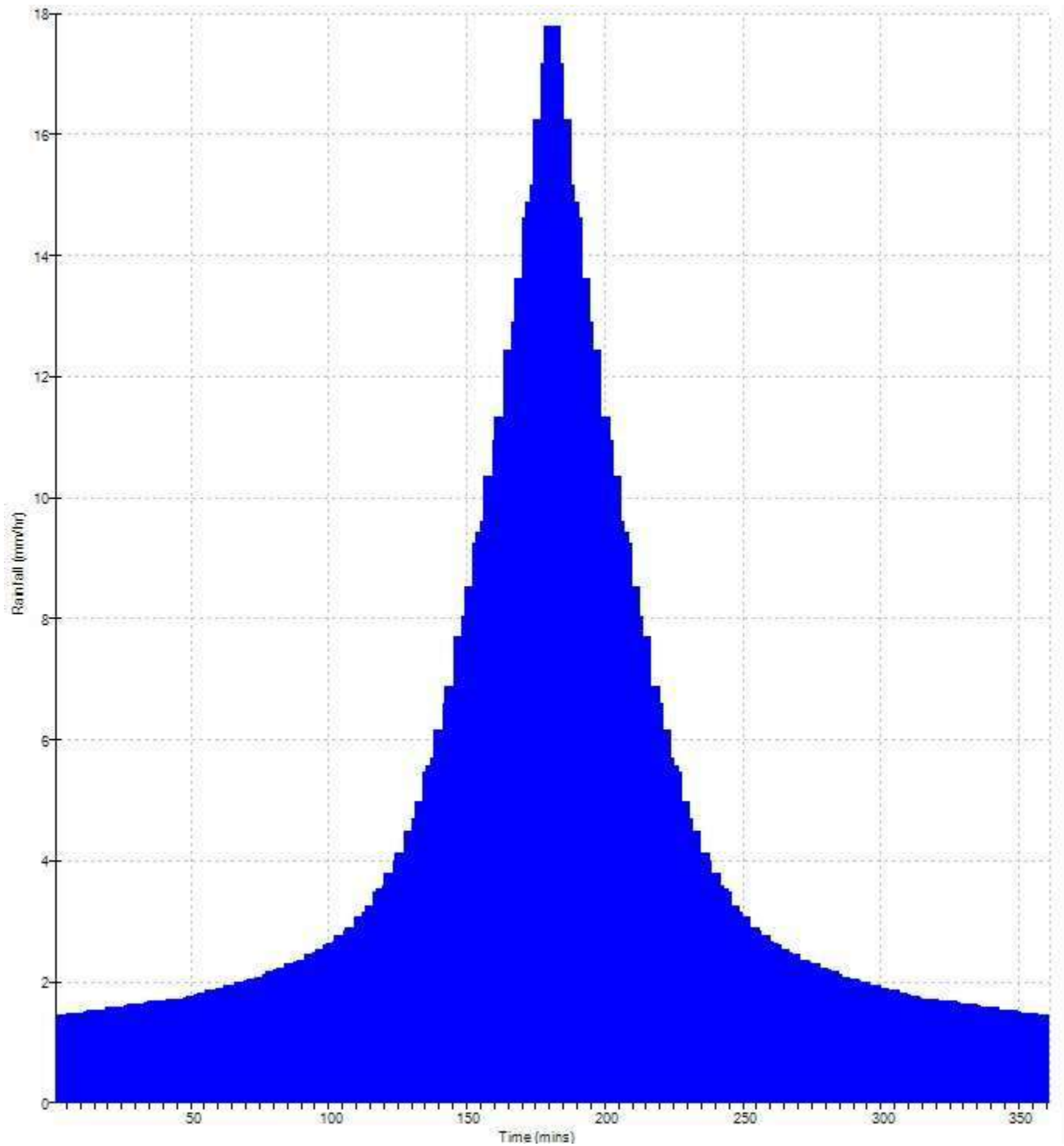
The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at [uksuds.com/terms-conditions](https://www.uksuds.com/terms-conditions) (<https://www.uksuds.com/terms-conditions>). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

Betts Associates Ltd		Page 1
6 Old Marsh Farm Barns Welsh Road, Sealand Flintshire, CH5 2LY	Greenvale Bamford	
Date 28/11/2024	Designed by HB	
File	Checked by KH	
Innovyze	Network 2020.1.3	

Rainfall profile

Storm duration (mins) 360

FEH Data	
FEH Rainfall Version	2013
Site Location	GB 386015 413468 SD 86015 13468
Data Type	Point
Peak Intensity (mm/hr)	17.795
Ave. Intensity (mm/hr)	4.539
Return Period (years)	2.0

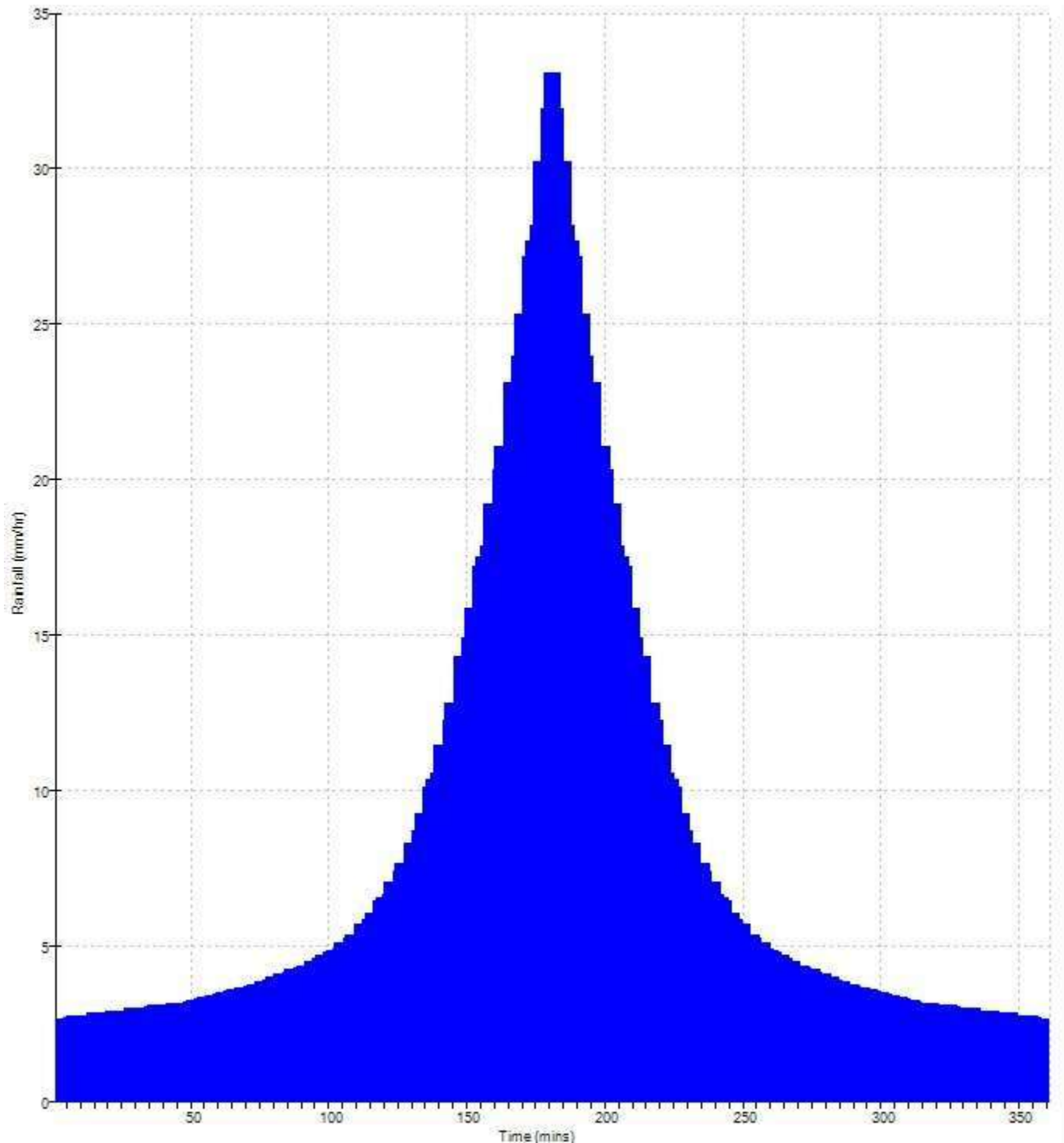


Betts Associates Ltd		Page 1
6 Old Marsh Farm Barns Welsh Road, Sealand Flintshire, CH5 2LY	Greenvale Bamford	
Date 28/11/2024	Designed by HB	
File	Checked by KH	
Innovyze	Network 2020.1.3	

Rainfall profile

Storm duration (mins) 360

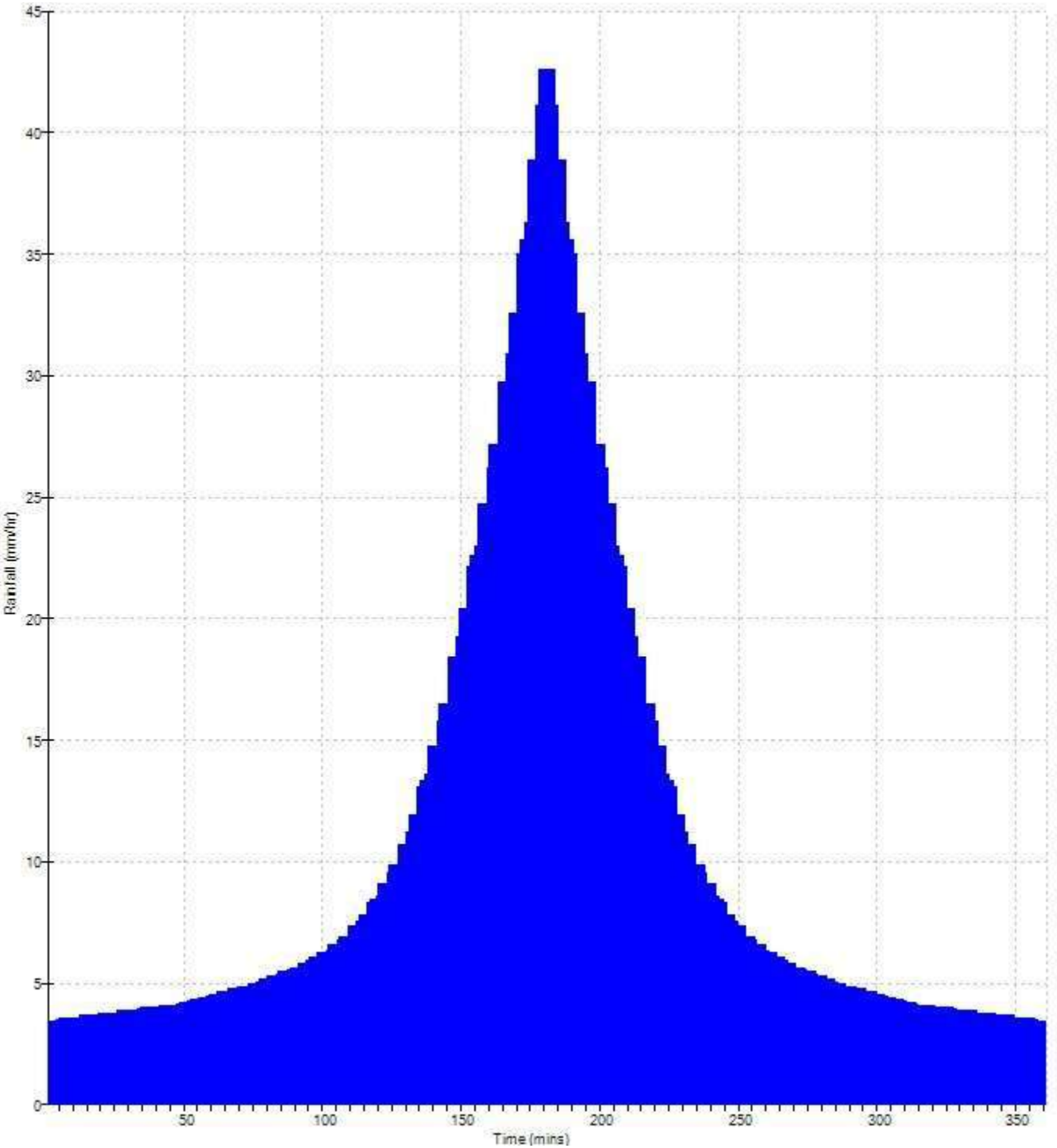
FEH Data	
FEH Rainfall Version	2013
Site Location	GB 386015 413468 SD 86015 13468
Data Type	Point
Peak Intensity (mm/hr)	33.095
Ave. Intensity (mm/hr)	8.443
Return Period (years)	30.0



Rainfall profile

Storm duration (mins) 360

FEH Data	
FEH Rainfall Version	2013
Site Location	GB 386015 413468 SD 86015 13468
Data Type	Point
Peak Intensity (mm/hr)	42.594
Ave. Intensity (mm/hr)	10.866
Return Period (years)	100.0



Betts Associates Ltd		Page 1
Old Marsh Farm Barns Welsh Road Sealand Flintshire CH5 2LY	Greenvale Bamford	
Date 28/03/2025 File	Designed by SM Checked by HB	
Micro Drainage Source Control 2020.1		

Greenfield Runoff Volume

FEH Data

Return Period (years)	2
Storm Duration (mins)	360
FEH Rainfall Version	2013
Site Location	GB 386015 413468 SD 86015 13468
Data Type	Point
Areal Reduction Factor	1.00
Area (ha)	2.695
SAAR (mm)	1174
CWI	123.754
SPR Host	36.700
URBEXT (1990)	0.0000

Results

Percentage Runoff (%)	36.39
Greenfield Runoff Volume (m ³)	267.102

©1982-2020 Innovyze

Betts Associates Ltd		Page 1																										
Old Marsh Farm Barns Welsh Road Sealand Flintshire CH5 2LY	Greenvale Bamford																											
Date 28/03/2025 File	Designed by SM Checked by HB																											
Micro Drainage Source Control 2020.1																												
<u>Greenfield Runoff Volume</u> FEH Data <table> <tr> <td>Return Period (years)</td> <td>30</td> </tr> <tr> <td>Storm Duration (mins)</td> <td>360</td> </tr> <tr> <td>FEH Rainfall Version</td> <td>2013</td> </tr> <tr> <td>Site Location</td> <td>GB 386015 413468 SD 86015 13468</td> </tr> <tr> <td>Data Type</td> <td>Point</td> </tr> <tr> <td>Areal Reduction Factor</td> <td>1.00</td> </tr> <tr> <td>Area (ha)</td> <td>2.695</td> </tr> <tr> <td>SAAR (mm)</td> <td>1174</td> </tr> <tr> <td>CWI</td> <td>123.754</td> </tr> <tr> <td>SPR Host</td> <td>36.700</td> </tr> <tr> <td>URBEXT (1990)</td> <td>0.0000</td> </tr> </table> Results <table> <tr> <td>Percentage Runoff (%)</td> <td>38.75</td> </tr> <tr> <td>Greenfield Runoff Volume (m³)</td> <td>528.952</td> </tr> </table>			Return Period (years)	30	Storm Duration (mins)	360	FEH Rainfall Version	2013	Site Location	GB 386015 413468 SD 86015 13468	Data Type	Point	Areal Reduction Factor	1.00	Area (ha)	2.695	SAAR (mm)	1174	CWI	123.754	SPR Host	36.700	URBEXT (1990)	0.0000	Percentage Runoff (%)	38.75	Greenfield Runoff Volume (m ³)	528.952
Return Period (years)	30																											
Storm Duration (mins)	360																											
FEH Rainfall Version	2013																											
Site Location	GB 386015 413468 SD 86015 13468																											
Data Type	Point																											
Areal Reduction Factor	1.00																											
Area (ha)	2.695																											
SAAR (mm)	1174																											
CWI	123.754																											
SPR Host	36.700																											
URBEXT (1990)	0.0000																											
Percentage Runoff (%)	38.75																											
Greenfield Runoff Volume (m ³)	528.952																											
©1982-2020 Innovyze																												

Betts Associates Ltd		Page 1
Old Marsh Farm Barns Welsh Road Sealand Flintshire CH5 2LY	Greenvale Bamford	
Date 28/03/2025 File	Designed by SM Checked by HB	
Micro Drainage Source Control 2020.1		

Greenfield Runoff Volume

FEH Data

Return Period (years)	100
Storm Duration (mins)	360
FEH Rainfall Version	2013
Site Location	GB 386015 413468 SD 86015 13468
Data Type	Point
Areal Reduction Factor	1.00
Area (ha)	2.695
SAAR (mm)	1174
CWI	123.754
SPR Host	36.700
URBEXT (1990)	0.0000

Results

Percentage Runoff (%)	40.69
Greenfield Runoff Volume (m ³)	715.004

©1982-2020 Innovyze

SURFACE WATER RUN-OFF CALCULATION SHEET



Development	Greenvale, Bamford
Project No.	HYD883

Revision	C	Completed by	BE
Date	12/12/2024	Checked by	HB

Areas			
Total Site	2.695	ha	
Development Area ¹	2.695	ha	
Existing Impermeable		ha	
Existing Impermeable ²		ha	
Existing Pervious	2.695	ha	
Existing Pervious ²	0.000	ha	
Proposed total impermeable	1.752	ha	65%
*55% impermeable Post-Dev. + 10% Allowance For Urban Creep			

Catchment Characteristics			
SAAR	1174	mm	
SPR	0.367	est. Using BFI	
BFI	0.531		
i ₁	17.8	mm/hr	d ₁ 26.4 mm
i ₃₀	33.1	mm/hr	d ₃₀ 51.4 mm
i ₁₀₀	42.6	mm/hr	d ₁₀₀ 63.5 mm

Run-off Rates-FEH Method			
Pre-development			
Impermeable -----	1yr	0.0	l/s
	30yr	0.0	l/s
	100yr	0.0	l/s
	50mm/hr ³	0.0	l/s
Pervious ⁴ -----	1yr	19.7	l/s
	30yr	38.5	l/s
	100yr	47.2	l/s
	QBar ⁵	21.0	l/s
Total -----	1yr	19.7	l/s
	30yr	38.5	l/s
	100yr	47.2	l/s
Post-development (without control)			
Impermeable ⁶ -----	1yr	86.6	l/s
	30yr	161.0	l/s
	100yr+45%CC	300.5	l/s

Volumes			
Pre-development			
Impermeable -----	1yr	0.0	cu.m
	30yr	0.0	cu.m
	100yr	0.0	cu.m
Pervious ⁴ -----	1yr	267.1	cu.m
	30yr	529.0	cu.m
	100yr	715.0	cu.m
Total -----	1yr	267.1	cu.m
	30yr	529.0	cu.m
	100yr	715.0	cu.m
Post-development			
Impermeable ⁶ -----	1yr	462.8	cu.m
	30yr	899.7	cu.m
	100yr	1111.5	cu.m

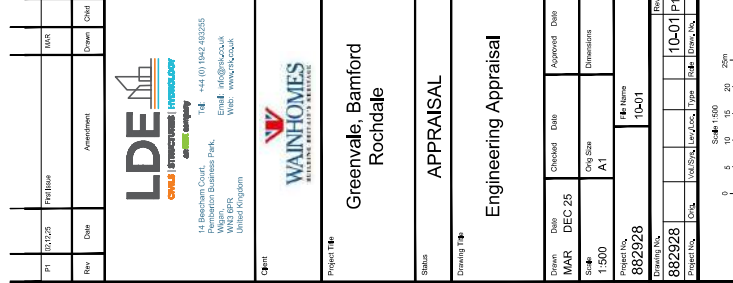
Stormwater Storage Estimates			
Based on Greenfield run-off QBar			
Microdrainage Quick Storage Estimates [using FEH catchment data]			
Return Period	Rate	lower	upper
1yr	16.9 l/s	208	428
30yr	16.9 l/s	560	913
100yr+45%CC	16.9 l/s	1310	2236
			mean
			318 cu.m
			736.5 cu.m
			1773 cu.m

1/ The 'development area' removes areas of POS and/or landscaped areas of the wider site that are to remain as existing.
 2/ On occasion the existing impermeable area cannot be evidenced to connect and a reduction is applied.
 3/ 50mm/hr is used for BRegs calculations and often used by Water Companies when considering allowable post-development rates of discharge. (Rational Method)
 4/ The Greenfield rates and of run-off have been calculated using the UK SUDS Calculator
 5/ QBar is the estimated flood flow for the 2.33yr return period event and is often used as a post-development rate restriction.
 6/ Post-development run-off is only considered from the impermeable area when the proposed post-development impermeable area >50% in accordance with the EA Guidance Preliminary rainfall runoff management for developments (W5-074/A/TR1/1 rev E (2012).

NB. The catchment characteristics are from the FEH catchment, the UK SUDS Calculator and Microdrainage.
 NB. The rainfall intensities and depths are calculated for the 6hr duration rainfall event (peak summer intensity)

APPENDIX J: DRAINAGE APPRAISAL

This page has been left intentionally blank



Surface Water drainage philosophy

- Surface water drainage system drains via gravity to the existing 300mm sewer which is being diverted as part of the total surface water disposal proposal.
- The total surface water discharge rate is proposed to be 15.9 l/s. This will need to be reviewed and approved by the relevant authorities. Basin is designed to contain the 2 year, 30 year and 100 year + 45% CC event flood volumes.
- Surface water discharges allow for 10% Urban Creep and garden run off over the 100 year run off rates for gardens that fall towards the development.
- CV value of 1,000 applied as requested by the LPA's.

Foul Water drainage philosophy

- Foul water network to drain to the proposed foul water pump station, flows are then pumped up to the existing foul water sewer located at the site entrance
- This is to be confirmed as acceptable by United Utilities
- 7.2m³ of emergency storage is required for the foul water in event of pump failure.

Prior to any construction, the contractor must confirm the precise invert level and pipe diameter of the receiving drainage system and must immediately advise RSK of any variation to that upon which the design has been based.

Note: The highways and drainage works are subject to Technical Approval from the LLFA, Highways and United Utilities respectively and may therefore change

The details provided on this drawing are subject to comments by all 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 Wainhomes risk and no liability will be accepted by RSK. Scheme based on Site plan ref. Revf.

APPENDIX K: QUICK STORAGE ESTIMATES

This page has been left intentionally blank

QUICK STORAGE ESTIMATES

GREENVALE, BAMFORD

1 YEAR RETURN PERIOD STORM EVENT

Variables	
FEH Rainfall	Cv (Summer) 1.000
Return Period (years) 2	Cv (Winter) 1.000
Version 2013 Point	Impermeable Area (ha) 1.752
Site GB 386015 413468 SD 86015 13468	Maximum Allowable Discharge (l/s) 16.9
	Infiltration Coefficient (m/hr) 0.00000
	Safety Factor 2.0
	Climate Change (%) 0

Results	
Global Variables require approximate storage of between 208 m ³ and 426 m ³ .	
These values are estimates only and should not be used for design purposes.	

30 YEAR RETURN PERIOD STORM EVENT

Variables	
FEH Rainfall	Cv (Summer) 1.000
Return Period (years) 30	Cv (Winter) 1.000
Version 2013 Point	Impermeable Area (ha) 1.752
Site GB 386015 413468 SD 86015 13468	Maximum Allowable Discharge (l/s) 16.9
	Infiltration Coefficient (m/hr) 0.00000
	Safety Factor 2.0
	Climate Change (%) 0

Results	
Global Variables require approximate storage of between 560 m ³ and 913 m ³ .	
These values are estimates only and should not be used for design purposes.	

QUICK STORAGE ESTIMATES

GREENVALE, BAMFORD

100 YEAR RETURN PERIOD STORM EVENT + 45% CLIMATE CHANGE

Variables	
FEH Rainfall	Cv (Summer) 1.000
Return Period (years) 100	Cv (Winter) 1.000
Version 2013 Point	Impermeable Area (ha) 1.752
Site GB 386015 413468 SD 86015 13468	Maximum Allowable Discharge (l/s) 16.9
	Infiltration Coefficient (m/hr) 0.00000
	Safety Factor 2.0
	Climate Change (%) 45

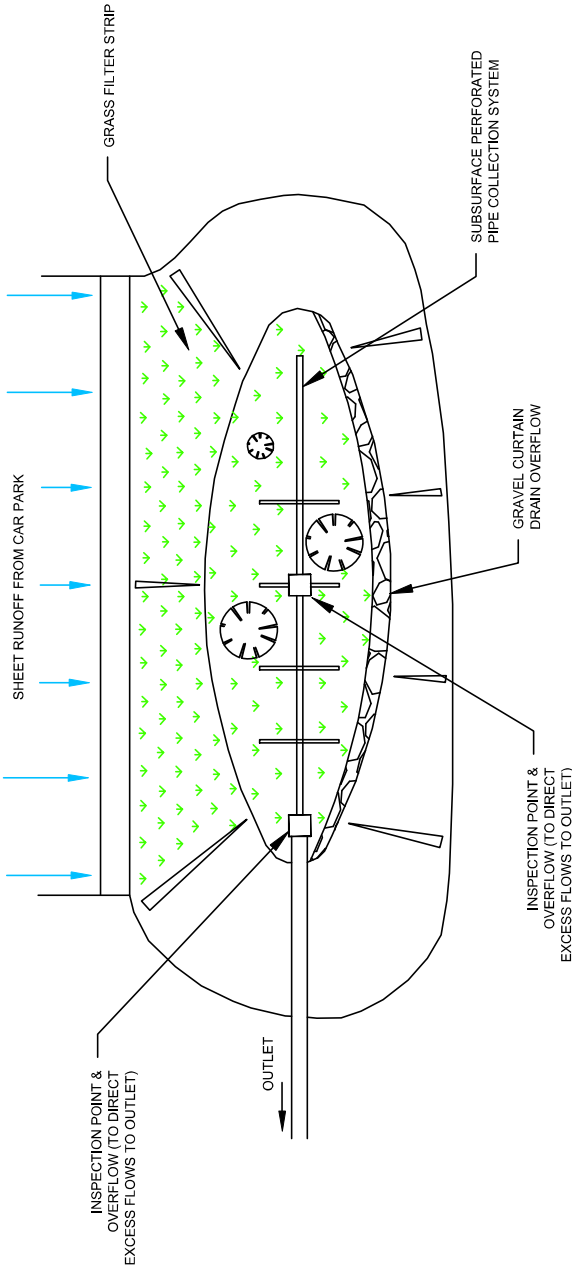
Results
Global Variables require approximate storage of between 1310 m ³ and 2236 m ³ .
These values are estimates only and should not be used for design purposes.

This page has been left intentionally blank.

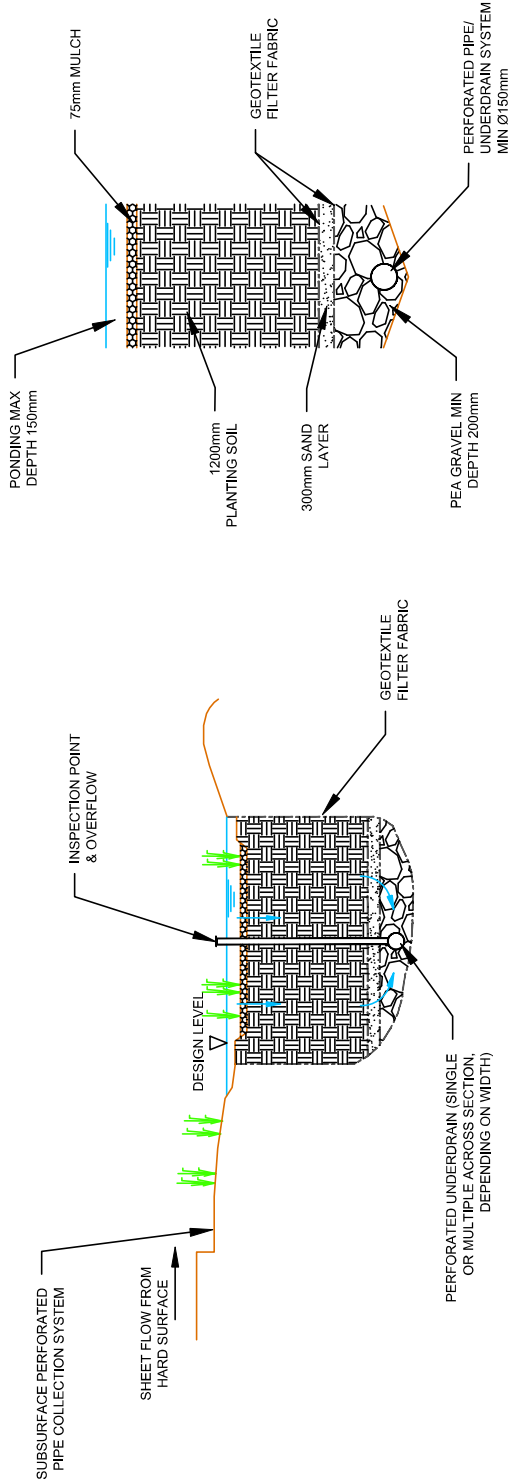
APPENDIX L: SUDS EXAMPLES

This page has been left intentionally blank

DO NOT SCALE



PLAN VIEW



PROFILE

TYPICAL SECTION

PROJECT:

TYPICAL SUDS DETAIL

TITLE:

BIORETENTION APPLICATIONS

DATE:	SCALE:	SIZE:	DRAWN:	CHECKED:
SEP 2014	① A3	CP	RDN	RDN
PROJECT No:	DRAWING No:	REV:		
BETTS	112	A		

REV

DATE

BY

DESCRIPTION

CHK

DRAWING STATUS: PRELIMINARY

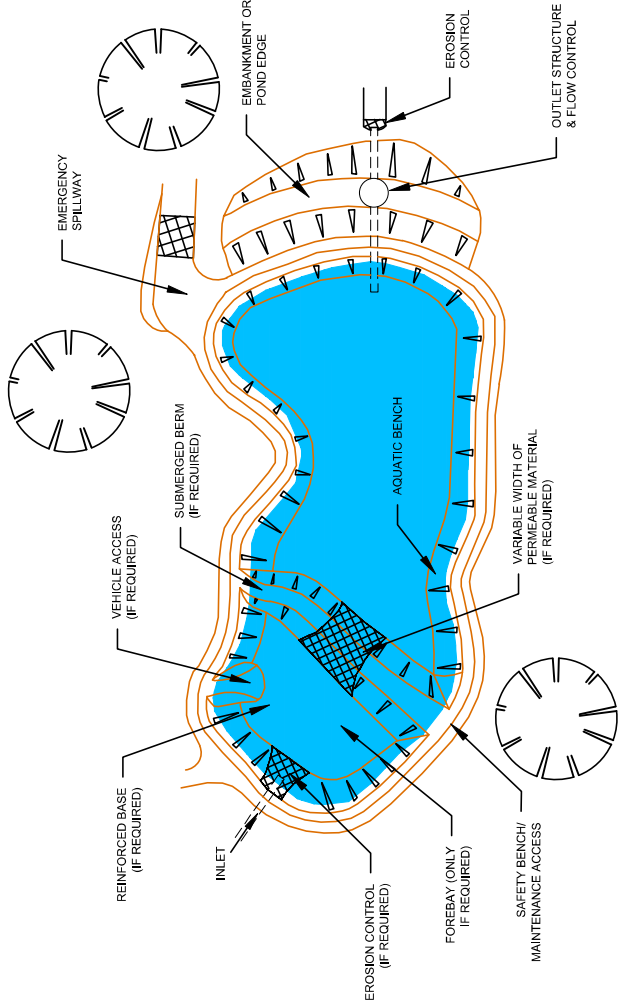
BETTS ASSOCIATES

CIVIL AND STRUCTURAL ENGINEERS

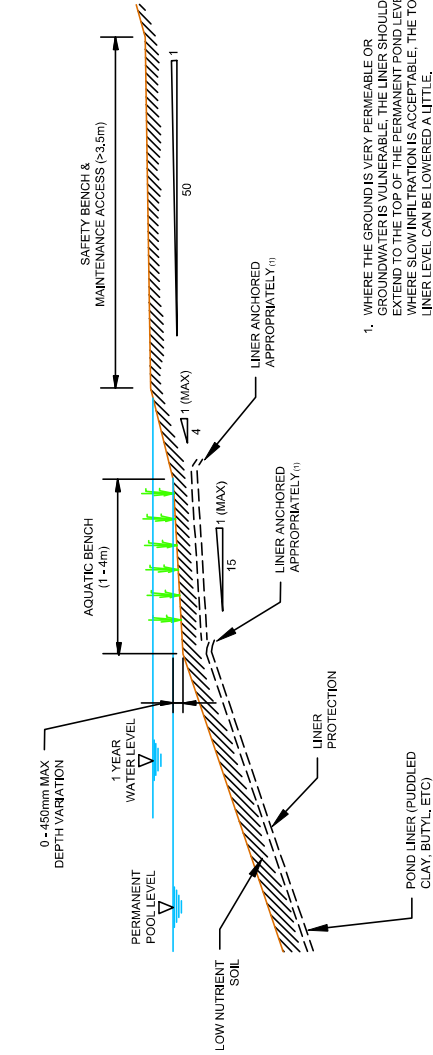
Unit 6, Old Moor Farm Barns, Main Road, Solihull, Edgbaston, Birmingham B37 2LY

Tel: 0121 444 288178 Fax: 0121 444 288115 enquiries@betts-associates.co.uk

DO NOT SCALE

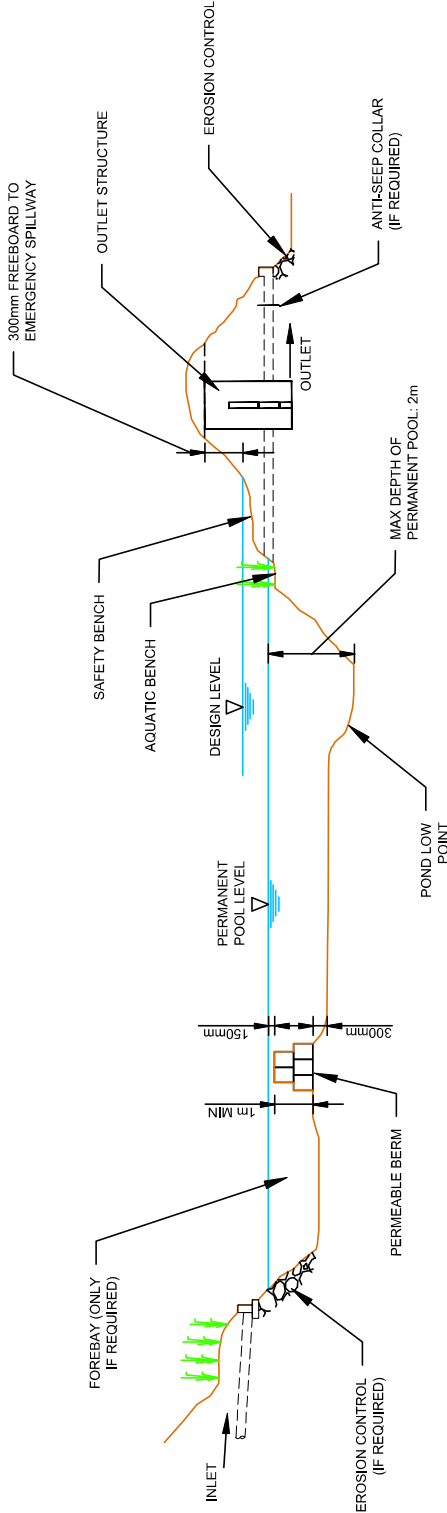


PLAN VIEW



1. WHERE THE GROUND IS VERY PERMEABLE OR GROUNDWATER IS VULNERABLE, THE LINER SHOULD EXTEND TO THE TOP OF THE PERMANENT POND LEVEL, WHERE SLOW INFILTRATION IS ACCEPTABLE, THE TOP LINER LEVEL CAN BE LOWERED A LITTLE.

TYPICAL POND EDGE GEOMETRY



PROFILE

REV	DATE	BY	DESCRIPTION	CHK
-----	------	----	-------------	-----

DRAWING STATUS:

PRELIMINARY

BETTS ASSOCIATES
CIVIL AND STRUCTURAL ENGINEERS
Unit 6, Old Morth Farm, Barns, Wether Road, Solihull, Edgbaston, Birmingham B15 2LY
Tel: 0121 444 288178 Fax: 0121 444 288115 email: info@betts-associates.co.uk

PROJECT:

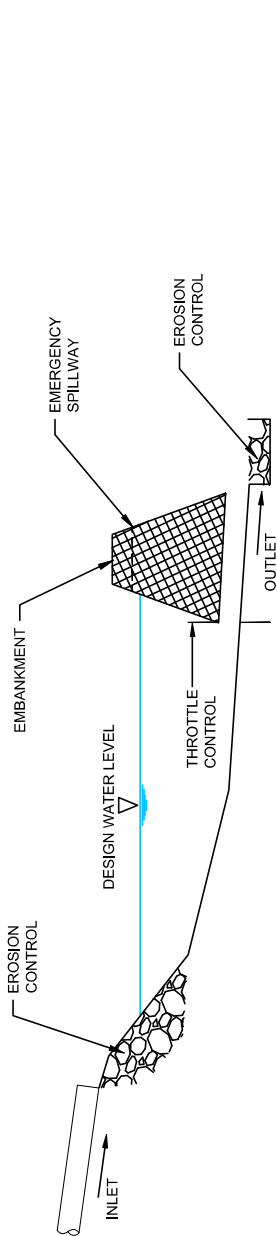
TYPICAL SUDS DETAIL

TITLE:

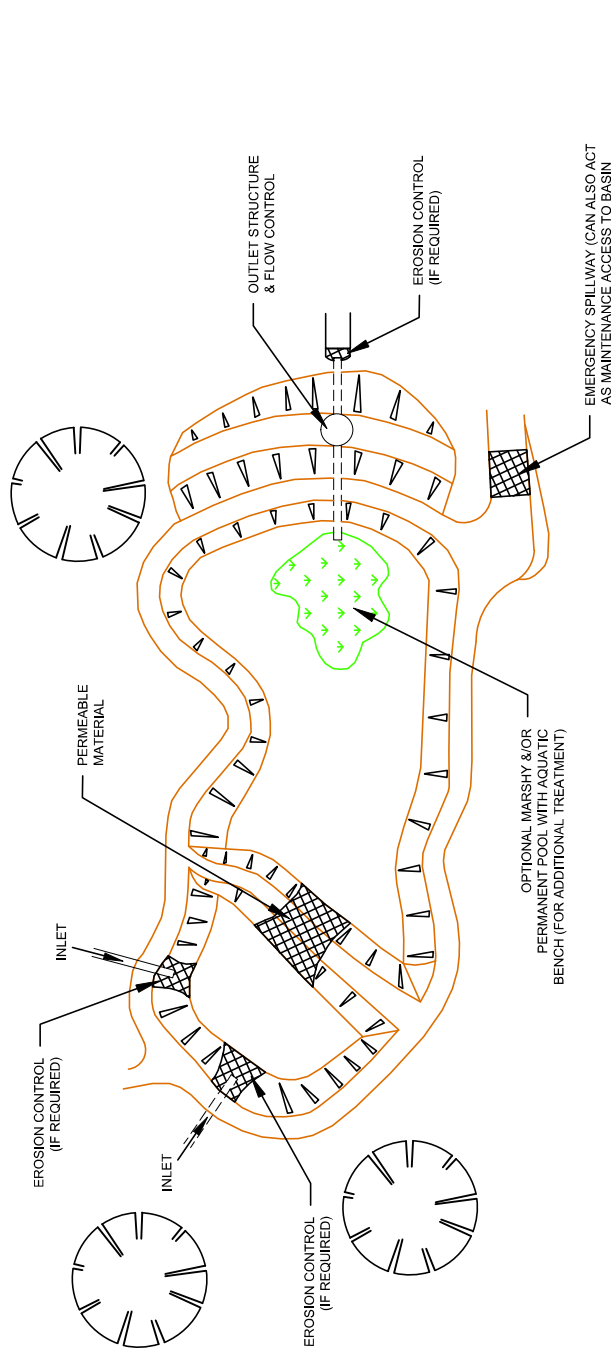
WET PONDS

DATE:	SCALE:	SIZE:	DRAWN:	CHECKED:
SEP 2014	A3	CP	RDN	RDN
PROJECT No:	DRAWING No:	REV:		
BETTS	111	A		

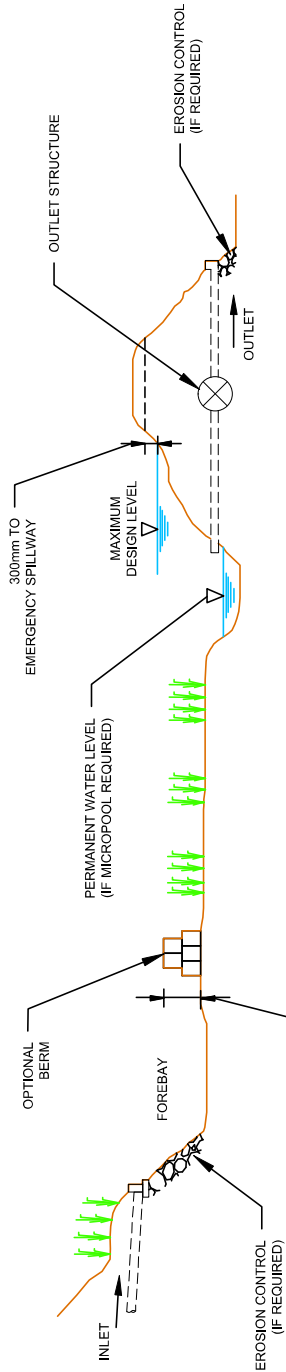
DO NOT SCALE



SCHEMATIC OF DETENTION
BASIN PROFILE



PLAN VIEW



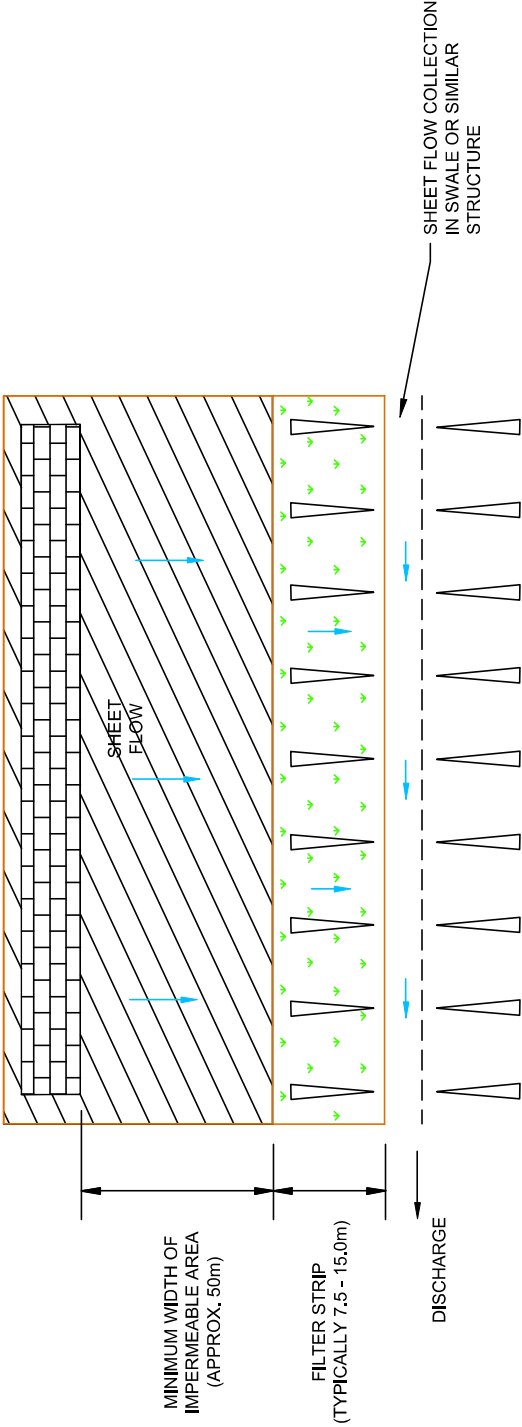
ELEVATION

REV	DATE	BY	DESCRIPTION	CHK
DRAWING STATUS: PRELIMINARY				

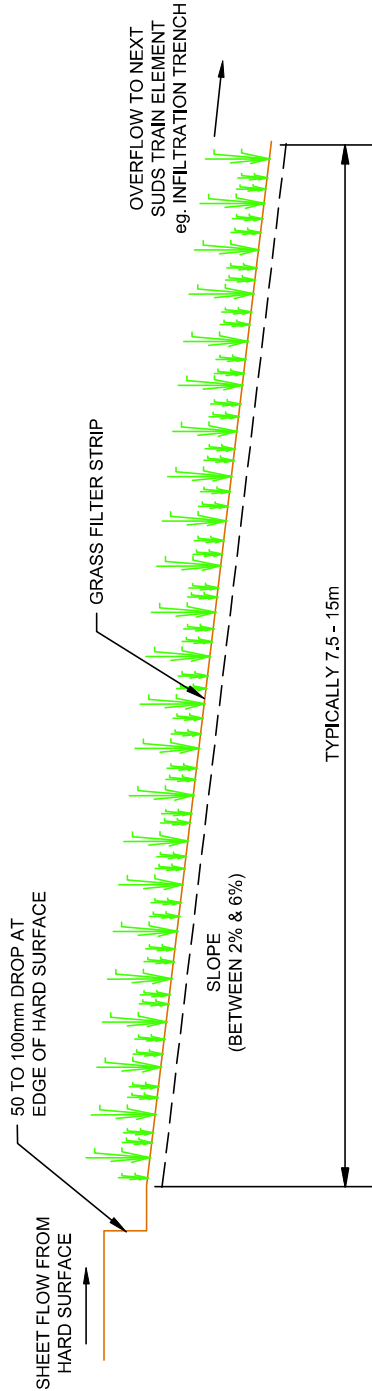
BETTS ASSOCIATES
CIVIL AND STRUCTURAL ENGINEERS
Unit 5, Old North Farm Barns, West Road, Fintona, CH5 2LY
Tel: 01244 288178 Fax: 01244 288315 enquiries@betts-associates.co.uk

PROJECT: TYPICAL SUDS DETAIL				
TITLE: DETENTION BASINS				
DATE: SEP 2014	SCALE: @ A3	SIZE: CP	DRAWN: RDN	CHECKED: RDN
PROJECT No: BETTS	DRAWING No: 110	REV: A		

DO NOT SCALE



PLAN



ELEVATION

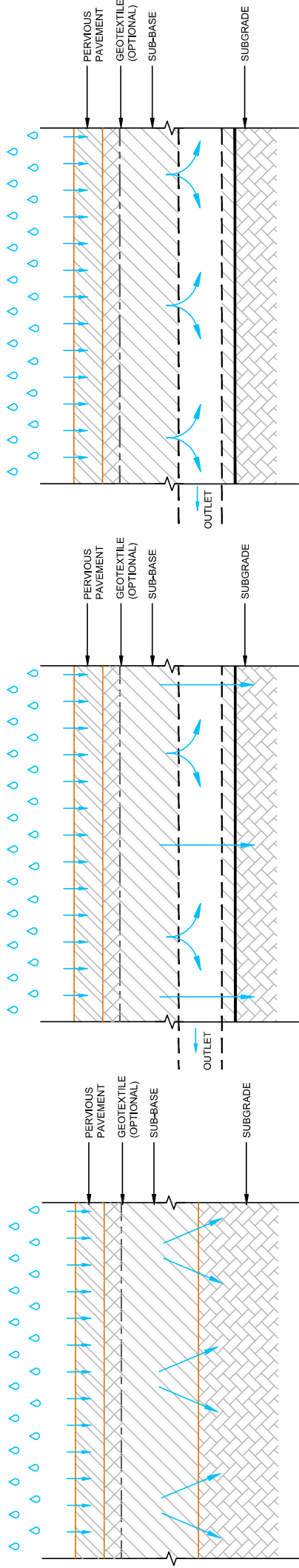
REV	DATE	BY	DESCRIPTION	CHK

DRAWING STATUS: PRELIMINARY

BETTS ASSOCIATES
CIVIL AND STRUCTURAL ENGINEERS
Unit 6, Old Moor Farm Barns, Main Road, Solihull, Finesse CH5 2LY
Tel: 01244 288178 Fax: 01244 288515 enquiries@betts-associates.co.uk

PROJECT:	TYPICAL SUDS DETAIL			
TITLE:	FILTER STRIPS			
DATE: SEP 2014	SCALE: 1:50	SHEET: A3	DRAWN: CP	CHECKED: RDN
PROJECT No: BETTS	DRAWING No: 107	REV: A		

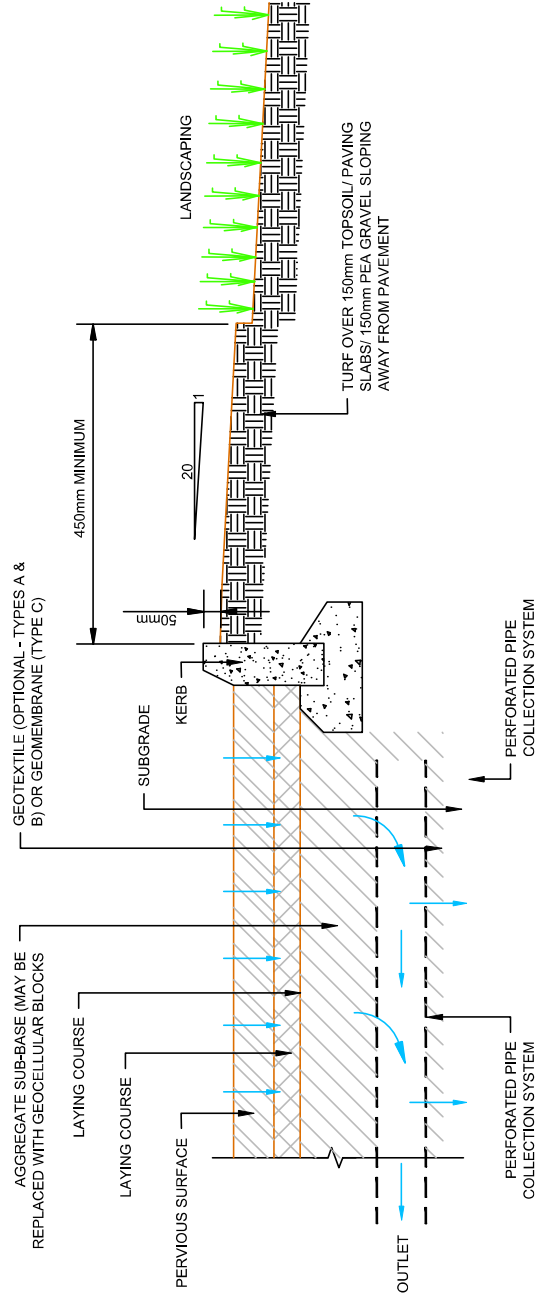
DO NOT SCALE



TYPE A: TOTAL INFILTRATION

TYPE B: PARTIAL INFILTRATION

TYPE C: NO INFILTRATION



LANDSCAPING DETAIL

REV	DATE	BY	DESCRIPTION	CHK
-----	------	----	-------------	-----

DRAWING STATUS:

PRELIMINARY

BETTS ASSOCIATES
CIVIL AND STRUCTURAL ENGINEERS
Unit 6, Old Moor Farm Barns, Wether Road, Solihull, Finesse CH5 2LY
Tel: 01244 288178 Fax: 01244 288515 enquiries@betts-associates.co.uk

PROJECT:

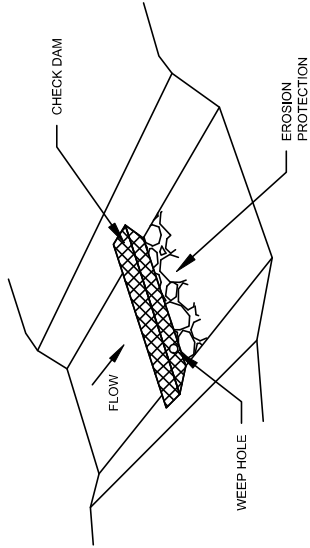
TYPICAL SUDS DETAIL

TITLE:

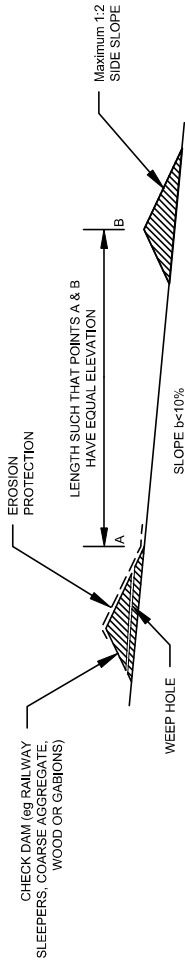
PERVIOUS PAVEMENTS

DATE:	SCALE	SIZE:	DRAWN:	CHECKED:
SEP 2014	1:1	A3	CP	RDN
PROJECT No:	DRAWING No:	REV:		
BETTS	105	A		

DO NOT SCALE

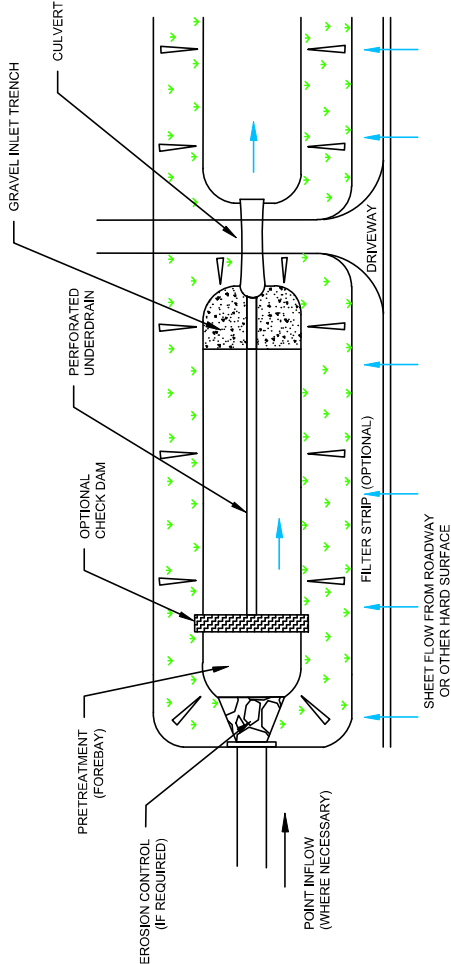


SCHEMATIC



ELEVATION

CHECK DAM



ENHANCED DRY SWALE

REV	DATE	BY	DESCRIPTION	CHK

DRAWING STATUS: PRELIMINARY



PROJECT:

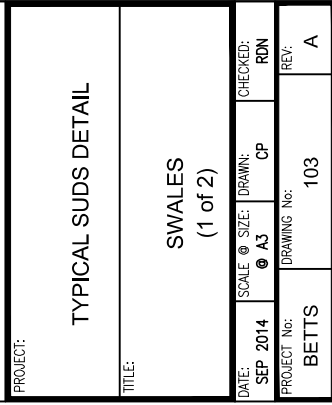
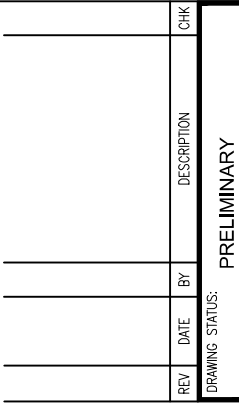
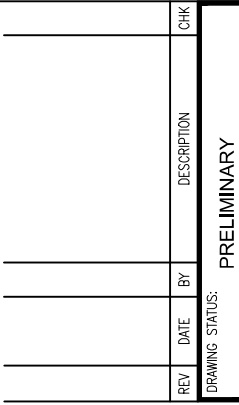
TYPICAL SUDS DETAIL

TITLE:

SWALES
(2 of 2)

DATE:	SCALE:	SIZE:	DRAWN:	CHECKED:
SEP 2014	@ A3	CP	RDN	RDN
PROJECT No:	DRAWING No:	REV:		
BETTS	104	A		

DO NOT SCALE

[illegible][illegible]

APPENDIX M: NOTES OF LIMITATIONS

The data essentially comprised a study of available documented information from various sources together with discussions with relevant authorities and other interested parties. There may also be circumstances at the site that are not documented. The information reviewed is not exhaustive and has been accepted in good faith as providing representative and true data pertaining to site conditions. If additional information becomes available which might impact our conclusions, we request the opportunity to review the information, reassess the potential concerns, and modify our opinion if warranted.

It should be noted that any risks identified in this report are perceived risks based on the available information.

This report was prepared by Betts Hydro Ltd for the sole and exclusive use of the titled client in response to particular instructions. Any other parties using the information contained in this report do so at their own risk and any duty of care to those parties is excluded.

This document has been prepared for the titled project only and should any third party wish to use or rely upon the contents of the report, written approval from Betts Hydro Ltd must be sought.

Betts Hydro Ltd accepts no responsibility or liability for the consequences of this document being used for the purpose other than that for which it was commissioned and for this document to any other party other than the person by whom it was commissioned.