

Land North of Whalley Road, Read

Flood Risk Assessment

Client: Applethwaite
Author: Jamie-Lee Emmott
Date: 10/03/2026
Reference: 24028-PWA-00-XX-RP-C-1000-P02

Document Control

Issued By Paul Waite Associates Ltd
Summit House
Riparian Way
The Crossings
Cross Hills
Keighley
West Yorkshire
BD20 7BW

01535633350
info@pwagroup.co.uk

Client: Applethwaite
Project: Land North of Whalley Road, Read
Report: Flood Risk Assessment
Status: Preliminary
Reference: 24028-PWA-00-XX-RP-C-1000-P02

Document Production Record

Issue Details	Name	Signature
Prepared By	Jamie-Lee Emmott	
Approved By	Liam Steadman	

Document Revision Record

Issue Number	Date	Revision Details
P01	29/02/2024	First issue.
P02	10/03/2026	Revised to suit new site layout
P03	08/04/2026	Revised to suit project title.

Executive Summary

The site is located within Flood Zone 1.

Flood risk from rivers and seas has been deemed as low.

Surface water flood risk has been found on the wider site area, although not within the development area, therefore this risk is considered as low.

Reservoir & Artificial waterbody flooding is assessed as low risk.

Proposed drainage is considered as low risk.

The risk for climate change is determined as low.

Residual risk is found as low.

Foreword

This report has been prepared for the sole use and reliance of Applewaite (the client) named above and cannot be relied upon by any other parties without the express written authorisation of Paul Waite Associates Ltd. Any unauthorized third party relies on this report at their own risk and the authors owe them no duty of care

The report should be read in its entirety, including all associated drawings and appendices. Paul Waite Associates Ltd cannot be held responsible for any misinterpretations arising from the use of extracts that are taken out of context.

The findings and opinions conveyed in this report (including review of any third-party reports) are based on information obtained from the sources listed, which Paul Waite Associates Ltd understands are reliable. All reasonable skill, care and diligence have been applied in examining the information obtained. However, Paul Waite Associates Ltd accepts no responsibility for inaccuracies in the data supplied or for opinions based on any such inaccurate data.

Paul Waite Associates Ltd reserves the right to amend their conclusions and recommendations in the light of further information that may become available.

This flood risk assessment report is prepared in accordance with the requirements generally set out in the 'Technical Guidance to the National Planning Policy Framework', updated in July 21 and following the standard section format and order of the GOV.UK – Flood risk and coastal change site specific flood risk assessment checklist.

PWA Credentials

This Flood Risk Assessment has been carried out by Paul Waite Associates Ltd who have over 30 years' experience of civil engineering and flood risk assessment preparation. This Flood Risk Assessment has been carried out following the general requirements of the Nation Planning Policy Framework (2021), considering recently updated national climate change considerations.

Flood Risk Assessment (FRA) Approach

The requirements for flood risk assessments are generally as set out in the 'Technical Guidance to the National Planning Policy Framework' Chapter 14, updated in July 21; and in more detail from the Government website 'Flood risk assessments if you're applying for planning permission'

<https://www.gov.uk/government/publications/national-planning-policy-framework--2>

<https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications>

Contents

1.	Development Site Details.....	1
1.1.	Site Location.....	1
1.2.	Current Land Use	2
1.3.	Historic Land Use	2
1.4.	Topographical Review	4
2.	Development Proposals	5
2.1.	Site Layout	5
2.2.	Vulnerability Classification.....	5
2.3.	Development Lifecycle.....	5
3.	Flood Zone	6
4.	Climate Change.....	7
5.	Site Specific Flood Risk	8
5.1.	Fluvial Flood Risk.....	8
5.2.	Pluvial Flood Risk.....	9
5.3.	Existing Sewer Flood Risk.....	10
5.4.	Groundwater Flood Risk	10
5.5.	Reservoir & Artificial Waterbody Flood Risk.....	11
5.6.	Risk from Climate Change.....	12
5.7.	Pre-Development Flood Risk Summary	13
6.	Flood Mitigation Measures	14
6.1.	Flood Risk Management	14
7.	Occupants and users of the development	14
8.	Exception Test.....	14
9.	Residual Risk.....	15
10.	Drainage Strategy.....	16
10.1.1.	Previously Developed / Brownfield	16
10.1.2.	Greenfield	16
10.1.3.	Proposed Development.....	16
10.2.	Surface Water Drainage.....	17
10.2.1.	Infiltration	17
10.2.2.	Watercourse/waterbody	17
10.2.3.	Greenfield Rate	18
10.2.4.	Surface Water Drainage Proposals.....	18
10.2.5.	Climate Change	18
10.3.	Foul Water Drainage Proposals	19
10.3.1.	Public Sewer	19

11.	Management and Maintenance	20
11.1.	Responsibilities	20
11.2.	Activities	20

Appendix A Proposed Site Layout

Appendix B Topographical Survey

1. Development Site Details

1.1. Site Location

Site Co-ordinates

OS X (Eastings): 388597

OS Y (Northings): 446780

Nearest Postcode: BB12 7RE



Figure 1 Site Location Plan

1.2. Current Land Use

The current land is described as entirely agricultural use, greenfield land.



Figure 2 Aerial Land View

1.3. Historic Land Use

A desk study of available historical Ordnance Survey (OS) Maps has been undertaken to identify potential significant changes of use for the site. Salient points relating to the history of the site and surrounding area are detailed in **Error! Reference source not found.** below.

Table 1 Site History Summary

Date	Site	Surrounding Land
1830-1880	The site is titled as Land North of Whalley Road, made up of undeveloped grass land, the land serves Read Hall.	Read Hall is located just off the west boundary, undeveloped grass land is located to the east and south boundary. Dudley Hill sandstone quarry is located 200m to the north.
1900	No significant change	Dudley Hill sandstone quarry is no longer in use. There is now a small development of terraced houses located to the southeast border.
1914	No significant change	No significant change
1937	No significant change	No significant change

Table 1 Site History Summary

1945	No significant change	No significant change
No further maps were available at the time of writing this report.		
2026	The site is now used to keep a mixture of livestock. A site walk over dated 14.02.24 confirmed the present of cattle and sheep.	Further expansion of the housing development to the east/southeast boundary. More dwellings are located on the north and southern boundary.

1.4. Topographical Review

A full site topographical survey was undertaken by the Survey Association in July 2015, a copy of this drawing is presented within Appendix B of this report and an extract from this is shown in Figure 3 below.

The site falls from Northeast to Southwest. The highest recorded level on the site is 126.740m AOD located in the Northeast corner, the lowest recorded level on the site is 91.000m AOD located in the Southwest corner. Giving approximate level difference of 36m.

An existing drain outfall has been located on the Northern boundary; the catchment area of this drain is unconfirmed.

There is a channel which runs through the site, the source of water from these channels is labelled as a spring. Towards the Southwest of the site there is a culvert which conveys the flows underground.

The figure presents tree root protection areas (hatched in orange) and disused mineshafts (in pink), although these are approximate locations.

Lowest and highest points are presented on the plan in white, red arrows present the general falls of the site.

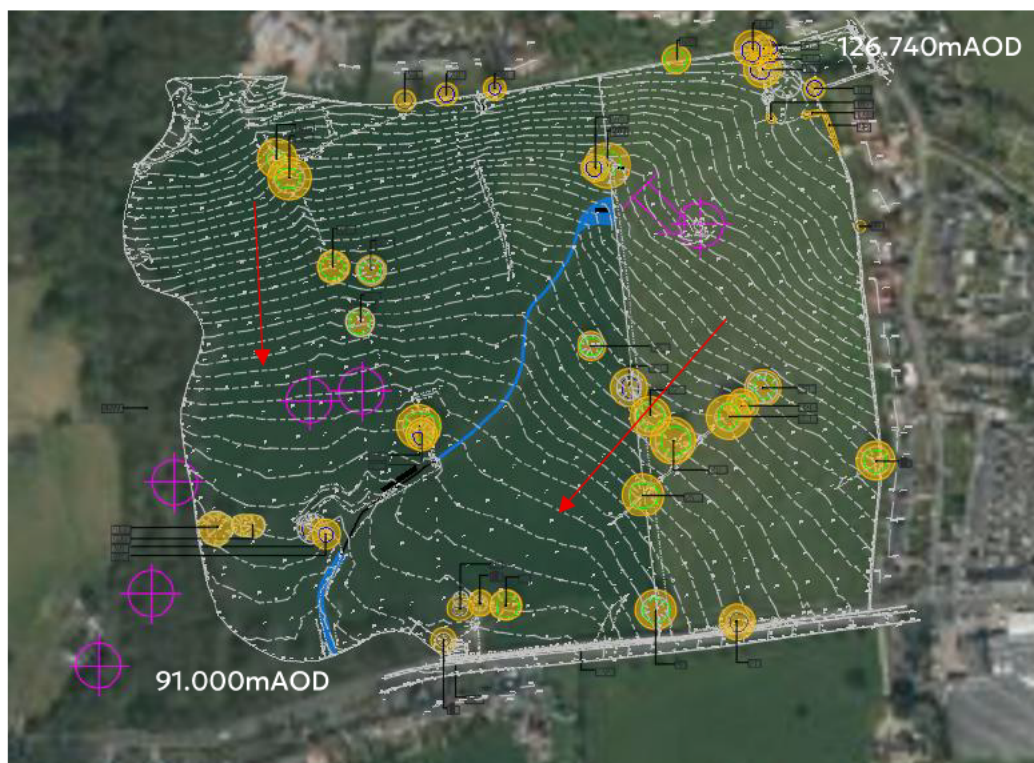


Figure 3 Topographical Survey

2. Development Proposals

2.1. Site Layout

Site proposals are to develop the land into a residential development to the East of the development site. This consists of main spine road networks, linking the proposed dwellings to the existing highway network. There are footways which provide access to the remaining of the site which is utilised as public open space.



Figure 4 Site Layout

2.2. Vulnerability Classification

With reference to the National Planning Policy Guidance GOV.UK Flood Risk and Coastal Change Site Specific Flood Risk Assessment – Guidance Annex 3, the primary development proposals can be seen as:

More Vulnerable e.g. buildings used for:

Dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels.

2.3. Development Lifecycle

A 100 year lifetime is assumed for residential developments when assessing in relation to flood risk.

3. Flood Zone

A review of the flood maps for planning was undertaken to understand the flood zone classification for the proposed development. In line with Figure 5 below. The development area lies within Flood Zone 1. A small area of Flood Zone 3 can be found to the Southwest of the development, although this is in the location of the existing channel on the site, therefore it is thought to have flooding associated with this, the Flood Zone 3 area is contained to the channel location.

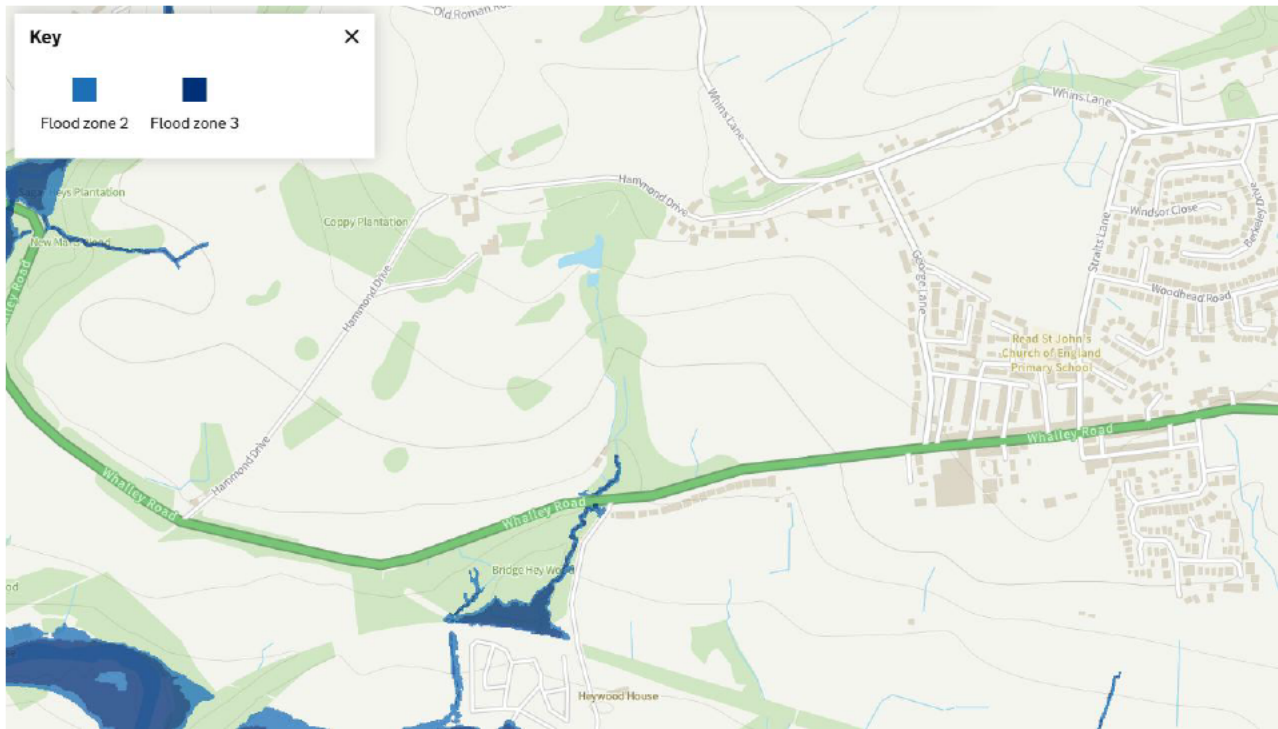


Figure 5 Flood Maps for Planning

4. Climate Change

The impacts of climate change will be considered within each of the report sections on specific flood risk.

This will take into account consideration current national climate change guidance published by the Government in February 2016 and last updated July 2020. Climate Change allowances are predictions of anticipated change for:

- Peak River Flow
- Peak Rainfall Intensity
- Sea Level Rise
- Offshore Wind Speed and Extreme Wave Height

When assessing the Peak River Flows for a more vulnerable development, the central allowance should be assessed in relation to the development. An anticipated climate change allowance of 46% should be applied in line with

Table 2 Ribble Management Catchment Peak Rainfall Allowances

Epoch	Central	Higher	Upper
2020s	16%	19%	27%
2050s	23%	29%	44%
2080s	36%	46%	71%

When assessing the peak rainfall allowances for a more vulnerable development the upper end allowance should be assessed in relation to the development. An anticipated climate change allowance of 40% should be applied to all the 3.3% (1 in 30 year) annual events and 50% for all 1% (1 in 100 year) annual events should be applied in line with **Error! Reference source not found..**

Table 3 Ribble Management Catchment Peak River Flow Allowances

Allowance Category	3.3% annual exceedance rainfall event		1% annual exceedance rainfall event	
	Central allowance	Upper end allowance	Central allowance	Upper end allowance
'2050s' (2024 to 2060)	25%	35%	25%	35%
'2070s' (2061 to 2125)	30%	40%	40%	50%

5.2. Pluvial Flood Risk

Pluvial flooding occurs when extreme rainfall events saturate drainage systems and excess surface water cannot be accommodated within existing drainage systems, leading to surcharging and flooding. This could also include the surcharge of watercourses and sewer systems as result of high rainfall intensities, pluvial flooding can occur from lower rainfall intensities and/or melting snow when ground is previously saturated or frozen.

The Environment Agency, working with the Lead Local Flood Authority (LLFA) have produced a series of updated Flood Maps for Surface Water (UFMFSE). These updated flood maps are based upon the latest modelling techniques and flood data, superseding previous nationally produced surface water mapping techniques

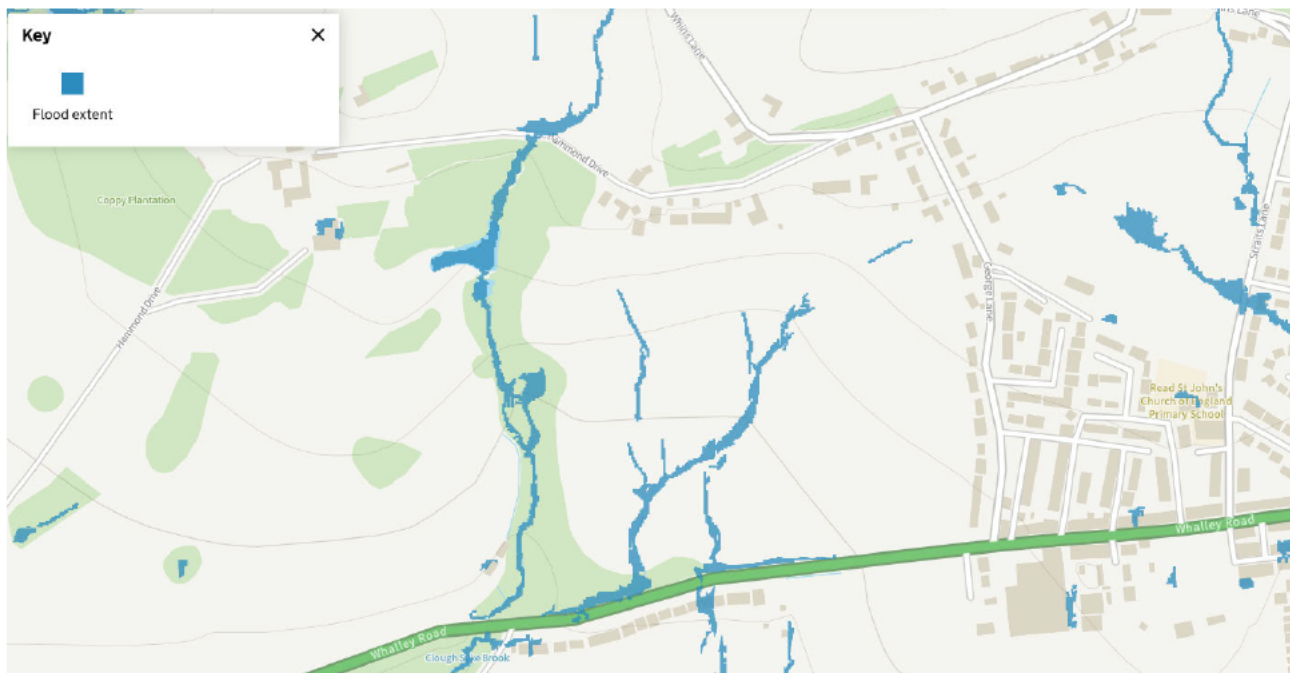


Figure 6 Pluvial Flood Risk

There is localised area of surface water flood risk which can be found within the site boundary, although they are not in the location of the development site. As presented in Figure 3, there is a channel that runs through the site, it is found that the surface water flood risk relates to this.

It is proposed that the route is to be formalised into a channel to convey the flows.



Figure 7 Pluvial and site plan

As presented in Figure 7, it is proposed that none of the surface water flood risk which can be found within the development area.

5.3. Existing Sewer Flood Risk

It is thought that no existing drainage is present on the site, due to the nature. Although, there are various properties which are surrounding, and it is thought that these will be positively drained due to the presence of existing public sewers surrounding the area. A desktop study presents that all properties surrounding have rainwater pipes located on the buildings. While the properties to the East of the site would not have impacts on the flood risk to the site, due to the falls, the Northern properties may. It is thought that there is a low risk of flooding from the Northern properties due to the distance from the existing properties and proposed development area on the site.

5.4. Groundwater Flood Risk

A review of Landis Soilscales presents the ground conditions to be loamy and clayey, which can lead to slowly permeable seasonally wet acid loamy and clayey soils. It is thought that groundwater maybe present on the site within the lower areas of the site, although due to the height difference across the site (from watercourse to the development area), it is unlikely groundwater flood would be a risk to the development site.

5.5. Reservoir & Artificial Waterbody Flood Risk

The Environment Agency Flood Maps for planning have been reviewed to determine the risk of flooding from artificial sources such as reservoirs, canals and flood defences, these maps will show any areas of potential risk of flooding due to failure of such structure.

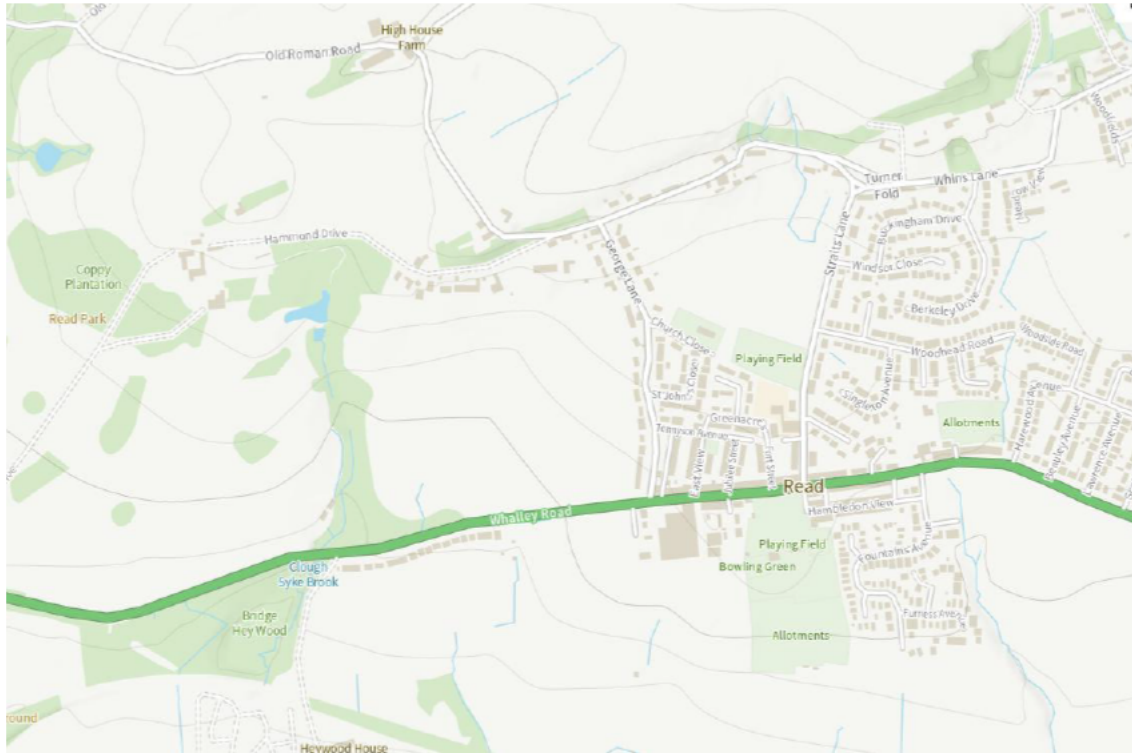


Figure 8 Reservoir & Artificial Waterbody Flood Risk

As above, it is deemed that there is low risk to the site and surrounding areas.

5.6. Risk from Climate Change

The impacts of climate change should be assessed upon all proposed developments for their anticipated lifecycle. Refer to Section 4 of this report for the climate change allowances that are to be considered within all site proposals. A summary of this section is presented below in

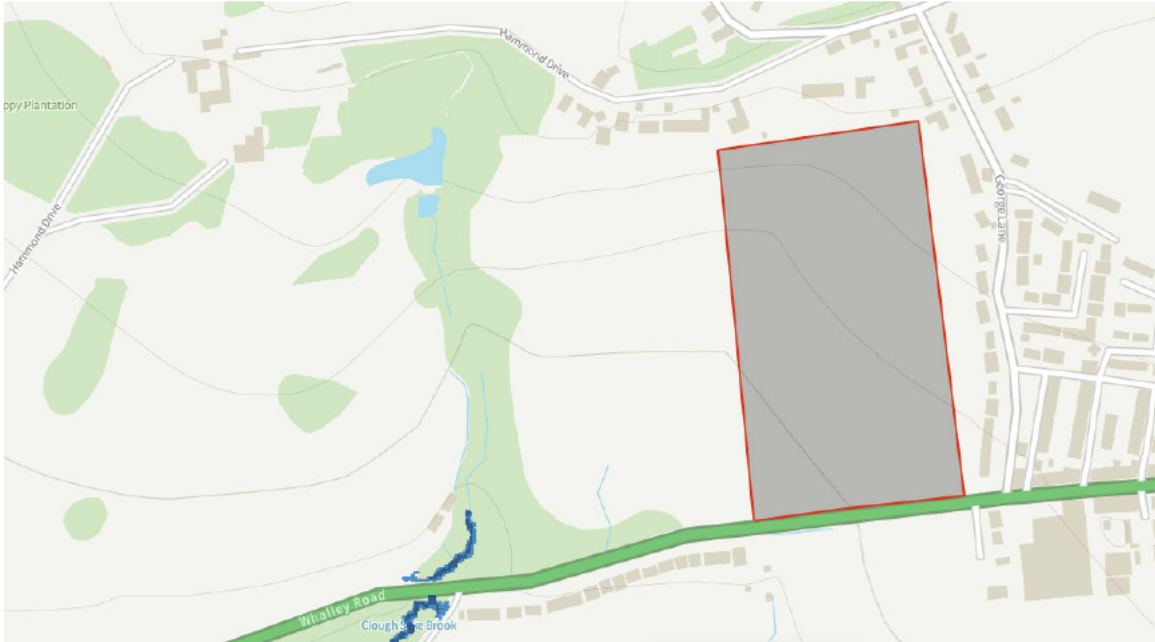


Figure 9 Environment Agency Flood Maps for Planning including Climate Change

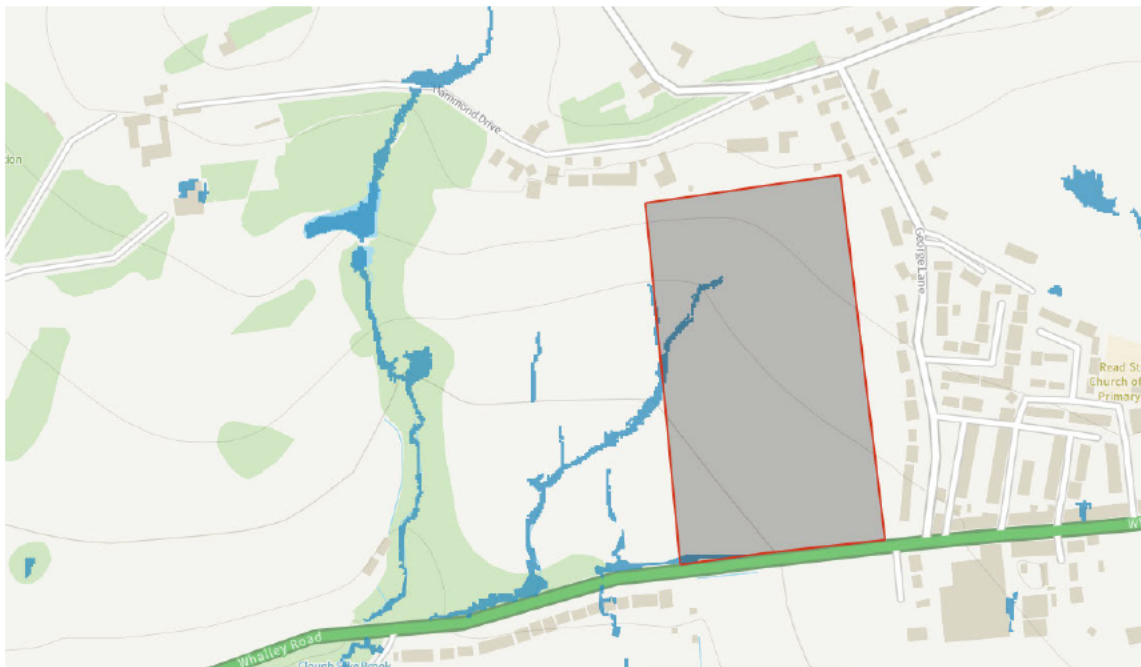


Figure 10 Environment Agency Surface Water Flood Maps (1:100)

The surface water flood risk increases slightly with the risk of climate change, although this still remains outside of the proposed development area.

5.7. Pre-Development Flood Risk Summary

Following the require of available flood information, the following can therefore be summarised in terms of flood risk:

Primary River Flood Risk	Low
Surface Water Flood Risk	Low
Existing Drainage Flood Risk	Low
Groundwater Flood Risk:	Low
Reservoir & Artificial Waterbody Flood Risk	Low
Risk from Climate Change	Low

6. Flood Mitigation Measures

6.1. Flood Risk Management

The site has generally been deemed as low risk of flooding, therefore, there are no formal flood risk mitigation measures proposed.

All new drainage should be designed in accordance with all relevant British standards, building relations and in accordance with northwest SuDS pro-forma which will be reviewed and approved through the planning process. Localised risk of flooding is mitigation by ensuring any flush doorways and other access points to the proposed building are not located around gullies, channel drains and other areas where surface water may pond during extreme rainfall events. General good practice is to be adopted where possible direction any potential flood exceedance flows away from proposed buildings and introduced 150mm threshold steps into any units where achievable. In line with current guidance, the drainage systems will be designed to accommodate a 1:100-year storm event + 50% climate change with 10% urban creep allowance. Flows from the surface are to be directed towards the surface water drainage system and leave site at a restricted rate.

7. Occupants and users of the development

It is thought that the proposed development will increase the number of occupants which are entering the site due to the nature of the existing site. although from reviewing the flood maps for planning, it is thought that the users (access and egress) from the site will not be at risk from any flood risk.

8. Exception Test

In line with the Flood Risk Vulnerability classification, the proposed development is classified as **more vulnerable** due to this being the highest classification which can be found on the site. the proposed development area can be found within Flood Zone 2.

Table 5 Exception Test

Flood Risk Vulnerability Classification		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Food Zones	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test Required	✓	✓
	Zone 3a	Exception Test Required	✓	X	Exception Test Required	✓
	Zone3b	Exception Test Required	✓	X	X	X

✓ Development is appropriate.

X Development is not appropriate.

The light blue represents the new classification, along with the orange representing the existing classification. Both present that the development is appropriate.

9. Residual Risk

A flood risk assessment should consider the residual risk to a proposed development for its intended lifecycle. In this case, with the development proposals consisting of residential development, a 100-year design life is assumed.

The two main residual risk can be found are:

- Residual Risk from flood risk management infrastructure, and
- Residual risk to a development once any site specific flood mitigation measures are taken into consideration.

As above, there is no flood risk management infrastructure which is considered as a part of the flood maps or above sections.

It is considered that due to no formal mitigation measures, it is considered that residual risk is low.

10. Drainage Strategy

10.1.1. Previously Developed / Brownfield

If you are proposing to use an existing drainage system for surface water management on your development site, your drainage system can be designed to 'previously developed' standards. For sites covered by buildings or impermeable hard surfaces this may require a reduction to existing rates to be applied to satisfy local planning policies.

For the avoidance of doubt, 'use of an existing drainage system' means using the entirety of the existing drainage system on site and does not refer to simply the point of discharge.

Example: If you are proposing to demolish an existing building and replace it with a new building but will use the existing means of surface water removal in entirety, this would be classified as 'previously developed.'

10.1.2. Greenfield

If you are proposing to install a new drainage system for surface water management on your development site then your drainage system must be designed to 'greenfield' standards, even if the land has been previously developed. It may be worth checking your Local Planning Authority's Local Plan for a local policy position.

Example 1: If you are proposing to construct buildings on land which has been previously developed (i.e., brownfield) but are installing a new surface water drainage system connecting to the existing outfall, this would be classified as 'greenfield.'

Example 2: If you are proposing to construct buildings on unbuilt 'green' land and will be installing a new surface water drainage system connecting to a new or existing outfall, this would be classified as 'greenfield.'

10.1.3. Proposed Development

The proposed application site is undeveloped agricultural land as existing. There is scope to implement a new drainage system to tackle surface water flooding issues therefore this site will using a greenfield design approach.

10.2. Surface Water Drainage

In accordance with National Planning Policy Framework (NPPF), Building Regulations Approved Document H and the local LLFA guidance, options for disposal of surface water from new developments should follow the hierarchy below:

1. Discharge to ground via infiltration.
2. Discharge to watercourse/waterbody
3. Discharge to surface water sewer.
4. Discharge to a combined sewer.

Sustainable Drainage Systems (SuDS) should also be used wherever possible to mimic as far as practicable the natural run off regime, improve water quality, reduce run-off volume and attenuate peak flows. These should be designed in accordance with the current guidance, CIRIA C753 'The SuDS Manual'.

An assessment of each method is presented below in priority order.

10.2.1. Infiltration

PWA attended a site walkover on 14.02.24. the land was observed to be waterlogged and saturated, indicating the existing ground has impeded drainage. To propose infiltration, it is recommended while a phase 2 site investigation, soakaway testing the BRE 365 is undertaken on the site.

10.2.2. Watercourse/waterbody

Should infiltration on the site be unviable for the surface water drainage system, then the next method in order of the hierarchy is to discharge a watercourse or waterbody.

After a desktop study, UK River maps located Clough Skye Brook. Located the southwest boundary. it is recommended a dialogue with the Environment Agency and LLFA is entered to discuss feasibility of a surface water outfall at this location. Below, Figure 11 presents the location of the watercourses in relation to the development area (edged in red)

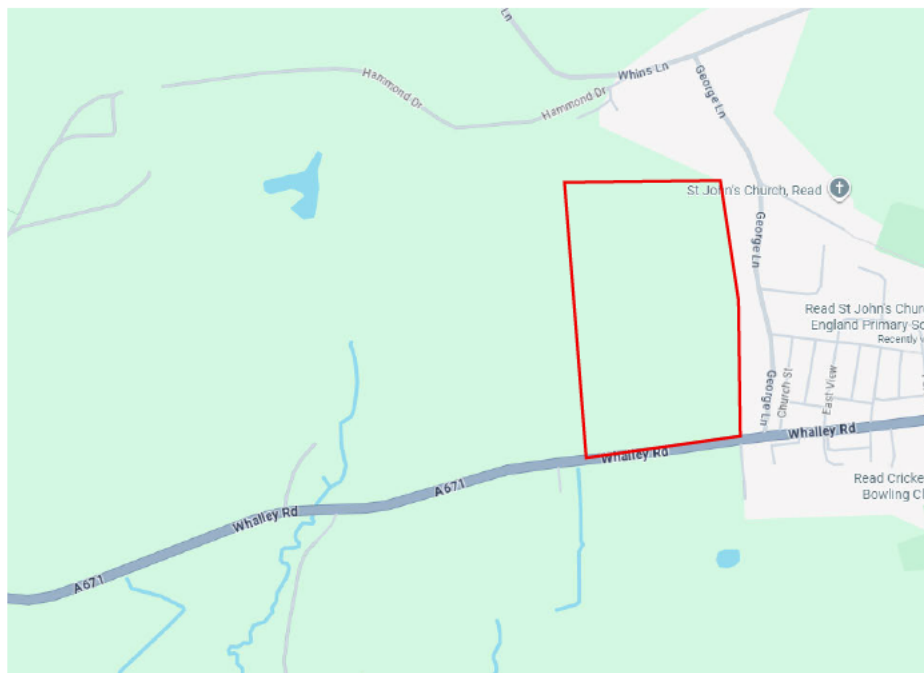


Figure 11 Watercourse Location

10.2.3. Greenfield Rate

As the site is greenfield, final outfall pipe from the proposed drainage system will discharge to the beck at a controlled rate.

The current greenfield site shows a 2.062 ha; no significant land changes have occurred or been made on the site therefore using this area the greenfield rate can be calculated. Fixed greenfield rate for surface water to be discharged is 18.40l/s.

Table 6 Run off analysis

Runoff Event	Flow Rate (l/s)
Q1 (1 in 1 year)	16.0
Q30 (1 in 30 years)	31.20
Q100 (1 in 100 years)	38.30
QBAR	18.40

10.2.4. Surface Water Drainage Proposals

To manage the surface water proposals and limit the discharge to the aforementioned greenfield discharge rate, it is proposed to utilise a positive below ground drainage system with a flow control device and attenuation in the form of a cellular attenuation structure.

Table 7 Storage Requirements

Drainage Feature	Volume (m³)
Pond	2829.21

10.2.5. Climate Change

Peak rainfall intensities should be utilised for the design as below

Table 8 Ribble Management Catchment Peak River Flow Allowances

Allowance Category	3.3% annual exceedance rainfall event		1% annual exceedance rainfall event	
	Central allowance	Upper end allowance	Central allowance	Upper end allowance
'2050s' (2024 to 2060)	25%	35%	25%	35%
'2070s' (2061 to 2125)	30%	40%	40%	50%

10.3. Foul Water Drainage Proposals

As priority, foul water drainage systems should seek to follow the below hierarchy for the discharge location, using the highest option up the list as reasonably practicable.

1. Public sewer
2. Private / shared sewer
3. Package treatment plant
4. Septic tank
5. Cesspit

10.3.1. Public Sewer

United utilities sewer records have been reviewed, and it has been determined that public combined main sewers are located within Whalley Road. Below, presented in Figure 12, are the public sewer records (development area edged in red).

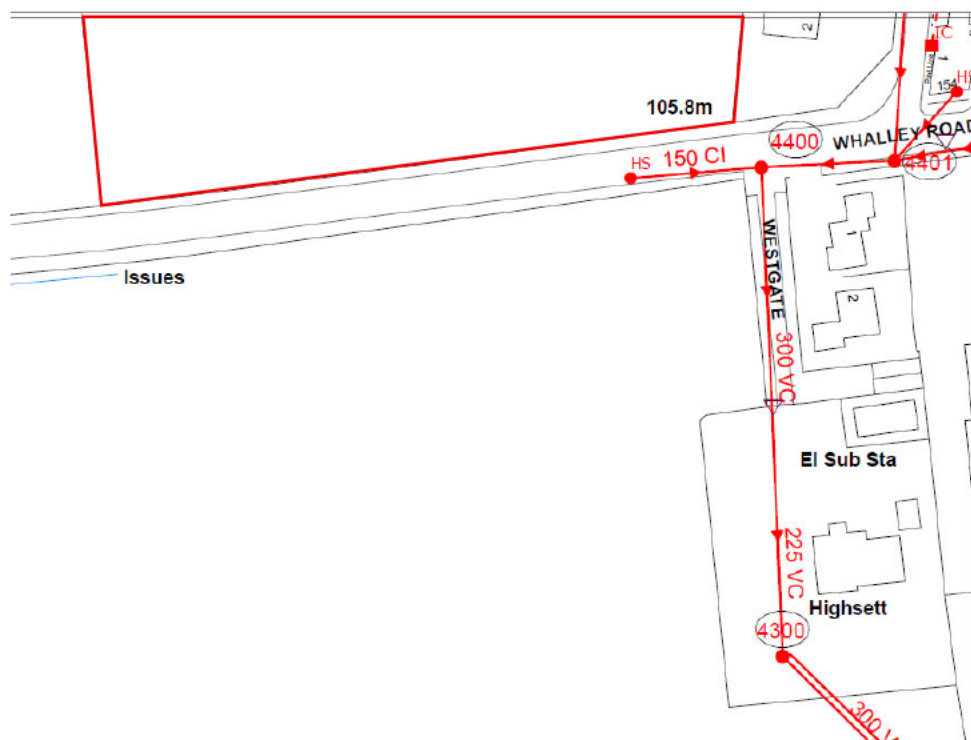


Figure 12 Public Sewer Records

11. Management and Maintenance

11.1. Responsibilities

Table 9 Maintenance Responsibilities

Feature	Responsibility
Main Spine Network (foul and surface)	United Utilities
Pond / Swales	United Utilities
Gullies and tails	Lancashire County Council
Plot drainage	Homeowner

11.2. Activities

Following development, the end users will have responsibility to ensure that continued inspections and maintenance of the proposed private drainage system and SuDS features are managed and maintained by a suitably qualified professional.

Table 10 Maintenance Requirements

Drainage System	
Regular maintenance	Frequency
Visually inspect gutters to ensure they are kept clear of leaves, debris, etc.	Annually. No triggers other than maintenance to be taken on regular schedule.
Lift covers of drainage to inspect chambers for debris and build-up of silts	
Occasional tasks	Frequency
Remove leaves and debris from gutters. Remove debris from inspection chambers to ensure outlets are kept clear of debris to ensure adequate drainage.	As required. Indicator of problem/trigger for maintenance when surcharging or flooding of drains occurs or gutters and chambers full of debris and leaves, etc.
Remedial works	Frequency
Should drains be heavily blocked or damaged, contact drainage maintenance company for unblocking/repair works.	As required. Indicator of problem/trigger for maintenance when drainage not functioning and unblocking pipes and chambers etc not effective.
Gullies	
Regular Maintenance	Frequency
Lift covers of channels and gullies to visually inspect for the build up of silt and debris.	Bi-annually
Occasional Taks	Frequency

Drainage System

Remove debris from channels and gullies.	Annually or as required
--	-------------------------

Remedial Work	Frequency
---------------	-----------

Should the channels or gullies be heavily blocked or damaged jet out/repair/replace them.	As required.
---	--------------

Hydrobrake Flow Control Unit

Regular Maintenance	Frequency
---------------------	-----------

Lift cover of flow control chamber and visually inspect flow control for debris.	Bi-annually
--	-------------

Remedial Work	Frequency
---------------	-----------

Should flow control unit be heavily blocked or damaged jet out/repair/replace flow control unit.	As required.
--	--------------

Pond

Regular Maintenance	Frequency
---------------------	-----------

Remove litter and debris, cut grass for spillways, access routes, meadow grass in and around basin, along with management of other vegetation and remove nuisance plants. Tidy dead growth before the start of the growing season.	Monthly or as required. To be undertaken by management and maintenance company.
Inspection of inlets, outlets, banksides, structures, pipework for blockages, or physical damage.	Monthly. To be undertaken by United Utilities.
Check penstock and other mechanical devices.	Annually. To be undertaken by United Utilities.
Hand cut-submerged and emergent aquatic plants (at min of 0.1m above pond base. Include max 25% of pond surface.	Annually. To be undertaken by management and maintenance company.
Remove 25% of bank vegetation from water's edge to a minimum of 1m above water level.	Annually. To be undertaken by management and maintenance company.

Occasional Work	Frequency
-----------------	-----------

Drainage System

Reseed areas of poor vegetation growth	As required.
Prune and trim trees and remove cuttings.	Every 2 years, or as required. To be undertaken by management and maintenance company.
Remove sediment from the inlets, outlets, forebay and main basin when required	Every 5 years, or as required. To be undertaken by United utilities upon adoption.
Remove the sediment from the main body of the basin when the pool volume is reduced by 20%.	3 – 10 years, or as required. To be undertaken by United Utilities.
Inspect banksides, structures, pipework for evidence of poor operation or physical damage.	Every 6 months. To be undertaken by United Utilities.
Inspect water body for signs of eutrophication.	Monthly, in the months May to October. To be undertaken by United Utilities.
Inspect silt accumulation rates establish appropriate removal.	Every 6 months. To be undertaken by United Utilities.

Pond

Remedial Work

Frequency

Repair erosion or other damage by reseeding or re-turfing.

As required. To be undertaken by management and maintenance

Realignment of rip-rap. Repair / rehabilitation of inlet, outlet and overflows. Relevel uneven surfaces and reinstate design levels.

As required. To be undertaken by United Utilities.

Swale

Regular Maintenance

Frequency

Remove litter and debris

Cut grass – to retain grass height within specified design range

Manage other vegetation and remove nuisance plants

Inspect inlets, outlets and overflows for blockages, and clear if required

Monthly, or half yearly.

Inspect infiltration surfaces for ponding, compaction, silt accumulation, record areas where water is ponding for >48 hours.

Inspect vegetation coverage

Inspect inlets and facility surface for silt accumulation, establish appropriate silt removal frequencies

Occasional Tasks

Frequency

Reseed areas of poor vegetation growth, alter plant types to better suit conditions, if required

As required or if bare soil is exposed over 10% or more of the swale treatment area

Remedial Actions

Frequency

Repair erosion or other damage by re-turfing or reseeding

Relevel uneven surfaces and reinstate design levels

Scarify and spike topsoil layer to improve infiltration performance, break up silt deposits and prevent compaction of the soils surface

As required

remove build-up sediment on upstream gravel trench, flow spreader or at top of filter strip

remove and dispose of oils or petrol residues using safe standard practices

12. Conclusion

This flood risk assessment has been conducted to assess the flood risk to the proposed residential development.

The Environment Agency's Flood Map for planning present the site falling within Flood Zone 1.

Flood Risk from Rivers and Seas have been considered as low.

Surface water flood risk for the development has been considered as low.

Groundwater flood risk has been assessed, and it has been determined as low.

Other secondary flooding which has been assessed is reservoir flooding, which is deemed as low risk.

Existing drainage has been considered, and it is thought due to the nature and existing topography of the site, existing drainage flood risk is considered as low risk.

Climate change risk is deemed as low for the site, due to the risk of climate change being considered the whole way through the report, and within the surface water calculations.

The risk from residual risk is considered to be low, as flood defences have not been considered and other mitigation measures are considered not required for the proposed development.

The findings of this report have concluded that the proposed development will not increase the flood risk off the site, from all sources. The development will look to improve the flood risk to the wider development, and also off the site.

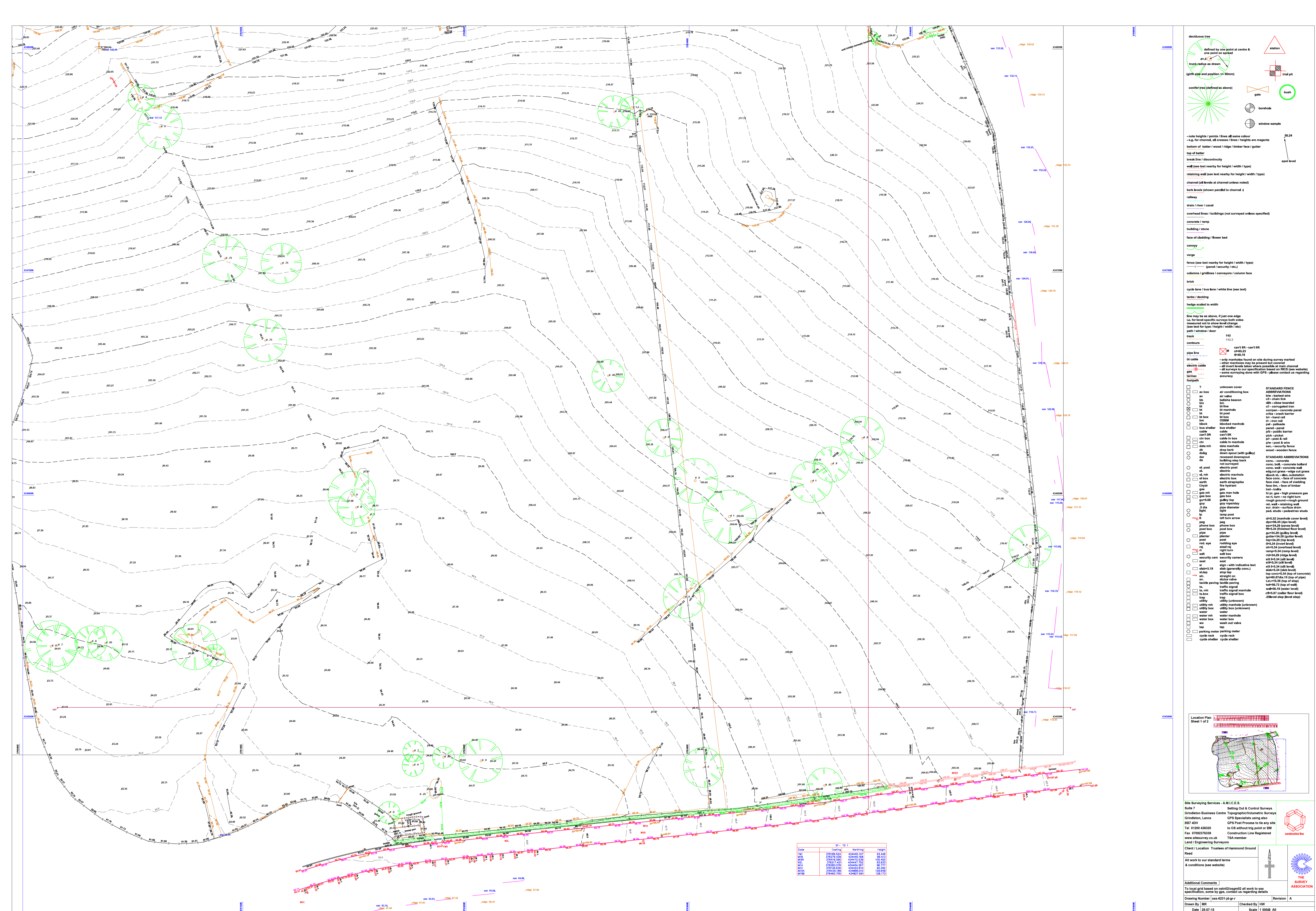
Utilising sustainable drainage features across the site for the surface water strategy, along with discharging off the site at a restricted greenfield discharge rate.

Appendix A – Proposed Site Layout



Appendix B – Topographical Survey

Code	Symbol	Height
100		100.00
101		101.00
102		102.00
103		103.00
104		104.00
105		105.00
106		106.00
107		107.00
108		108.00
109		109.00
110		110.00
111		111.00
112		112.00
113		113.00
114		114.00
115		115.00
116		116.00
117		117.00
118		118.00
119		119.00
120		120.00
121		121.00
122		122.00
123		123.00
124		124.00
125		125.00
126		126.00
127		127.00
128		128.00
129		129.00
130		130.00
131		131.00
132		132.00
133		133.00
134		134.00
135		135.00
136		136.00
137		137.00
138		138.00
139		139.00
140		140.00
141		141.00
142		142.00
143		143.00
144		144.00
145		145.00
146		146.00
147		147.00
148		148.00
149		149.00
150		150.00
151		151.00
152		152.00
153		153.00
154		154.00
155		155.00
156		156.00
157		157.00
158		158.00
159		159.00
160		160.00
161		161.00
162		162.00
163		163.00
164		164.00
165		165.00
166		166.00
167		167.00
168		168.00
169		169.00
170		170.00
171		171.00
172		172.00
173		173.00
174		174.00
175		175.00
176		176.00
177		177.00
178		178.00
179		179.00
180		180.00
181		181.00
182		182.00
183		183.00
184		184.00
185		185.00
186		186.00
187		187.00
188		188.00
189		189.00
190		190.00
191		191.00
192		192.00
193		193.00
194		194.00
195		195.00
196		196.00
197		197.00
198		198.00
199		199.00
200		200.00
201		201.00
202		202.00
203		203.00
204		204.00
205		205.00
206		206.00
207		207.00
208		208.00
209		209.00
210		210.00
211		211.00
212		212.00
213		213.00
214		214.00
215		215.00
216		216.00
217		217.00
218		218.00
219		219.00
220		220.00
221		221.00
222		222.00
223		223.00
224		224.00
225		225.00
226		226.00
227		227.00
228		228.00
229		229.00
230		230.00
231		231.00
232		232.00
233		233.00
234		234.00
235		235.00
236		236.00
237		237.00
238		238.00
239		239.00
240		240.00
241		241.00
242		242.00
243		243.00
244		244.00
245		245.00
246		246.00
247		247.00
248		248.00
249		249.00
250		250.00
251		251.00
252		252.00
253		253.00
254		254.00
255		255.00
256		256.00
257		257.00
258		258.00
259		259.00
260		260.00
261		261.00
262		262.00
263		263.00
264		264.00
265		265.00
266		266.00
267		267.00
268		268.00
269		269.00
270		270.00
271		271.00
272		272.00
273		273.00
274		274.00
275		275.00
276		276.00
277		277.00
278		278.00
279		279.00
280		280.00
281		281.00
282		282.00
283		283.00
284		284.00
285		285.00
286		286.00
287		287.00
288		288.00
289		289.00
290		290.00
291		291.00
292		292.00
293		293.00
294		294.00
295		295.00
296		296.00
297		297.00
298		298.00
299		299.00
300		300.00
301		301.00
302		302.00
303		303.00
304		304.00
305		305.00
306		306.00
307		307.00
308		308.00
309		309.00
310		310.00
311		311.00
312		312.00
313		313.00
314		314.00
315		315.00
316		316.00
317		317.00
318		318.00
319		319.00
320		320.00
321		321.00
322		322.00
323		323.00
324		324.00
325		325.00
326		326.00
327		327.00
328		328.00
329		329.00
330		330.00
331		331.00
332		332.00
333		333.00
334		334.00
335		335.00
336		336.00
337		337.00
338		338.00
339		339.00
340		340.00
341		341.00
342		342.00
343		343.00
344		344.00
345		345.00
346		346.00
347		347.00
348		348.00
349		349.00
350		350.00
351		351.00
352		352.00
353		353.00
354		354.00
355		355.00
356		356.00
357		357.00
358		358.00
359		359.00
360		360.00
361		361.00
362		362.00
363		363.00
364		364.00
365		365.00
366		366.00
367		367.00
368		368.00
369		369.00
370		370.00
371		371.00
372		372.00
373		373.00
374		374.00
375		375.00
376		376.00
377		377.00
378		378.00
379		379.00
380		380.00
381		381.00
382		382.00
383		383.00
384		384.00
385		385.00
386		386.00
387		387.00
388		388.00
389		389.00
390		390.00
391		391.00
392		392.00
393		393.00
394		394.00
395		395.00
396		396.00
397		397.00
398		398.00
399		399.00
400		400.00
401		401.00
402		402.00
403		403.00
404		404.00
405		405.00
406		406.00
407		407.00
408		408.00
409		409.00
410		410.00
411		411.00
412		412.00
413		413.00
414		414.00
415		415.00
416		416.00
417		417.00
418		418.00
419		419.00
420		420.00
421		421.00
422		422.00
423		423.00
424		424.00
425		425.00
426		426.00
427		427.00
428		428.00
429		429.00
430		430.00
431		431.00
432		432.00
433		433.00
434		434.00
435		435.00
436		436.00
437		437.00
438		438.00
439		439.00
440		440.00
441		441.00
442		442.00
443		443.00
444		444.00
445		445.00
446		446.00
447		447.00
448		448.00
449		449.00
450		450.00
451		451.00
452		452.00
453		453.00
454		454.00
455		455.00
456		456.00
457		457.00
458		458.00
459		459.00
460		460.00
461		461.00
462		462.00
463		463.00
464		464.00
465		465.00
466		466.00
467		467.00
468		468.00
469		469.00
470		470.00
471		471.00
472		472.00
473		473.00
474		474.00
475		475.00
476		476.00
477		477.00
478		478.00
479		479.00
480		480.00
481		481.00
482		482.00
483		483.00
484		484.00
485		485.00
486		486.00
487		487.00
488		488.00
489		489.00
490		490.00
491		491.00
492		492.00
493		493.00
494		494.00
495		495.00
496		496.00
497		497.00
498		498.00
499		499.00
500		500.00
501		501.00
502		502.00
503		503.00
504		504.00
505		505.00
506		506.00
507		507.00
508		508.00
509		509.00
510		510.00
511		511.00
512		512.00
513		513.00
514		514.00
515		515.00
516		516.00
517		517.00
518		518.00
519		519.00
520		520.00
521		521.00
522		522.00
523		523.00
524		524.00
52		



End of Report