

Land North of Whalley Road, Read

Flood Risk Assessment & Drainage Strategy

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Author: Jamie-Lee Emmott
Date: 10/03/2026
Reference: 24028-PWA-00-XX-RP-C-1000-P04

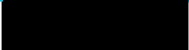
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Client: Applethwaite
Project: Land North of Whalley Road, Read
Report: Flood Risk Assessment & Drainage Strategy
Status: Preliminary
Reference: 24028-PWA-00-XX-RP-C-1000-P04

Document Production Record

Issue Details	Name	Signature
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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.
P04	13/07/2026	Report revised to suit LLFA comments through planning.

Executive Summary

This Flood Risk Assessment and Drainage Strategy has been prepared on behalf of Applethwaite in support of the proposed residential development on land north of Whalley Road, Read. The site currently comprises undeveloped agricultural greenfield land and the proposals include residential development, associated access roads, footways, public open space and supporting drainage infrastructure.

The proposed development area is shown to lie within Flood Zone 1 and is therefore at low risk of fluvial and tidal flooding. A small area of higher flood risk is identified to the southwest of the wider site boundary, associated with the existing channel; however, this is outside the proposed residential development area and does not affect safe access or egress.

The assessment confirms that flood risk from surface water, existing drainage, groundwater, reservoirs and artificial sources is low for the proposed development area. Localised surface water risk is present within the wider site, broadly associated with the existing channel and lower-lying land, but this is outside the proposed built development and is to be managed through the proposed drainage and open space strategy.

Climate change has been considered throughout the assessment and drainage design. The surface water drainage system is proposed to accommodate the relevant design storm events including climate change and urban creep allowances, with runoff restricted to the calculated greenfield discharge rate.

Surface water will be managed in accordance with the drainage hierarchy. Rainwater harvesting is proposed at plot level through water butts, while infiltration has been discounted at this stage due to observed waterlogged and saturated ground conditions. The strategy therefore proposes attenuation and controlled discharge to the nearby watercourse, with storage provided within a SuDS basin and associated drainage features.

The proposed drainage strategy includes attenuation storage, flow control, management of everyday rainfall and provision for long-term inspection and maintenance. Maintenance responsibilities are identified for the adopted drainage network, SuDS features, highway drainage and private plot drainage to support the continued performance of the system over the lifetime of the development.

Overall, the assessment concludes that the proposed residential development is appropriate in flood risk terms, subject to detailed drainage design, relevant approvals and implementation of the proposed SuDS and maintenance measures. The development is not expected to increase flood risk elsewhere and has the potential to improve management of surface water runoff across the wider site.

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 February 2025; 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>

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Appendix A Proposed Site Layout

Appendix B Topographical Survey

Appendix C Drainage Strategy

Appendix D Hydraulic Calculations

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 standstone 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
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.

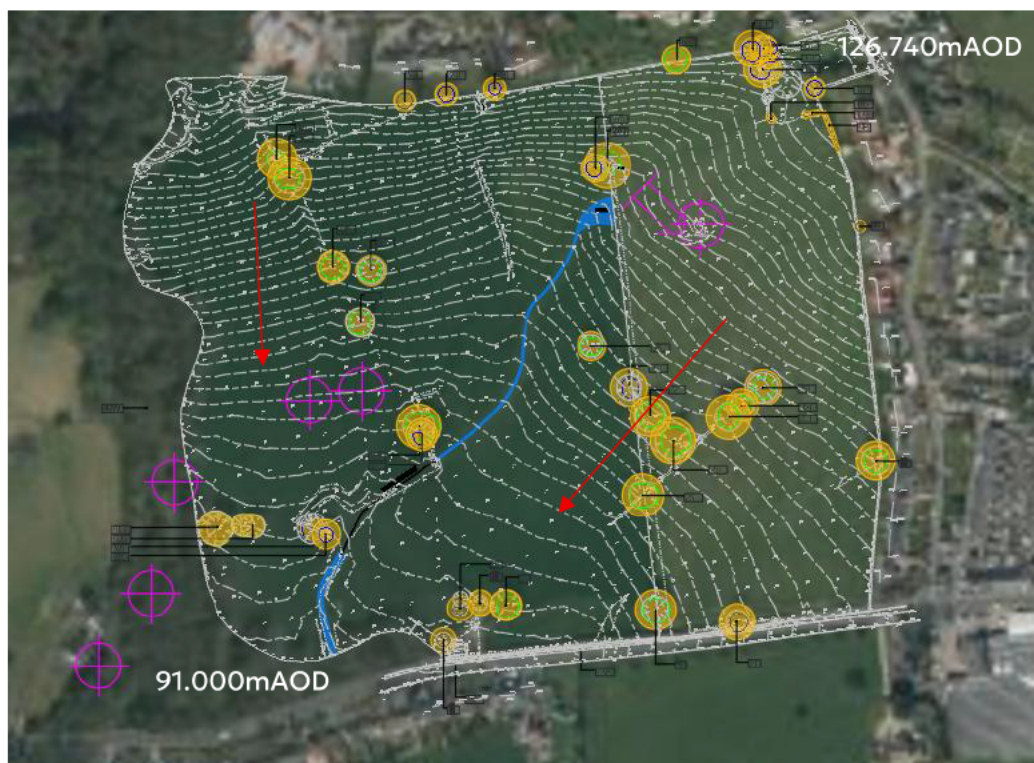


Figure 3 Topographical Survey

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.

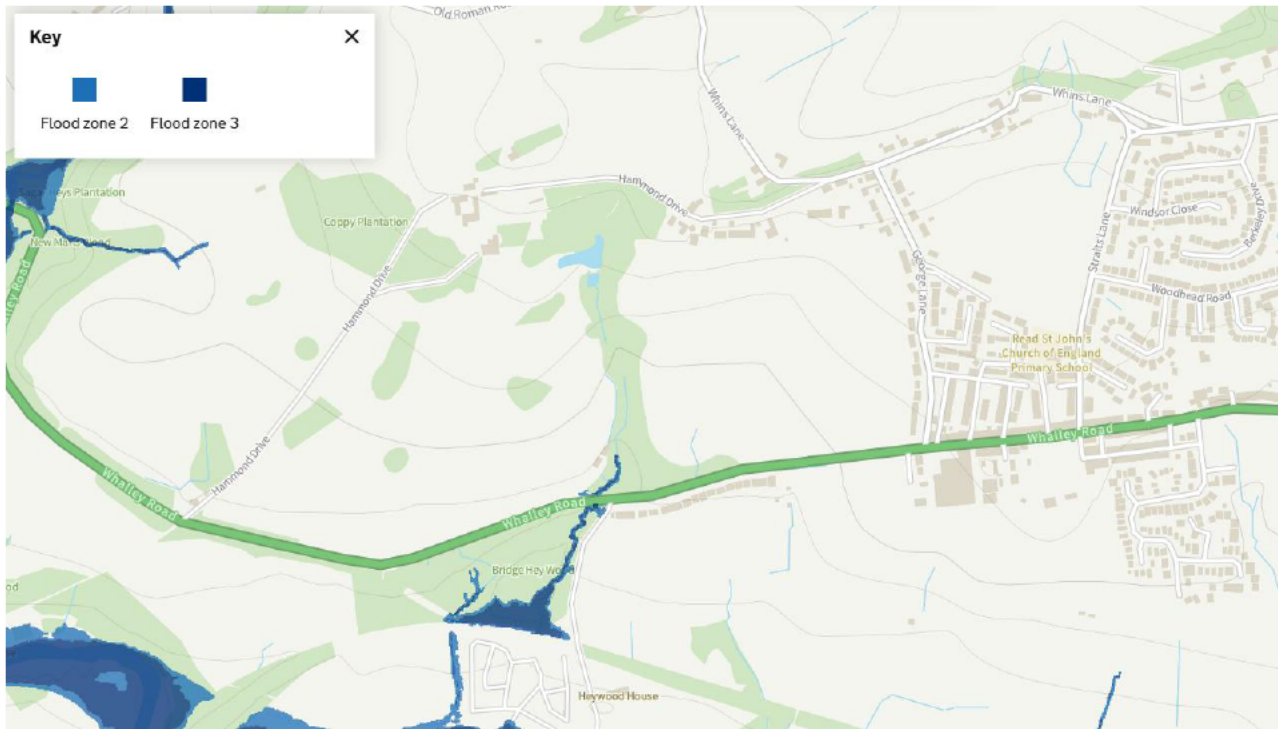


Figure 5 Flood Maps for Planning

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. Site Specific Flood Risk

The Environment Agency's website provides online mapping to identify multiple sources for flooding for planning purposes. A review of the potential sources of flooding is contained within this section.

5.1. Fluvial Flood Risk

Fluvial flooding occurs when watercourses such as rivers, streams and becks flood because of high or intense rainfall events.

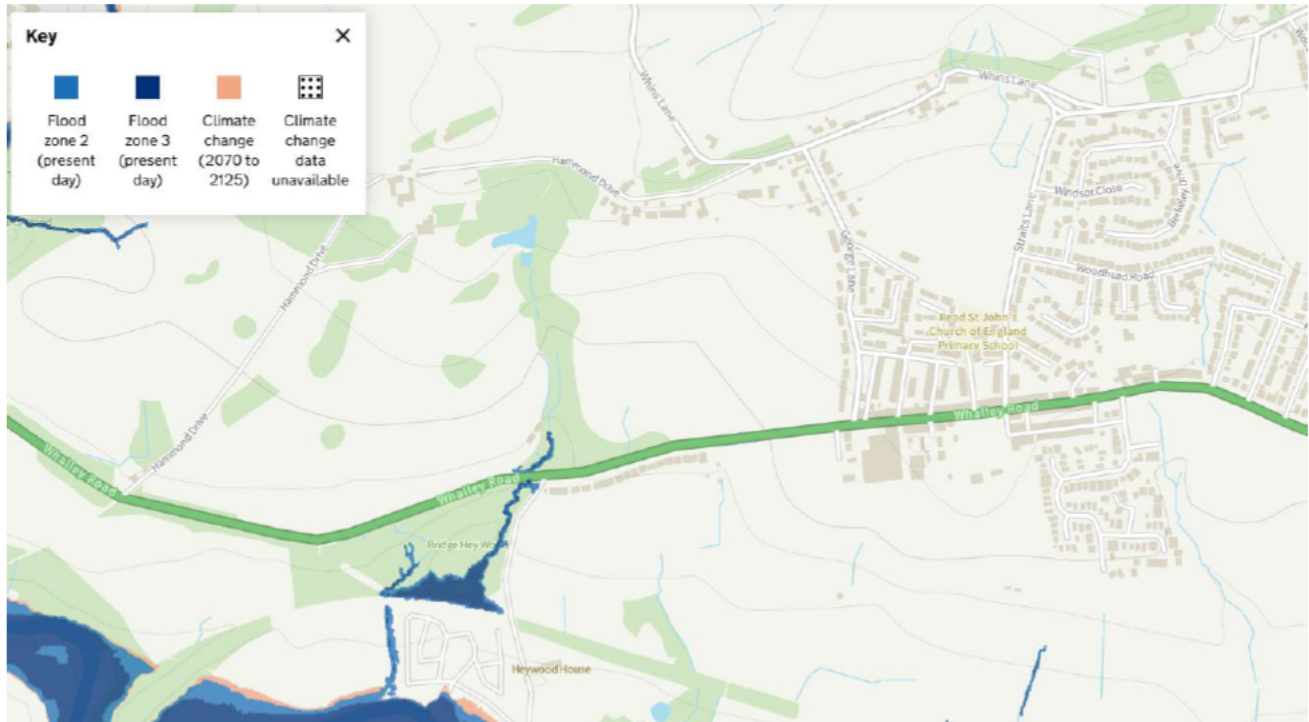


Table 4 Fluvial Flood Maps for Planning

As above, it is presented that there is only a small amount of flooding that can be found within the full site boundary, this is not located close to the proposed development and significantly lower. It is thought that this flooding will be contained within the channel, and it looks as though climate change will not effect the area of flood zone 3 on the site. Due to this area being located outside of the residential area, and not effecting the access to and from the site, it is deemed that the actual site is at low risk of Fluvial Flooding.

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

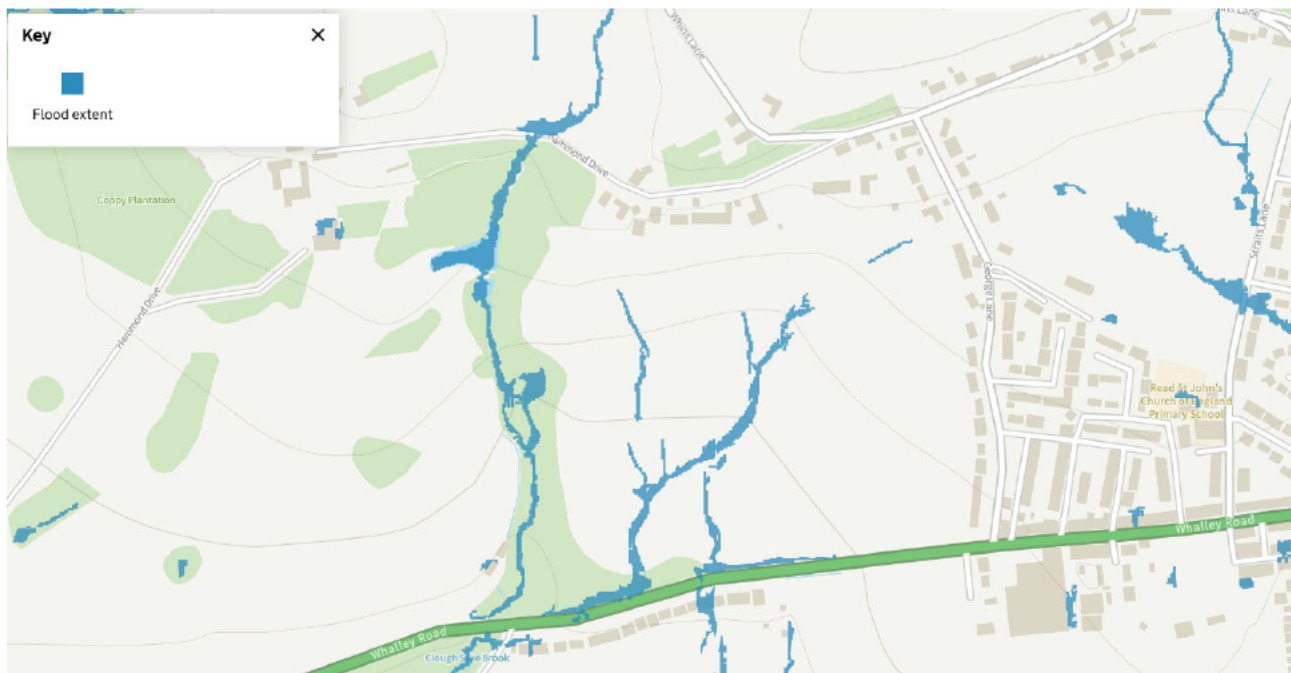


Figure 6 Pluvial Flood Risk

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.

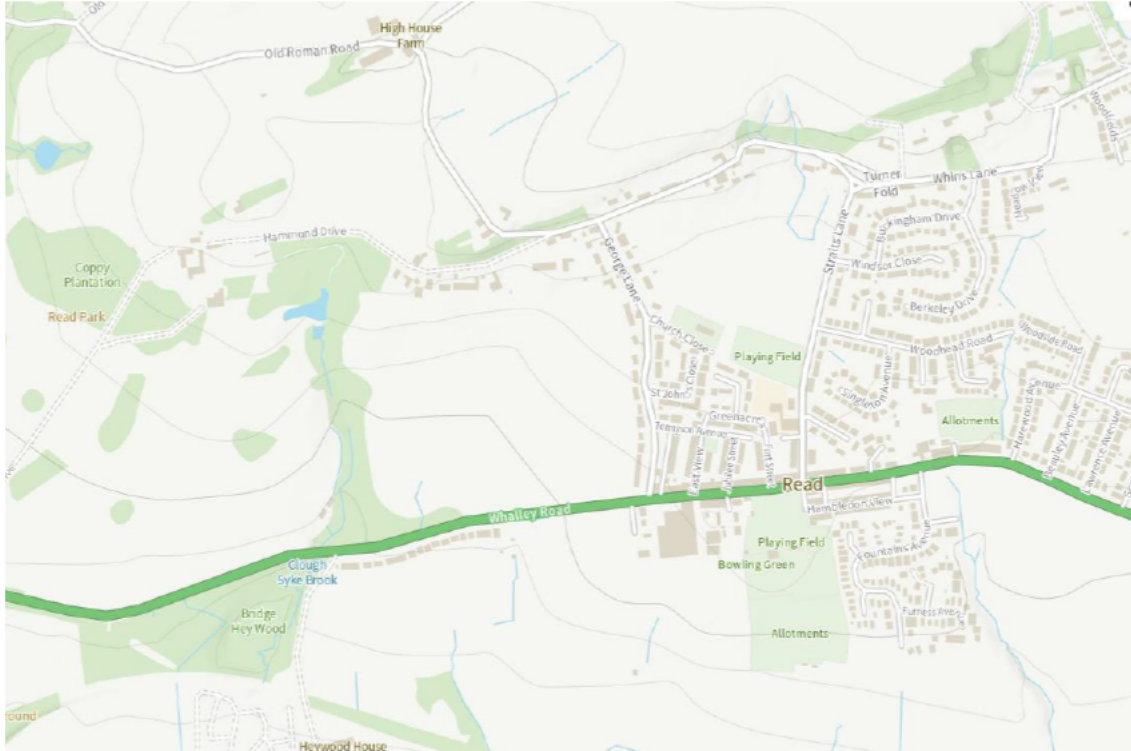


Figure 8 Reservoir & Artificial Waterbody Flood Risk

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

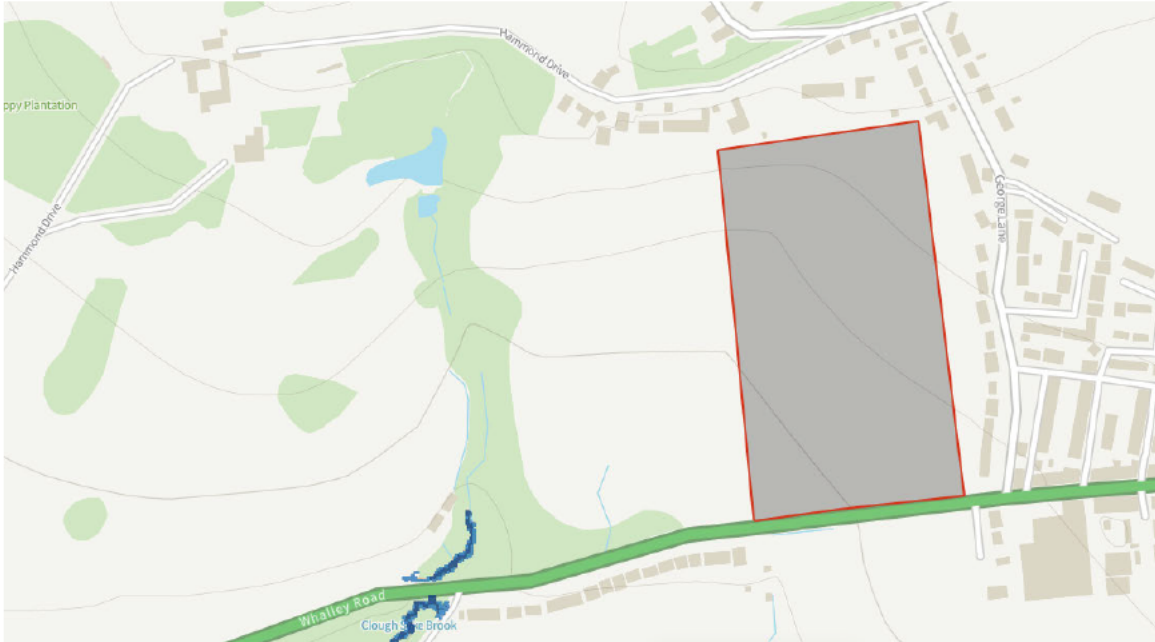


Figure 9 Environment Agency Flood Maps for Planning including Climate Change

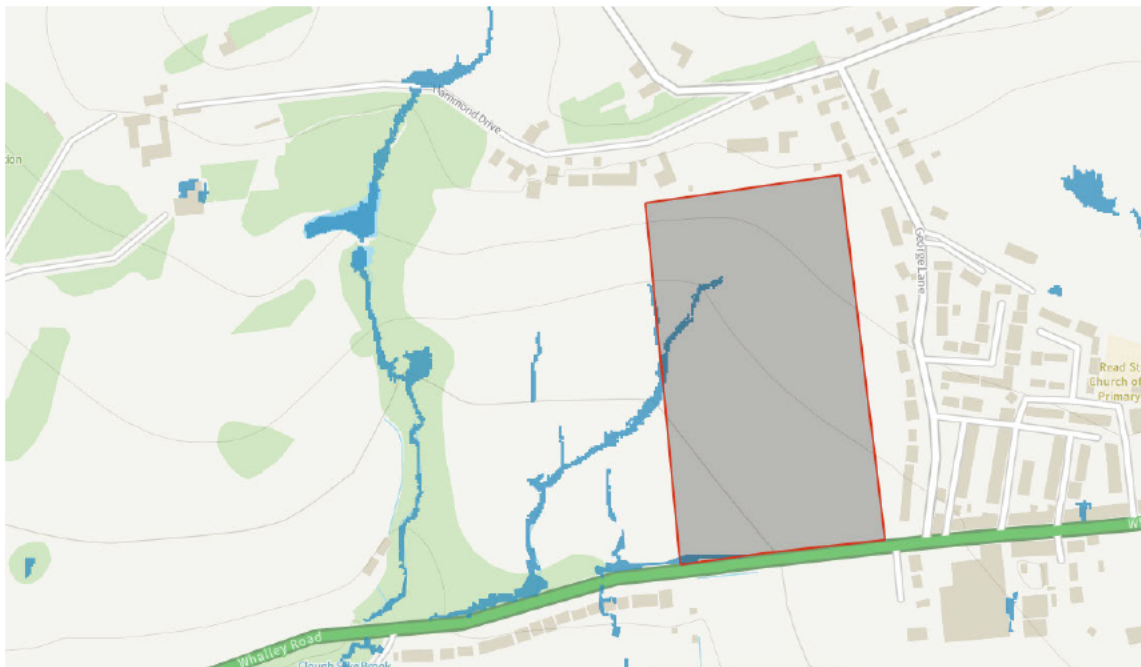


Figure 10 Environment Agency Surface Water Flood Maps (1:100)

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. Reuse of rainwater for non-potable use
2. Discharge to ground via infiltration.
3. Discharge to watercourse/waterbody
4. Discharge to surface water sewer.
5. 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'.

10.2.1. Reuse for non-potable use

In accordance with the Sustainable Drainage Hierarchy, priority should be given to the collection and re-use of surface water before consideration is given to discharge, attenuation or other forms of management. To align with this principle, the proposed development incorporates rainwater harvesting measures in the form of rainwater butts connected to at least one roof drainage downpipe serving each dwelling.

Rainfall collected from roof areas will be diverted to the rainwater butts and stored for subsequent non-potable uses, such as garden watering, vehicle washing and general external cleaning. This provides a practical means of reducing potable water consumption while also reducing the volume and rate of surface water runoff entering the wider drainage network during smaller and more frequent rainfall events.

The provision of rainwater butts on each plot represents a distributed source control measure and accords with the first preference of the Sustainable Drainage Hierarchy by promoting the collection and re-use of surface water at source. The stored water can be reused by future residents, providing an ongoing sustainable drainage benefit throughout the lifetime of the development. Consequently, the proposed drainage strategy incorporates opportunities for surface water re-use before reliance on downstream attenuation measures within the wider SuDS network.

10.2.2. Infiltration

PWA attended a site walkover on 14/02/2024. During the visit, it was observed to have waterlogged, with areas of standing water and saturated ground conditions evident across most of the lower areas of the site. These observations indicate that the underlying soils exhibit poor natural drainage characteristics and that infiltration of surface water is likely to be significantly constrained.

The observed saturated ground conditions suggest that infiltration rates are likely to be low and that soakaways or other infiltration-based SuDS features may not drain effectively between storm events. This could result in reduced storage capacity, prolonged ponding and an increased risk of localised flooding.

In the absence of infiltration testing data and given the clear evidence of waterlogged ground conditions, infiltration has not been considered a viable means of surface water disposal for this development. Accordingly, the drainage strategy has been developed on the basis of attenuation and controlled discharge, with infiltration measures excluded from the design. Should future site investigation works demonstrate infiltration to be feasible, opportunities to incorporate infiltration drainage can be reviewed at the detailed design stage.

10.2.3. 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)

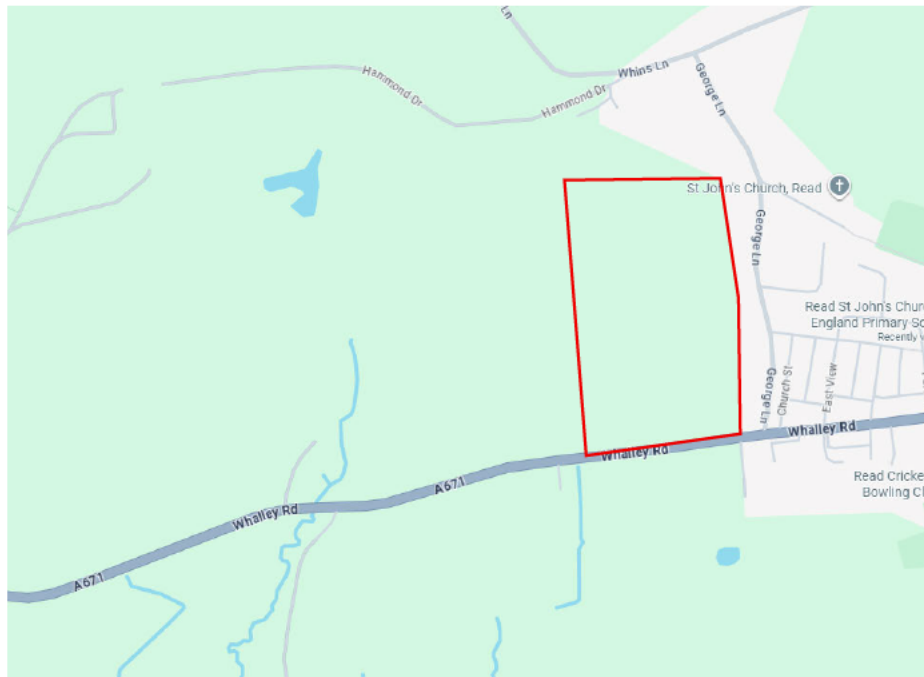


Figure 11 Watercourse Location

10.2.4. 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

10.2.5. 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 (m ³)
Pond	2829.21

10.2.6. 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%

10.2.7. Management of Everyday Rainfall

To manage everyday rainfall events, the first 5mm of runoff from each storm should be collected for re-use, infiltrated into the ground, or captured and conveyed within Sustainable Drainage System (SuDS) features.

To achieve this objective, the proposed development incorporates rainwater butts connected to the rear rainwater downpipes of all dwellings, together with a SuDS attenuation basin designed to provide storage equivalent to, or greater than, the runoff volume generated by the first 5mm of rainfall falling on all impermeable areas within the development, including an allowance for urban creep.

Rainwater Harvesting

Rainwater butts will be installed on at least one rainwater downpipe at the rear of each dwelling. These will facilitate the collection and re-use of rainwater for non-potable purposes, such as garden watering and vehicle washing. In addition to promoting water re-use, the rainwater butts provide distributed source control storage across the site, contributing to the management of the initial 5mm of rainfall.

Storage Within SuDS Basin

The proposed SuDS basin, which provides attenuation for runoff from the entire development, includes a forebay designed to accommodate a storage volume equal to, or greater than, the runoff generated by the first 5mm of rainfall falling on the impermeable surfaces.

The required storage volume has been calculated as follows:

$21,972\text{m}^2$ (impermeable area + 10% Urban Creep) $\times$ 0.005m = 109.86m^3 .

The proposed forebay, with a storage depth of 0.5m , provides a storage volume of 116.715m^3 and therefore exceeds the required storage volume of 109.86m^3 .

The forebay will remain unlined to maximise any available infiltration into the underlying ground. However, based on the findings of the ground investigation, infiltration rates are anticipated to be limited and have therefore not been relied upon within the drainage design. The forebay has been designed to drain down into the main basin between storm events via a permeable bund arrangement, ensuring that the storage volume remains available for subsequent rainfall events.

The drainage strategy provides storage capacity equivalent to the runoff generated by the first 5mm of rainfall falling on the developed impermeable area and therefore accords with the requirement to manage the first 5mm of rainfall on-site.

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).

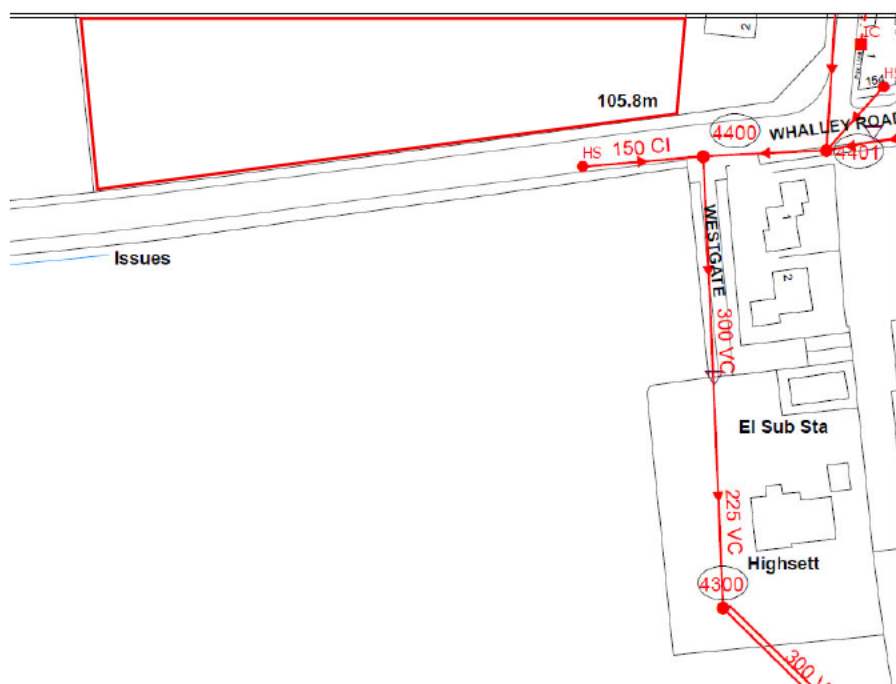


Figure 12 Public Sewer Records

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 and Drainage Strategy has been prepared to assess flood risk and surface water drainage requirements associated with the proposed residential development on land north of Whalley Road, Read.

The proposed development area lies within Flood Zone 1 and is therefore considered to be at low risk of fluvial and tidal flooding. A limited area of Flood Zone 3 is present within the wider site boundary to the southwest, associated with the existing channel; however, this is outside the proposed residential development area and does not affect the proposed access or egress arrangements.

The assessment of flood risk from rivers and the sea, surface water, existing drainage, groundwater, reservoirs and other artificial sources has identified the proposed development area as being at low risk. Localised surface water risk associated with the existing watercourse/channel is present within the wider site, but this is outside the built development area and will be managed through the proposed drainage and open space strategy.

Climate change has been considered throughout the assessment and drainage design. The proposed drainage network is to be designed to accommodate the relevant rainfall events, including appropriate allowances for climate change and urban creep, with discharge restricted to the calculated greenfield rate.

Surface water runoff from the development will be managed in accordance with the drainage hierarchy. Rainwater harvesting will be provided at plot level through water butts, infiltration has been discounted at this stage due to observed saturated ground conditions, and the proposed strategy is therefore based on attenuation and controlled discharge to the nearby watercourse.

The proposed SuDS basin, forebay, flow control and associated drainage infrastructure provide attenuation storage and management of everyday rainfall, including storage for the first 5mm of runoff from impermeable areas. The proposed drainage strategy therefore supports sustainable management of surface water across the site.

Long-term inspection and maintenance requirements have been identified for the adopted drainage network, SuDS features, highway drainage and private plot drainage. These responsibilities and maintenance activities will help ensure that the drainage system continues to operate effectively throughout the lifetime of the development.

Residual flood risk is considered to be low. No formal flood defence infrastructure is relied upon for the development, and the proposed layout, drainage design and exceedance management measures are intended to ensure that surface water is managed safely without increasing flood risk elsewhere.

Overall, the proposed residential development is considered acceptable in flood risk and drainage terms, subject to detailed design, relevant approvals, implementation of the proposed SuDS measures and delivery of the identified maintenance regime. The development is not expected to increase flood risk to surrounding land or downstream receptors and has the potential to improve the management of surface water runoff across the wider site.

Appendix A – Proposed Site Layout

ACCOMODATION SCHEDULE							
Ref	House Type	Beds	Sq. Ft	FMV	Affordable	Total Beds	Total SqFt
Thu	Thursby Semi/Mews	3	1023	7		21	7161
Als	Alston - CT	3	1089	4		12	4356
Yew	Yewdale	3	1107	5		15	5535
Fr	Firbank	3	1154	5		15	5770
Cas	Casterton Det	4	1231	1		4	1231
Cas DA	Casterton Det	4	1231	3		12	3693
Win	Windermere Det	4	1363	3		12	4089
Lev	Levens	4	1430	2		8	2860
Mil	Milburn	4	1468	6		24	8908
Ken	Kentmere	4	1484	2		8	2968
Cal	Calder Outrigger	4	1741	6		24	10446
Cro	Crofton	4	1932	5		20	9660
Hav	Haverthwaite	5	2309	5		25	11545
Bar	Baron	2	760	8	16	16	6080
Whi	Whitwell - 7.5%	2	774	8	16	16	6102
Thu	Thursby	3	1023	7	21	7161	
Total			54	23		253	
Grandtotal			77			253	97555

This aerial map shows the Read Hall estate and its surrounding landscape. Key features include:

- Buildings and Structures:**
 - The Stables
 - Coppy Barn
 - The Granary
 - The Coach
 - Read Hall (the main residence)
 - Read Park (a smaller building or structure)
- Landmarks and Features:**
 - Fish Pond
 - SM Pond
 - Path (un)
 - Path
- Other Labels:**
 - all
 - TK

The map also shows a large green field, a road, and a river or stream flowing through the landscape.



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Key

Application Boundary

Boundary Treatments

	1.8m Brick wall with timber infill panels
	1.8m Timber fence
	1.2m high timber post and rail fence
	Hedge Planting refer to detailed landscaping layout for exact details

NB. Red edge removed from this drawing for clarity of boundary details.

Hard Landscaping

_____ Access Road / Footwa

Private Footpath/Patio - Paving Slabs

Private Driveway/Parking

Private Shared Drive

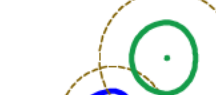
● Denotes dual aspect ty

Existing neighbouring buildings

Topographical survey line (brown lines) measured where possible

Ordnance survey line (black lines)

Existing Trees



Trees to be retained

Trees / Bushes to be removed

Affordable housing location

 Affordable housing plot

 Existing development

Planning

General Arrangements Colour

Drawing No.	23-154-P02	Rev.	
Scale:	1:1000		
Date:	Jan 2025		
Sheet Size:	A0		

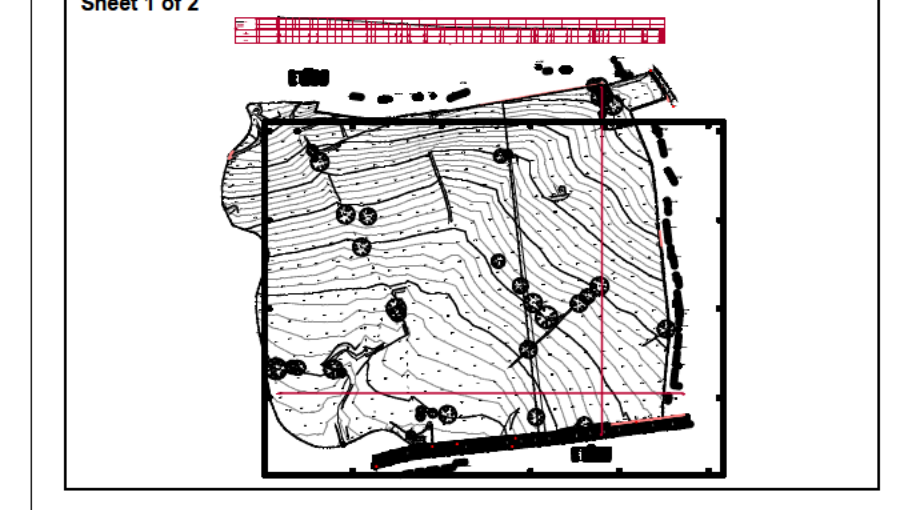
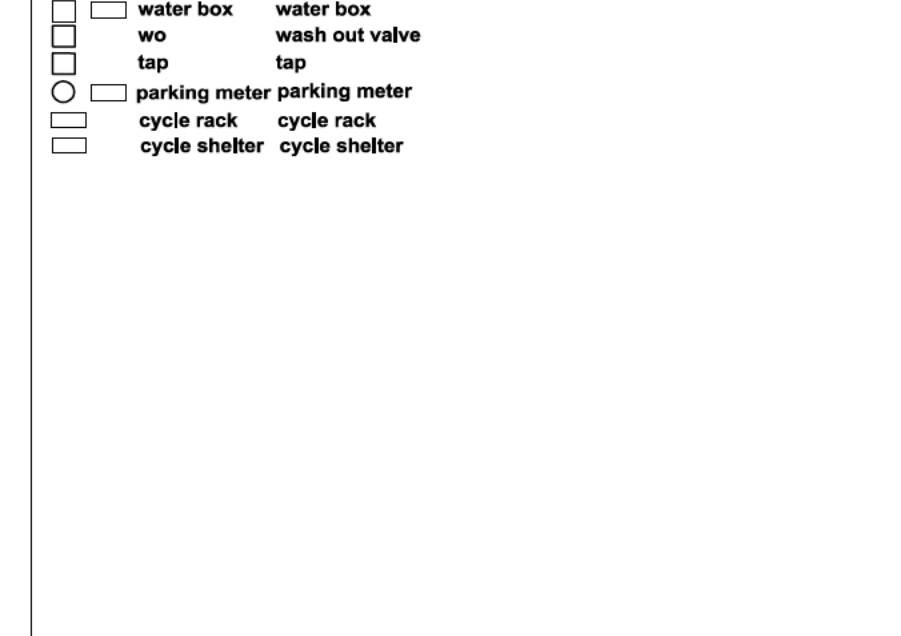
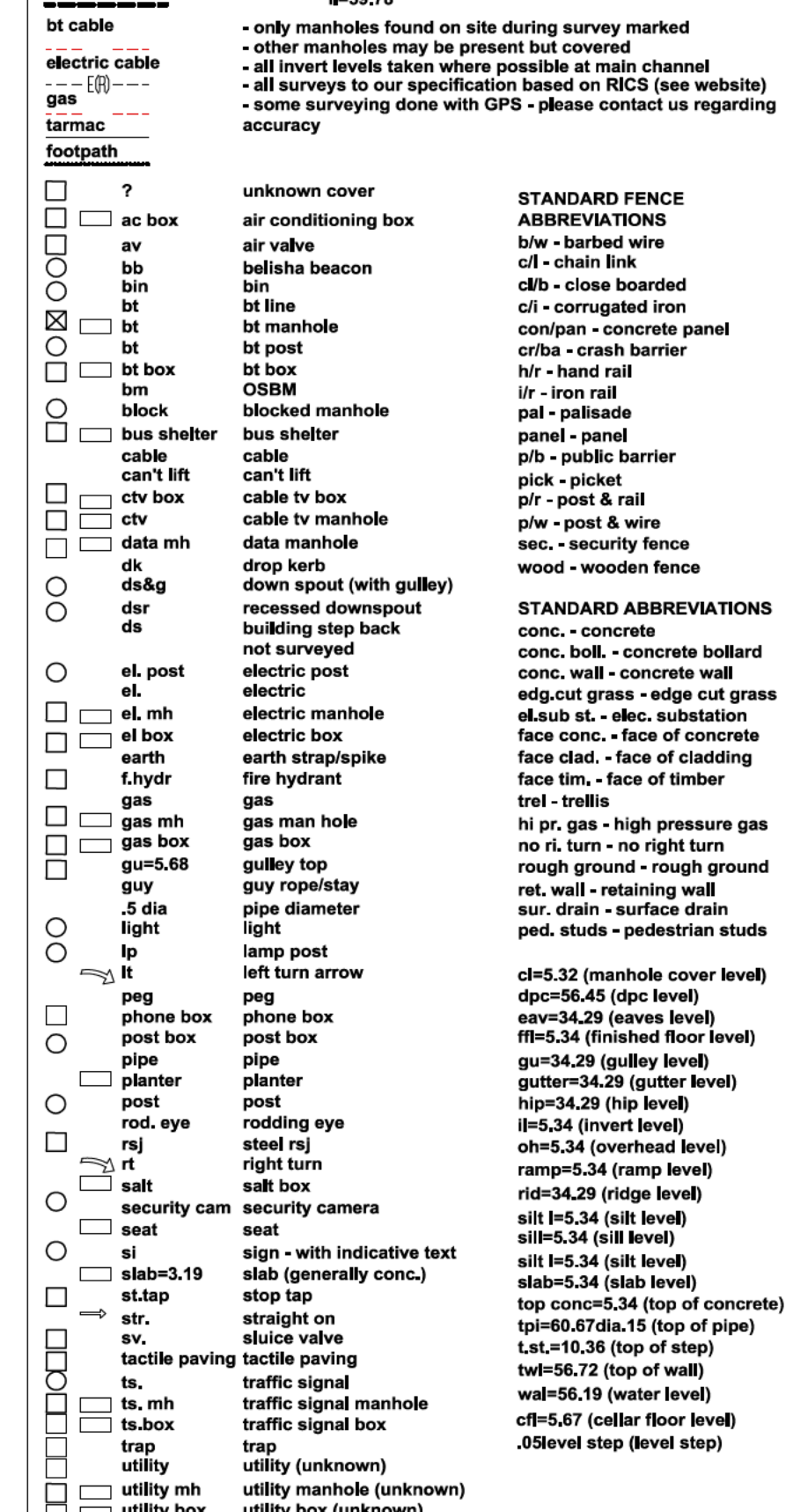
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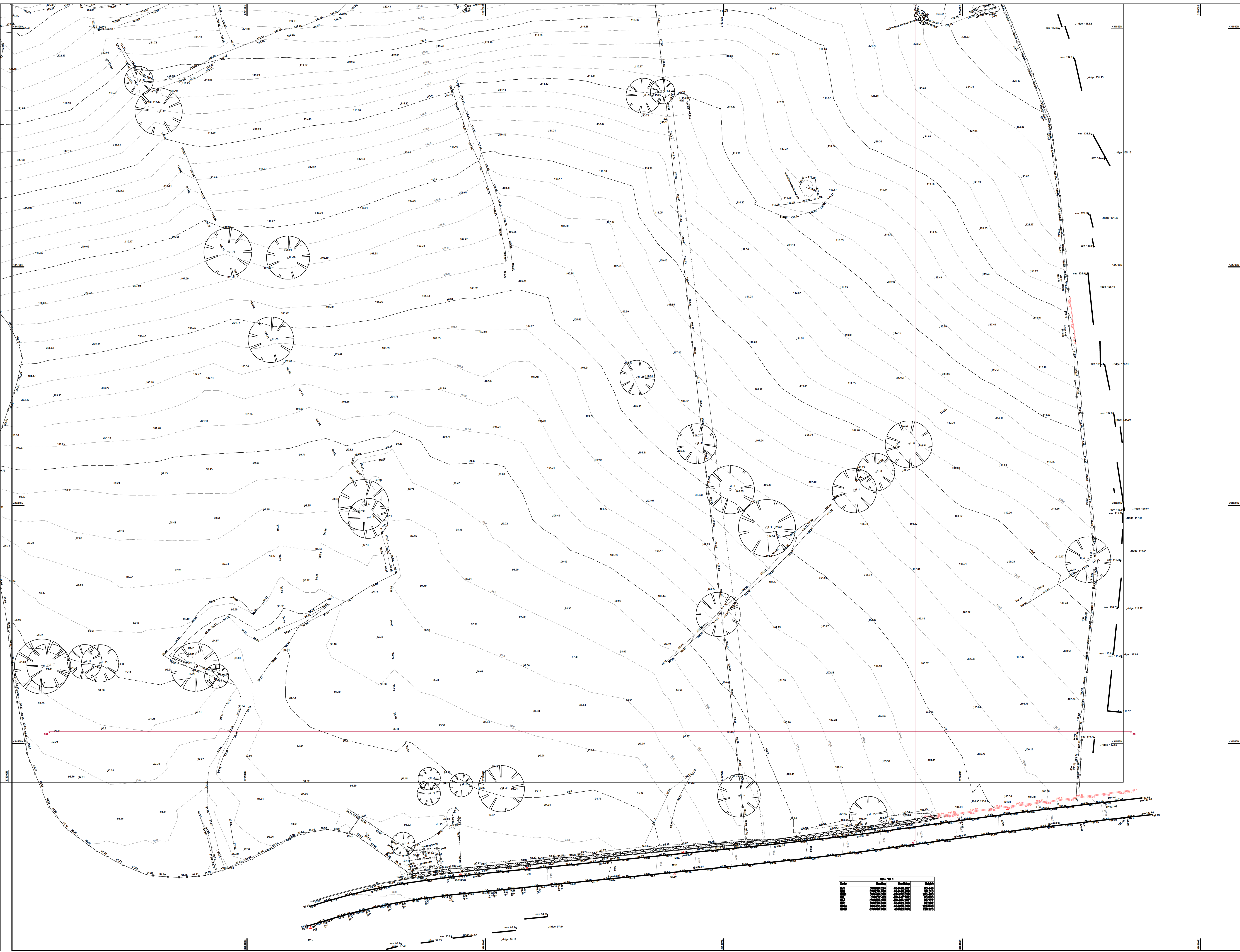
urban design | masterplanning | architecture

Appendix B – Topographical Survey

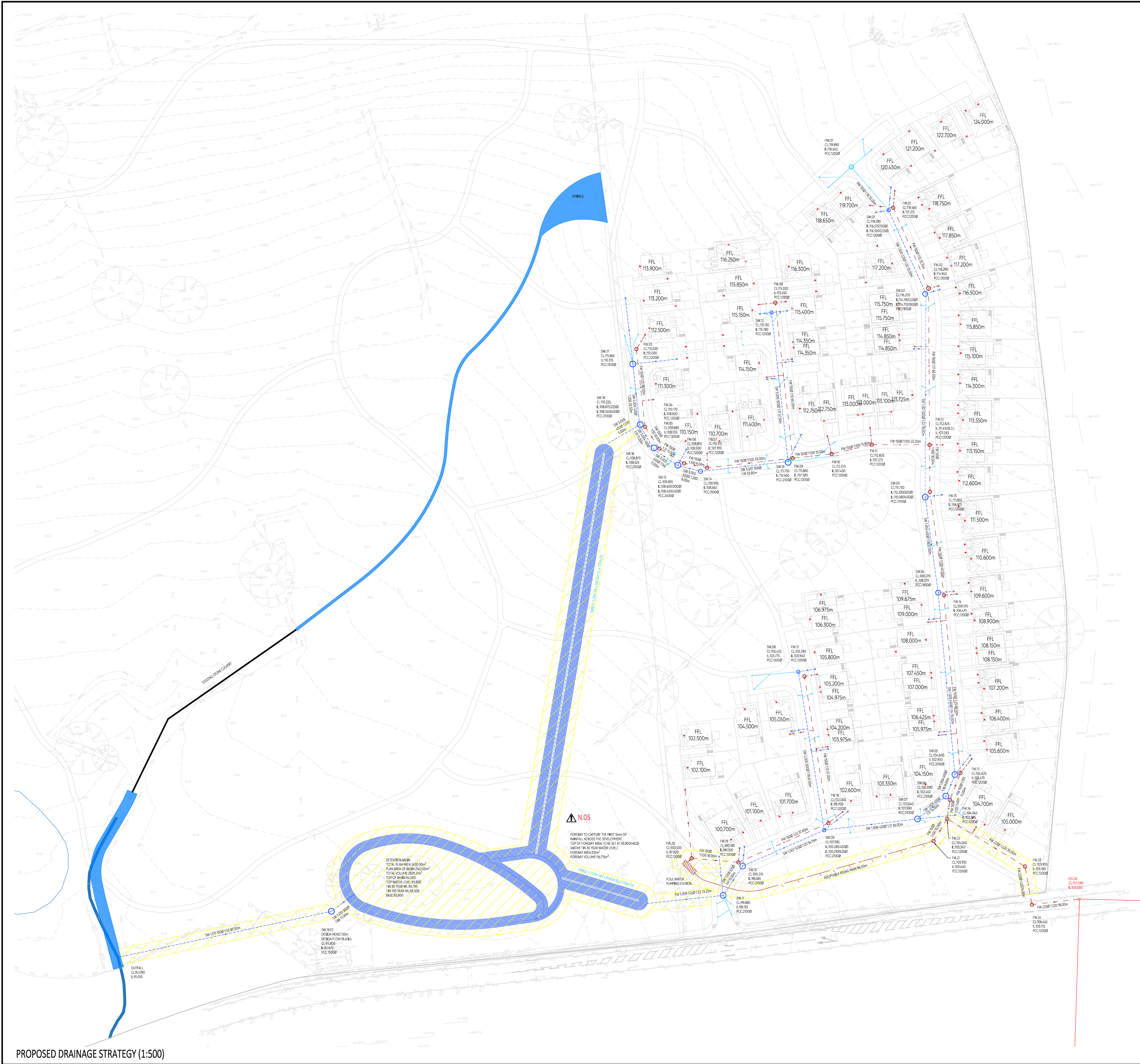


Site Surveying Services - A.M.C.I.E.S.	Setting Out & Control Surveys	
Suite 7	Topographic/Volumetric Surveys	
Grindleton Business Centre	GPS Specialists using also	
Grindleton, Lancs	BPS Total Process to the any site	
BT 01200	to OS without trig point or BM	
Tel 01420 438320	Construction Line Registered	construction line
Fax: 07992376338	TSA member	
www.sitesurvey.co.uk		
Land / Engineering Surveyors		

Need All work to our standard terms & conditions (see website)					
Additional Comments To local grid based on osm20/osgm02 all work to sss specification, some by gps, contact us regarding details					
Drawing Number sss-6231-jd-gr-		Revision A			
Drawn By MR		Checked By HW			
Date 29-07-15		Scale 1 500@ A0			



Appendix C – Drainage Strategy



PROPOSED DRAINAGE IS PRELIMINARY
ONLY AND IS SUBJECT TO DETAILED
DESIGN.

REFER TO PWA DOCUMENT
24028-PWA-00-XX-RP-1000 FOR THE
PROPOSED DRAINAGE STRATEGY
PRINCIPLES.



PROPOSED IMPERMEABLE AREA (1:1250)

SITE LOCATION
OS X (EASTINGS) 376507
OS Y (NORTHINGS) 434565
NAT GRID 5078307 34565
POSTCODE BB12 7BH

NOTES:

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KEY

- DRAINING COMBINED WATER SEWER
- EXISTING COMBINED WATER MANHOLE
- PROPOSED SURFACE WATER MANHOLE
- PROPOSED SURFACE WATER FLOW CONTROL MANHOLE
- PROPOSED SURFACE WATER INSPECTION CHAMBER
- PROPOSED GULLY
- PROPOSED FLOOD WATER SEWER
- PROPOSED FLOOD WATER MANHOLE
- PROPOSED FLOOD WATER INSPECTION CHAMBER
- SITE BOUNDARY

AREA	TOTAL AREA m ² (ha)
PROPOSED IMPERMEABLE	20,618m ² (2.062ha)
PRIVATE IMP. + 10%	14,886m ² (1.489ha)
SHARED IMP.	7,086m ² (0.709ha)
TOTAL	21,972m ² (2.197ha)

*TOTALS FOR HECTARES (ha) AND METERS SQUARED (m²) DIFFER SLIGHTLY DUE TO ROUNDING AND ACCUMULATION OF INDIVIDUAL AREAS.

GREENFIELD RUNOFF RATES	
RETURN PERIOD (YEARS)	FLOW RATE (l/s)
1 IN 1 YEAR	16.0l/s
1 IN 30 YEAR	31.20l/s
1 IN 100 YEAR	38.30 l/s
1 IN 2.33 YEAR (QBAR)	18.40l/s

TABLE 1: DESIGNER'S RISK ASSESSMENT		
RISK REFERENCE	RISK DESCRIPTION	RISK CONSIDERATION/ MITIGATION
R.01	LOCATION AND LEVELS OF EXISTING PUBLIC SEWER	SURVEY SHOULD BE UNDERTAKEN TO DETERMINE ACTUAL LOCATION AND LEVELS OF EXISTING PUBLIC SEWER BEFORE SITE WORKS COMMENCE.
R.02	DRAINAGE LESS THAN 1.2m COVER TO CROWN IN ROAD	CONCRETE SLAB PROTECTION SHOULD BE INTRODUCED WHERE DRAINAGE HAS INSUFFICIENT COVER FOR HIGHWAY AREAS.
R.03	ADOPTABLE PUMPING STATION	LOCATION, ACCESS AND LAYOUT TO BE CONFIRMED WITH UNITED UTILITIES.
R.04	REDUCTION OF FLOOD RISK ACROSS THE SITE	INTRODUCTION OF OPENING CULVERT WORKS TO THE WEST OF THE DEVELOPMENT SITE COULD REDUCE FLOOD RISK.
R.05	EXISTING OFFSITE CULVERT	CULVERT DOWNSTREAM OF WATERCOURSE CONNECTION SHOULD BE INVESTIGATED TO ENSURE POSITIVE OUTFALL.

TABLE 2: NOTE TO DEVELOPER	
NOTE REFERENCE	NOTE DESCRIPTION
N.01	SVP AND SWP LOCATIONS TO BE BY ARCHITECT. LATERAL LOCATIONS INDICATIVE UNTIL FULL DESIGN OF PRIVATE DRAINAGE IS PROPOSED.
N.02	CHANNEL DRAINAGE AND GULLIES DRAINING PRIVATE AREAS TO CONNECT INTO PRIVATE DRAINAGE SYSTEM.
N.03	SECTION 106 APPROVAL TO BE OBTAINED BEFORE CONNECTION INTO EXISTING PUBLIC SEWER IS MADE.
N.04	LAND DRAINAGE CONSENT APPROVAL TO BE OBTAINED BEFORE CONNECTION INTO WATERCOURSE IS MADE.
N.05	THE FREE FLOW OF RAINFALL IS TO BE CONTAINED ON SITE BY THE SEEDMENT FOREBAY. AT 120mm x 120mm x 100mm FOREBAY VOLUME = 16.75m ³
N.06	ALL PLOTS ARE TO HAVE RAINWATER BUTTS FITTED TO THE REAR FURNISHMENTS PRIOR TO THE REUSE WITHIN THE EXTERNAL AREAS OF THE PROPERTY.

REV

13/07/20

WORK DESIGN UPDATED TO MANAGE EVERYDAY RAINFALL.

LS

LS

REV

20/03/20

FIRST ISSUE.

LS

LS

REV

01/08/20

REVISED

LS

LS

PWA / GROUP

CIVIL SUMMIT HOUSE, REPARIAN WAY, 01535 633300
STRUCTURAL THE CROSSINGS, CROSS HILLS, info@pwa-group.co.uk
GEOTECHNICAL KESLEY, BELT FEN www.pwa-group.co.uk

Client

APPLETHWAITE

Project

PROPOSED RESIDENTIAL DEVELOPMENT
WHALLEY ROAD
READ

Title

DRAINAGE STRATEGY

Size	A1	Scale	1:500	Designed	JLE	Checked	LS	Date	MAR 26
Drawing Status	PRELIMINARY								
Job Number	24028	Originator	PWA	Zone	00	Level	XX	Type	DR
								File	C
								Drawing No.	1002
								Rev	P02

Appendix D – Hydraulic Calculations

Project: Proposed Residential Development Whalley Road		Date: 18/03/2026			
		Designed by: JLE	Checked by:		Approved By:
Report Details: Type: Junctions Storm Phase: Phase		Company Address: Summit House Riparian Way The Crossings			

Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)	Invert Level (m)	Chamber Shape	Diameter (m)
SW.01	Manhole	376387.399	434738.220	118.590	2.090	116.500	Circular	1.200
SW.02	Manhole	376401.682	434706.267	116.205	1.500	114.705	Circular	1.800
SW.03	Manhole	376401.420	434628.267	111.730	1.650	110.080	Circular	2.100
SW.04	Manhole	376406.386	434591.602	109.270	1.200	108.070	Circular	1.800
SW.05	Manhole	376412.824	434521.899	104.600	1.650	102.950	Circular	2.100
SW.06	Manhole	376409.482	434513.542	104.090	1.650	102.440	Circular	2.100
SW.07	Manhole	376398.479	434504.886	103.640	1.650	101.990	Circular	2.100
SW.08	Manhole	376352.808	434561.284	105.425	1.650	103.775	Circular	1.500
SW.09	Manhole	376362.719	434500.587	101.935	1.725	100.210	Circular	2.100
SW.10	Manhole	376331.463	434486.783	100.210	1.725	98.485	Circular	2.100
SW.11	Manhole	376323.969	434475.554	99.880	1.725	98.155	Circular	2.100
SW.12	Manhole	376342.503	434699.017	115.130	1.350	113.780	Circular	1.200
SW.13	Manhole	376348.859	434641.870	111.755	1.350	110.405	Circular	2.100
SW.14	Manhole	376315.267	434638.134	109.995	1.350	108.645	Circular	1.500
SW.17	Manhole	376289.318	434679.293	111.665	1.350	110.315	Circular	1.500
SW.18	Manhole	376291.925	434655.938	110.225	1.885	108.340	Circular	2.100
SW.16	Manhole	376297.405	434646.476	109.875	1.480	108.395	Circular	2.100
SW.15	Manhole	376306.545	434640.354	109.835	1.385	108.450	Circular	2.100
Simple Junction (1)	Simple Junction	376294.899	434472.470					
Simple Junction	Simple Junction	376278.945	434648.420					
SW.19.FC	Manhole	376165.800	434482.301	93.800	1.130	92.670	Circular	1.500
Simple Junction (2)	Simple Junction	376155.214	434482.007					

Name	Lock
SW.01	None
SW.02	None
SW.03	None
SW.04	None
SW.05	None
SW.06	None
SW.07	None
SW.08	None
SW.09	None
SW.10	None
SW.11	None
SW.12	None
SW.13	None
SW.14	None
SW.17	None
SW.18	None
SW.16	None
SW.15	None
Simple Junction (1)	
Simple Junction	
SW.19.FC	None
Simple Junction (2)	

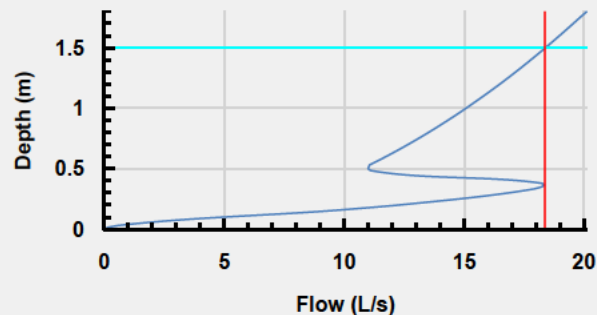
Project: Proposed Residential Development Whalley Road		Date: 18/03/2026			
		Designed by: JLE	Checked by:		Approved By:
Report Details: Type: Junctions Storm Phase: Phase		Company Address: Summit House Riparian Way The Crossings			

Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
SW.01	Outlet	1.000	Free Discharge
SW.02	Outlet	1.001	Free Discharge
SW.03	Outlet	1.002	Free Discharge
SW.04	Outlet	1.003	Free Discharge
SW.05	Outlet	1.004	Free Discharge
SW.06	Outlet	1.005	Free Discharge
SW.07	Outlet	1.006	Free Discharge
SW.08	Outlet	2.000	Free Discharge
SW.09	Outlet	1.007	Free Discharge
SW.10	Outlet	1.008	Free Discharge
SW.11	Outlet	1.009	Free Discharge
SW.12	Outlet	3.000	Free Discharge
SW.13	Outlet	3.001	Free Discharge
SW.14	Outlet	3.002	Free Discharge
SW.17	Outlet	4.000	Free Discharge
SW.18	Outlet	3.005	Free Discharge
SW.16	Outlet	3.004	Free Discharge
SW.15	Outlet	3.003	Free Discharge
Simple Junction (1)	Outlet	Swale 2	Free Discharge
Simple Junction	Outlet	Swale 1	Free Discharge
	Outlet	1.011	Hydro-Brake®

Invert Level (m)	92.670
Design Depth (m)	1.500
Design Flow (L/s)	18.4
Objective	Minimise Upstream Storage Requirements
Application	Surface Water Only
Sump Available	☐
Unit Reference	CHE-0173-1840-1500-1840

SW.19.FC



Project: Proposed Residential Development Whalley Road	Date: 18/03/2026		
	Designed by: JLE	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: Summit House Riparian Way The Crossings		





Pond

Type : Pond

Dimensions

Exceedance Level (m)	94.000
Depth (m)	1.200
Base Level (m)	92.800
Freeboard (mm)	0
Initial Depth (m)	0.000
Porosity (%)	100
Average Slope (1:X)	5.062
Total Volume (m³)	2829.218

Depth (m)	Area (m²)	Volume (m³)
0.000	1500.00	0.000
0.100	2265.00	186.941
0.200	2326.00	416.484
0.300	2388.00	652.177
1.200	2450.00	2829.218

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	Swale 2
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	Swale 1
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	1.010
Outlet Type	Free Discharge

Advanced

Perimeter	Circular
Length (m)	86.986
Friction Scheme	Manning's n
n	0.35

Project: Proposed Residential Development Whalley Road		Date: 18/03/2026			
		Designed by: JLE	Checked by:		Approved By:
Report Details: Type: Connections Storm Phase: Phase		Company Address: Summit House Riparian Way The Crossings			

Name	From	Length (m)	Connection Type	Slope (1:X)	Manning's n	Colebrook-White Roughness (mm)	Diameter / Base Width (mm)	Height (mm)
1.000	SW.01	35.000	Pipe	20.349		0.6	225	
1.001	SW.02	78.000	Pipe	17.430		0.6	300	
1.002	SW.03	37.000	Pipe	18.408		0.6	450	
1.003	SW.04	70.000	Pipe	13.672		0.6	450	
1.004	SW.05	9.000	Pipe	17.647		0.6	450	
1.005	SW.06	14.000	Pipe	31.111		0.6	450	
1.006	SW.07	36.018	Pipe	21.125		0.6	450	
2.000	SW.08	61.500	Pipe	18.413		0.6	300	
1.007	SW.09	34.168	Pipe	19.808		0.6	525	
1.008	SW.10	13.500	Pipe	40.909		0.6	525	
3.003	SW.15	11.000	Pipe	200.000		0.6	450	
3.000	SW.12	57.500	Pipe	17.037		0.6	300	
3.001	SW.13	33.800	Pipe	19.205		0.6	300	
3.002	SW.14	9.000	Pipe	200.000		0.6	300	
4.000	SW.17	23.500	Pipe	16.319		0.6	225	
3.005	SW.18	15.000	Pipe	8.152		0.6	450	
3.004	SW.16	10.935	Pipe	200.000		0.6	450	
1.009	SW.11	29.234	Pipe	21.575		0.6	525	
Swale 2	Simple Junction (1)	33.596	Trapezoidal Channel	8.399	0.350		1000	1000
Swale 1	Simple Junction	158.635	Trapezoidal Channel	12.203	0.350		1000	1000
1.010	Pond	11.224	Pipe	86.338		0.6	300	
1.011	SW.19.FC	10.590	Pipe	62.294		0.6	150	

Name	Side Slope (1:X)	Upstream Cover Level (m)	Upstream Invert Level (m)	Downstream Cover Level (m)	Downstream Invert Level (m)	Lock	Flow Restriction (L/s)
1.000		118.590	116.500	116.205	114.780	Levels	
1.001		116.205	114.705	111.730	110.230	Levels	
1.002		111.730	110.080	109.270	108.070	Levels	
1.003		109.270	108.070	104.600	102.950	Levels	
1.004		104.600	102.950	104.090	102.440	Levels	
1.005		104.090	102.440	103.640	101.990	Levels	
1.006		103.640	101.990	101.935	100.285	Levels	
2.000		105.425	103.775	101.935	100.435	Levels	
1.007		101.935	100.210	100.210	98.485	Levels	
1.008		100.210	98.485	99.880	98.155	Levels	
3.003		109.835	108.450	109.875	108.395	Levels	
3.000		115.130	113.780	111.755	110.405	Levels	
3.001		111.755	110.405	109.995	108.645	Levels	
3.002		109.995	108.645	109.835	108.600	Levels	
4.000		111.665	110.315	110.225	108.875	Levels	
3.005		110.225	108.340	107.000	106.500	Levels	
3.004		109.875	108.395	110.225	108.340	Levels	
1.009		99.880	98.155	97.800	96.800	Levels	
Swale 2	3.00	97.800	96.800	94.000	92.800	Levels	
Swale 1	3.00	107.000	106.000	94.000	93.000	Levels	
1.010		94.000	92.800	93.800	92.670	Levels	
1.011		93.800	92.670	93.800	92.500	Levels	0.0

Project: Proposed Residential Development Whalley Road		Date: 18/03/2026			
		Designed by: JLE	Checked by:		Approved By:
Report Details: Type: Inflow Summary Storm Phase: Phase		Company Address: Summit House Riparian Way The Crossings			

Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (ha)
Plot 1+2	SW.07		Time of Concentration	0.050	100	0	100	0.050
Plot 26-18	SW.09		Time of Concentration	0.062	100	0	100	0.062
Plot 36-42+46-47	SW.08		Time of Concentration	0.130	100	0	100	0.130
Plot 48-49	SW.11		Time of Concentration	0.064	100	0	100	0.064
Plot 67-69	SW.15		Time of Concentration	0.062	100	0	100	0.062
Plot 74-77	SW.17		Time of Concentration	0.080	100	0	100	0.080
Plot 12-17	SW.03		Time of Concentration	0.130	100	0	100	0.130
Plot 18-21+56-60	SW.02		Time of Concentration	0.170	100	0	100	0.170
Plot 43-45	SW.10		Time of Concentration	0.058	100	0	100	0.058
Plots 3-8	SW.05		Time of Concentration	0.120	100	0	100	0.120
Plots 9-11 + 29-35	SW.04		Time of Concentration	0.174	100	0	100	0.174
Plots 22-25+61-62	SW.01		Time of Concentration	0.140	100	0	100	0.140
Plots 50-55	SW.13		Time of Concentration	0.074	100	0	100	0.074
Plots 63-66 +70-73	SW.12		Time of Concentration	0.151	100	0	100	0.151
Road	SW.01		Time of Concentration	0.063	100	0	100	0.063
Road	SW.02		Time of Concentration	0.087	100	0	100	0.087
Road (1)	SW.03		Time of Concentration	0.028	100	0	100	0.028
Road (2)	SW.07		Time of Concentration	0.027	100	0	100	0.027
Road (3)	SW.08		Time of Concentration	0.088	100	0	100	0.088
Road (4)	SW.09		Time of Concentration	0.027	100	0	100	0.027
Road (5)	SW.10		Time of Concentration	0.029	100	0	100	0.029
Road (6)	SW.11		Time of Concentration	0.034	100	0	100	0.034
Road (7)	SW.13		Time of Concentration	0.030	100	0	100	0.030
Road (8)	SW.12		Time of Concentration	0.075	100	0	100	0.075
Road (9)	SW.16		Time of Concentration	0.052	100	0	100	0.052
Road (1)	SW.04		Time of Concentration	0.077	100	0	100	0.077
Road (2)	SW.06		Time of Concentration	0.029	100	0	100	0.029
Road (3)	SW.13		Time of Concentration	0.044	100	0	100	0.044
Road (4)	SW.17		Time of Concentration	0.042	100	0	100	0.042
TOTAL		0.0		2.197				2.197

Project: Proposed Residential Development Whalley Road		Date: 18/03/2026			
Report Details: Type: Junctions Summary Storm Phase: Phase		Designed by: JLE	Checked by:		Approved By:
		Company Address: Summit House Riparian Way The Crossings			



FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Resident Volume

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW.01	FSR: 1 years: +0 %: 15 mins: Summer	118.5 90	116.5 00	116.58 3	0.083	32.8	0.094	0.000	31.8	14.275	OK
SW.02	FSR: 1 years: +0 %: 15 mins: Summer	116.2 05	114.7 05	114.81 1	0.106	73.4	0.271	0.000	69.3	32.327	OK
SW.03	FSR: 1 years: +0 %: 15 mins: Summer	111.73 0	110.0 80	110.18 9	0.109	94.8	0.377	0.000	93.1	43.419	OK
SW.04	FSR: 1 years: +0 %: 15 mins: Summer	109.2 70	108.0 70	108.18 6	0.116	133.7	0.295	0.000	129.7	61.064	OK
SW.05	FSR: 1 years: +0 %: 15 mins: Summer	104.6 00	102.9 50	103.10 3	0.153	149.1	0.532	0.000	143.3	69.444	OK
SW.06	FSR: 1 years: +0 %: 15 mins: Summer	104.0 90	102.4 40	102.61 5	0.175	148.0	0.607	0.000	145.4	71.452	OK
SW.07	FSR: 1 years: +0 %: 15 mins: Summer	103.6 40	101.9 90	102.14 0	0.150	157.8	0.520	0.000	152.1	76.800	OK
SW.08	FSR: 1 years: +0 %: 15 mins: Summer	105.4 25	103.7 75	103.84 9	0.074	35.3	0.130	0.000	33.4	15.332	OK
SW.09	FSR: 1 years: +0 %: 15 mins: Summer	101.9 35	100.2 10	100.36 2	0.152	200.0	0.526	0.000	196.8	98.334	OK
SW.10	FSR: 1 years: +0 %: 15 mins: Summer	100.2 10	98.48 5	98.702	0.217	210.9	0.751	0.000	204.6	104.389	OK
SW.11	FSR: 1 years: +0 %: 15 mins: Summer	99.88 0	98.15 5	98.316	0.161	220.5	0.559	0.000	216.9	111.273	OK
SW.12	FSR: 1 years: +0 %: 15 mins: Summer	115.1 30	113.7 80	113.85 3	0.073	36.6	0.083	0.000	35.7	15.916	OK
SW.13	FSR: 1 years: +0 %: 15 mins: Summer	111.75 5	110.4 05	110.50 2	0.097	59.7	0.335	0.000	57.4	26.308	OK
SW.14	FSR: 1 years: +0 %: 15 mins: Summer	109.9 95	108.6 45	108.85 0	0.205	57.4	0.362	0.000	53.5	26.256	OK
SW.17	FSR: 1 years: +0 %: 15 mins: Summer	111.66 5	110.3 15	110.37 5	0.060	19.7	0.106	0.000	19.2	8.587	OK
SW.18	FSR: 1 years: +0 %: 15 mins: Summer	110.2 25	108.3 40	108.42 8	0.088	86.8	0.306	0.000	85.2	42.745	OK
SW.16	FSR: 1 years: +0 %: 15 mins: Summer	109.8 75	108.3 95	108.56 2	0.167	70.0	0.579	0.000	67.6	34.181	OK
SW.15	FSR: 1 years: +0 %: 15 mins: Summer	109.8 35	108.4 50	108.63 1	0.181	63.5	0.625	0.000	61.6	30.584	OK
Simple Junction (1)	FSR: 1 years: +0 %: 15 mins: Summer		96.80 0	97.269	0.469	216.9			169.0	112.492	OK
Simple Junction	FSR: 1 years: +0 %: 15 mins: Summer		106.0 00	106.15 2	0.152	85.2			16.6	17.300	OK
SW.19.FC	FSR: 1 years: +0 %: 960 mins: Summer	93.80 0	92.67 0	93.004	0.334	14.3	0.591	0.000	14.3	763.411	Surcharged
Simple Junction (2)	FSR: 1 years: +0 %: 15 mins: Summer		92.50 0	92.500	0.000	0.0			0.0	0.000	OK

Project: Proposed Residential Development Whalley Road		Date: 18/03/2026			
Report Details: Type: Junctions Summary Storm Phase: Phase		Designed by: JLE	Checked by:		Approved By:
		Company Address: Summit House Riparian Way The Crossings			



FSR: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Resident Volume

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW.01	FSR: 2 years: +0 %: 15 mins: Summer	118.590	116.500	116.596	0.096	42.5	0.109	0.000	41.2	18.478	OK
SW.02	FSR: 2 years: +0 %: 15 mins: Summer	116.205	114.705	114.828	0.123	95.0	0.313	0.000	90.0	41.843	OK
SW.03	FSR: 2 years: +0 %: 15 mins: Summer	111.730	110.080	110.205	0.125	123.1	0.434	0.000	121.0	56.205	OK
SW.04	FSR: 2 years: +0 %: 15 mins: Summer	109.270	108.070	108.203	0.133	173.6	0.338	0.000	168.7	79.033	OK
SW.05	FSR: 2 years: +0 %: 15 mins: Summer	104.600	102.950	103.132	0.182	193.9	0.629	0.000	186.6	89.886	OK
SW.06	FSR: 2 years: +0 %: 15 mins: Summer	104.090	102.440	102.646	0.206	192.7	0.713	0.000	189.4	92.486	OK
SW.07	FSR: 2 years: +0 %: 15 mins: Summer	103.640	101.990	102.165	0.175	205.5	0.606	0.000	198.5	99.426	OK
SW.08	FSR: 2 years: +0 %: 15 mins: Summer	105.425	103.775	103.859	0.084	45.7	0.149	0.000	43.4	19.837	OK
SW.09	FSR: 2 years: +0 %: 15 mins: Summer	101.935	100.210	100.387	0.177	260.5	0.613	0.000	256.8	127.297	OK
SW.10	FSR: 2 years: +0 %: 15 mins: Summer	100.210	98.485	98.740	0.255	275.0	0.882	0.000	267.3	135.148	OK
SW.11	FSR: 2 years: +0 %: 15 mins: Summer	99.880	98.155	98.341	0.186	287.8	0.645	0.000	283.7	144.042	OK
SW.12	FSR: 2 years: +0 %: 15 mins: Summer	115.130	113.780	113.864	0.084	47.3	0.095	0.000	46.3	20.586	OK
SW.13	FSR: 2 years: +0 %: 15 mins: Summer	111.755	110.405	110.516	0.111	77.3	0.385	0.000	74.5	34.034	OK
SW.14	FSR: 2 years: +0 %: 15 mins: Summer	109.995	108.645	108.891	0.246	74.5	0.435	0.000	70.0	33.978	OK
SW.17	FSR: 2 years: +0 %: 15 mins: Summer	111.665	110.315	110.384	0.069	25.5	0.122	0.000	24.9	11.100	OK
SW.18	FSR: 2 years: +0 %: 15 mins: Summer	110.225	108.340	108.442	0.102	113.7	0.355	0.000	111.7	55.326	OK
SW.16	FSR: 2 years: +0 %: 15 mins: Summer	109.875	108.395	108.589	0.194	91.6	0.673	0.000	88.8	44.250	OK
SW.15	FSR: 2 years: +0 %: 15 mins: Summer	109.835	108.450	108.662	0.212	83.0	0.734	0.000	80.7	39.582	OK
Simple Junction (1)	FSR: 2 years: +0 %: 15 mins: Summer		96.800	97.343	0.543	283.7			210.2	145.810	OK
Simple Junction	FSR: 2 years: +0 %: 15 mins: Summer		106.000	106.182	0.182	111.7			23.2	24.295	OK
SW.19.FC	FSR: 2 years: +0 %: 960 mins: Summer	93.800	92.670	93.041	0.371	15.7	0.656	0.000	15.7	892.572	Surcharged
Simple Junction (2)	FSR: 2 years: +0 %: 15 mins: Summer		92.500	92.500	0.000	0.0			0.0	0.000	OK

Project: Proposed Residential Development Whalley Road		Date: 18/03/2026			
		Designed by: JLE	Checked by:		Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase		Company Address: Summit House Riparian Way The Crossings			



FSR: 30 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Resident Volume

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW.01	FSR: 30 years: +40 %: 15 mins: Summer	118.5 90	116.5 00	116.69 4	0.194	112.8	0.219	0.000	108.5	48.980	OK
SW.02	FSR: 30 years: +40 %: 15 mins: Summer	116.2 05	114.7 05	114.94 2	0.237	251.3	0.604	0.000	238.2	110.947	OK
SW.03	FSR: 30 years: +40 %: 15 mins: Summer	111.73 0	110.0 80	110.30 1	0.221	326.1	0.765	0.000	321.8	149.042	OK
SW.04	FSR: 30 years: +40 %: 15 mins: Summer	109.2 70	108.0 70	108.29 9	0.229	461.3	0.583	0.000	451.6	209.575	OK
SW.05	FSR: 30 years: +40 %: 15 mins: Summer	104.6 00	102.9 50	103.35 1	0.401	518.3	1.387	0.000	489.5	238.462	OK
SW.06	FSR: 30 years: +40 %: 15 mins: Summer	104.0 90	102.4 40	102.89 5	0.455	505.6	1.576	0.000	485.6	245.427	Surcharged
SW.07	FSR: 30 years: +40 %: 15 mins: Summer	103.6 40	101.9 90	102.32 2	0.332	528.4	1.151	0.000	522.9	263.930	OK
SW.08	FSR: 30 years: +40 %: 15 mins: Summer	105.4 25	103.7 75	103.92 1	0.146	121.2	0.259	0.000	116.3	52.591	OK
SW.09	FSR: 30 years: +40 %: 15 mins: Summer	101.9 35	100.2 10	100.54 8	0.338	688.7	1.172	0.000	681.3	337.611	OK
SW.10	FSR: 30 years: +40 %: 15 mins: Summer	100.2 10	98.48 5	99.066	0.581	729.7	2.012	0.000	703.5	358.921	Surcharged
SW.11	FSR: 30 years: +40 %: 15 mins: Summer	99.88 0	98.15 5	98.489	0.334	758.0	1.157	0.000	748.2	382.485	OK
SW.12	FSR: 30 years: +40 %: 15 mins: Summer	115.1 30	113.7 80	113.92 2	0.142	125.6	0.161	0.000	123.5	54.556	OK
SW.13	FSR: 30 years: +40 %: 15 mins: Summer	111.75 5	110.4 05	110.60 9	0.204	205.8	0.708	0.000	199.8	90.214	OK
SW.14	FSR: 30 years: +40 %: 15 mins: Summer	109.9 95	108.6 45	109.36 3	0.718	199.8	1.268	0.000	194.8	90.166	Surcharged
SW.17	FSR: 30 years: +40 %: 15 mins: Summer	111.66 5	110.3 15	110.43 7	0.122	67.8	0.216	0.000	66.3	29.441	OK
SW.18	FSR: 30 years: +40 %: 15 mins: Summer	110.2 25	108.3 40	108.52 6	0.186	313.9	0.645	0.000	313.0	146.968	OK
SW.16	FSR: 30 years: +40 %: 15 mins: Summer	109.8 75	108.3 95	108.75 7	0.362	253.0	1.256	0.000	247.6	117.497	OK
SW.15	FSR: 30 years: +40 %: 15 mins: Summer	109.8 35	108.4 50	108.88 4	0.434	229.2	1.503	0.000	224.1	105.082	OK
Simple Junction (1)	FSR: 30 years: +40 %: 15 mins: Summer		96.80 0	97.655	0.855	748.2			679.7	387.992	OK

Project: Proposed Residential Development Whalley Road		Date: 18/03/2026			
		Designed by: JLE	Checked by:	Approved By:	
Report Details: Type: Junctions Summary Storm Phase: Phase		Company Address: Summit House Riparian Way The Crossings			

Simple Junction	FSR: 30 years: +40 %: 15 mins: Summer		106.000	106.390	0.390	313.0			142.5	95.619	OK
SW.19.FC	FSR: 30 years: +40 %: 960 mins: Summer	93.800	92.670	93.496	0.826	18.4	1.459	0.000	18.3	1257.563	Surcharged
Simple Junction (2)	FSR: 30 years: +40 %: 15 mins: Summer		92.500	92.588	0.088	14.7			14.7	5.396	OK

Project: Proposed Residential Development Whalley Road		Date: 18/03/2026			
		Designed by: JLE	Checked by:		Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase		Company Address: Summit House Riparian Way The Crossings			



FSR: 100 years: Increase Rainfall (%): +50: Critical Storm Per Item: Rank By: Max. Resident Volume

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW.01	FSR: 100 years: +50 %: 15 mins: Summer	118.590	116.500	117.834	1.334	156.6	1.509	0.000	132.8	67.450	Surcharged
SW.02	FSR: 100 years: +50 %: 15 mins: Summer	116.205	114.705	115.495	0.790	331.1	2.011	0.000	267.3	153.637	Surcharged
SW.03	FSR: 100 years: +50 %: 15 mins: Summer	111.730	110.080	110.327	0.247	389.2	0.855	0.000	388.7	206.465	OK
SW.04	FSR: 100 years: +50 %: 15 mins: Summer	109.270	108.070	108.339	0.269	582.4	0.685	0.000	576.0	290.012	OK
SW.05	FSR: 100 years: +50 %: 15 mins: Summer	104.600	102.950	104.177	1.227	668.6	4.252	0.000	636.6	330.420	Surcharged
SW.06	FSR: 100 years: +50 %: 15 mins: Summer	104.090	102.440	103.450	1.010	658.9	3.499	0.000	626.7	340.174	Surcharged
SW.07	FSR: 100 years: +50 %: 15 mins: Summer	103.640	101.990	102.561	0.571	686.1	1.978	0.000	644.9	364.891	Surcharged
SW.08	FSR: 100 years: +50 %: 15 mins: Summer	105.425	103.775	103.950	0.175	168.2	0.310	0.000	166.9	71.882	OK
SW.09	FSR: 100 years: +50 %: 15 mins: Summer	101.935	100.210	100.834	0.624	880.5	2.161	0.000	736.7	467.568	Surcharged
SW.10	FSR: 100 years: +50 %: 15 mins: Summer	100.210	98.485	99.725	1.240	803.9	4.296	0.000	796.3	496.924	Surcharged
SW.11	FSR: 100 years: +50 %: 15 mins: Summer	99.880	98.155	99.034	0.879	871.9	3.044	0.000	874.1	529.803	Surcharged
SW.12	FSR: 100 years: +50 %: 15 mins: Summer	115.130	113.780	113.956	0.176	174.4	0.199	0.000	172.5	75.468	OK
SW.13	FSR: 100 years: +50 %: 15 mins: Summer	111.755	110.405	111.280	0.875	286.7	3.031	0.000	233.1	125.128	Surcharged
SW.14	FSR: 100 years: +50 %: 15 mins: Summer	109.995	108.645	109.572	0.927	233.1	1.638	0.000	223.8	125.093	Surcharged
SW.17	FSR: 100 years: +50 %: 15 mins: Summer	111.665	110.315	110.469	0.154	94.1	0.272	0.000	91.9	40.813	OK
SW.18	FSR: 100 years: +50 %: 15 mins: Summer	110.225	108.340	108.555	0.215	393.9	0.743	0.000	396.7	203.908	OK
SW.16	FSR: 100 years: +50 %: 15 mins: Summer	109.875	108.395	108.781	0.386	308.2	1.338	0.000	302.0	162.997	OK
SW.15	FSR: 100 years: +50 %: 15 mins: Summer	109.835	108.450	108.963	0.513	271.6	1.778	0.000	268.1	145.790	Surcharged
Simple Junction (1)	FSR: 100 years: +50 %: 15 mins: Summer		96.800	97.709	0.909	874.1			867.1	537.191	OK

Project: Proposed Residential Development Whalley Road		Date: 18/03/2026			
		Designed by: JLE	Checked by:	Approved By:	
Report Details: Type: Junctions Summary Storm Phase: Phase		Company Address: Summit House Riparian Way The Crossings			

Simple Junction	FSR: 100 years: +50 %: 15 mins: Summer		106.000	106.477	0.477	396.7			249.2	156.086	OK
SW.19.FC	FSR: 100 years: +50 %: 960 mins: Summer	93.800	92.670	93.779	1.109	18.4	1.960	0.000	18.3	1463.809	Flood Risk
Simple Junction (2)	FSR: 100 years: +50 %: 15 mins: Summer		92.500	92.600	0.100	17.8			17.8	9.753	OK

Project: Proposed Residential Development Whalley Road		Date: 18/03/2026			
		Designed by: JLE	Checked by:		Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Company Address: Summit House Riparian Way The Crossings			



**FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max.
DS Depth**

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. Avg. Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Avg. Depth (m)	Max. Inflow (L/s)	Max. Residual Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)
Pond	FSR: 1 years: +0 %: 960 mins: Summer	93.008	93.008	93.008	0.208	0.208	0.208	51.7	434.916	0.000	0.000	14.3	763.531

Project: Proposed Residential Development Whalley Road	Date: 18/03/2026		
	Designed by: JLE	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Company Address: Summit House Riparian Way The Crossings		



Percentage Available (%)	Status
84.628	OK

Project: Proposed Residential Development Whalley Road		Date: 18/03/2026			
		Designed by: JLE	Checked by:		Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Company Address: Summit House Riparian Way The Crossings			



**FSR: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max.
DS Depth**

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. Avg. Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Avg. Depth (m)	Max. Inflow (L/s)	Max. Residual Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)
Pond	FSR: 2 years: +0 %: 960 mins: Summer	93.046	93.045	93.045	0.246	0.245	0.245	61.1	522.762	0.000	0.000	15.7	892.711

Project: Proposed Residential Development Whalley Road	Date: 18/03/2026		
	Designed by: JLE	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Company Address: Summit House Riparian Way The Crossings		



Percentage Available (%)	Status
81.523	OK

Project: Proposed Residential Development Whalley Road		Date: 18/03/2026			
		Designed by: JLE	Checked by:		Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Company Address: Summit House Riparian Way The Crossings			



**FSR: 30 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max.
DS Depth**

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. Avg. Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Avg. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)
Pond	FSR: 30 years: +40 %: 960 mins: Summer	93.498	93.498	93.498	0.698	0.698	0.698	151.1	1608.901	0.000	0.000	18.4	1258.995

Project: Proposed Residential Development Whalley Road	Date: 18/03/2026			
	Designed by: JLE	Checked by:	Approved By:	
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Company Address: Summit House Riparian Way The Crossings			

Percentage Available (%)	Status
43.133	OK

Project: Proposed Residential Development Whalley Road		Date: 18/03/2026			
		Designed by: JLE	Checked by:		Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Company Address: Summit House Riparian Way The Crossings			



**FSR: 100 years: Increase Rainfall (%): +50: Critical Storm Per Item: Rank By:
Max. DS Depth**

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. Avg. Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Avg. Depth (m)	Max. Inflow (L/s)	Max. Residual Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)
Pond	FSR: 100 years: +50 %: 960 mins: Summer	93.783	93.783	93.783	0.983	0.983	0.983	202.1	2298.635	0.000	0.000	18.4	1465.666

Project: Proposed Residential Development Whalley Road	Date: 18/03/2026		
	Designed by: JLE	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Company Address: Summit House Riparian Way The Crossings		



Percentage Available (%)	Status
18.754	OK

End of Report