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Drainage Strategy Report

LAND TO NORTH OF MORESBY HALL, WHITEHAVEN, CA28 6PJ

25-C-18182

Rev B

May 2026

Contents

1. INTRODUCTION

A L Daines & Partners LLP (ALD) have been engaged to undertake a Surface and Foul Water Drainage Strategy, in accordance with the National Planning Policy Framework (NPPF) [1] for the proposed housing development to land north of Moresby Hall, Whitehaven.

The purpose of this report is to provide a strategy to manage surface and foul water flows from the site, in support of the planning application, while fulfilling the requirements of the Local Planning Authority (LPA) and the Lead Local Flood Authority (LLFA).

2. PLANNING CONTECT

2.1. PLANNING POLICY

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

Paragraph 182 reads *"Applications which could affect drainage on or around the site should incorporate sustainable drainage systems to control flow rates and reduce volumes of runoff, and which are proportionate to the nature and scale of the proposal. These should provide multifunctional benefits wherever possible, through facilitating improvements in water quality and biodiversity, as well as benefits for amenity. Sustainable drainage systems provided as part of proposals for major development should:*

a) take account of advice from the Lead Local Flood Authority;
b) have appropriate proposed minimum operational standards; and
c) have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development."

2.2. PLANNING POLICY IN SITE CONTEXT

The site covers 0.163Ha of greenfield land and according to the most recent Environment Agency (EA) flood risk maps, lies entirely within Flood Zone 1.

The NPPF site categorisation Table 1.1 puts a residential development of this nature within the 'More vulnerable' category. Developments in the 'More vulnerable' category are acceptable within Flood Zone 1 and therefore the site-specific Flood Risk Assessment (FRA) need only be brief.

The FRA statement is included within this report.

3. SITE INFORMATION

3.1. SITE PLAN

The proposed development is located on an existing 0.163ha area of greenfield land to the north of Moresby Hall, Whitehaven as shown on red line bordered plan in Figure 1.

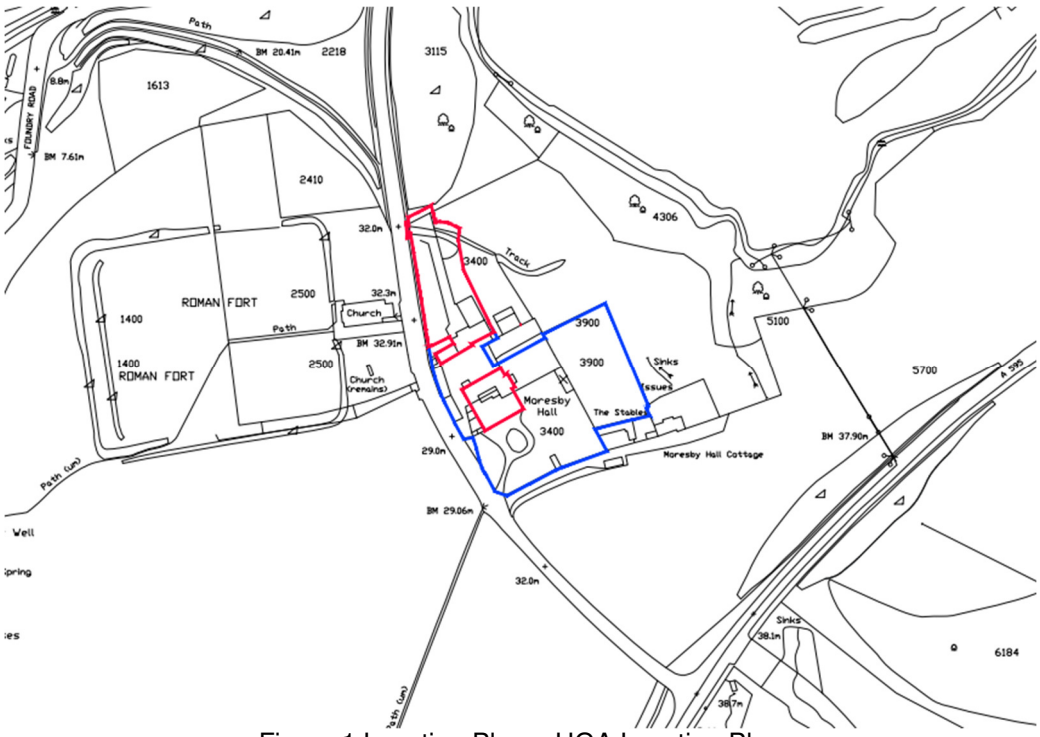


Figure 1 Location Plan – HGA Location Plan

The proposed layout of the development is shown on HGA site plan drawing 2511-04 in Appendix A.

3.2. SITE TOPOGRAPHY & EXISTING USE

The existing ground is generally unused overgrown scrub landscape, with intermediate dry stone walling facilitating a tiered ground profile dropping away from the highway towards the eastern field boundary.

The western boundary at the highway is approximately 32m AOD with the lowest point on the eastern field boundary at approx. 26.5m AOD revealing a maximum level change of 5.5m.

The southern site boundary adjoins Moresby Hall estate.

3.3. DEVELOPMENT DESCRIPTION

The proposed development will see a new shared access created off the adopted highway leading to 5No. dwellings.

As part of the same application a barn within Moresby Hall curtilage is to be converted for staff accommodation. The barn is pre-existing and it's surface water discharge is already positively drained via existing systems. This strategy will therefore only reference this barn in terms of foul water strategy and it will be treated as part of Moresby Hall which is to be kept separate from the proposed residential development.

4. SURFACE WATER MANAGEMENT

The existing flow paths are likely north west to south east towards the low point on the site.

The proposed development drained areas are as follows:

- 0.037ha Plots 1-5 incl. 10% urban creep
- 0.037ha Access road

Total positively drained area = 0.074ha

The majority of the garden areas will retain existing flow paths.

The drained areas plan is included in Appendix B for reference.

4.1. PERMEABILITY AND SOIL PROFILE

British Geological Survey (BGS) and Land Information Systems (LandIS) mapping services have been used determine the following land make-up:

Bedrock: Pennine Middle Coal Measures Formation-Sandstone.

Superficial drift: Till, Devensian-Diamicton

Soil: Soilscape 17 – Slowly permeable seasonally wet acid loamy and clayey soils.

This soilscape is different to that noted during percolation testing investigations. Trial pits excavated at both ends of the site indicate a gravelly/cobbly silty CLAY

The trial hole excavation locations and results can be seen in Appendix C.

2No. pits were dug to a depth of circa 1.5m below ground level to enable percolation tests to determine the infiltration rate of the ground. These tests were carried out in accordance with the guidance in document BRE 365 Soakaway Design.

The infiltration rate is as per the below formula extracted from the BRE 365 guide.

$$\text{Soil infiltration rate } f = \frac{V_{p75-25}}{a_{s50} \times t_{p75-25}}$$

where:

V_{p75-25} = the effective storage volume of water in the soakage trial pit between 75% and 25% effective storage depth

a_{s50} = the internal surface area of the soakage trial pit up to 50% effective storage depth and including the base area

t_{p75-25} = the time for the water level to fall from 75% to 25% effective storage depth.

The test results are shown below along with calculated infiltration rates for each pit.

Percolation testing				Date	27/10/2025		
	Weather on day	Fine					
	Weather preceding days	Heavy rain					
TP1							
	l		0.75	a50	0.5925		
	d		0.3	Vp75-25	0.039375		
	w		0.35	tp75-25	see below		
Perc test results		TP1		75	25	75-25 time	
			1			1760	sec
			2			1990	sec
			3			1902	sec
					Av. tp75-25	**1884**	sec
					Vp s/mm	12.56	
		Infiltration rate, f =		3.52737E-05			
TP2							
	l		0.75	a50	0.54		
	d		0.3	Vp75-25	0.03375		
	w		0.3	tp75-25	see below		
Perc test results		TP2		75	25	75-25 time	
			1			1015	sec
			2			1078	sec
			3			1056	sec
					Av. tp75-25	**1049.6667**	sec
					Vp s/mm	6.9977778	
		Infiltration rate, f =		5.95427E-05			
Result:		**Av. F**		**4.74082E-05**	**m/s**		
		m/hr		0.170669585	m/hr		

The average infiltration rate across the pits is 4.741×10^{-5} m/s (0.171 m/hr) which is greater than the lowest recommended value of 1×10^{-5} m/s. Infiltration can therefore be utilised across the site.

4.2. CURRENT FOUL AND SURFACE WATER DRAINAGE PROVISION

Existing watercourses

There are no open watercourse features within the site, with the nearest one being Lowca Beck running east to west approximately 85m beyond the eastern site boundary. To access this beck from the site would require routes across third party land and is not seen as a feasible route.

Existing sewers

There are no existing United Utilities (UU) owned sewer systems present on the site.

There are no UU sewer assets shown close to the site, however approximately 140m to the north of the site UU asset mapping indicates there is a 300mm diameter concrete combined sewer running west to east towards Whitehaven Wastewater Treatment Works.

The UU search records are shown in Appendix D.

5. FLOOD RISK ASSESSMENT

The current Environment Agency Flood Map for Planning shows the site to be located wholly within Flood Zone 1.

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

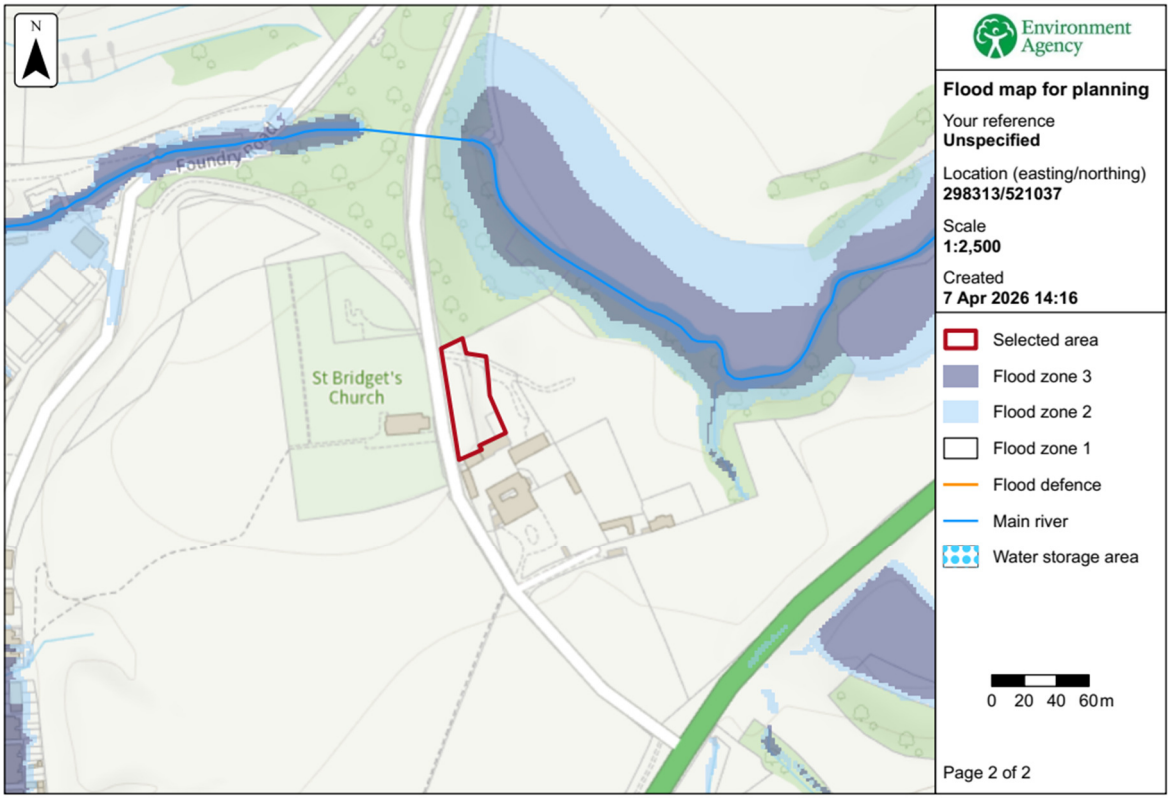


Figure 2 Flood map for planning

A full FRA is therefore not required, although the Environment Agency long term flood risk maps are included below to further inform this report.

The long-term flood risk mapping from surface water and rivers is also very low (0.1%) with no areas of the site showing any form of heightened flood risk.

The design of the drainage and road systems shall ensure that no additional peak flows leave the site and therefore no increase in flood risk outside of the development boundary will occur.

6. SURFACE WATER DRAINAGE STRATEGY

The aim of the strategy is to provide a design which will avoid, reduce and delay the discharge of surface water flows into public sewers and watercourses. This will aid in the protection of watercourses but will also ensure that no knock-on effects are seen beyond the site and that the risk of localised flooding and pollution within the site are reduced as far as possible.

To satisfy these criteria, surface water flows shall be subject to assessment via the hierarchy of drainage in accordance with the LASOO Non-Statutory Technical Standards for Sustainable Drainage: Practice Guidance. The hierarchy is as follows:

Hierarchy options:

1. Drain into the ground (infiltration);
2. To a surface water body;
3. To a surface water sewer, highway drain or another drainage system;
4. To a combined sewer.

The drainage strategy for the site is to be developed using the first level on the above hierarchy for the following reasons:

Drain into the ground (infiltration).

The site has been shown through trial hole excavation and percolation tests to be suitable for infiltration.

It is therefore proposed to discharge surface water through a combination of permeable paving and below ground infiltration soakaways. This will ensure that drainage will be achieved as close to source as possible, therefore limiting any change to on-site flow paths and that there is no increased risk of flooding beyond the site boundaries.

6.1. SURFACE WATER PROPOSED DESIGN

In accordance with the earlier mentioned hierarchy of drainage the system has been designed to utilise infiltration-based SuDS components to offer the best solution for surface water drainage.

As per the LASOO guidance the design is required to prevent flooding to any part of the site for storms up to and including the 1:30yr rainfall event, while any exceedance for the 6 hour 1:100yr event should be controlled within the site and should not flood any properties or service areas.

In this case, the infiltration rates of the ground will allow for storage systems to be sized to store the full 1:100yr events without any overland flow or above ground storage.

6.1.1. CONSIDERATION OF SUDS COMPONENTS

A range of SuDS components are available and have been considered for use. Their applicability to the site has been addressed below:

- Rainwater harvesting – suitable for use on the site, however there is no guarantee the systems will be able to capture flows if already at capacity from previous events. Discounted for site flow calculations.
- Green roofs – suitable for use on the site, however due to the nature of the properties and low volume control potential these have been discounted for

inclusion within the site flow calculations. Plot owners may still choose to use these and should be encouraged to do so where they would be appropriate.

- Soakaways – underlying ground conditions make this a suitable method for providing site drainage close to source and will be used to store and dissipate rainwater from the hardstanding areas. **Viable**
- Water butts – suitable for use but their effectiveness is dependent on homeowner maintenance which cannot be enforced. Discounted for site flow calculations.
- Permeable paving – underlying ground conditions make this a suitable and cost-effective method of drainage for a large portion of the driveway areas. **Viable**
- Swales – Not considered due to their large land uptake and porosity of the ground.
- Filter drains – Not required.
- Detention basins – Not required due to available ground infiltration rates
- Ponds/wetlands –. Not required due to available ground infiltration rates. Plot owners may introduce these if desired but shall not be used for site flow calculations.
- Underground closed storage crate/tank systems – Not required.

6.1.2. CLIMATE CHANGE

Environment Agency guidance issued in 2016 estimates that peak rainfall intensity will increase due to climate change over the next 100 years. There is therefore an allowance of 45% attributed to the 30yr event and an allowance of 50% for the 100yr storm event calculations in line with the Upper End estimate for the site location.

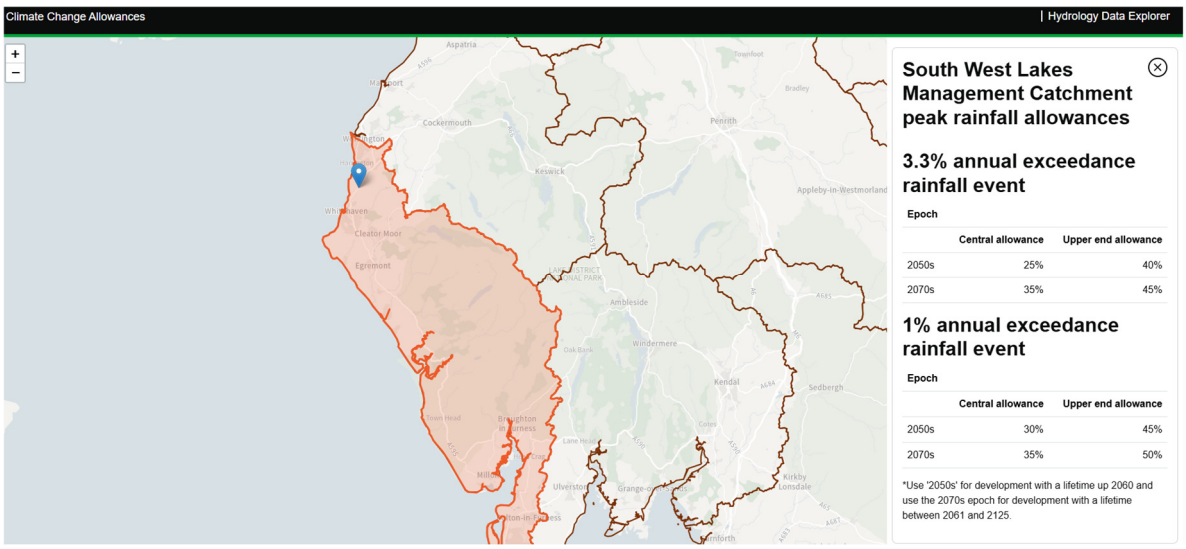


Figure 3 DEFRA Rainfall peak climate change allowance extract

6.1.3. PERCENTAGE IMPERMEABILITY (PIMP)

All impermeable areas are modelled as 100% PIMP. This will allow for sufficient capacity for all hardstanding areas to be positively drained.

6.1.4. VOLUMETRIC RUNOFF COEFFICIENT (CV)

Industry standard Cv values vary for summer and winter and account for water volumes which do not enter the drainage system i.e. that is lost through infiltration, depression storage, evaporation, initial wetting etc. Standard values are 0.75 for summer and 0.84 for winter.

In this instance, only areas of impermeable hardstanding are modelled and therefore the standard values have been uplifted to 0.84 and 0.95 respectively for both summer and winter storms. This results in conservative design with no infiltration allowance.

6.1.5. SURFACE WATER QUALITY

In the absence of statutory requirements and prescriptive standards, The SuDS Manual provides best industry practice for assessing the pollutant potential of developments and providing mitigation methods to increase run off water quality through the use of SuDS components.

The simple index approach has been utilised here to assess the pollutant hazard indices and proposed treatment components. Note, this has been carried out in conjunction with the above SuDS component suitability assessment for the site.

Table 26.2 from The SuDS Manual below outlines the pollution hazard indices for different land uses.

TABLE 26.2 Pollution hazard indices for different land use classifications

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro-carbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/ industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways[1]	Medium	0.7	0.6	0.7
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways[1]	High	0.8[2]	0.8[2]	0.9[2]

Figure 4 SuDS Manual Table 26.2 Pollution hazard indices

This development is to be classed as a mix of ‘Very low’ and ‘low’ risk land uses due to the presence of residential roofs and individual property driveways.

This level of risk suggests the following level of pollution control:

Land use	Suspended solids	Metal	Hydrocarbons
Residential roofs	0.2	0.2	0.05
Driveways	0.5	0.4	0.4

Table 26.4 from the SUDS Manual, shown below, details pollution mitigation indices for various SUDS components when discharging to groundwater.

TABLE 26.4 Indicative SuDS mitigation indices for discharges to groundwater

Characteristics of the material overlying the proposed infiltration surface, through which the runoff percolates[1]	TSS	Metals	Hydrocarbons
A layer of dense vegetation underlain by a soil with good contaminant attenuation potential[2] of at least 300 mm in depth[3]	0.6[4]	0.5	0.6
A soil with good contaminant attenuation potential[2] of at least 300 mm in depth[3]	0.4[4]	0.3	0.3
Infiltration trench (where a suitable depth of filtration material is included that provides treatment, ie graded gravel with sufficient smaller particles but not single size coarse aggregate such as 20 mm gravel) underlain by a soil with good contaminant attenuation potential[2] of at least 300 mm in depth[3]	0.4[4]	0.4	0.4
Constructed permeable pavement (where a suitable filtration layer is included that provides treatment, and including a geotextile at the base separating the foundation from the subgrade) underlain by a soil with good contaminant attenuation potential[2] of at least 300 mm in depth[3]	0.7	0.6	0.7
Bioretention underlain by a soil with good contaminant attenuation potential[2] of at least 300 mm in depth[3]	0.8[4]	0.8	0.8
Proprietary treatment systems[5, 6]	These must demonstrate that they can address each of the contaminant types to acceptable levels for inflow concentrations relevant to the contributing drainage area.		

Figure 5 SuDS Manual Table 26.4 SuDS mitigation indicies

Given the small size of the development and the low-risk land use, a balanced view of risk versus reward should be pursued to ensure that while pollution risks are minimized, there are not onerous requirements imposed.

The highest risk elements (albeit still categorised as 'low') originate from the parking areas and access road. It is proposed to provide permeable block paving to the driveways of each plot, with the access off the highway and turning head being provided in impermeable tarmac due to the steep slopes involved.

The remainder of the hardstanding areas are allocated for residential roofs which are in the 'very low' risk category. These, along with the access road run off will be treated using a proprietary system – e.g. ACO V-septor to remove the pollutants in the first flush scenarios which present the highest risks. The hazard versus mitigation table below shows this to be adequate.

Land use	Suspended solids	Metal	Hydrocarbons
Pollution hazard	0.5	0.4	0.4
ACO V-Septor	0.5	0.5	0.4

Surface water drainage proposals

Based on the above assessments, it is proposed that a split drainage system will be utilised for the differing surface uses.

Parking/driveways

All driveways and parking areas, shall be designed and constructed as permeable paving effectively maintaining drainage to those areas at source.

As the infiltration rates are acceptable, the system is designed to provide full infiltration as per a Type A system as described in The SuDS Manual section 20.1.9.

Terracing of the system below ground should be considered where slopes exceed 1:20. Finalised design levels have not been set as of the date of this report. An example system is shown below in Figure 7.

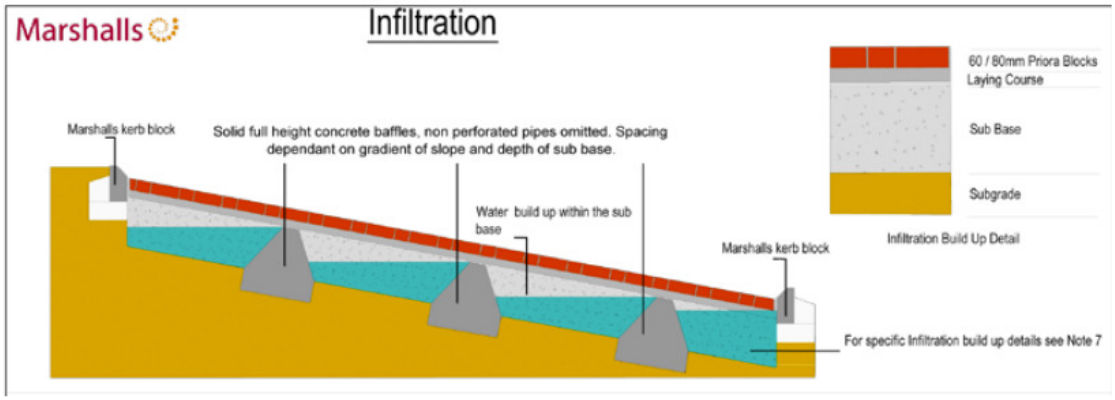


Figure 6 Example permeable paving terracing detail

The permeable paving system shall be designed by specialist manufacturer, however an example material build-up is shown below for reference.

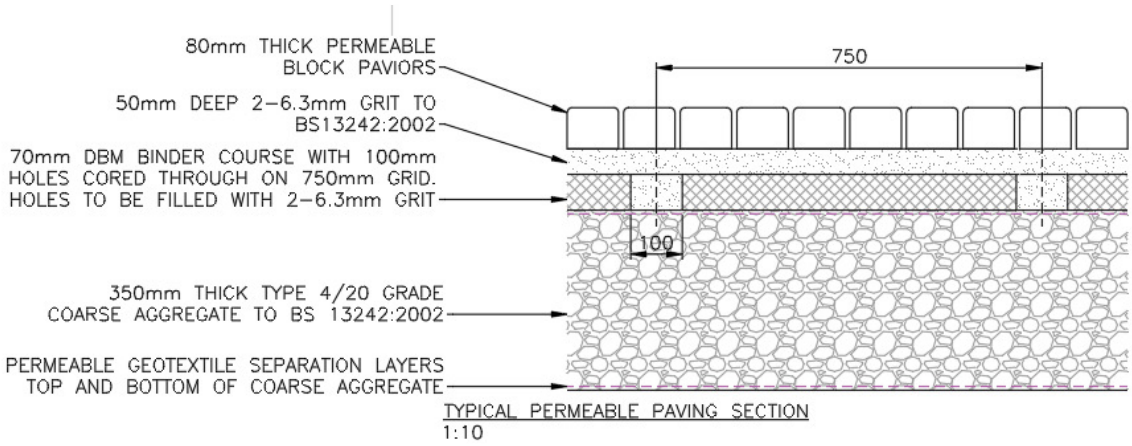


Figure 7 Example permeable paving material make-up

Dwellings & turning head off highway

The dwellings and access turning head shall be positively drained to geocellular crate infiltration systems positioned beneath the access turning head. This will store storm flows and prevent any discharge from the site up to and including the 1:100yr +50% storm event.

The average site infiltration rate has been calculated at 0.171 m/hr.

As per The SuDS Manual, a safety factor of 2.0 has been applied to this infiltration rate to allow for potential reduction in performance over time either through silting up or lack of capacity due to saturation.

Infodrainage calculations in Appendix E are provided to prove the storage system is sufficient up to a 1:100yr + 50% storm of 6 hour duration.

Using a proprietary system, the crates would be 0.8m deep with a minimum of 0.8m ground cover.

A typical section through geocellular infiltration make-up is shown below:

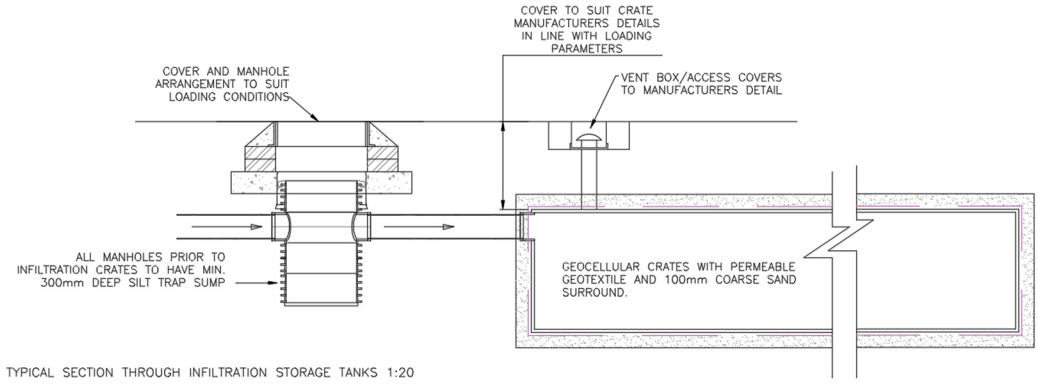


Figure 8 Typical geocellular soakaway makeup

Drainage plan proposals are shown in Appendix F drawing 25-C-18182/02.

An ACO (or similar approved) drainage channel across the highway access will prevent any highway run-off from entering the site. This will be connected into the existing highway drainage system.

Exceedance flows

A high level exceedance flow route will be available from the southernmost manhole on the proposed surface water scheme with a pipe routed to an existing culvert which is located towards the southern boundary of the proposed site with Moresby Hall.

7. MAINTENANCE

All components shall be maintained in accordance with the relative requirements shown in the SuDS Manual. These intervals should be deemed as a minimum frequency and reference should also be made to the manufacturers guidance to ensure all components are maintained correctly.

Table 13.1 from the SuDS Manual for soakaways has been included below for reference.

TABLE 13.1 Operation and maintenance requirements for soakaways

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

Figure 9 SuDS Manual table 13.1 Soakaway maintenance

Table 20.15 from the SuDS Manual for permeable paving has been included below for reference.

TABLE 20.15 Operation and maintenance requirements for pervious pavements		
Maintenance schedule	**Required action**	**Typical frequency**
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphospate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, 48 h after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

Figure 10 SuDS Manual table 20.15 Permeable paving maintenance

8. FOUL WATER DRAINAGE STRATEGY

Proposed residential development

All foul water from the plots will be positively drained via a new system which is proposed to run north along the highway from the site and discharge into the existing combined public sewer across Lowca Beck.

The site drainage will connect into the new gravity sewer under the highway via a pumped rising main to a new chamber in the bellmouth of the development.

A Section 50 Street Works Permit would need to be obtained with Cumberland Council for private drains beneath a highway.

Further surveying of the existing highway levels and crossing of Lowca Beck to the existing UU sewer will be required, along with a CCTV survey of the existing

combined sewer. Permission from United Utilities will be required under a S106 connection application.

Plans of the proposed foul sewer is shown in Appendix F drawing 25-C-18182/02&03.

Note
This foul connection to the UU system is to be made if financially and practically feasible, in line the General Binding Rules for wastewater discharge due to its location within 30m x 5No. dwellings – 150m – of the new development.

If this connection proves to be unfeasible due to the crossing over the Lowca Beck, the alternative proposal would be to route the foul water through the adjacent Moresby Hall site to an upgraded septic tank system which currently serves the buildings adjacent to the site.

The alternative proposal is shown on drawing 25-C-18182/02 in Appendix F and is highlighted red.

Proposed barn conversion – Moresby Hall

The proposed staff accommodation to be provided in the existing converted barn is treated as separate to the main residential scheme and forms an addition to the existing Moresby Hall compound.

In order to ensure all services are maintainable through Moresby Hall, the foul water from this barn conversion shall be routed through the existing foul drainage system on the site to the existing / upgraded septic tank to the west of Moresby Hall.

A detailed analysis of the load and capacity requirements for the septic tank shall be carried out at the detailed design stage to ensure sufficient capacity is available. If a new treatment device is required it would be recommended that a modern package treatment tank system be utilised in lieu of a septic tank to ensure betterment on the existing scenario.

The additional foul water connection to the existing system is shown on drawing 25-C-18182/02 in Appendix F for reference.

9. MANAGEMENT

All separate surface and foul water drainage systems within the site are proposed to remain private and be maintained by a newly formed management company contributed to by all plot owners.

The new foul sewer up the highway is anticipated to remain private and be maintained in accordance with highway standard procedures.

The foul system within Moresby Hall serving the new barn conversion is to remain private and be maintained by the owners of Moresby Hall as an addition to their current maintenance regimen.

10. APPENDICES

Appendix A – HGA Site plan.

Appendix B – Drained areas plan

Appendix C – Trial hole location plan & results.

Appendix D – United Utilities Sewer Records.

Appendix E – Infodrainage calculations up to and including 1:100yr + 50%

Appendix F – Proposed drainage plans

Appendix A

MORESBY

KEY:
- Extent of development site
- Extent of other site ownership

NORTH

2410

32.0m

FORT

2500

32.3m

Church

Path

BM 32.91m

2500

Church
(remains)

0.5m

6.0m

2.4m

Existing Access Improved

PLOT 5

PLOT 4

PLOT 3

PLOT 2

PLOT 1

Turning Head

6.0m

0.5m

3400

Track

4306

3900

3900

Sinks

Issues

Moresby
Hall

3400

The Stables

29.0m

Moresby Hall Cottage

BM 29.06m

32.0m

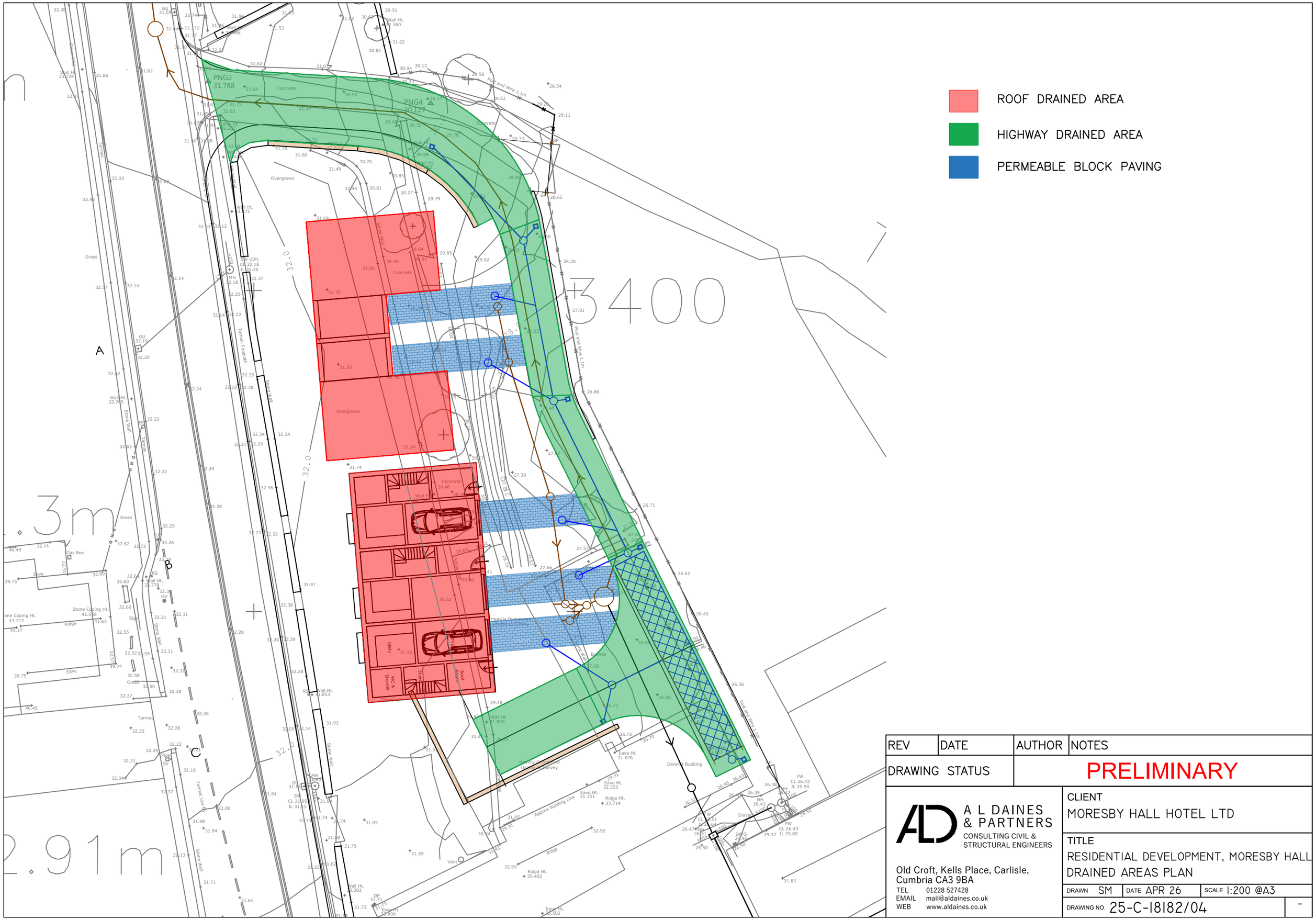
BM 37.90m

5100

Sinks

Revisions	- Mar 26 *Drawing set up ahead planning application JC*
Client	Moresby Hall Hotel Limited
Project	Proposed Residential Development Moresby Hall Moresby Whitehaven CA28 6PJ
Drawing	Block Plan As Proposed
Drawing No.	2511 - 03
Scale	1:500 @ A1 1:1000 @ A3
Drawn	JC / GC
Date	Mar 2026

Appendix B



REV	DATE	AUTHOR	NOTES
DRAWING STATUS			PRELIMINARY

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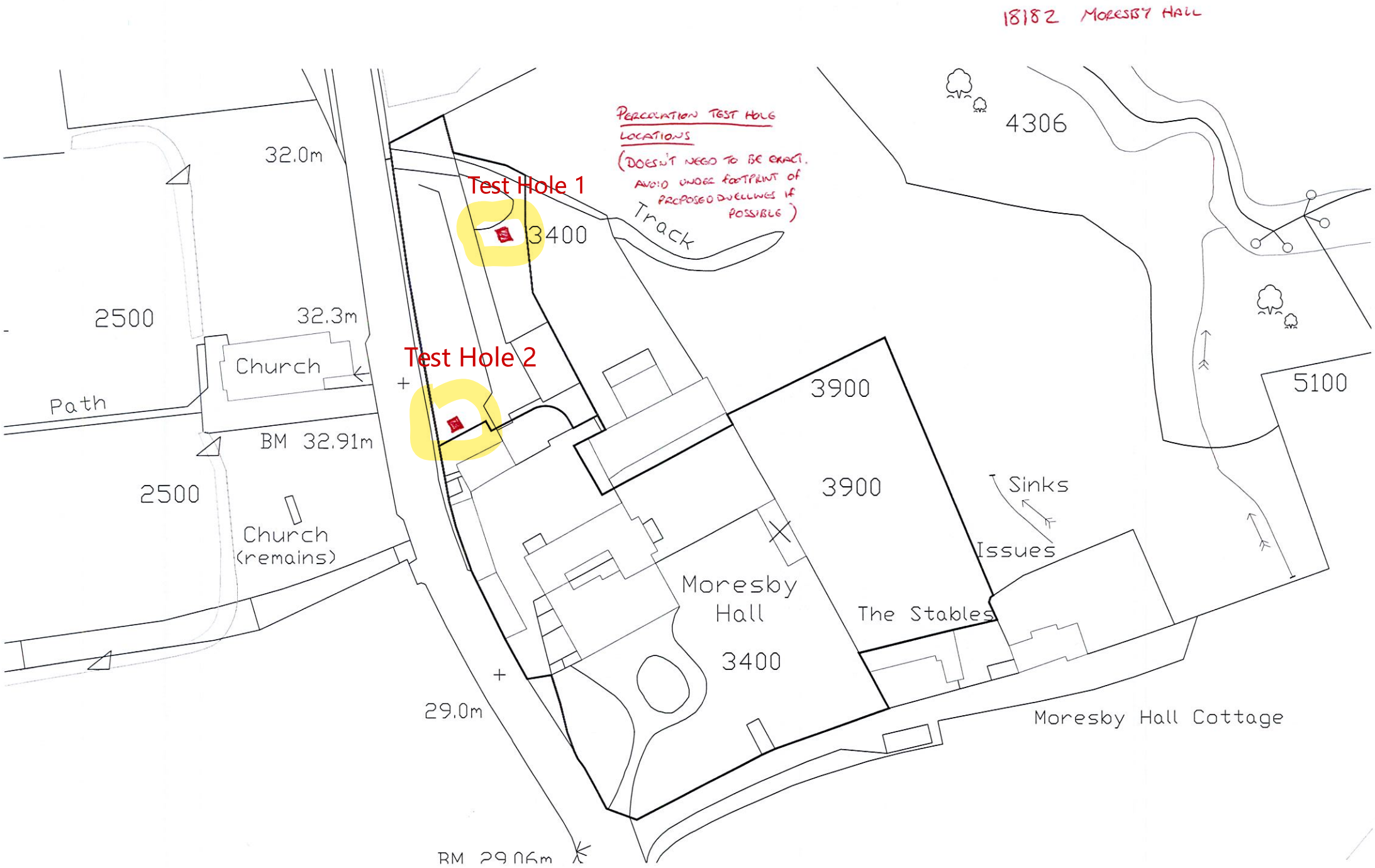
CLIENT
MORESBY HALL HOTEL LTD

TITLE
RESIDENTIAL DEVELOPMENT, MORESBY HALL
DRAINED AREAS PLAN

DRAWN	DATE	SCALE
SM	APR 26	1:200 @A3

DRAWING NO. 25-C-18182/04 -

Appendix C


18182 Moresby Hall
Percolation Test Hole Locations
(Doesn't need to be exact. Avoid under footprint of proposed dwellings if possible)
Test Hole 1
Test Hole 2
32.0m
2500
32.3m
Church
Path
BM 32.91m
2500
Church
(remains)
3400
Track
4306
5100
3900
3900
Sinks
Issues
Moresby
Hall
3400
The Stables
29.0m
Moresby Hall Cottage
RM 29.06m

Trial Pit 1

Percolation Test Results

Moresby Hall - Test Hole Pit 1

Test Recording Table (for each test hole)

Please fill in the relevant information below:

Trial Pit Dimensions:

Width (m): 350mm Length (m): 750mm (2) Depth (m): 1650mm

Proposed invert level of the drain (m): _____

Test Number	75% Time (sec)	25% Time (sec)	25%-75% Time (sec)	Vp s/mm
1				
2				
3				

elapsed time 29min 25sec = 1760
225mm down 33min 10sec = 1990
to 75mm 31min 42sec = 1902

AV: 1884

AV: Vp s/mm = 12.56

Test completed by: Rob Rimmer & Malcolm Smith

Signed: [signature] Date: 04/11/25

Test completed on 27/10/25 AM. - 9.00 am - 11.30 am

Weather: fine.

Previous 24 hours: heavy rain

Trial pit 1

Trial pit 1

Trial Pit 2

Percolation Test Results

Moresby Hall - Test Hole Pit 2

Test Recording Table (for each test hole)

Please fill in the relevant information below:

Trial Pit Dimensions:

Width (m): 300mm Length (m): 750mm (?) Depth (m): 1480mm

Proposed invert level of the drain (m): _____

Test Number	75% Time (sec)	25% Time (sec)	25%-75% Time (sec)	Vp s/mm
1	elapsed time 225mm down to 75mm		16min 55secs	=1015
2			17min 58secs	=1078
3			17min 36secs	=1056

AV. 1050

Test completed by: [redacted] completed by: Matthew & Malcolm Smith

Signed: _____ Date: 04/11/25

AV SCORE = 1050
AV Vp s/mm = 7

Test completed on 27/10/25 12:00 - 14:00

Weather: Fine

Previous 24 hours: Heavy Rain

Trial pit 2

Trial pit 2

Trial pit 2

Appendix D

United Utilities
Water for the North West

How to contact us:

United Utilities Water Limited
Property Searches
Haweswater House
Lingley Mere Business Park
Great Sankey
Warrington
WA5 3LP

Telephone: 0370 7510101

E-mail: propertysearches@uuplc.co.uk

A L Daines & Partners LLP

Old Croft
Kells Place,
Carlisle,
CA3 9BA

FAO:

Your Ref: 18182 Moresby
Our Ref: UUPS-ORD-722927
Date: 16/04/2026

Dear Sirs

Location: Moresby Hall

I acknowledge with thanks your request dated 08/04/2026 for information on the location of our services.

Please find enclosed plans showing the approximate position of United Utilities' apparatus known to be in the vicinity of this site.

The enclosed plans are being provided to you subject to the United Utilities terms and conditions for both the wastewater and water distribution plans which are shown attached.

If you are planning works anywhere in the North West, please read United Utilities' access statement before you start work to check how it will affect our network. http://www.unitedutilities.com/work-near-asset.aspx .

I trust the above meets with your requirements and look forward to hearing from you should you need anything further.

If you have any queries regarding this matter please contact us .

Yours Faithfully,

Karen McCormack
Property Searches Manager

United Utilities Water Limited
Registered In England & Wales No. 2366678
Registered Office Haweswater House, Lingley Mere Business Park,
Lingley Green Avenue, Great Sankey, Warrington, WA5 3LP

Water for the North West

TERMS AND CONDITIONS - WASTEWATER AND WATER DISTRIBUTION PLANS

These provisions apply to the public sewerage, water distribution and telemetry systems (including sewers which are the subject of an agreement under Section 104 of the Water Industry Act 1991 and mains installed in accordance with the agreement for the self construction of water mains) (UUWL apparatus) of United Utilities Water Limited "(UUWL)".

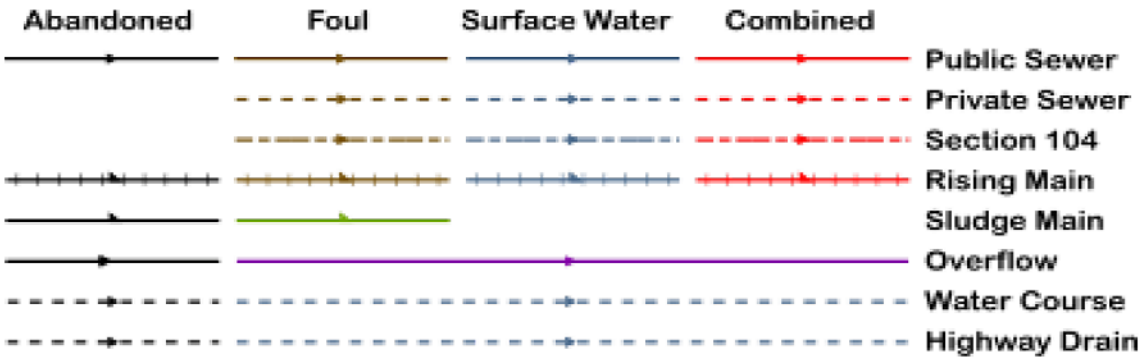
TERMS AND CONDITIONS:

- This Map and any information supplied with it is issued subject to the provisions contained below, to the exclusion of all others and no party relies upon any representation, warranty, collateral contract or other assurance of any person (whether party to this agreement or not) that is not set out in this agreement or the documents referred to in it.
- This Map and any information supplied with it is provided for general guidance only and no representation, undertaking or warranty as to its accuracy, completeness or being up to date is given or implied.
- In particular, the position and depth of any UUWL apparatus shown on the Map are approximate only. UUWL strongly recommends that a comprehensive survey is undertaken in addition to reviewing this Map to determine and ensure the precise location of any UUWL apparatus. The exact location, positions and depths should be obtained by excavation trial holes.
- The location and position of private drains, private sewers and service pipes to properties are not normally shown on this Map but their presence must be anticipated and accounted for and you are strongly advised to carry out your own further enquiries and investigations in order to locate the same.
- The position and depth of UUWL apparatus is subject to change and therefore this Map is issued subject to any removal or change in location of the same. The onus is entirely upon you to confirm whether any changes to the Map have been made subsequent to issue and prior to any works being carried out.
- This Map and any information shown on it or provided with it must not be relied upon in the event of any development, construction or other works (including but not limited to any excavations) in the vicinity of UUWL apparatus or for the purpose of determining the suitability of a point of connection to the sewerage or other distribution systems.
- No person or legal entity, including any company shall be relieved from any liability howsoever and whensoever arising for any damage caused to UUWL apparatus by reason of the actual position and/or depths of UUWL apparatus being different from those shown on the Map and any information supplied with it.
- If any provision contained herein is or becomes legally invalid or unenforceable, it will be taken to be severed from the remaining provisions which shall be unaffected and continue in full force and affect.
- This agreement shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts, save that nothing will prevent UUWL from bringing proceedings in any other competent jurisdiction, whether concurrently or otherwise.

United Utilities Water Limited
Registered In England & Wales No. 2366678
Registered Office Haweswater House, Lingley Mere Business Park,
Lingley Green Avenue, Great Sankey, Warrington, WA5 3LP

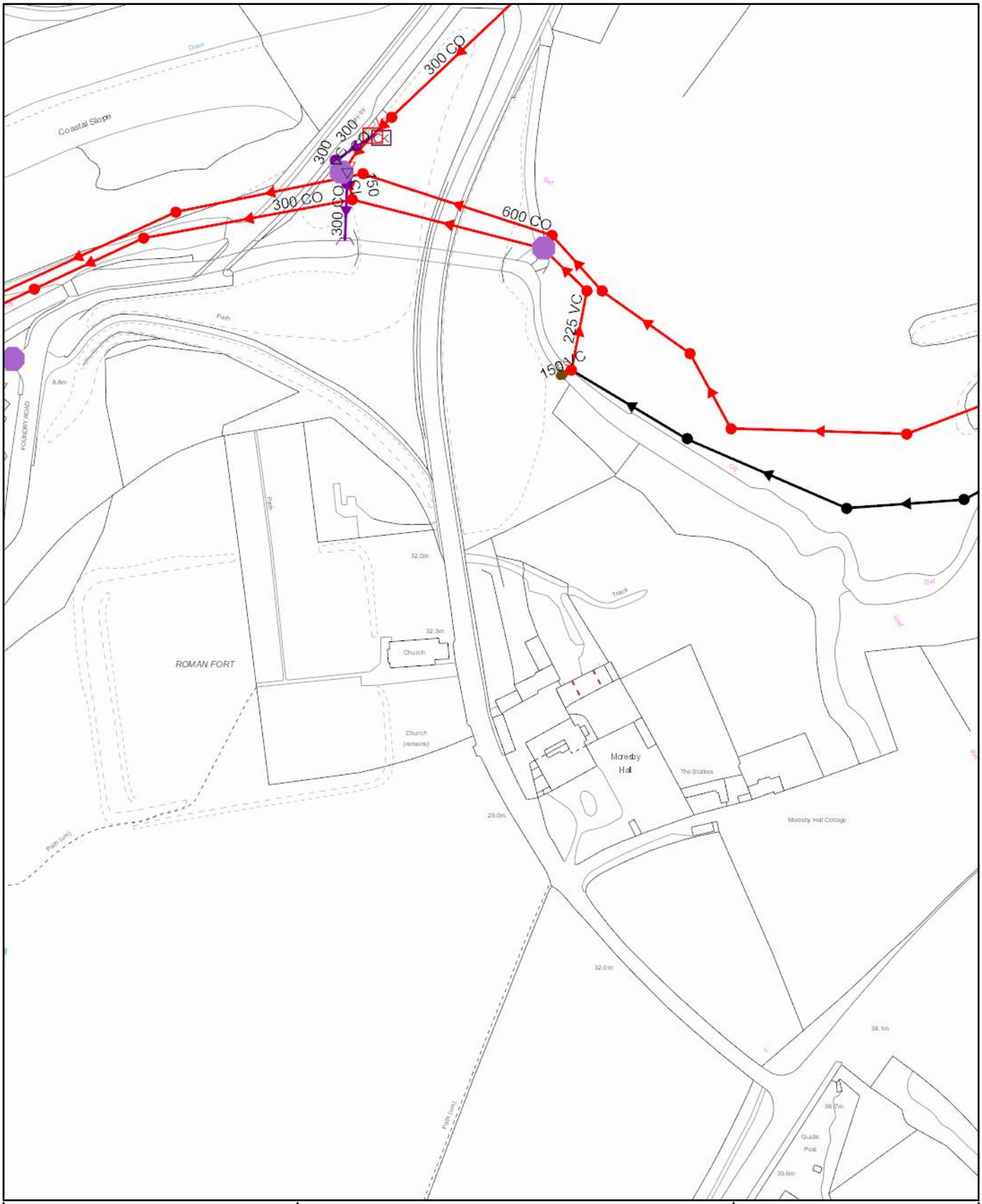
United Utilities
Water for the North West

Wastewater Symbology



All point assets follow the standard colour convention: red – combined, brown - foul, blue – surface water, purple - overflow

- Manhole
- HS Head of System
- ES Extent of Survey
- RE Rodding Eye
- IN Inlet
- DP Discharge Point
- HY Vortex
- PE Penstock
- WO Washout Chamber
- VA Valve
- AV Air Valve
- NRV Non Return Valve
- SO Soakaway
- GU Gully
- CA Cascade
- FM Flow Meter
- HA Hatch Box
- OI Oil Interceptor
- SM Summit
- DS Drop Shaft
- OP Orifice Plate
- Side Entry Manhole
- Outfall
- Screen Chamber
- IC Inspection Chamber
- Bifurcation Chamber
- LH Lamp Hole
- T Junction / Saddle
- CA Catchpit
- VC Valve Chamber
- Vent Column
- Vortex Chamber
- Penstock Chamber
- T Network Storage Tank
- V Sewer Overflow
- WwTW Ww Treatment Works
- Ww Pumping Station
- Septic Tank
- CK Control Kiosk
- DNM Network Monitoring Point
- Change of Characteristic



Scale:	1:2386	**SEWER RECORDS**	United Utilities Water for the North West
Date:	16/04/2026		
Address or Site Reference:	Moresby Hall		
Printed by:	Property Searches		

The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. United Utilities Water will not accept liability for any loss or damage caused by the actual position being different from those shown.

Appendix E

Residential development, Moresby Hall:	Date: 31/03/2026		
	Designed by: SM	Checked by:	Approved By:
Report Details: Type: Junctions Storm Phase: Phase	Company Address:		

Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)	Invert Level (m)	Sump Depth (m)	Chamber Shape
Manhole	Manhole	63.927	139.633	29.600	1.000	28.600	0.000	Circular
Manhole (1)	Manhole	71.306	119.361	27.500	0.600	26.900	0.000	Circular
Manhole (2)	Manhole	76.387	107.076	27.000	0.600	26.400	0.300	Circular
Manhole (3)	Manhole	76.275	98.309	27.000	0.600	26.400	0.300	Circular

Name	Diameter (m)	Lock
Manhole	0.600	All
Manhole (1)	0.600	All
Manhole (2)	0.600	All
Manhole (3)	0.600	All

Residential development, Moresby Hall:	Date: 31/03/2026		
	Designed by: SM	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address:		

Cellular Storage

Type : Cellular Storage

Dimensions

Exceedance Level (m)	26.500
Depth (m)	0.800
Base Level (m)	24.700
Number of Crates Long	17
Number of Crates Wide	5
Number of Crates High	2
Porosity (%)	95
Crate Length (m)	1
Crate Width (m)	0.5
Crate Height (m)	0.4
Total Volume (m³)	33.300

Advanced

Base Infiltration Rate (m/hr)	0.171
Side Infiltration Rate (m/hr)	0.171
Safety Factor	2.0

Residential development, Moresby Hall:	Date: 31/03/2026		
	Designed by: SM	Checked by:	Approved By:
Report Details: Type: Connections Storm Phase: Phase	Company Address:		

Name	Length (m)	Connection Type	Slope (1:X)	Manning's n	Colebrook-White Roughness (mm)	Diameter / Base Width (mm)	Upstream Cover Level (m)	Upstream Invert Level (m)
Pipe	21.574	Pipe	12.690		0.6	150	29.600	28.600
Pipe (1)	13.294	Pipe	66.470		0.6	150	27.500	26.900
Pipe (2)	7.305	Pipe	3.653		0.6	100	27.000	26.700
Pipe (3)	1.990	Pipe	0.995		0.6	100	27.000	26.700

Name	Downstream Cover Level (m)	Downstream Invert Level (m)	Part Family	Lock	Culvert Type	Culvert Entrance
Pipe	27.500	26.900		None	(None)	(None)
Pipe (1)	27.000	26.700		None	(None)	(None)
Pipe (2)	26.500	24.700		None	(None)	(None)
Pipe (3)	26.500	24.700		None	(None)	(None)

Residential development, Moresby Hall:	Date: 31/03/2026		
	Designed by: SM	Checked by:	Approved By:
Report Details: Type: Inflow Summary Storm Phase: Phase	Company Address:		

Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (ha)
Plot 4&5	Manhole (1)		Time of Concentration	0.019	100	10	110	0.021
Plots 1-3	Manhole (2)		Time of Concentration	0.018	100	10	110	0.020
Road 1	Manhole		Time of Concentration	0.012	100	0	100	0.012
Road 2	Manhole (1)		Time of Concentration	0.008	100	0	100	0.008
Road 3	Cellular Storage		Time of Concentration	0.011	100	0	100	0.011
Road 4	Manhole (3)		Time of Concentration	0.007	100	0	100	0.007
TOTAL		**0.0**		**0.074**				**0.077**

Residential development, Moresby Hall:	Date: 31/03/2026		
	Designed by: SM	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Phase	Company Address:		

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

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m^3)
Plot 4&5	FSR: 1 years: +0 %: 15 mins: Winter	0.02	2.3	1.045
Plots 1-3	FSR: 1 years: +0 %: 15 mins: Winter	0.02	2.1	0.988
Road 1	FSR: 1 years: +0 %: 15 mins: Winter	0.01	1.3	0.597
Road 2	FSR: 1 years: +0 %: 15 mins: Winter	0.01	0.9	0.394
Road 3	FSR: 1 years: +0 %: 15 mins: Winter	0.01	1.2	0.540
Road 4	FSR: 1 years: +0 %: 15 mins: Winter	0.01	0.7	0.340

Residential development, Moresby Hall:	Date: 31/03/2026		
	Designed by: SM	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Phase	Company Address:		

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

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m^3)
Plot 4&5	FSR: 2 years: +0 %: 15 mins: Winter	0.02	2.9	1.351
Plots 1-3	FSR: 2 years: +0 %: 15 mins: Winter	0.02	2.8	1.270
Road 1	FSR: 2 years: +0 %: 15 mins: Winter	0.01	1.7	0.771
Road 2	FSR: 2 years: +0 %: 15 mins: Winter	0.01	1.1	0.514
Road 3	FSR: 2 years: +0 %: 15 mins: Winter	0.01	1.5	0.696
Road 4	FSR: 2 years: +0 %: 15 mins: Winter	0.01	1.0	0.442

Residential development, Moresby Hall:	Date: 31/03/2026		
	Designed by: SM	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Phase	Company Address:		

FSR: 30 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m^3)
Plot 4&5	FSR: 30 years: +45 %: 15 mins: Winter	0.02	7.9	3.668
Plots 1-3	FSR: 30 years: +45 %: 15 mins: Winter	0.02	7.5	3.458
Road 1	FSR: 30 years: +45 %: 15 mins: Winter	0.01	4.5	2.094
Road 2	FSR: 30 years: +45 %: 15 mins: Winter	0.01	3.0	1.393
Road 3	FSR: 30 years: +45 %: 15 mins: Winter	0.01	4.1	1.890
Road 4	FSR: 30 years: +45 %: 15 mins: Winter	0.01	2.6	1.201

Residential development, Moresby Hall:	Date: 31/03/2026		
	Designed by: SM	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Phase	Company Address:		

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

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m^3)
Plot 4&5	FSR: 50 years: +50 %: 15 mins: Winter	0.02	9.1	4.215
Plots 1-3	FSR: 50 years: +50 %: 15 mins: Winter	0.02	8.6	3.971
Road 1	FSR: 50 years: +50 %: 15 mins: Winter	0.01	5.2	2.406
Road 2	FSR: 50 years: +50 %: 15 mins: Winter	0.01	3.5	1.602
Road 3	FSR: 50 years: +50 %: 15 mins: Winter	0.01	4.7	2.171
Road 4	FSR: 50 years: +50 %: 15 mins: Winter	0.01	3.0	1.376

Residential development, Moresby Hall:	Date: 31/03/2026		
	Designed by: SM	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	Company Address:		

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

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
Manhole	FSR: 1 years: +0 %: 15 mins: Winter	29.600	28.600	28.617	0.017	1.3	0.005	0.000	1.3	0.598	OK
Manhole (1)	FSR: 1 years: +0 %: 15 mins: Winter	27.500	26.900	26.946	0.046	4.4	0.013	0.000	4.2	2.035	OK
Manhole (2)	FSR: 1 years: +0 %: 15 mins: Winter	27.000	26.400	26.723	0.323	6.3	0.092	0.000	6.3	2.658	Flood Risk
Manhole (3)	FSR: 1 years: +0 %: 60 mins: Winter	27.000	26.400	26.707	0.307	0.4	0.087	0.000	0.4	0.291	Flood Risk

Residential development, Moresby Hall:	Date: 31/03/2026		
	Designed by: SM	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	Company Address:		

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

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
Manhole	FSR: 2 years: +0 %: 15 mins: Winter	29.600	28.600	28.619	0.019	1.7	0.005	0.000	1.6	0.772	OK
Manhole (1)	FSR: 2 years: +0 %: 15 mins: Winter	27.500	26.900	26.953	0.053	5.7	0.015	0.000	5.4	2.634	OK
Manhole (2)	FSR: 2 years: +0 %: 15 mins: Winter	27.000	26.400	26.726	0.326	8.2	0.092	0.000	8.2	3.542	Flood Risk
Manhole (3)	FSR: 2 years: +0 %: 30 mins: Winter	27.000	26.400	26.709	0.309	0.7	0.087	0.000	0.7	0.260	Flood Risk

Residential development, Moresby Hall:	Date: 31/03/2026		
	Designed by: SM	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	Company Address:		

FSR: 30 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Depth

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
Manhole	FSR: 30 years: +45 %: 15 mins: Winter	29.600	28.600	28.630	0.030	4.5	0.008	0.000	4.5	2.092	OK
Manhole (1)	FSR: 30 years: +45 %: 15 mins: Winter	27.500	26.900	26.998	0.098	15.4	0.028	0.000	14.7	7.144	OK
Manhole (2)	FSR: 30 years: +45 %: 15 mins: Winter	27.000	26.400	26.744	0.344	22.2	0.097	0.000	22.1	10.222	Flood Risk
Manhole (3)	FSR: 30 years: +45 %: 15 mins: Winter	27.000	26.400	26.718	0.318	2.6	0.090	0.000	2.6	0.846	Flood Risk

Residential development, Moresby Hall:	Date: 31/03/2026		
	Designed by: SM	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	Company Address:		

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

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
Manhole	FSR: 50 years: +50 %: 15 mins: Winter	29.600	28.600	28.632	0.032	5.2	0.009	0.000	5.1	2.403	OK
Manhole (1)	FSR: 50 years: +50 %: 15 mins: Winter	27.500	26.900	27.009	0.109	17.7	0.031	0.000	16.9	8.210	OK
Manhole (2)	FSR: 50 years: +50 %: 15 mins: Winter	27.000	26.400	26.748	0.348	25.4	0.099	0.000	26.3	11.791	Flood Risk
Manhole (3)	FSR: 50 years: +50 %: 15 mins: Winter	27.000	26.400	26.719	0.319	3.0	0.090	0.000	2.9	1.021	Flood Risk

Residential development, Moresby Hall:	Date: 31/03/2026		
	Designed by: SM	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Company Address:		

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

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS 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)	Percentage Available (%)	Status
Cellular Storage	FSR: 1 years: +0 %: 120 mins: Winter	24.795	24.795	0.095	0.095	3.4	3.848	0.000	9.252	0.0	0.000	88.445	OK

Residential development, Moresby Hall:	Date: 31/03/2026		
	Designed by: SM	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Company Address:		

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

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS 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)	Percentage Available (%)	Status
Cellular Storage	FSR: 2 years: +0 %: 120 mins: Winter	24.843	24.843	0.143	0.143	4.3	5.778	0.000	11.794	0.0	0.000	82.649	OK

Residential development, Moresby Hall:	Date: 31/03/2026		
	Designed by: SM	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Company Address:		

FSR: 30 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS 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)	Percentage Available (%)	Status
Cellular Storage	FSR: 30 years: +45 %: 240 mins: Winter	25.357	25.357	0.657	0.657	7.7	26.519	0.000	43.554	0.0	0.000	20.365	OK

Residential development, Moresby Hall:	Date: 31/03/2026		
	Designed by: SM	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Company Address:		

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

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS 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)	Percentage Available (%)	Status
Cellular Storage	FSR: 50 years: +50 %: 240 mins: Winter	25.527	25.527	0.827	0.827	8.9	32.341	0.000	50.648	0.0	0.000	2.879	OK

Residential development, Moresby Hall:	Date: 31/03/2026		
	Designed by: SM	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase	Company Address:		

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

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
Pipe	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	Manhole (1)	Manhole (1)	29.600	28.617	0.031	0.598	0.5	0.03	1.3	OK
Pipe (1)	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	Manhole (1)	Manhole (2)	27.500	26.946	0.045	2.035	0.9	0.19	4.2	OK
Pipe (2)	FSR: 1 years: +0 %: 60 mins: Winter	Pipe	Manhole (3)	Cellular Storage	27.000	26.707	0.047	0.291	0.2	0.01	0.4	Flood Risk
Pipe (3)	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	Manhole (2)	Cellular Storage	27.000	26.723	0.033	2.658	4.6	0.1	6.3	Flood Risk

Residential development, Moresby Hall:	Date: 31/03/2026		
	Designed by: SM	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase	Company Address:		

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

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
Pipe	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	Manhole (1)	Manhole (1)	29.600	28.619	0.036	0.772	0.5	0.03	1.6	OK
Pipe (1)	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	Manhole (1)	Manhole (2)	27.500	26.953	0.052	2.634	1.0	0.25	5.4	OK
Pipe (2)	FSR: 2 years: +0 %: 30 mins: Winter	Pipe	Manhole (3)	Cellular Storage	27.000	26.709	0.058	0.260	0.2	0.02	0.7	Flood Risk
Pipe (3)	FSR: 2 years: +0 %: 15 mins: Winter	Pipe	Manhole (2)	Cellular Storage	27.000	26.726	0.046	3.542	4.1	0.13	8.2	Flood Risk

Residential development, Moresby Hall:	Date: 31/03/2026		
	Designed by: SM	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase	Company Address:		

FSR: 30 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
Pipe	FSR: 30 years: +45 %: 15 mins: Winter	Pipe	Manhole	Manhole (1)	29.600	28.630	0.064	2.092	0.6	0.09	4.5	OK
Pipe (1)	FSR: 30 years: +45 %: 15 mins: Winter	Pipe	Manhole (1)	Manhole (2)	27.500	26.998	0.094	7.144	1.3	0.67	14.7	OK
Pipe (2)	FSR: 30 years: +45 %: 15 mins: Winter	Pipe	Manhole (3)	Cellular Storage	27.000	26.718	0.100	0.846	0.4	0.08	2.6	Flood Risk
Pipe (3)	FSR: 30 years: +45 %: 15 mins: Winter	Pipe	Manhole (2)	Cellular Storage	27.000	26.744	0.100	10.222	6.6	0.36	22.1	Flood Risk

Residential development, Moresby Hall:	Date: 31/03/2026		
	Designed by: SM	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase	Company Address:		

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

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
Pipe	FSR: 50 years: +50 %: 15 mins: Winter	Pipe	Manhole	Manhole (1)	29.600	28.632	0.070	2.403	0.6	0.1	5.1	OK
Pipe (1)	FSR: 50 years: +50 %: 15 mins: Winter	Pipe	Manhole (1)	Manhole (2)	27.500	27.009	0.103	8.210	1.3	0.77	16.9	OK
Pipe (2)	FSR: 50 years: +50 %: 15 mins: Winter	Pipe	Manhole (3)	Cellular Storage	27.000	26.719	0.100	1.021	0.4	0.09	2.9	Flood Risk
Pipe (3)	FSR: 50 years: +50 %: 15 mins: Winter	Pipe	Manhole (2)	Cellular Storage	27.000	26.748	0.100	11.791	6.3	0.43	26.3	Flood Risk

Appendix F

NEW ø100 FW PIPE TO UU SEWER

ø1200 STILLING CHAMBER TO END OF PUMPED RISING MAIN

32.0m

32.3m

BM 32.91m

Church

Track

521075N

521050N

521025N

521000N

3400

3900

3900

Retaining wall

Lower Ground FFL 29.11

Plot 1 driveway

P1

Plot 2 driveway

P2

Lower Ground FFL 29.11

P3

Plot 3 driveway

Lower Ground FFL 26.483

Plot 4 driveway

P4

P5

Plot 5 driveway

Lower Ground FFL 23.00

Retaining wall

Retaining wall

ø150

ø225

ø225

ø150

80mm PE100 PUMPED RISING MAIN

ACO V-SEPTOR (OR EQUIVALENT ALTERNATIVE)

KLARGESTER HILLMASTER PENNINE FOUL WATER PUMPING STATION (OR EQUIVALENT ALTERNATIVE)

17x2.5mx0.8m CRATED ATTENUATION TANK/SOAKAWAY

EXCEEDANCE SW ROUTE TO 'EX. CULVERT'. LOCATION TBC ON SITE

EXISTING SEPTIC TANK TO BE UPGRADED FOR ADDITIONAL STAFF ACCOMODATION CAPACITY (& TO ACCOMODATE NEW RESIDENTIAL SITE IF ALTERNATIVE FW ROUTE IS REQUIRED)

EXISTING RUN TO SEPTIC TANK

PROPOSED STAFF ACCOMM. IN Ex. BARN

EXISTING FW SYSTEM

NEW FW PIPE TO SERVE NEW STAFF ACCOMMODATION. ROUTED BACK TO Ex. FW SYSTEM WITHIN HALL SITE

PNG1 31.027

PNG2 31.788

PNG4 30.177

ALTERNATIVE FW ROUTE FOR RESIDENTIAL DEVELOPEMNT IF REQUIRED

PERMEABLE BLOCK PAVED DRIVEWAY

REV	DATE	AUTHOR	NOTES
A	21/05/26	SM	BARN ACCOMMODATION FW ROUTE ADDED

DRAWING STATUS: PRELIMINARY

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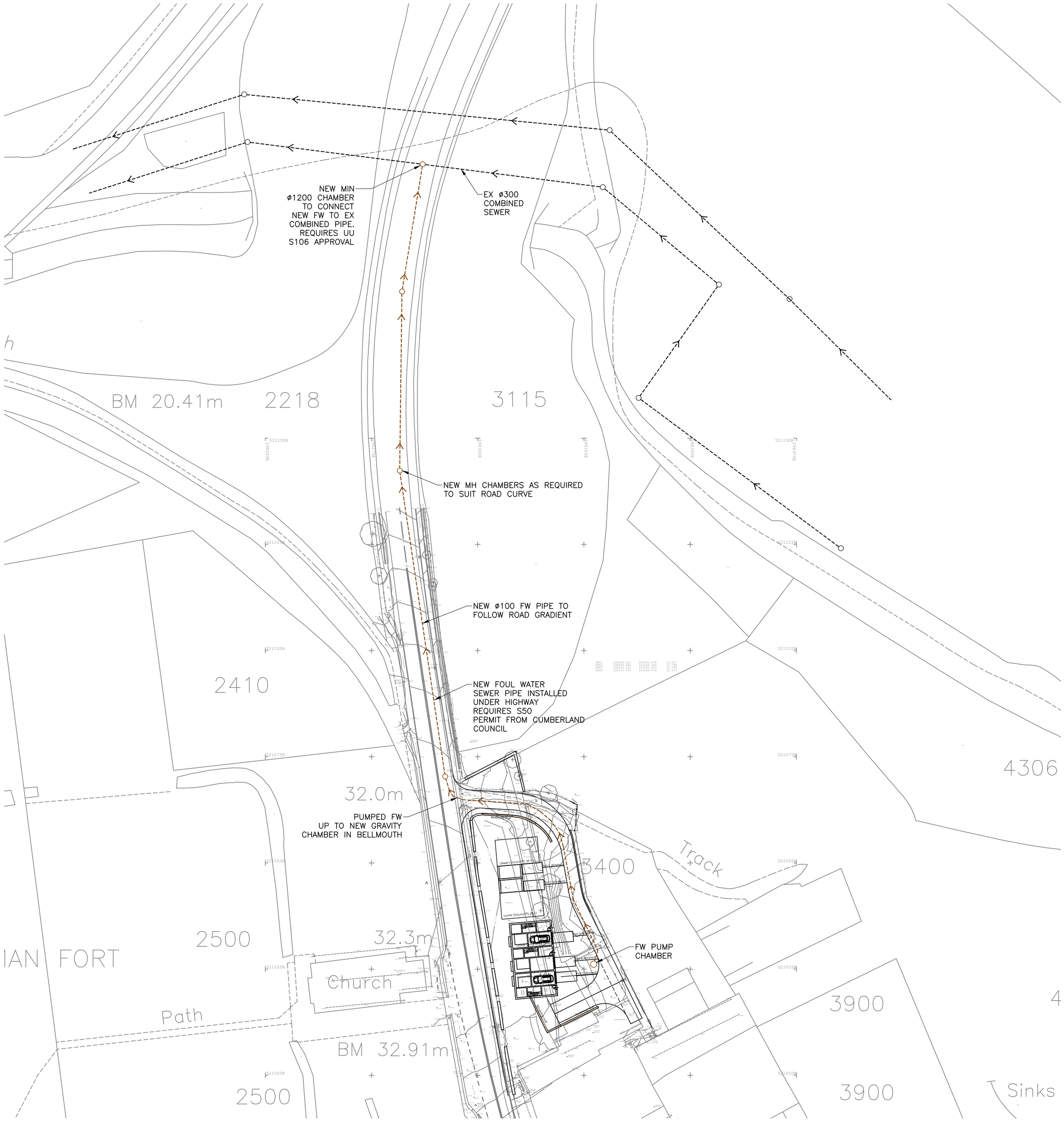
CLIENT: MORESBY HALL HOTEL LIMITED

TITLE: RESIDENTIAL DEVELOPMENT, MORESBY HALL
SITE DRAINAGE PLAN

DRAWN KIA | DATE APRIL 26 | SCALE AS SHOWN @A1

DRAWING NO. 25-C-18182/02 | A



REV	DATE	AUTHOR	NOTES
DRAWING STATUS		PRELIMINARY	

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CLIENT
MORESBY HALL HOTEL LIMITED

TITLE
RESIDENTIAL DEVELOPMENT, MORESBY HALL
OFF SITE DRAINAGE PLAN

DRAWN	DATE	SCALE
KIA	APRIL 26	1:500 @ A1

DRAWING NO. 25-C-18182/03 -